KNOWLEDGE AND ADOPTION OF CASTOR AS INTERCROP WITH GROUNDNUT IN SOUTH SAURASHTRA AGRO CLIMATIC ZONE OF GUJARAT

BY

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A THESIS SUBMITTED TO THE JUNAGADH AGRICULTURAL UNIVERSITY IN PARTIAL FULFILMENT OF REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

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IN AGRICULTURAL EXTENSION

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SEPTEMBER - 2012 Registration No: - J4-00622-2010
DEDICATED TO
MY PARENTS
FOR THEIR
DREAMS, HOPES & ENDLESS PRAYERS

VIJAYAL...
ABSTRACT
KNOWLEDGE AND ADOPTION OF CASTOR AS INTERCROP WITH GROUNDNUT IN SOUTH SAURASHTRA AGRO CLIMATIC ZONE OF GUJARAT

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ABSTRACT

Despite considerable advance in agricultural production technology as well as expansion in infrastructure for increasing productivity of various crops, the gap between know how already attained and their application in the field is still quite large. There is a wide scope for increasing the castor production per unit area. Castor is the most important non-edible oil seed crop. The castor as intercrop with which crops is popular in Saurashtra region. There are many problems experienced by the farmers in adoption of recommended crop production technologies. In this content, it is right time to examine the technological knowledge of farmers with respect to castor as intercrop with groundnut. It is equally important to know the level of adoption of this practice. This would be useful to prepare extension strategy, if there is communication gap. It would also be useful to increase the adoption level by identification and analysis of the factors responsible for it. Hence, it felt necessary to take up the study entitled “Knowledge and adoption of castor as intercrop with groundnut in South Saurashtra Agro Climatic Zone of Gujarat” was undertaken with following specific objectives.
1. To study the personal, socio-economic, communication, psychological and situational characteristics of the respondents.

2. To measure the knowledge level of respondents about recommended crop production technology of castor as intercrop with groundnut.

3. To know the extent of adoption of respondents about recommended crop production technology of castor as intercrop with groundnut.

4. To ascertain the relationship between knowledge level of respondents about recommended crop production technology of castor as intercrop with groundnut and their selected characteristics.

5. To ascertain the relationship between adoption of respondents about recommended crop production technology of castor as intercrop with groundnut and their selected characteristics.

6. To identify the constraints faced by respondents in adoption of recommended crop production technology of castor as intercrop with groundnut.

7. To seek the suggestions from the respondents to overcome the constraints in adoption of recommended crop production technology of castor as intercrop with groundnut.

In context to above objectives, a sample of 120 respondents representing 24 villages of Keshod, Vanthali, Manavadar, Dhoraji, Jetpur and Upleta Talukas of South Saurashtra was drawn by using multistage purposive sampling techniques. To measure respondents’ level of knowledge about recommended crop production technology of castor as intercrop with
groundnut, a teacher made knowledge index was developed and used. To measure respondents’ extent of adoption of recommended crop production technology of castor as intercrop with groundnut, the teacher made adoption index was developed and used. The scale developed by Chattopadhyay (1974) was used with slight modification. The data were collected with the help of structured schedule by personal interview method. The data were collected, analyzed and interpreted in the light of specific objectives.

**Major findings**

Majority (68.33 per cent) of respondents belonged to medium extension participation, medium risk orientation (67.50 per cent), medium size of land holding (65.83 per cent), medium annual income (61.67 per cent) and medium cropping intensity (60.83 per cent).

More than one half (56.66 per cent) of respondents belonged to medium mass media exposure, medium localite-cosmopolite value orientation (56.66 per cent), primary level of education (55.00 per cent), medium social participation (52.50 per cent) and middle age group (50.83 per cent).

As less than one half (49.17 per cent) of respondents belonged to medium innovativeness and bore well irrigation potentiality (39.17 per cent).

Majority (65.00 per cent) of the respondents had medium level of knowledge about the recommended crop production technology of castor as intercrop with groundnut. Whereas, 20.00 per cent and 15.00 per cent respondents had low and high levels knowledge about recommended crop production technology of castor as intercrop with groundnut, respectively.
Majority (60.00 per cent) of the respondents had medium adoption about the recommended crop production technology of castor as intercrop with groundnut. Whereas, 21.67 per cent had low and 18.33 per cent had high extent of adoption of recommended crop production technology of castor as intercrop with groundnut, respectively.

The characteristics of the respondents like education, extension participation, innovativeness, risk orientation and cropping intensity had positive and highly significant relationship with the knowledge of farmers about recommended crop production technology of castor as intercrop with groundnut.

The characteristics of the respondents like size of land holding, social participation, localite-cosmopolite value orientation, mass media exposure and irrigation potentiality were positively and significantly related with the knowledge of farmers about recommended crop production technology of castor as intercrop with groundnut.

There was no significant relationship with the knowledge about recommended crop production technology of castor as intercrop with groundnut and their annual income. Age was negatively and significantly related with the knowledge of farmers about recommended crop production technology of castor as intercrop with groundnut.

The characteristics of the respondents like education, extension participation, innovativeness and cropping intensity had positive and highly significant relationship with the adoption of recommended crop production technology of castor as intercrop with groundnut.
The characteristics of the respondents like social participation, localite-cosmopolite value orientation, mass media exposure and risk orientation had positive and significant relationship with the adoption of recommended crop production technology of castor as intercrop with groundnut.

There was no significant relationship with the adoption of recommended crop production technology of castor as intercrop with groundnut and their annual income, size of land holding and irrigation potentiality. Age was negatively and significantly related with the adoption of recommended crop production technology of castor as intercrop with groundnut.

The important constraints faced by respondents were: high price of chemical fertilizers, less supply of electricity, high price of improved and hybrid seeds, high cost of threshing and harvesting as well as high cost and lack of skilled labours, scarcity of FYM/compost fertilizers, non-availability of chemical fertilizers in required quantity in time, high price of insecticides/pesticides and fungicides, non-availability of irrigation water at important growth stages of castor and insufficient demonstration of improved technologies on farmers' fields etc.

However, the suggestions given by the respondents to overcome the constraints in adoption of recommended castor production technology the five most important suggestions expressed by respondents were: remunerative price of the product should be made available, the projects for increasing availability of irrigation water should be implemented, chemical fertilizers should be made available at subsidized rate, there must be regular electric supply at the time of critical stages of crops for irrigation and cost of threshing and harvesting should be reduced by innovation of improved machinery.
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CERTIFICATE

This is to certify that the thesis entitled “KNOWLEDGE AND ADOPTION OF CASTOR AS INTERCROP WITH GROUNDNUT IN SOUTH Saurashtra AGRO CLIMATIC ZONE OF GUJARAT” submitted by Mr. HUMBAL UJJVAL NAGDANBHAI in partial fulfillment of the requirements for the award of the degree of MASTER OF SCIENCE (AGRICULTURE) in AGRICULTURAL EXTENSION of 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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Date: 20/11/2012  

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This is to certify that Mr. HUMBAL UJJAVAL NAGDANBHAI student of M.Sc. (Agri.) in the subject of AGRICULTURAL EXTENSION has made all corrections/ modification in the thesis entitled “KNOWLEDGE AND ADOPTION OF CASTOR AS INTERCROP WITH GROUNDNUT IN SOUTH SAURASHTRA AGRO CLIMATIC ZONE OF GUJARAT” as suggested by the external examiner and the advisory committee in the oral examination held on 20/11/2012. The final copies of the thesis duly bound and corrected have been submitted on 26/11/2012.

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INTRODUCTION
Twentieth century witnessed an outstanding and unprecedented scientific and technological development in all fields, ranging from agriculture to industry and further to information technology. This progress has virtually transformed human life in terms of prosperity and higher standard of living for a section of the population of the world. In the developing countries of the Asia-Pacific region, increased agricultural productivity, rapid industrial growth and expansion of non formal rural economy have resulted in near tripling of per capita Gross Domestic Product (GDP) and in decrease of poverty incidence by half during the post green revolution area. Despite continuous growth in the economy and considerable food availability, the aggregate food security situation in the developing world has not shown much progress. Moreover, agricultural intensification has often been associated with land, water and environmental degradation. With dwindling natural resource base and increasing environmental concerns, balancing food and environmental security assumes greater importance for sustainable livelihood for the posterity.

Inspite of very substantial gains in agriculture production over the past few decades, the task of meeting the food grains, feed and fodder needs of increasing human and livestock population remains a formidable challenge before scientific community. It is estimated that India’s population will touch nearly 1350 millions by 2020 A.D. The food requirement of the country by 2020 A.D. is expected to be 300 million tones (Anonymous, 2005). This additional production has to come from
existing land and water resources. In the present situation, increasing agricultural production through extensive agriculture has limited scope due to limited availability of cultivable area. An area of 143.8 million ha out of 329 million of geographical area is at present under cultivation and further expansion of cultivable area is extremely difficult. Under these circumstances, to meet the requirement of food grains for ever increasing population, the only option open is through time and space utilization in agriculture (Sankaran and Rangaswamy, 1990).

The availability of land for agriculture is shrinking every day as it is increasingly utilized for non-agricultural purposes. Under this situation, one of the important strategies to increase agricultural output is the development of new high intensity cropping systems including intercropping systems. Intercropping system which involves rising of more than one crop on the same piece of land, which more or less simultaneously increases the cropping intensity both in space and time dimensions.

Intercropping is an age old practice in India, especially under rainfed conditions, which aims to increase total productivity per unit area and to equitably and judiciously utilize land resources and farming inputs including labour. The intercropping system besides meeting the varied requirements of a farmer harnesses the farm resources efficiently. Development of feasible and economically viable intercropping systems largely depends on adoption of proper planting geometry, planting time and selection of compatible crops. Thus, the objective of intercropping is now more towards augmenting the total productivity per unit area of the land per unit time by growing more than one crop in the same field, with prime objective being better utilization of environmental resources (Rajat De and
Singh, 1979). The intercropping is mainly practiced to cover the risk of total failure of one of the component crops due to vagaries of weather or pest and disease incidence. The yield advantages in intercropping systems are associated with full use of environmental resources over time (Willey et al., 1986). The benefit of intercropping system against mono cropping is reduction of one component may be compensated by other components. In the tropics at low level of production, it has become abundantly clear that adoption of sole cropping practices for many food crops provides less dependable returns (Webster and Wilson, 1996). Also for increasing the production, intercropping system may be considered to satisfy the farmers' security motives.

Oil seed crops have a specific place in Indian agriculture, industry and foreign exchange. India has made a spectacular progress in crop production during last three decades. However, the production of oilseeds is yet to make an indelible impression. Groundnut occupies a predominant position among the entire oilseed crops of Saurashtra region of Gujarat state. Since last few years, it has been observed that groundnut under dry land conditions does not give sustainable yield due to irregular, uneven and erratic nature of monsoon. Under such circumstances castor (Ricinus communis L.) has proved to be highly adaptable crop due to its drought tolerance. It is mainly growing under rainfed conditions on marginal lands with poor management practices.

Castor (Ricinus communis L.) is a non-edible oilseed, belonging to the Euphorbiaceae family. India is the world leader in castor production and dominates the international castor oil trade. The Indian variety of castor has oil content of 48%. Out of
48% about 42% of oil is being extracted and the cake retains the rest. The castor seed products have widespread application in many industries like paint, lubricant, pharmaceutical, textiles, soaps, varnishes, resins, plastics, nylon, dyeing, phenyl, refined oil, perfumed hair oils. Castor cake provides an excellent organic manure with 4.5 per cent nitrogen, 2.6 per cent phosphorus and 1.0 per cent potash. Castor leaves are sometimes used as green fodder for animals and rearing eri-silk worm in eri-silk producing areas. Castor stalks are useful in manufacturing paper, cardboard and also widely used as a fuel. Its hulls are used as manure after decomposition.

Castor is one of the most important cash crops in the world and is cultivated on a commercial basis in about 30 different countries including Brazil, India, China, Russia, Philippines and Thailand. India contributes 25% of castor production of the world and ranks second being next only to Brazil. The annual production of 10.03 lakh tones from an area of 7.52 lakh ha and productivity of 1334 kg ha\(^{-1}\) (Anonymous, 2010\(^{a}\)). The major castor production states in India are Gujarat, Andhra Pradesh, Karnataka and Orissa. It is also grown in Tamilnadu, Bihar, Maharashtra and Rajasthan. Gujarat ranks first in India with respect to area, production and productivity, Which as 4.22 lakh hectares, 4.31 lakh tones and 1972 kg ha\(^{-1}\), respectively (Anonymous, 2010\(^{b}\)). Scattered cultivation of castor is found in almost all districts of Gujarat. It is grown mostly as pure crop and in some states as intercrop. Castor crop can be intercropped with a large number of crops such as groundnut, jowar, bajra, redgram, fingermillet, maize, greengram and in some cases with commercial crops like chilli, turmeric etc.
South Saurashtra Zone of Gujarat is characterized by low and erratic rainfall habit, so the crop production potential is also low. This instability in crop production is further amplified by high evaporation condition, low soil water holding capacity and unavailability of irrigation water. Studies by the Indian meteorology department revealed that rainfall pattern at and around Junagadh permit successful raising of 14-16 weeks long duration crop in 50-60 per cent of the years. Under such conditions castor as intercrop with groundnut cropping system is the best suited to this region.

1.1 STATEMENT OF THE PROBLEM

Intercropping system is a common practice in the low level equilibrium farmers to insulate their investments against adversities of nature. Encouraging results have popularized this system among all oilseed crops, the castor is the most thrived age crop of Gujarat state.

The South Saurashtra Zone of Gujarat is characterized by the drought prone area where the monsoon is irregular, uneven and erratic in nature. The sole crops are not always secure so far as the production is concentrated. The small quantity of water received during monsoon is not enough for wheat, onion and other crops. The castor can be taken up by this quantity of water hence, it has become popular in Saurashtra. The other factors are additional income without reduction in yield of groundnut. In this content, it is right time to examine the technological knowledge of farmers with respect to castor as intercrop with groundnut. It is equally important to know the level of adoption of this practice. This would be useful to prepare extension strategy if there is communication gap. It would also be useful to
increase the adoption level by identification and analysis of the factors responsible for it. Hence, it felt necessary to take up the study entitled “Knowledge and adoption of castor as intercrop with groundnut in South Saurashtra Agro Climatic Zone of Gujarat.”

1.2 OBJECTIVE OF THE STUDY

The general objective of the study is to determine the knowledge and adoption of the castor as intercrop with groundnut growers with respect to castor as intercrop with groundnut production technology. However, the specific objectives are:

1. To study the personal, socio-economic, communication, psychological and situational characteristics of the respondents.

2. To measure the knowledge level of respondents about recommended crop production technology of castor as intercrop with groundnut.

3. To know the extent of adoption of respondents about recommended crop production technology of castor as intercrop with groundnut.

4. To ascertain the relationship between knowledge level of respondents about recommended crop production technology of castor as intercrop with groundnut and their selected characteristics.

5. To ascertain the relationship between adoption about recommended crop production technology of castor as intercrop with groundnut and their selected characteristics.
6. To identify the constraints faced by respondents in adoption of recommended crop production technology of castor as intercrop with groundnut.

7. To seek suggestions from the respondents to overcome the constraints in adoption of recommended crop production technology of castor as intercrop with groundnut.

1.3 SIGNIFICANCE OF THE STUDY

The population of the world is increasing by leaps and bound. It is expected that about 7 billion people are living on this earth by the year 2012. This rate of population will cause imbalance between demand and supply of agricultural products viz., food, fibre and oil etc. The situation in the semi-arid tropics which includes a majority of the third world countries which account for about 2/3 of the world’s population is far worse because of complexities of reason, mainly low and erratic rainfall leading droughts in single cropping system, paucity of permanent water reservoirs to develop irrigation facilities, lack of suitable technology for land and water management and crop production, small and fragment holdings and farmers’ poor economic conditions. The possibilities of further increasing the area under cultivation are blocked especially in semi-arid tropics of India.

Thus, intercropping is one of the ways to increase the production per unit of land, water and capital. This can be achieved by adoption of castor as intercrop with groundnut in this area. It is also expected that the findings will be helpful to extension workers, planners and policy makers in formulation of
the strategy for raising the agricultural production and income from per unit area of land.

1.4 ASSUMPTIONS OF THE STUDY

The study was based on the following assumptions:
1. All the respondents had an equal chance to contact the extension agencies working in the area and to derive the benefits of their services.
2. The recommended improved farm practices of the castor as intercrop with groundnut cultivation were technically sound, economically feasible, educationally attainable, culturally compatible and practically applicable to the farmers taking castor as intercrop with groundnut.

1.5 LIMITATIONS OF THE STUDY

Due to limited time and resources available the study has following limitations.
1. The study was restricted to a selected area of the South Saurashtra Agro Climatic Zone of Gujarat State only.
2. The study was based on individual’s perception and expressed opinion of the respondents.
3. Only 120 farmers were selected for the study those who have cultivation of castor as intercrop with groundnut.
4. Some selected characteristics of farmers taking castor as intercrop with groundnut were studied.
CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to present some of the recent studies which are related to the present investigation. They are very few studies so far conducted and reported on this aspect, however attempts have been made to collect relevant research findings and present them in the light of the objectives under study.

2.1 Perceptions of farmers, environmental, psychological and socio-economic attributes of respondents.

2.2 Extent of adoption of recommended crop production technologies.

2.3 Constraints faced by respondents in adoption of improved crop production technologies.

2.4 Suggestions from the respondents to overcome the constraints in adoption of improved crop production technologies.
CHAPTER II

REVIEW OF LITERATURE

The main purpose of this chapter is to present some of the recent research studies which are related to the present investigation. There are very few studies so far conducted and reported in India on this aspect, however attempts has been made to collect related research findings and are presented in the light of the objectives under the following heads.

2.1 Personal, socio-economic, communication, psychological and situational characteristics of the respondents.

2.2 Knowledge level of respondents about recommended crop production technology.

2.3 Extent of adoption of respondents about recommended crop production technology.

2.4 Relationship between knowledge level of respondents about recommended crop production technology and their selected characteristics.

2.5 Relationship between adoption of respondents about recommended crop production technology and their selected characteristics.

2.6 Constraints faced by respondents in adoption of improved crop production technology.

2.7 Suggestions from the respondents to overcome the constraints in adoption of improved crop production technology.
2.1 SELECTED CHARACTERISTICS OF THE RESPONDENTS

2.1.1 PERSONAL CHARACTERISTICS

2.1.1.1 Age

Javia (2004) reported that nearly three-fifth (61.00 per cent) of the groundnut growers belonged to middle age group, whereas, 26.00 per cent and 13.00 per cent of the groundnut growers belonged to young and old age group, respectively.

Sharma et al. (2005) revealed that majority (76.56 per cent) of the respondents were in middle age group followed by young age group 13.15 per cent and old age group 10.29 per cent.

Tavethiya (2006) revealed that 49.00 per cent of cumin growers were in middle age group whereas, 19.00 per cent and 32.00 per cent of the respondents were in old and young age group, respectively.

Jadeja (2008) reported that less than half (45.00 per cent) of the neem owners belonged to middle age group followed by 31.00 per cent and 24.00 per cent in old and young age group, respectively.

Kumbhani (2009) reported that nearly half (45.63 per cent) of the coriander growers belonged to middle age group whereas, 20 per cent and 34.37 per cent of the respondents were in old and young age group, respectively.

2.1.1.2 Education

Verma (2000) stated that nearly half (44.44 per cent) of the respondents were educated up to primary level, while 24.22 per cent and 23.05 per cent respondents belonged to illiterate and secondary education level group, respectively. Only 8.59 per cent of the respondents had higher education.

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

Javia (2004) reported that 59.00 per cent groundnut growers had the primary education, 18.00 per cent had the secondary level of education, while 16.00 per cent and 07.00 per cent respondents belonged to illiterate and higher education level group, respectively.

Chavada (2005) indicated that 42.00 per cent Bt. cotton growers had the primary education, 30.67 per cent had the secondary education, while 14.67 per cent had the higher secondary education level and 8.66 per cent had illiterate and 4.00 per cent college level of education.

Tavethiya (2006) indicated that 60.00 per cent of the respondents were either illiterate or educated up to primary level (up to 7th standard). Two fifth of (40.00 per cent) respondents were educated up to secondary and above higher secondary level.

Jadeja (2008) summarized that near about two-third (64.00 per cent) of the neem owners educated up to primary level. Whereas, 10.00 per cent of the respondents were educated up to secondary level, one-fifth (20.00 per cent) were illiterate and only 6.00 per cent of the respondents were educated above higher secondary level.

2.1.2 SOCIO-ECONOMIC CHARACTERISTICS

2.1.2.1 Size of land holding

Chhodavadia (2001) observed that about half (48.08 per cent) of the demonstrating farmers and non-demonstrating farmers (51.92 per cent) belonged to small size of land holding followed by medium and large size of land holding.
Sahoo (2004) found that 8.33 per cent of the respondents had annual income up to Rs. 20,000, 8.33 per cent had an income of Rs. 20,000 to 30,000 and 83.34 per cent had an annual income of more than Rs. 30,000.

Chavada (2005) reported that that half (50.00 per cent) of the respondents had medium annual income Rs. 15,000 to 25,000 while, 26.67 and 23.33 per cent of them had low and high annual income, respectively.

Kamani (2007) revealed that 61.43 per cent of the organic farmers had medium annual income, followed by 25.00 per cent and 13.57 per cent with high and low income, respectively.

Kumbhhani (2009) indicated that three-fifth (60.00 per cent) of the respondents had medium income about Rs 40,000 to 80,000. About 16.88 pre cent of the respondents were from high income group. Whereas, 23.12 per cent of the respondents had income of below Rs 40,000, respectively.

2.1.2.3 Social participation

Chhodavadia (2001) indicated that 73.08 per cent of demonstrating farmers had medium social participation, and 19.23 per cent had high and 7.69 per cent had low social participation, while in case of non-demonstrators farmers majority (67.31 per cent) of respondents were found in medium social participation group, while 19.23 per cent had low and 13.46 per cent had high social participation.

Javia (2004) revealed that majority (68.00 per cent) of the respondents had medium social participation followed by low (19.00 per cent) and high (13.00 per cent) social participation.

Chavada (2005) reported majority 61.11 per cent of the respondents had medium social participation followed by low (16.67 per cent) and high (22.22 per cent) social participation.
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Chavada (2005) reported that that half (50.00 per cent) of the respondents had medium annual income Rs. 15,000 to 25,000 while, 26.67 and 23.33 per cent of them had low and high annual income, respectively.

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Chchodavadia (2001) indicated that 73.08 per cent of demonstrating farmers had medium social participation, and 19.23 per cent had high and 7.69 per cent had low social participation, while in case of non-demonstrators farmers majority (67.31 per cent) of respondents were found in medium social participation group, while 19.23 per cent had low and 13.46 per cent had high social participation.

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Chavada (2005) reported majority 61.11 per cent of the respondents had medium social participation followed by low (16.67 per cent) and high (22.22 per cent) social participation.
Makwana (2007) revealed that majority of (66.67 per cent) the Gir malharis had low social participation followed by medium (20.83 per cent) and high (12.50 per cent) social participation.

Jadeja (2008) reported that 60.00 per cent of the respondents had medium social participation, followed by low (18.00 per cent) and high (16.00 per cent) social participation.

Dalsaniya (2010) concluded that 53.33 per cent of the sesame growers had medium level of social participation, followed by high (11.67 per cent) and low (11.67 per cent), social participation.

2.1.3 COMMUNICATION CHARACTERISTICS

2.1.3.1 Localite-cosmopolite value orientation

Gajera (1991) found that 66.67 per cent of the milk animal owners were from medium level of cosmopoliteness, whereas 13.33 and 20.00 per cent of them had low and high cosmopoliteness value, respectively.

Kanani (1998) revealed that more than half of (54.17 per cent) of the groundnut growers were found to have medium cosmopoliteness, whereas 26.66 and 19.17 per cent of them had high and low cosmopoliteness, respectively.

Thakrar (1998) revealed that 64.06 per cent of the farmers, who had recharged their wells had medium level of localite-cosmopolite value orientation, followed by high (23.50 per cent) and low (12.50 per cent) level of localite-cosmopolite value orientation.

Kamani (2007) observed that majority of (77.85 per cent) the organic farmers were found to have medium level localite-cosmopolite value orientation, whereas 13.57 and 8.58 per cent
of them had low and high localite-cosmopolite value orientation, respectively.

Makwana (2007) observed that about two-third of (65.00 per cent) the Gir maldharis were found to have low level localite-cosmopolite value orientation, whereas 25.00 and 10.00 per cent of them had medium and high localite-cosmopolite value orientation.

Satasiya (2008) indicated that majority of 54.54 per cent demonstrator farmers were found to have medium level localite-cosmopolite value orientation, whereas 27.27 per cent and 18.18 per cent of them had low and high localite-cosmopolite value orientation, respectively. In case of non-demonstrator farmers, 47.27 per cent had medium level localite-cosmopolite value orientation whereas 30.90 per cent and 21.81 per cent had low and high localite-cosmopolite value orientation, respectively.

2.1.3.2 Extension participation

Verma (2000) revealed that about three-fourth (73.83 per cent) of the groundnut growers had medium extension participation whereas, 15.63 and 10.54 per cent of the respondents had low and high extension participation, respectively.

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

Chavada (2005) reported that 61.11 per cent of the respondents had medium extension participation, whereas 25.56 and 13.33 per cent of the respondents had low and high extension participation, respectively.
Kamani (2007) revealed that 74.28 per cent of organic farmers had medium level of extension participation followed by 15.72 and 10.00 per cent of them had high and low level of extension participation, respectively.

Makwana (2007) reported that more than one half (53.33 per cent) of the Gir maldharis were from medium extension participation group.

Jadeja (2008) revealed that 58.00 per cent of the neem owners had medium extension participation, whereas 23.00 per cent and 19.00 per cent of them had high and low extension participation, respectively.

Kumbhani (2009) indicated that 54.37 per cent of the coriander growers had medium extension participation, whereas 23.76 and 21.87 per cent of them high and low extension participation, respectively.

### 2.1.3.3 Mass media exposure

Chauhan et al. (2003) reported that 58.75 per cent of the respondents had medium level of mass media exposure followed by low (23.75 per cent) and high (17.50 per cent) level of mass media exposure.

Jadav (2005) stated that 60.50 per cent of the mango orchard growers had medium level of mass media exposure whereas, 24.00 and 15.50 per cent of them had low and high level of mass media exposure, respectively.

Tavethiya (2006) found that 60.00 per cent of the cumin growers had medium mass media exposure, whereas 20.00 per cent of the respondents had low and 20.00 per cent of the respondents had high mass media exposure.

Bharad (2007) found that 53.50 per cent of the mango growers had medium level of mass media exposure whereas,
43.50 and 3.00 per cent of them had high and low level of mass media exposure, respectively.

Dalsaniya (2010) concluded that 56.67 per cent of the respondents had medium level of mass media exposure, whereas 25.00 and 18.33 per cent of them had high and low level of mass media exposure, respectively.

2.1.4 PSYCHOLOGICAL CHARACTERISTICS

2.1.4.1 Innovativeness

Javia (2004) stated that majority (62.00 per cent) of groundnut growers had medium level of innovativeness followed by low (21.00 per cent) and high (17.00 per cent) level of innovativeness.

Chavada (2005) revealed that 84.66 per cent of Bt. cotton growers had medium level of innovativeness, followed by 8.67 and 6.67 per cent of respondents belonged to high and low categories, respectively.

Tavethiya (2006) revealed that about 41.00 per cent of the cumin grower were found to have high innovativeness whereas, 37.00 and 22.00 per cent of them medium and low innovativeness, respectively.

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

Kamani (2007) found that about 45.71 per cent of the organic farmers were found to have high innovativeness whereas, 35.72 and 18.57 per cent of them medium and low innovativeness, respectively.
Jadeja (2008) found that about 42.00 per cent of the neem owners were found to have high innovativeness whereas, 40.00 and 18.00 per cent of them have medium and low level of innovativeness, respectively.

Satasiya (2008) indicated that the 43.63 per cent demonstrator farmers had medium innovativeness, and 32.72 per cent had high and 23.63 per cent had low innovativeness, while 36.36 per cent non-demonstrators found in medium innovativeness, while 29.09 per cent had low and 34.54 per cent had high innovativeness.

2.1.4.2 Risk orientation

Jadav (2001) indicated that majority (72.50 per cent) of the onion growers were from the medium risk orientation group; followed by 16.67 and 10.83 per cent respondents were from low and high risk orientation group, respectively.

Sahoo (2004) found that 62.50 per cent of the respondents were from medium risk orientation group, whereas 30.84 and 6.66 per cent of the respondents belonged to low and high risk orientation, respectively.

Patel (2005) observed that slightly more than two-third (67.78 per cent) of the organic farmers had medium level of risk orientation, while 24.44 and 7.78 per cent of them had high and low level of orientation, respectively.

Chavada (2005) indicated that majority (80.56 per cent) of the respondents were from medium risk orientation group, whereas 12.22 and 7.22 per cent of respondents belonged to low and high level of risk orientation, group respectively.

Tavethiya (2006) clearly indicated that 56.00 per cent respondents were belonged to medium risk orientation group,
followed by 28.00 and 16.00 per cent respondents belonged to high and low risk orientation, respectively.

Kamani (2007) reported that slightly more than two-third (67.15 per cent) of organic farmers had medium level of risk orientation, while 24.48 and 8.57 per cent of them had high and low level of risk orientation, respectively.

Dalsaniya (2010) indicated that 71.67 per cent respondents belonged to medium risk orientation group, followed by 17.50 percent (low) and 10.83 per cent (high) risk orientation.

2.1.5 SITUATIONAL CHARACTERISTICS

2.1.5.1 Irrigation potentiality

Verma (2000) stated that majority of the groundnut growers (64.06 per cent) had medium irrigation facility followed by low irrigation facility 25.78 per cent. Only 10.16 per cent of the respondents had high irrigation facility.

Jadav (2001) revealed that 17.50 per cent of onion growers had low irrigation potentiality whereas, 59.17 and 23.33 per cent of the respondents were having medium and high irrigation potentiality, respectively.

Tavethiya (2006) observed that 38.00 per cent of the respondents possessed up to 25.00 per cent irrigation facility and 30.00 per cent possessed 26.00 to 50.00 per cent irrigation facilities while only 20.00 and 12.00 of respondents possessed 51.00 to 75.00 per cent and 76.00 to 100.00 per cent irrigation facilities, respectively.

Bharad (2007) revealed that 64.00 per cent of the mango growers had a medium level of irrigation facility. While, 31.50 per cent and 4.50 per cent were in the category of less and more irrigation facilities, respectively.
followed by 28.00 and 16.00 per cent respondents belonged to high and low risk orientation, respectively.

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Dalsaniya (2010) reported that 43.33 per cent growers having bore well as source of water for irrigation facility. Whereas, 21.67 per cent sesame growers were found using well and canal for irrigating their crops. Only 16.67 per cent sesame growers had canal to irrigate their crops. Remaining 10.00 and 08.33 per cent sesame growers had well and check dam as source of water for irrigation, respectively.

2.1.5.2 Cropping intensity

Verma (2000) found that more than half (55.09 per cent) of the respondents were in the category of medium cropping intensity, while 25.38 and 19.53 per cent of the respondents were in the categories of high and low cropping intensity groups, respectively.

Jadav (2001) revealed that more than half of the onion growers (57.50 per cent) had medium onion cropping intensity whereas, 22.50 and 20.00 per cent respondents had high and low onion cropping intensity, respectively.

Bharad (2007) indicated that 60.00 per cent of the mango growers had medium cropping intensity, whereas 6.00 per cent and 34.00 per cent had low and high level of cropping intensity, respectively.

Kamani (2007) found that majority of the organic farmers (61.43 per cent) had medium level of cropping intensity, followed by 25.00 per cent organic farmers had low cropping intensity. and (13.57 per cent) organic farmers had high level of cropping intensity.

Satasiya (2008) indicated that 63.63 per cent of demonstrator farmers had medium cropping intensity, and 16.36 per cent had high and 20.00 per cent, of them had low cropping intensity, while 58.18 per cent non-demonstrators
farmers were found in medium cropping intensity, while 9.09 per cent of them had low and 32.72 per cent had high cropping intensity, respectively.

Kumbhani (2009) revealed that 65.62 per cent respondents had medium cropping intensity followed by 15.63 and 18.75 per cent respondents with high and low cropping intensity, respectively.

2.2 KNOWLEDGE LEVEL OF RESPONDENTS ABOUT RECOMMENDED CROP PRODUCTION TECHNOLOGY

Verma (2000) found that majority of the respondents (69.92 per cent) had medium knowledge of groundnut production technology, whereas 16.41 and 13.67 percent respondents had low and high level of knowledge, respectively, regarding groundnut production technology.

Sagwal and Malik (2001) reported that 55.00 per cent of the respondents had high level of knowledge about essential production practices and 45.00 per cent had medium level of knowledge regarding essential production practice of rice.

Chaudhury et al. (2001) revealed that 51.67 per cent of the farmers possessed high level of knowledge about maize production technology whereas, 48.33 per cent of the respondents had low level of knowledge.

Barad (2004) concluded that 65.00 per cent of garlic growers were in medium knowledge, group whereas, 15.00 per cent and 20.00 per cent of them were in low and high knowledge group respectively.

Javia (2004) stated that majority of groundnut farmers (64.00 per cent) had medium level of knowledge followed by
21.00 and 15.00 per cent with low and high knowledge about recommended groundnut production technology, respectively.

Sahoo (2004) found that majority (73.33 per cent) of the groundnut growers had medium knowledge about eco-friendly practices, followed by 18.34 and 8.33 per cent with high and low level of knowledge, respectively.

Chavada (2005) concluded that 81.33 per cent of Bt. cotton growers had medium level of knowledge, followed by 10.67 per cent has high and 8.00 per cent had low level of knowledge about distinctive features of Bt. cotton growers.

Patel (2005) stated that majority of groundnut growers (71.00 per cent) had medium level of knowledge, followed by 19.00 and 10.00 per cent with high and low levels of knowledge about organic farming practices, respectively.

Tavethiya (2006) revealed 60.00 per cent of the cumin growers were in medium level knowledge group whereas; equal number of cumin growers i.e. 20.00 per cent were in each had high and low level knowledge group about recommended cumin production technology.

Bharad (2007) revealed that the majority of the (72.00 per cent) respondents had average level of knowledge regarding improved mango production technology, followed by the best 21.00 per cent and poor 7.00 per cent level, respectively.

Jadeja (2008) revealed that 73.00 per cent of the respondents had medium level of knowledge whereas, 13.00 per cent had low and 14.00 per cent had high level of knowledge about indigenous scientific practices.

Satasiya (2008) revealed that 67.27 per cent of the demonstrator farmers had medium level of knowledge whereas, 9.09 per cent had low and 23.63 per cent had high level of
knowledge about castor production technology, while in case of non-demonstrator farmers 60.00 per cent had medium level of knowledge while, 23.63 and 11.10 per cent had low level and high level of knowledge, respectively.

Kumbhani (2009) indicated that 65.62 per cent of the coriander growers were having medium level knowledge of coriander production technology followed by 17.51 per cent and 16.87 per cent of respondents in high and low knowledge group, respectively.

2.3 EXTENT OF ADOPTION OF RESPONDENTS ABOUT RECOMMENDED CROP PRODUCTION TECHNOLOGY

Mundwa and Patel (2000) observed that nearly two-third (63.33 per cent) had medium level of adoption of the respondents of the wheat production technology. The remaining 16.67 per cent and 20.00 per cent of respondents had high and low level of adoption, respectively.

Patel et al. (2000) revealed that the 77.50 per cent of the sugarcane growers had medium level of adoption of dry farming technology of sugarcane. There were 12.50 and 10.00 per cent of the sugarcane growers had low and high level of adoption, respectively.

Vekaria et al. (2000) revealed that majority (69.05 per cent) of groundnut growers were under the category of medium adopters while, 15.71 and 15.24 per cent of the respondents were found under low and high adopter categories, respectively.

Prajapati et al. (2002) opined that majority of the chilli growers (70.00 per cent) had moderately adopted the recommended chilli cultivation technology. There were 20.83 and
9.17 per cent of the farmers having low and high level of adoption, respectively.

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.

Barad (2004) concluded that 63.33 per cent of the garlic growers were medium adopters whereas, 20.00 per cent and 16.17 per cent of respondents were high and low adoption group, respectively.

Javia (2004) revealed that majority of respondents (61.00 per cent) were in medium level of adoption category, followed by 20.00 and 19.00 per cent in high and low adoption categories, respectively.

Sahoo (2004) concluded that majority of respondents (71.66 per cent) belonged to medium adoption category followed by 15.84 and 12.50 per cent from high and low adoption categories, respectively.

Tavethiya (2006) indicated that 58.00 per cent of the cumin growers had medium level of adoption of improved cumin production technology followed by 22.00 and 20.00 per cent of respondents were in high and low adoption group, respectively.

Bharad (2007) indicated that majority of the respondents (66.50 per cent) were in medium level of extent of adoption followed by high 20.50 and low 13.00 per cent extent of adoption of recommended mango production technology.

Satasiya (2008) revealed that 69.10 per cent of the demonstrator farmers had medium level of adoption. Followed by 20.00 per cent and 10.90 per cent of them had high and low extent of adoption, respectively. In case of non-demonstrator
farmers, 65.45 per cent found in medium level of adoption, where as 21.81 per cent and 12.74 per cent had low and high level of adoption of castor production technology, respectively.

2.4 RELATIONSHIP BETWEEN KNOWLEDGE LEVEL OF RESPONDENTS ABOUT RECOMMENDED CROP PRODUCTION TECHNOLOGY AND THEIR SELECTED CHARACTERISTICS

2.4.1 Age and knowledge

Nurzaman et al. (2001) found that there was a negative but significant relationship between age and knowledge of farmers about integrated pest management.

Barad (2002) revealed that there was positive and significant association between age of the cattle owners and their extent of knowledge about traditional veterinary practices.

Jadav et al. (2003) observed that there was negative but significant association between onion growers’ knowledge of recommended onion production technology and their age.

Chavada (2005) observed that there was non-significant association between extent of knowledge of farmers and their age.

Dalsaniya (2010) concluded that there was negative and significant association between extent of knowledge of farmers and their age.

2.4.2 Education and knowledge

Barad (2002) observed that there was negative and significant association between education of the cattle owners and their extent of knowledge of traditional veterinary practices.
Temkar and Chauhan (2002) revealed that extent of knowledge regarding artificial insemination was significantly correlated with the education of the respondents.

Sahoo (2004) inferred that there was positive and significant association between extent of knowledge of groundnut growers and their educational level.

Tavethiya (2006) concluded that there was positive and significant association between extent of knowledge of farmers and their education.

Chauhan (2008) concluded that there was positive and significant linear association between extent of knowledge of farmers and their education.

Jadeja (2008) inferred that there was positive and significant association between farmers’ extent of knowledge about use of different parts of neem and their education.

Satasiya (2008) concluded that there was positive and significant association between extent of knowledge of farmers and their education.

### 2.4.3 Size of land holding and knowledge

Kumbhare (2000) found that the size of land holding was positively and non-significantly correlated with the knowledge possessed by castor growers about improved castor production technology.

Jadav (2001) reported that land holding of onion growers found to have non-significantly associated with knowledge of farmers about recommended onion production technology.

Sahoo (2004) observed that there was no association between extent of knowledge of respondents and their size of land holding.
Patel (2005) said that there was positive and significant association between extent of knowledge of the respondents and their size of land holding.

Chauhan (2008) inferred that there was no relationship between knowledge of organic farming practices and size of land holding of the respondents.

Satasiya (2008) observed that there was no relationship between knowledge of castor production practices and size of land holding of the respondents.

Dalsaniya (2010) concluded that there was no relationship between knowledge of sesame production practices and size of land holding of the respondents.

2.4.4 Annual income and knowledge

Chhodavadia (2001) revealed that there was highly significant relationship between income of the respondents and their knowledge level of groundnut –pigeon pea relay cropping system.

Patel (2005) revealed that there was no significant relationship between level of knowledge of the respondents and their annual income.

Tavethiya (2006) indicated that there was non significant relationship between extent of knowledge and their annual income.

Chauhan (2008) inferred that there was no significant relation observed between extent of knowledge and their annual income.

Jadeja (2008) concluded that there was no association between farmers’ extent of knowledge about use of different parts of neem and their annual income.
Satasiya (2008) found that there was no association between level of knowledge of demonstrator and non-demonstrator farmers and their annual income.

Kumbhani (2009) inferred that there was non significant relationship between extent of knowledge and their annual income.

2.4.5 Social participation and knowledge

Chhodavadia (2001) reported that there was positive and highly significant correlation between the social participation and level of knowledge of groundnut -pigeon pea relay cropping system.

Barad (2004) concluded that there was positive and significant association between knowledge of garlic growers about recommended garlic production technology and their social participation.

Chavada (2005) concluded that there was positive and significant association between Bt. cotton growers’ knowledge about distinctive features of Bt. cotton and their social participation.

Tavethiya (2006) revealed that there was positive and significant association between cumin growers’ knowledge of recommended cumin production technology and their social participation.

2.4.6 Localite-cosmopolite value orientation and knowledge

Dokal (1996) concluded that there was no association between gram growers’ extent of knowledge and their cosmopolitaness.
Manju (1996) reported that there was no significant association between the knowledge of indigenous practices of coconut growers and their cosmopoliteness.

Kanani (1998) concluded that there was no significant association between the knowledge of indigenous practices of groundnut growers and their cosmopoliteness.

Satasiya (2008) reported that there was positive and significant association between extent of knowledge and their localite cosmopolite value orientation.

2.4.7 Extension participation and knowledge

Loganandhan (2002) reported that organic farmers were found better in participation of extension activities, and utilization of information sources.

Sahoo (2004) revealed that there was highly significant relationship between level of knowledge of the respondents and their extension participation.

Jadeja (2008) inferred that there was positive and significant association between the farmers’ extent of knowledge about use of different parts of neem and their extension participation.

Satasiya (2008) reported that there was a positive and significant association between the knowledge of the respondents about castor production technology and their extension participation.

2.4.8 Mass media exposure and knowledge

Sahoo (2004) inferred that there was positive and significant association between level of knowledge and their exposure to information sources.
Tavethiya (2006) inferred that there was positive and significant association between the level of knowledge and their exposure to information sources.

Makwana (2007) inferred that there was negative association between the level of knowledge and their exposure to information sources.

Dalsaniya (2010) concluded that there was positive and significant association between the level of knowledge of farmers and their mass media exposure.

2.4.9 Innovativeness and knowledge

Patel (2005) found that there was positive and significant association between the level of knowledge of farmers in relation to organic farming practices and their innovativeness.

Tavethiya (2006) inferred that there was positive and significant association between the level of knowledge of farmers and their innovativeness.

Chauhan (2008) reported that there was positive and significant association between the level of knowledge of farmers and their innovativeness.

Satasiya (2008) reported that there was positive and significant association between the level of knowledge of farmers and their innovativeness.

Kumbhani (2009) inferred that there was positive and significant association between the level of knowledge of farmers and their innovativeness.

2.4.10 Risk orientation and knowledge

Chhodavadia (2001) indicated that association between the risk preference of respondents and their knowledge level of
roundnut-pigeon pea relay cropping system was positive and highly significant.

Chavada (2005) concluded that there was positive and significant association between knowledge of Bt. cotton growers and their risk orientation.

Tavethiya (2006) found that there was significant relationship between cumin growers’ knowledge of recommended cumin production technology and their risk orientation.

Chauhan (2008) inferred that there was significant relationship between extent of knowledge and their risk orientation.

Satasiya (2008) concluded that there was positive and significant association between knowledge of castor growers and their risk orientation.

2.4.11 Irrigation potentiality and knowledge

Jadav (2001) indicated that there was positive and significant association between onion growers’ knowledge and their irrigation potentiality.

Chavada (2005) concluded that there was positive and significant association between knowledge of Bt. cotton growers and their irrigation potentiality.

Tavethiya (2006) concluded that there was positive and significant association between cumin growers’ knowledge of cumin production technology and their irrigation potentiality.

Chauhan (2008) indicated that there was positive and significant association between organic farmers’ knowledge and their irrigation potentiality.

Dalsaniya (2010) concluded that there was positive association between Kharif sesame growers’ knowledge of sesame production technology and their irrigation potentiality.
4.12 Cropping intensity and knowledge

Jadav (2001) revealed that there was the positive significant association between onion crop intensity and knowledge of recommended onion crop technology.

Chavada (2005) concluded that there was positive and significant association between knowledge of Bt cotton growers and their cropping intensity.

Tavethiya (2006) concluded that there was association between cumin crop intensity and knowledge of recommended cumin technology. It is obvious that with increase in crop intensity the knowledge also increased.

Satasiya (2008) concluded that there was positive and significant association between crop intensity and knowledge of demonstrator farmers.

Dalsaniya (2010) concluded that there was association between sesame cropping intensity and knowledge of recommended sesame technology.

2.5 RELATIONSHIP BETWEEN ADOPTION OF RESPONDENTS ABOUT RECOMMENDED CROP PRODUCTION TECHNOLOGY AND THEIR SELECTED CHARACTERISTICS

2.5.1 Age and extent of adoption

Jadav *et al.* (2003) revealed that age was negatively and significantly associated with onion growers’ adoption of recommended onion production technology.

Sahoo (2004) reported that there was positive and non-significant relationship between age of respondents and their adoption of eco-friendly practices in groundnut.
Kotadiya (2006) concluded that there was negative and significant association between age and adoption of beneficiary farmers and non-significant correlation in case of non-beneficiary farmers.

Tavethiya (2006) concluded that there was negative and significant association between cumin growers’ adoption of recommended cumin production technology and their age.

Kamani (2007) found that the age had negative and significant relationship with level of adoption which indicated that as the age of organic farmers increases, the extent of adoption decreases and vice versa.

Kumbhani (2009) concluded that there was negative and significant association between coriander growers’ adoption of recommended coriander production technology and their age.

2.5.2 Education and extent of adoption

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

Jadav et al. (2003) inferred that education had positive and significant association with onion growers’ adoption of recommended onion production technology.

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

Patel (2005) suggested that education was significantly and positively corelated with adoption of organic farmers.

Kamani (2007) inferred that there was positive and highly significant correlation between extent of adoption of the respondents and their education.
Satasiya (2008) inferred that there was positive and highly significant correlation between extent of adoption of the respondents and their education.

2.5.3 Size of land holding and extent of adoption

Gomase et al. (1998) showed that the size of land holding was significantly and positively corelated with the adoption of recommended cultivation of Kagzi lime.

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

Sahoo (2004) concluded that there was no association between extent of adoption and their size of land holding.

Tavethiya (2006) concluded that there is no association between cumin growers’ adoption of recommended cumin production technology and their size of land holding.

Satasiya (2008) concluded that there was no association between castor growers’ adoption of recommended castor production technology and their size of land holding.

2.5.4 Annual income and extent of adoption

Chavada (1998) opined that there was non-significant association between the extent of adoption of groundnut based inter/relay crop growers about improved groundnut based inter/relay crop production technology and their annual income.

Kamani (2007) found that there was no association between farmers’ level of adoption towards organic framings practices on their annual income.
Satasiya (2008) reported that there was no association between farmers’ level of adoption with respect to castor production practices and their annual income.

Dalsaniya (2010) concluded that there was no association between farmers’ level of adoption for sesame production practices and their annual income.

2.5.5 Social participation and extent of adoption

Barad (2004) concluded that there was positive and significant association between garlic growers’ adoption of recommended garlic production technology and their social participation.

Tavethiya (2006) reported that was positive and significant association between cumin growers’ adoption of recommended cumin production technology and their social participation.

Makwana (2007) reported that social participation had positive and significant association with adoption of Gir maldharis with respect to improved animal husbandry.

Satasiya (2008) concluded that there was positive and significant association between adoption of recommended castor production technology and social participation.

Dalsaniya (2010) concluded that there was positive significant association between Kharif sesame growers’ adoption of recommended sesame production technology and their social participation. The adoption increased with an increase of social participation of the respondents.
2.5.6 Localite-cosmopolite value orientation and extent of adoption

Patel (2000) concluded that there was positive and significant association between extent of adoption and their localite cosmopolite value orientation.

Kamani (2007) inferred that the localite cosmopolite value orientation of the respondents was positively and significantly correlated with their adoption towards organic farming practices.

Makwana (2007) concluded that there was non significant association between Gir *maldharis* extent of adoption and their localite cosmopolite value orientation.

Satasiya (2008) concluded that there was positive and significant association between adoption of recommended castor production technology and their localite cosmopolite value orientation.

2.5.7 Extension participation and extent of adoption

Jadav (2001) reported that there was high and significant relationship between onion growers’ adoption of recommended onion production technology and their extension participation.

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

Sahoo (2004) revealed that there was positive and significant association between groundnut growers’ of extent of adoption and their extension participation.

Satasiya (2008) concluded that there was positive and significant association between adoption of recommended castor production technology and extension participation.
Kumbhani (2009) indicated that there was positive and significant association between coriander growers’ adoption of recommended coriander production technology and their extension participation.

2.5.8 Mass media exposure and extent of adoption

Manju (1996) inferred that extent of adoption of indigenous coconut cultivation practices possessed a positive and significant relationship with exposure to information sources.

Tavethiya (2006) revealed that there was positive and significant association between cumin growers’ adoption of recommended cumin production technology and their exposure to information sources.

Makwana (2007) inferred that there was no association between Gir maldharis adoption of improved animal husbandry and their exposure to information sources.

Dalsaniya (2010) concluded that there was positive significant association between Kharif sesame growers’ adoption of recommended sesame production technology and their mass media exposure.

2.5.9 Innovativeness and extent of adoption

Loganandhan (2002) found that organic farmers had lower degree of innovation proneness than conventional farmers.

Sahoo (2004) revealed that there was positive and significant association between extent of adoption and their innovativeness.

Tavethiya (2006) revealed that there was positive significant association between cumin growers’ adoption of recommended cumin production technology and their innovativeness.
Kamani (2007) found that the innovativeness of the respondents was positively and significantly correlated with their adoption towards organic farming practices.

Satasiya (2008) inferred that the innovativeness of the demonstrator respondents was positively and significantly correlated with their adoption of recommended castor production practices.

Dalsaniya (2010) concluded that there was a positive significant association between Kharif sesame growers’ adoption of recommended sesame production technology and their innovativeness.

2.5.10 Risk orientation and extent of adoption

Jadav (2001) revealed that risk orientation was significantly associated with onion growers’ adoption of recommended onion production technology.

Sahoo (2004) revealed that risk orientation was negatively and non-significantly associated with groundnut growers’ adoption of recommended eco-friendly practices.

Tavethiya (2006) indicated that there was positive and significant association between cumin growers’ adoption of recommended cumin production technology and risk orientation.

Kamani (2007) found that the risk orientation had positive and significant relationship with extent of adoption.

Chauhan (2008) indicated that the risk orientation had positive and significant relationship with extent of adoption.

Satasiya (2008) indicated that the risk orientation of the demonstrator respondents was positively and significantly related with their adoption for recommended castor production practices.
2.5.11 Irrigation potentiality and extent of adoption

Jadav (2001) revealed that there was an association between onion growers’ extent of adoption of recommended onion production technology and their irrigation potentiality.

Barad (2004) concluded that there was positive and significant association between garlic growers’ adoption of recommended garlic production technology and their irrigation potentiality.

Tavethiya (2006) concluded that there was positive and significant association between adoption of recommended cumin production technology and their irrigation potentiality.

Chauhan (2008) revealed that there was significant relationship between irrigation potentiality and extent of adoption of organic farming practice.

Satasiya (2008) indicated that the irrigation potentiality of the demonstrator respondents was positively and significantly correlated with their adoption for recommended castor production practices.

Kumbhani (2009) concluded that there was positive and significant association between adoption of recommended coriander production technology and their irrigation potentiality.

2.5.12 Cropping intensity and extent of adoption

Jadav (2001) concluded that there was highly significant association between onion growers’ adoption of recommended onion production technology and their onion crop intensity.

Barad (2004) concluded that there was positive and significant association between garlic growers’ adoption of recommended garlic production technology and their garlic crop intensity.
Tavethiya (2006) indicated that there is positive and significant association between cumin growers’ adoption of recommended cumin production technology and their cumin crop intensity.

Satasiya (2008) revealed that there is positive and significant association between castor growers’ adoption of recommended castor production technology and crop intensity.

2.6 CONSTRAINTS FACED BY RESPONDENTS IN ADOPTION OF IMPROVED CROP PRODUCTION TECHNOLOGY

Constraints in the adoption of agricultural technology should be studied critically for the speedy transfer of any technology. It plays an important role of new agricultural technology just as weeds in the flow of water in an irrigation channel. So, for increasing extent of adoption of improved agricultural technology, it is necessary to minimize the constraints, as far as possible. The views and findings of different investigators are presented as under:

Jadav (2001) revealed that majority of the onion growers expressed constraints such as: lack of irrigation (75.00 per cent), problem in onion storage (73.33 per cent), low price of onion in the market (71.66 per cent), high price of fertilizer (67.50 per cent), inadequate and irregular power supply (66.66 per cent), high cost of pesticides (65.00 per cent) and poor economic condition (60.00 per cent).

Prajapati et al. (2002) concluded that lack of knowledge about recommended chilli production technology and unavailability of fertilizers in time as well as weight and quality loss during storage and transportation were the major
constraints faced by farmers in adoption of chilli production technology.

Kotadiya (2006) reported that lack of awareness about recent recommendations of IMPT (87.50 per cent), insufficient guidance about after care of orchard (66.40 per cent), lack of publicity about scheme IHDP (53.12 per cent), lack of credit facility (50.00 per cent), insufficient staff of the state department to visit all the BF (43.75 per cent), difficult process of getting subsidy (31.25 per cent), lack of awareness about the scheme IHDP (25.00 per cent) and delaying in providing subsidy which is granted (21.88 per cent) were the major constraints faced by the BF in taking benefit of IHDP.

Tavethiya (2006) observed the constraints in cumin production technology were: inadequate and irregular power supply (82.00 per cent), weight and quality loss during storage and transportation (78.00 per cent), high charges of electricity (77.00 per cent), inadequate storage facilities (75.00 per cent), lack of market infrastructure facilities (71.00 per cent), lack of post harvest management facilities (70.00 per cent) and fluctuation of cumin price in the market (69.00 per cent).

Kamani (2007) found that certain situations like fragmented holding, less consumers awareness both organic food products, lack of faith among consumer etc. were the common constraints perceived by the farmers.

Satasiya (2008) concluded that high price of improved seeds (Rank I), high cost of threshing/harvesting (Rank II), lack of irrigation facility (Rank III), non availability of finance in time (Rank IV), high price of chemical fertilizers (Rank V), high price of herbicides and high price of fungicides/Pesticides (Rank VI), lack of knowledge about critical stages (Rank VII), high cost of
labour (Rank VIII), non-availability of Extension workers in villages as per time schedule (Rank IX), unawareness about the recommendation of pesticides/fungicides (Rank X) were the constraints expressed by the respondents.

2.7 SUGGESTIONS FROM THE RESPONDENTS TO OVERCOME THE CONSTRAINTS IN ADOPTION OF IMPROVED CROP PRODUCTION TECHNOLOGY

The farmers face some constraints in adoption of any improved production technology. At the same time, they have some suggestions which may very important in the sense that, these suggestions may be useful in developing strategies for minimizing the constraints.

The views of various experts, investigators, sociologist, economist and technologist in this respect are shown as under:

Dangar (1996) stated that the most important suggestions expressed by the chiku growers to overcome the constraints in adoption of improved chiku cultivation practices were; regular electric power supply should be made available (85.00 per cent), exploration of additional irrigation facility (78.00 per cent), crop insurance scheme should be introduced (75.00 per cent), training should be imparted to the fruit growers in relation to the best orchard management (69.00 per cent), agricultural input should be subsidized (65.00 per cent) and organization of demonstration on improved technology of chiku cultivation (56.00 per cent).

Verma (2000) concluded the most important suggestions offered by the majority of the groundnut growers were ranked as;

1. The government should purchase groundnut at remunerative price.
2. Inputs should be made available at subsidized rate.
3. Multiple resistance variety should be developed.
4. Soil testing facilities should be made available at field level by organizing camps.
5. Subsidies should be given to increase farm mechanization.
6. Production and availability of the seed of improved varieties should be ensured.
7. There must be regular electric supply at the time of critical irrigation stages of crop.

Jadav (2001) concluded that the most important suggestions expressed by the onion growers to overcome the constraints for the adoption of improved onion production practices were: The provision should be made to increase irrigation potentiality (90.00 per cent), remunerative price should be given to onion growers (83.33 per cent), sufficient and regular electricity should be provided (74.16 per cent), provision of storage facility (70.00 per cent), all inputs should be made available (55.00 per cent) and sufficient and timely credit facility should be made available (55.00 per cent).

Jadav (2005) reported the suggestions given by the respondents to overcome the constraints in adoption of improved mango production technology. Following eight suggestions expressed by more than 60.00 per cent were,

1. Regular electric power supply should be made available.
2. Crop insurance scheme should be introduced in mango crop.
3. Effective control measures of pests and diseases should be evolved.
4. Price of pesticides and fertilizers should be low.
5. Co-operative society for mango should be constituted.
6. Training should be given to the fruit growers in relation to the best orchard management.

7. Remunerative minimum prices should be fixed by the Government.

Satasiya (2008) revealed that important suggestions offered by the respondents were; cost of harvesting/threshing should be reduced (Rank I), farmers should be protected by crop insurance, (Rank II), inputs should be made available at subsidized rate (Rank III), remunerative price should be made available to the castor growers for their products (Rank IV).
THEORATICAL ORIENTATION

CHAPTER III
THEORETICAL ORIENTATION

The review of literature related to the study is given in the preceding chapter in order to formulate theoretical framework. The chapter has been sub-divided into the following sections:

3.1 Conceptual framework of the study
3.2 The paradigm

3.1.1 Conceptual framework of the study

The main objective of this research was to review the existing theoretical and empirical analyses of the factors affecting the decision of adoption or respondents (Fig. 1.2).

Majority of the respondents were from middle age group (Java, 2006 and Jideja, 2009) who were educated up to primary level. Many (Java, 2006 and Jideja, 2009) had medium size of farm holding (Bennett, 2004 and Lunsford, 2006). These respondents annual income (Java, 2006 and Jideja, 2009) had medium social participation (Java, 2006 and Lunsford, 2006). These respondents had medium knowledge-attitude value association (Kasu, 2007 and Mekonnen, 2008) and had medium extension participation (Jideja, 2006 and Kandera, 2006). They have medium media exposure (Java, 2006 and Jideja, 2009).
CHAPTER-III
THEORETICAL ORIENTATION

The review of literature related to the study is given in the preceding chapter helped in formulating theoretical orientation. The chapter has been sub divided into the following major heads.

3.1 Conceptual framework of the study
3.2 The paradigm

3.1 CONCEPTUAL FRAMEWORK OF THE STUDY

3.1.1 Independent variables

The main objective of conceptual framework being developed in this study is to provide an abstract view to the knowledge and extent of adoption of the respondents on recommended crop production technology of castor as intercrop with groundnut and their interaction with personal, socio-economic, communication, psychological and situational characteristics. The framework is expected to facilitate theoretical and empirical analysis of the knowledge and extent of adoption of respondents (Fig. 1 & 2).

Majority of the respondents were from middle age group (Javia, 2004 and Jadeja, 2008), were educated up to primary level (Verma, 2000 and Jadeja, 2008), had medium size of land holding (Barad, 2004 and Bharad, 2007), had medium annual income (Jadav, 2001 and Kamani, 2007), had medium social participation (Javia, 2004 and Jadeja, 2008), had medium localite-cosmopolite value orientation (kamani, 2007 and Satasiya, 2008), had medium extension participation (Jadeja, 2008 and Kumbhani, 2009), had medium mass media exposure...
(Bharad, 2007 and Dalsaniya, 2008), had medium innovativeness (Javia, 2004 and Chavada, 2005), had medium risk orientation (Sahoo, 2004 and Kamani, 2007), had medium irrigation potentiality (Jadav, 2001 and Bharad, 2007) and had medium cropping intensity. (Jadav, 2001 and Kamani, 2007).

3.1.2 Dependent variables

3.1.2.1 Knowledge

Knowledge is the body of understood information possessed by an individual. It is that part of a person’s information which is established fact (English and English, 1961). Knowledge is considered as those behaviour and test situations, which emphasize the remembering, either by recognition or recall of ideas, material or phenomena (Bloom et al., 1955). Knowledge is the function of an innovation decision process when “the individual is exposed to an innovation existence and gains some understanding of its functions.” There are three components of the knowledge viz.,

1. “Awareness knowledge” which refers to the information that innovation exists.

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

3. “Principle knowledge” which comprises the functioning. Principles underlying the innovation (Rogers and shoemaker, 1971)

Taking a clue from the foregoing discussion, the knowledge considered as a body of “understood information” and “how to knowledge” possessed by the farmers about castor as intercrop with groundnut product.
Majority of the respondents had medium level of knowledge regarding groundnut production technology (Verma, 2000). Majority of the garlic growers had medium level of knowledge (Barad, 2004). Majority of the groundnut growers had medium level of knowledge (Patel, 2005). Majority of the demonstrator and non-demonstrator farmers had medium level of knowledge about castor production technology (Satasiya, 2008).

### 3.1.2.2 Adoption

According to Rogers (1962), adoption process is the mental process through which an individual passes from first hearing about an innovation to its final adoption. It is also a decision making process, as adoption of an innovation requires a decision by an individual. The adoption could take place any where on the “Continuum” from unawareness to complete knowledge. The innovation adoption process has two components.

1. The symbolic adoption in which the idea is accepted.
2. The use of adoption in which the material component of practices of innovation is accepted.

In some of the studies, the use of adoption of recommended “package of practices” have been regarded as use of adoption (Gunawardana et al., 1980)

Majority of the respondents were medium adopters of recommended production technology (Barad, 2004; Sahoo, 2004; Tavethiya, 2006; Bharad, 2007 and Satasiya, 2008).

### 3.1.3 Association

It is envisaged that the extent of association between two variables (independent and dependent) provides the strength and
direction and effects of one variable on the other variable and independent variable, which are included in present study. Attempts are being made to ascertain the extent of association between the variables and their direction. As regards to the association between selected characteristics of the respondents and their knowledge level, it was observed that age was significantly associated with knowledge level (Nurzaman et al., 2001), education was significantly association with knowledge level (Sahoo, 2004 and Jadeja, 2008) and size of land holding was significantly associated with knowledge level (Patel, 2005). The annual income was not significantly associated with knowledge level (Patel, 2005 and Tavethiya, 2006). While, social participation was significantly associated with knowledge level Chavada, 2005 and Tavethiya, 2006), localite-cosmopolite value orientation was significantly associated with knowledge level (Satasiya, 2008) and extension participation was significantly associated with knowledge level (Jadeja, 2008). Further, mass media exposure was significantly associated with knowledge level (Sahoo, 2004 and Tavethiya, 2006), innovativeness was significantly associated with knowledge level (Patel, 2005 and Tavethiya, 2006) and risk orientation was significantly associated with knowledge level (Tavethiya, 2006) and irrigation potentiality was significantly associated with knowledge level (Jadav, 2001) and cropping intensity was significantly associated with knowledge level (Jadav, 2001 and Satasiya, 2008).

As regards to the association between selected characteristics of the respondents and their extent of adoption, it was observed that age was significantly associated with extent of adoption (Kotadiya, 2006 and Kamani, 2007) and education was significantly associated with extent of adoption (Chaudhary et
al., 2001 and Patel, 2005). While size of land holding was not significantly associated with extent of adoption (Sahoo, 2004) and annual income was non significantly associated with extent of adoption (Chhodavadia, 2001 and Kamani, 2007). The social participation was significantly associated with extent of adoption (Tavethiya, 2006 and Makwana, 2007), localite-cosmopolite value orientation was significantly associated with adoption (Kamani, 2007 and Satasiya, 2008) and extension participation was significantly associated with extent of adoption (Jadav, 2001 and Ranganathan et al., 2001) The mass media exposure was significantly associated with extent of adoption (Tavethiya, 2006 and Dalsaniya, 2010), innovativeness was significantly associated with extent of adoption (Sahoo, 2004 and Kamani, 2007) and risk orientation was significantly associated with extent of adoption (Tavethiya, 2006 and Satasiya, 2008). The irrigation potentiality was significantly associated with extent of adoption (Tavethiya, 2006 and Chauhan, 2008) and cropping intensity was significantly associated with extent of adoption (Jadav, 2001 and Tavethiya, 2006).

3.1.4 Constraints

The difficulties or problems faced by respondents while adoptions of recommended agricultural production technology were considered as constraints.

Major constraints in adoption of chilli production technology were lack of knowledge about recommended chilli production technology and unavailability of fertilizers in time as well as weight and quality loss during storage and transportation were the major constraints faced by farmers in adoption of chilli production technology. (Prajapati et al., 2002). While major
constraints in adoption of cumin production technology were: inadequate and irregular power supply (82.00 per cent), weight and quality loss during storage and transportation (78.00 per cent), high charges of electricity (77.00 per cent), inadequate storage facilities (75.00 per cent), lack of market infrastructure facilities (71.00 per cent) etc. (Tavethiya, 2006) and major constraints in adoption of castor production technology were; high price of improved seeds (Rank I), high cost of threshing/harvesting (Rank II), lack of irrigation facility (Rank III), non availability of finance in time (Rank IV) and high price of chemical fertilizers (Rank V) etc. (Satasiya, 2008).

3.1.5 Suggestions

The ways and means or opinions as suggested by the respondent farmers to overcome constraints in adoption of improved production technology were considered as the suggestions in this study.

As regards suggestions offered by groundnut growers to overcome the constraints in adoption of recommended groundnut production technology were: The government at should purchase groundnut remunerative price, inputs should be made available at subsidized rate, multiple resistance variety should be developed, soil testing facilities should be made available at field level by organizing camps, subsidies should be given to increase farm mechanization (Verma, 2000). The provision should be made to increase irrigation potentiality, remunerative price should be given to onion growers, sufficient and regular electricity should be supplied (Jadav, 2001).
3.2 THE PARADIGM

The conceptual framework given in the preceding section may be presented paradigmatically which has been developed during the course of study. The models shown in Fig. 1 and 2 are tentative and generalized one. The final form of such a model will be suggested at the end of this thesis in the chapter of "Summary and Conclusions" on all the aspects based on objectives of the study.
Factors related with knowledge of respondents about recommended crop production technology of castor as intercrop with groundnut. (Tentative paradigm)

Factors related with

Independent Variables

- Age
- Education
- Size of Land Holding
- Annual Income
- Social Participation
- Localite-cosmopolite value orientation
- Extension Participation
- Mass media Exposure
- Innovativeness
- Risk Orientation
- Irrigation potentiality
- Cropping intensity

Dependent Variable

Knowledge

Fig.1 Factors related with knowledge of respondents about of recommended crop production technology of castor as intercrop with groundnut. (Tentative paradigm)
Factors related with extent of adoption of respondents about recommended crop production technology of castor as intercrop with groundnut. (Tentative paradigm)

Fig. 2 Factors related with extent of adoption of respondents about recommended crop production technology of castor as intercrop with groundnut. (Tentative paradigm)
CHAPTER IV
RESEARCH METHODOLOGY

4.1 Identification of the problem

4.2 Sources of the data

4.3 Area of the study

4.4 Research design

4.5 Sampling technique

4.6 Operationalization

4.7 Measurement
   4.7.1 Independent variables
   4.7.2 Dependent variables

4.8 Tools of data analysis

4.9 Model formulation

4.10 Hypothesis

4.1 IDENTIFICATION OF THE PROBLEM

Sakhtiyar is the most important groundnut growing state, occupying an area of 18,29 lakh hectares and a production of 17.87 lakh tonnes, with an average productivity of 0.98 kg per hectare (Anonymous, 2010). The production of groundnut has been low because of irregular and erratic rainfall, low level of adoption of improved groundnut production technology, diseases and pests.
CHAPTER IV
RESEARCH METHODOLOGY

Methodology deals with the methods and procedures followed in carrying out this study. It describes and classifies the methods which were used for measuring the dependent and independent variables as well as techniques followed for collection and analysis of data.

4.1 Identification of the problem
4.2 Sources of the data
4.3 Area of the study
4.4 Research design
4.5 Sampling technique
4.6 Operationalization of concepts
4.7 Measurement of variables
  4.7.1 Independent variables
  4.7.2 Dependent variables
4.8 Tools of data collection and field procedures
4.9 Analysis of the data
4.10 Research hypothesis

4.1 IDENTIFICATION OF THE PROBLEM

Gujarat is the most important groundnut growing state occupying an area of 18.23 lakh hectares and production of 17.57 lakh tones with an average productivity of 96.4 kg ha⁻¹ (Anonymous, 2010). The production of kharif groundnut is still low because of irregular and erratic rainfall, low level of adoption of improved groundnut production technology and infestation of diseases and pests.
Under such condition castor as intercrop with groundnut is one of the systems to increase the production per unit area of land. The farmers have adopted this castor as intercrop with groundnut on large scale in Saurashtra region of Gujarat state by the efforts of Junagadh Agricultural University, Junagadh and other extension agencies. Therefore, it is necessary to know the knowledge and adoption of castor as intercrop with groundnut.

4.2 SOURCES OF THE DATA
The basic information regarding the study was gathered from the records of village, taluka and district panchayat.

After the primary survey, an interview schedule was prepared in light of objectives and the respondents were personally interviewed by the investigator.

Secondary data and other relevant information for the study was gathered from the reference books, reports, bulletins and periodicals on the subject published by different authors, organizations, institutions and agencies.

4.3 AREA OF THE STUDY
The study was conducted in the South Saurashtra Agro Climatic Zone of Gujarat State for the following reasons.
1. The area has ideal conditions for the successful cultivation of castor as intercrop with groundnut cultivation.
2. The soil and climatic conditions are very favorable for the cultivation of castor as intercrop with groundnut.
3. Similar research study was not conducted in the area under study.
4. The researcher being familiar with the farming condition of the area.

4.4 RESEARCH DESIGN

The study was conducted under ex-post facto research design. It is systemic empirical enquiry in which the scientist does not have direct control over the independent variables because their manifestations have already occurred or they are inherently not manipulated (Kerlinger, 1969).

4.5 SAMPLING TECHNIQUES

A multistage purposive random sampling technique was followed for this study. The sampling technique is described as under.

4.5.1 Selection of the Talukas

The South Saurashtra Zone is consisted of 25 talukas of 4 distracts of the state having common agro-climatic conditions. Out of 25 talukas, 6 talukas were purposively selected.

4.5.2 Selection of the Villages

From each selected taluka four villages were selected purposively. Thus 24 vilages were selected.

4.5.3 Selection of the Respondents

Total 120 respondents, 5 respondents from each selected village were selected by using purposive random sampling technique with a condition that the farmers have cultivated castor as intercrop with groundnut at least since last two years.
Table 1. Selected talukas, villages and respondents

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Talukas</th>
<th>Name of Villages</th>
<th>Number of selected respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Keshod</td>
<td>Mangalpur</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Agatray</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manekvada</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dervan</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>Vanthali</td>
<td>Khorasa</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lushada</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Khokharda</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tikar</td>
<td>5</td>
</tr>
<tr>
<td>3.</td>
<td>Manavadar</td>
<td>Kothariya</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nanadiya</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sanosara</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sardargadh</td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td>Dhoraji</td>
<td>Jamnavad</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pipadiya</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moti marad</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vadodar</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td>Jetpur</td>
<td>Akala</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dedarva</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rupavati</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kharachiya</td>
<td>5</td>
</tr>
<tr>
<td>6.</td>
<td>Upleta</td>
<td>Samadhiyada</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kathrota</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kundhech</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lath</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>
Fig 3. Map of South Saurashtra Agro Climatic Zone Showing selected talukas

- Keshod
- Vanthali
- Manavadar
- Dhoraji
- Jepur
- Upleta

Selected Talukas
4.6 OPERATIONALIZATION OF THE CONCEPTS

The various terms used in this study need to be defined so, as to clarify the concept in the particular content, in which they were used.

4.6.1 Knowledge

It is the body of understood information possessed by an individual with respect to recommended crop production technology of castor as intercrop with groundnut.

4.6.2 Adoption

It is the degree of respondents’ use of recommended crop production technology of castor as intercrop with groundnut as recommended by the Gujarat/Junagadh Agricultural University.

4.6.3 Constraints

This refers to the items of difficulty which faced by the farmers in adoption of recommended crop production technology of castor as intercrop with groundnut.

4.6.4 Age

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

4.6.5 Education

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

4.6.6 Size of land holding

It is the number of hectare of land an individual farmer possesses and cultivates.

4.6.7 Annual income

This indicates about the total annual income which was earned by the respondents from both farming and allied fields put together.
4.6.8 Social participation

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

4.6.9 Localite-cosmopolite value orientation

It is defined as the degree to which a farmer is oriented to his immediate outside social system. Such as visiting to the nearest town purpose of visit etc.

4.6.10 Extension participation

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

4.6.11 Mass media exposure

It is operationalised as the extent of contact of farmers and use of various sources of information like radio, television, demonstration, print media agricultural fair, farmers’ day etc. for the production of castor as intercrop with groundnut.

4.6.12 Innovativeness

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

4.6.13 Risk orientation

It is the degree to which respondents are oriented towards the risk and uncertainty in their occupation.

4.6.14 Irrigation potentiality

It is the potentialities of irrigation in the part of the total area for which irrigation facility possesses by respondents.

4.6.15 Cropping intensity

It is in percentage of proportion of total cropped area under castor as intercrop with groundnut to the size of cultivable holding.
### 4.7 MEASUREMENT OF VARIABLES

#### 4.7.1 Measurement of independent variables

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Variables</th>
<th>Measurement techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>(I)</td>
<td>Personal</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Age</td>
<td>Structured schedule used</td>
</tr>
<tr>
<td>2.</td>
<td>Education</td>
<td>Scale developed by Trivedi (1963)</td>
</tr>
<tr>
<td>(II)</td>
<td>Socio-economic</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Size of Land holding</td>
<td>Structured schedule used</td>
</tr>
<tr>
<td>2.</td>
<td>Annual income</td>
<td>Scale developed by Pareek and Trivedi (1963)</td>
</tr>
<tr>
<td>3.</td>
<td>Social participation</td>
<td>Scale developed by Subramaniam (1986)</td>
</tr>
<tr>
<td>(III)</td>
<td>Communication</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Localite-cosmopolite value orientation</td>
<td>Scale developed by Singh (1967)</td>
</tr>
<tr>
<td>2.</td>
<td>Extension participation</td>
<td>Scale developed by Siddaramaiah and Jalihal (1983)</td>
</tr>
<tr>
<td>3.</td>
<td>Mass media exposure</td>
<td>Structured schedule used</td>
</tr>
<tr>
<td>(IV)</td>
<td>Psychological</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Innovativeness</td>
<td>Scale developed by Singh (1977)</td>
</tr>
<tr>
<td>2.</td>
<td>Risk orientation</td>
<td>Scale developed by Singh and Supe (1969)</td>
</tr>
<tr>
<td>(V)</td>
<td>Situational</td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Irrigation potentiality</td>
<td>Scale developed by Geethakutty (1993)</td>
</tr>
<tr>
<td>2.</td>
<td>Cropping intensity</td>
<td>Scale developed by Singh (1981)</td>
</tr>
</tbody>
</table>
land possessed in hectares, the respondents were grouped into three categories.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>SIZE OF LAND HOLDING</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Small size of land holding (Up to 1 ha)</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Medium size of land holding (1 to 2 ha)</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Large size of land holding (above 2 ha)</td>
<td>3</td>
</tr>
</tbody>
</table>

4.7.1.4 Annual income

This indicates the total annual income expressed in rupees earned by the respondents from both farm and non-farm enterprises put together. The actual income in monetary term was taken into account on the basis of annual income the respondents were grouped into three categories. Scale developed by Pareek and Trivedi (1963).

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>ANNUAL INCOME</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low (up to Rs.40,000)</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Medium (Rs 40,001 to 80,000)</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>High (Above Rs. 80,000)</td>
<td>3</td>
</tr>
</tbody>
</table>

4.7.1.5 Social participation

It was measured with the help of the scale developed by Subramaniam (1986) with the necessary modification to suit the present study. The score procedure was followed as given below:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>SOCIAL PARTICIPATION</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Membership in any organization</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No membership</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Membership in each organization</td>
<td>1</td>
</tr>
</tbody>
</table>
land possessed in hectares, the respondents were grouped into three categories.

<table>
<thead>
<tr>
<th>Sr. No.</th>
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<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Medium size of land holding</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
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<th>SCORE</th>
</tr>
</thead>
<tbody>
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<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Medium (Rs 40,001 to 80,000)</td>
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<tr>
<td>3</td>
<td>High (Above Rs. 80,000)</td>
<td>3</td>
</tr>
</tbody>
</table>

4.7.1.5 Social participation

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<table>
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<tr>
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<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Membership in any organization</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No membership</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Membership in each organization</td>
<td>1</td>
</tr>
<tr>
<td>Sr. No.</td>
<td>Categories</td>
<td>Range</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>1.</td>
<td>Low social participation</td>
<td>&lt;Mean – S. D.</td>
</tr>
<tr>
<td>2.</td>
<td>Medium social participation</td>
<td>In between Mean ± S. D.</td>
</tr>
<tr>
<td>3.</td>
<td>High social participation</td>
<td>&gt;Mean + S. D.</td>
</tr>
</tbody>
</table>

(III) COMMUNICATION CHARACTERISTICS

4.7.1.6 Localite-cosmopolite value orientation

It was measured with the help of the scale developed by Singh (1967). The scale consisted of five statements. The agreement with the negative items would indicate localite value orientation and the strong agreement with the positive items would indicate cosmopolite value orientation. The scoring was based on a five point as under:

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Negative</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

On the basis of total score obtained, the respondents were grouped into three categories.
4.7.1.7 Extension participation

The extent of contact of a farmer with different extension agencies and their participation in various extension activities or programmes like meetings, seminar etc.

It was measured with the help of extension participation scale developed by Siddaramaiah and Jalihal (1983).

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of extension activities</th>
<th>Yes/No</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Conducted demonstration on your field?</td>
<td>9.50</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Had discussion with extn. workers?</td>
<td>6.84</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Participated on field days on the farmers’ fields?</td>
<td>6.63</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Participated in ext. meetings?</td>
<td>6.60</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>See demonstration plot of your neighbor and had discussion with him?</td>
<td>6.16</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Participated in <em>krushi mela</em>?</td>
<td>4.84</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Visited any agricultural exhibition?</td>
<td>2.79</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Had read ext. publications?</td>
<td>1.89</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Listened radio programmes on agriculture</td>
<td>1.50</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Viewed T.V. programmes on agriculture</td>
<td>1.50</td>
<td></td>
</tr>
</tbody>
</table>
Extension participation index = \[ \frac{\text{Actual total score value}}{\text{Possible total score}} \times 100 \]

Respondents were grouped into three categories.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Categories</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Low extension participation</td>
<td>Mean – S. D.</td>
</tr>
<tr>
<td>2.</td>
<td>Medium extension participation</td>
<td>In between Mean + S. D.</td>
</tr>
<tr>
<td>3.</td>
<td>High extension participation</td>
<td>Mean + S. D.</td>
</tr>
</tbody>
</table>

4.7.1.8 Mass media exposure

To measure the mass media exposure of the respondents, the scores were assigned to respondents on the basis of frequency of their use of various sources of information. The scores assigned to various frequencies of uses were regularly (3), frequently (2), once in a week (1) and not at all (0).

Thus, the score assigned to each type of information sources of which respondents had responded were summed up. The sum total of the score, thus, obtained was considered as an index of respondents mass media exposure.

According to the mass media exposure of respondents the mean and standard deviation were worked out and the respondents were grouped into three categories viz., low, medium and high.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Categories</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Low mass media exposure</td>
<td>Mean – S. D.</td>
</tr>
<tr>
<td>2.</td>
<td>Medium mass media exposure</td>
<td>In between Mean + S. D.</td>
</tr>
<tr>
<td>3.</td>
<td>High mass media exposure</td>
<td>Mean + S. D.</td>
</tr>
</tbody>
</table>
(IV) PSYCHOLOGICAL CHARACTERISTICS

4.7.1.9 Innovativeness

Innovativeness is operationally defined as the degree to which a farmer is relatively earlier in adoption of new ideas. The procedure developed by Singh (1977) was used to measure the innovativeness of a farmer. The questions were asked as;

“When would you prefer to adopt an improved practice in farming?”
1. As soon as it is brought to my knowledge (3 score)
2. After I have seen some other farmers using successfully (2 score)
3. Prefer to wait and take my own time (1 score)

4.7.1.10 Risk orientation

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

The scale consisted 6 statements out of which two were negative. The respondents were asked to respond on three point continuum rating scale as agree, undecided and disagree giving 3, 2 and 1 score, respectively for positive statements and 1, 2 and 3 score respectively for negative statements. The total score was calculated by summing up the scores obtained for each statement by the respondents.

The respondents were classified into three categories on the basis of mean and S.D. as under.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Categories</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Low risk orientation</td>
<td>Mean – S. D.</td>
</tr>
<tr>
<td>2.</td>
<td>Medium risk orientation</td>
<td>In between Mean ± S. D.</td>
</tr>
<tr>
<td>3.</td>
<td>High risk orientation</td>
<td>Mean + S. D.</td>
</tr>
</tbody>
</table>
(V) SITUATIONAL CHARACTERISTICS

4.7.1.11 Irrigation potentiality

The extent to which crops are being irrigated was measured. The scoring procedure developed by Geethakutty (1993) was used with slight modification, viz; availability of irrigation water and area covered under irrigation was considered for the purpose. Facility of irrigation sources of the respondents was taken into consideration, as it is an important input for crop production. The detail of categorization and scoring procedure was as follows.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Well only</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Canal only</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Well and canal</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>Tube well /Bore well</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>Check dam</td>
<td>5</td>
</tr>
</tbody>
</table>

4.7.1.12 Cropping intensity

It denotes the intensity of land used by the farmers. In other words it is a ratio of total cropped area to net cultivated area expressed in percentage. This was calculated with the help of formula given by Singh (1981).

\[
\text{Cropping Intensity} = \frac{\text{Total cropped area in ha.}}{\text{Net cultivated area in ha.}} \times 100
\]

The respondents were classified into following three groups with the help of mean and S.D. viz.
### 4.7.2 MEASUREMENT OF DEPENDENT VARIABLES

#### 4.7.2.1 Knowledge

For measuring the knowledge of respondents about recommended crop production technology of castor as intercrop with groundnut, the teacher made index was developed and used.

The respondents were asked whether they know particular recommended crop production technology of castor as intercrop with groundnut or not. The total numbers of correct answers were calculated accordingly those who know that practice.

A unit score was given to correct and zero to incorrect response. The total score obtained by individual respondent for all the statements was calculated. The knowledge was calculated by using following formula

\[
K_i = \frac{X_1 + X_2 + \ldots + X_n}{N} \times 100
\]

Where as,

- \(K_i\) = Knowledge index
- \(X_1 + X_2 + \ldots + X_n\) = Total number of correct answers i.e. Total score
- \(N\) = Total number of items in the test
The respondents were classified into three categories of knowledge on the basis of mean and standard deviation as under:

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

4.7.2.2 Adoption

The adoption of recommended crop production technology of castor as intercrop with groundnut was divided into 16 different practices. It was decided by consulting the experts/scientists/extension workers working in the concern field. A comprehensive list of all the practices adopted by farmers under above sub heads was prepared. The different weightage was given to the each practice. The weightage of particular practice was determined by seeking the opinions of the expert scientist/extension workers, considering the total score 100 (Table 2). The farmers were asked about the practices they followed on their farm. Their responses were recorded in the schedule. The responses obtained from respondents were analyzed. The mean and standard deviation were calculated.

The respondents were grouped 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 adoption</td>
<td>Mean – S. D.</td>
</tr>
<tr>
<td>2.</td>
<td>Medium adoption</td>
<td>In between Mean ± S. D.</td>
</tr>
<tr>
<td>3.</td>
<td>High adoption</td>
<td>Mean + S. D.</td>
</tr>
</tbody>
</table>
Table 2. The weightage given to different practices in the scale

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of practices</th>
<th>Total score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Soil testing</td>
<td>4.00</td>
</tr>
<tr>
<td>2.</td>
<td>Preparatory tillage</td>
<td>4.30</td>
</tr>
<tr>
<td>3.</td>
<td>Improved varieties</td>
<td>9.50</td>
</tr>
<tr>
<td>4.</td>
<td>FYM/compost</td>
<td>5.40</td>
</tr>
<tr>
<td>5.</td>
<td>Chemical fertilizers</td>
<td>11.45</td>
</tr>
<tr>
<td>6.</td>
<td>Seed rate</td>
<td>10.55</td>
</tr>
<tr>
<td>7.</td>
<td>Seed treatment</td>
<td>10.05</td>
</tr>
<tr>
<td>8.</td>
<td>Sowing time</td>
<td>6.25</td>
</tr>
<tr>
<td>9.</td>
<td>Thinning and gap filling</td>
<td>4.75</td>
</tr>
<tr>
<td>10.</td>
<td>Sowing distance</td>
<td>5.20</td>
</tr>
<tr>
<td>11.</td>
<td>Depth of sowing</td>
<td>2.90</td>
</tr>
<tr>
<td>12.</td>
<td>Interculturing</td>
<td>4.25</td>
</tr>
<tr>
<td>13.</td>
<td>Weed control</td>
<td>5.00</td>
</tr>
<tr>
<td>14.</td>
<td>Plant protection measures</td>
<td>7.20</td>
</tr>
<tr>
<td>15.</td>
<td>Irrigation</td>
<td>5.50</td>
</tr>
<tr>
<td>16.</td>
<td>Harvesting</td>
<td>3.70</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

For measuring the adoption of recommended crop production technology of castor as intercrop with groundnut, the adoption index was developed and used. The scale developed by Chattopadhyay (1974) was used with slight modification.
The respondents were classified into three categories of knowledge on the basis of mean and standard deviation as under:

<table>
<thead>
<tr>
<th>Sr. No.</th>
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</thead>
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The respondents were grouped into three categories on the basis of mean and standard deviation.

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<tr>
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</tr>
<tr>
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</tr>
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</table>
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<table>
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<th>Name of practices</th>
<th>Total score (100)</th>
</tr>
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</tr>
<tr>
<td>4.</td>
<td>FYM/compost</td>
<td>5.40</td>
</tr>
<tr>
<td>5.</td>
<td>Chemical fertilizers</td>
<td>11.45</td>
</tr>
<tr>
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</tr>
<tr>
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<td>6.25</td>
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<td>9.</td>
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<tr>
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</tr>
<tr>
<td>16.</td>
<td>Harvesting</td>
<td>3.70</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

For measuring the adoption of recommended crop production technology of castor as intercrop with groundnut, the adoption index was developed and used. The scale developed by Chattopadhyay (1974) was used with slight modification.
AQ = \frac{\left( \frac{e_1}{P_1} \right) W_1 + \left( \frac{e_2}{P_2} \right) W_1 + \ldots + \left( \frac{e_n}{P_n} \right) W_n}{W \times N} \times 100

Where,

AQ = Adoption quotient

\( e_1, \ldots, e_n \) = Extent of adoption in terms of score obtained by the farmers for particular castor as intercrop with groundnut.

\( P_1, \ldots, P_n \) = Potentiality of the respondents in terms of score obtained for the particular practices.

\( W_1, \ldots, W_n \) = Weightage of the particular practice, for adoption score 1 and non-adoption score 0.

W = Summation of the weightage of all practices included.

N = Number of years for which adoption quotient was calculated.

4.7.3 Constraints faced by the respondents in adoption of recommended crop production technology of castor as intercrop with groundnut

For ascertaining the constraints faced by the respondents in adoption of castor as intercrop with groundnut an explorative study was made. The constraints were kept open before the respondents to offer their difficulties. The practice wise constraints were collected from the respondents and percentage was worked out for each constraint. To trace the relative importance of constraints, overall ranks were assigned on the basis of percentage.
4.7.4 Suggestions made by respondents to overcome the constraints

To overcome the practice wise constraints, the suggestions were kept open before the respondents. The suggestions were collected from the respondents and percentage were worked out. To trace the relative importance of the suggestion, the over all ranks were assigned on the basis of percentage.

4.8 TOOLS OF DATA COLLECTION AND FIELD PROSEDURES

4.8.1 Collection of data

The basic informations regarding the study were gathered from the records of Village panchayat, Taluka panchayat and office of the District panchayat, Sub divisional Agricultural Officers and several farmers growing castor as intercrop within groundnut.

After the primary survey, an interview schedule was prepared in light of objectives and the respondents were personally interviewed by the investigator.

The secondary data and other relevant informations for the study were gathered from the reference books, annual reports, bulletins journals and periodicals on the subject published by different authors, organizations, institutions and agencies.

4.8.2 Construction of interview schedule

To cover all pertinent aspects, in light of the objectives of the study, an interview schedule with questions (on all dependent and independent variables) was prepared for collection of data. A few modifications were made after of pre-testing. The final schedule was translated into vernacular Gujarati language and it was personally introduced to the respondents individually by following the principles of
interviewing to elicit better responses. The responses were recorded in the schedule itself.

4.9 **ANALYSIS OF THE DATA**

All the responses were recorded and transferred to master sheet. They were compiled, scored, tabulated and analyzed to give statistical treatments in such a way that they might give proper answer to the specific objective of the study. The following statistical tools were used for interpreting the data.

4.9.1 **Frequency and percentage**

Simple averages and percentages methods were extensively used to analyze the collected data.

4.9.2 **Mean score**

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

4.9.3 **Standard deviation**

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

\[
S.D = \sqrt{\frac{\sum (X_i - \bar{X})^2}{n - 1}}
\]

Where,

- \(X_i\) = individual score
- \(\bar{X}\) = mean score
- \(n\) = total number of respondents

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

\(X_i = \text{Mean} \pm S.D.\)
4.9.4 Coefficient of correlation (r)

To find out the relationship between dependent and independent variables, the Pearson’s product moment method of computing correlation coefficient, which provides generally accepted means for measuring the relationship, was used (Chandel, 1975).

Following formula was used to calculate the correlation coefficient (Garret, 1967).

\[
r = \frac{SP(XY)}{\sqrt{SS(x)SS(y)}}
\]

Where,
- \(r\) = Co-efficient of correlation
- \(X\) and \(Y\) = Two variables under study.
- \(SP\) (xy) = Sum of product of the deviations on \(x\) and \(y\) from their means.
- \(SS(x)\) = Sum of squares of deviations due to ‘\(x\)’ variable.
- \(SS(y)\) = Sum of squares of deviations due to ‘\(y\)’ variable.

For testing the significance of ‘\(r\),’ \(t\) value was calculated by using the following formula:

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

Where,
- \(t\) = Calculated ‘\(t\)’ value
- \(r\) = Coefficient of correlation
- \(n\) = Total member of observations.
4.10 RESEARCH HYPOTHESIS (IN NULL FORM)

H1: 1 There is no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and the personal characteristics of the respondents.

H1: 2 There is no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and the socio-economic characteristics of the respondents.

H1: 3 There is no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and the communication characteristics of the respondents.

H1: 4 There is no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and the psychological characteristics of the respondents.

H1: 5 There is no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and the situational characteristics of the respondents.

H2: 1 There is no relationship between the adoption of recommended crop production technology of castor as intercrop with groundnut and the personal characteristics of the respondents.

H2: 2 There is no relationship between the adoption of recommended crop production technology of castor as intercrop with groundnut and the socio-economic characteristics of the respondents.
H2: 3 There is no relationship between the adoption of recommended crop production technology of castor as intercrop with groundnut and the communication characteristics of the respondents.

H2: 4 There is no relationship between the adoption of recommended crop production technology of castor as intercrop with groundnut and the psychological characteristics of the respondents.

H2: 5 There is no relationship between the adoption of recommended crop production technology of castor as intercrop with groundnut and the situational characteristics of the respondents.
FINDINGS AND DISCUSSION
CHAPTER – V
FINDINGS AND DISCUSSION

This chapter deals with the findings and discussion of the study. The information collected through personal interview from the respondents was classified, tabulated and analyzed in light of the objectives of the study. The facts and findings of the study have been presented under the following heads:

5.1 Personal, socio-economic, communication, psychological and situational characteristics of the respondents.

5.2 Knowledge level of respondents about recommended crop production technology of castor as intercrop with groundnut.

5.3 Extent of adoption of respondents about recommended crop production technology of castor as intercrop with groundnut.

5.4 Relationship between knowledge level of respondents about recommended crop production technology of castor as intercrop with groundnut and their selected characteristics.

5.5 Relationship between adoption of respondents about recommended crop production technology of castor as intercrop with groundnut and their selected characteristics.

5.6 Constraints faced by respondents in adoption of respondents about recommended crop production technology of castor as intercrop with groundnut.

5.7 Suggestions from the respondents to overcome the constraints in adoption of recommended crop production technology of castor as intercrop with groundnut.
5.1 SELECTED CHARACTERISTICS OF RESPONDENTS

Knowledge and adoption of the recommended crop production technology of castor as intercrop with groundnut are mainly influenced by different characteristics of respondents. It was not possible to include all the characteristics of respondents growing the castor as intercrop with groundnut. However, some important characteristics of the respondents were selected and findings have been presented as under.

5.1.1 PERSONAL CHARACTERISTICS

5.1.1.1 Age

The data presented in Table 3 (1) indicated that 50.83 per cent of the respondents were from middle age group, whereas 28.33 and 20.83 per cent of the respondents belonged to the young and old age group, respectively.

The observed findings might be due to the fact that generally in the rural social system, the heads of the families who in majority cases were of middle aged, are used to take decisions in farming and other activities.

This finding was in conformity with the findings of Javia (2004), Tevethiya (2006) and Jadeja (2008).

5.1.1.2 Education

The data presented in Table 3 (2) indicated that 55.00 per cent of the respondents were educated up to primary level whereas, 23.33 per cent of the respondents were illiterate, 15.83 per cent of the respondents were educated up to secondary level and only 5.83 per cent of the respondents were educated up to higher secondary level.
Thus, the most of the respondents were middle aged. This might be due to lack of proper educational facilities in area under study, they could not get higher education. So, majority of the respondents were educated up to primary level. This finding was in conformity with the findings of Verma (2000) and Javia (2004).

Table 3. Distribution of the respondents according to their personal characteristics

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Young age group</td>
<td>34</td>
<td>28.33</td>
</tr>
<tr>
<td></td>
<td>(Up to 35 years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Middle age group</td>
<td>61</td>
<td>50.83</td>
</tr>
<tr>
<td></td>
<td>(36 to 50 years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Old age group</td>
<td>25</td>
<td>20.83</td>
</tr>
<tr>
<td></td>
<td>(Above 50 years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Illiterate</td>
<td>28</td>
<td>23.33</td>
</tr>
<tr>
<td></td>
<td>Primary</td>
<td>66</td>
<td>55.00</td>
</tr>
<tr>
<td></td>
<td>(1to7th standard)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>19</td>
<td>15.83</td>
</tr>
<tr>
<td></td>
<td>(8th to 10th standard)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Higher education</td>
<td>7</td>
<td>5.83</td>
</tr>
<tr>
<td></td>
<td>(Above 10th)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n = 120
5.1.2 SOCIO-ECONOMIC CHARACTERISTICS

5.1.2.1 Size of land holding

The data presented in Table 4 (1) revealed that about 65.83 per cent of respondents had medium size of land holding whereas, 20.83 and 13.33 per cent respondents possessed small and large size of land holding, respectively.

This might be due to the fact in rural areas yet joint family system is prevailing.

This finding was in conformity with the findings of Barad (2004), Tavethiya (2006) and Bharad (2007).

5.1.2.2 Annual income

The data presented in Table 4 (2) indicated that 61.67 per cent of the respondents had medium income (Rs 40,000 to 80,000). About 26.67 per cent of the respondents were from high income group. Whereas, 11.67 per cent of the respondents were from low income group (below Rs 40,000).

The probable reason for this might be that the castor is kharif crop and give good performance as intercrop with groundnut even though less rainfall and that is why the farmers are getting assured average yield. Therefore, majority respondents viz., 61.67 per cent and 26.67 per cent were from the categories of medium and high-income group, respectively.

The finding was in line with the findings of Jadav (2001), Chavada (2005) and Kamani (2007).

5.1.2.3 Social participation

Data presented in Table 4 (3) revealed that 52.50 per cent of the respondents had medium level of social participation, followed by low (33.33 per cent) and high (14.16 per cent) social participation.
Table 4. Distribution of the respondents according to their socio-economic characteristics

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Size of land holding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Small size (up to 1ha)</td>
<td>25</td>
<td>20.83</td>
</tr>
<tr>
<td></td>
<td>Medium size (1 to 2 ha)</td>
<td>79</td>
<td>65.83</td>
</tr>
<tr>
<td></td>
<td>Large size (above 2 ha)</td>
<td>16</td>
<td>13.33</td>
</tr>
<tr>
<td>2.</td>
<td>Annual income</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>14</td>
<td>11.67</td>
</tr>
<tr>
<td></td>
<td>(Up to Rs. 40,000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>74</td>
<td>61.67</td>
</tr>
<tr>
<td></td>
<td>(Rs. 40,000 to 80,000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>32</td>
<td>26.67</td>
</tr>
<tr>
<td></td>
<td>(Above Rs. 80,000)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Social participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low social participation</td>
<td>40</td>
<td>33.33</td>
</tr>
<tr>
<td></td>
<td>(Below 1.08)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium social participation</td>
<td>63</td>
<td>52.50</td>
</tr>
<tr>
<td></td>
<td>(1.08 to 3.46)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High social participation</td>
<td>17</td>
<td>14.16</td>
</tr>
<tr>
<td></td>
<td>(Above 3.46)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean = 2.27 S.D. = 1.19</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is known that there are many co-operative organizations in Gujarat state. Most of villages of this area having at least two co-operative societies viz., service cooperative society and milk producers co-operative society. The majority of the farmers were members of both of these co-operative societies. Moreover,
some farmers were also found members of other organizations. Therefore, majority of the respondents were belonged to medium level of social participation.

This result was supported by Javia (2004) and Dalsaniya (2010).

5.1.3 COMMUNICATION CHARACTERISTICS

5.1.3.1 Localite -cosmopolite value orientation

It is evident from Table 5 (1) that 56.66 per cent of the respondents had medium localite- cosmopolite value orientation, whereas 24.16 and 19.16 per cent of them had low and high localite-cosmopolite value orientation, respectively.

This might be due to the fact that most of the respondents believed to have contact with outside agencies to satisfy some of their needs pertaining to the recommended crop production technology of castor as intercrop with groundnut.

This finding was supported by Kamani (2007) and Satasiya (2008).

5.1.3.2 Extension participation

The data regarding extension participation are presented in Table 5 (2). On the basis of data, it is clear that 68.33 per cent of the respondents had medium extension participation, whereas 21.67 and 10.00 per cent of them had low and high extension participation, respectively.

It can be inferred that the farmers of this area are always in need of information related to crop production technology and that is why they participate in different extension activities. However, they are not participating all extension programmes. Therefore, majority of the respondents belonged to medium extension participation group.
This finding was likes of that of the findings of Verma (2000) and Chavada (2006).

Table 5. Distribution of the respondents according to their communication characteristics

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Localite-cosmopolite value orientation</td>
<td>29</td>
<td>24.16</td>
</tr>
<tr>
<td></td>
<td>(Below 8.04)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium localite cosmopolite value orientation</td>
<td>68</td>
<td>56.66</td>
</tr>
<tr>
<td></td>
<td>(8.04 to 15.24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High localite- cosmopolite value orientation</td>
<td>23</td>
<td>19.16</td>
</tr>
<tr>
<td></td>
<td>(Above 15.24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean = 11.64   S.D. = 3.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Extension participation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low extension participation</td>
<td>26</td>
<td>21.67</td>
</tr>
<tr>
<td></td>
<td>(Below 13.57)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium extension participation</td>
<td>82</td>
<td>68.33</td>
</tr>
<tr>
<td></td>
<td>(13.57 to 30.51)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High extension participation</td>
<td>12</td>
<td>10.00</td>
</tr>
<tr>
<td></td>
<td>(Above 30.51)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean = 22.04   S.D. = 8.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass media exposure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-------</td>
<td>-------</td>
<td></td>
</tr>
<tr>
<td>Low mass media exposure</td>
<td>24</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>(Below 7.36)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium mass media exposure</td>
<td>68</td>
<td>56.66</td>
<td></td>
</tr>
<tr>
<td>(7.36 to 14.56)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High mass media exposure</td>
<td>28</td>
<td>23.33</td>
<td></td>
</tr>
<tr>
<td>(Above 14.56)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean = 10.96  S.D. = 3.60</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5.1.3.3 Mass media exposure

The data presented in Table 5 (3) revealed that 56.66 per cent of the respondents had medium level of mass media exposure, whereas 23.33 and 20.00 per cent of them had high and low level of mass media exposure, respectively.

This might be due to the fact that in the rural area the modern means of communication is not still popular or the programmes related to agriculture are not regularly attended by the farmers.

This finding was in line with the findings of Bharad (2007) and Dalsaniya (2010).

### 5.1.4 PSYCHOLOGICAL CHARACTERISTICS

#### 5.1.4.1 Innovativeness

It is apparent from the Table 6 (1) that 49.17 per cent of the respondents were found to have medium innovativeness, whereas 35.83 and 15.00 per cent of them had high and low innovativeness, respectively.

Out of total 85.00 per cent had medium and high innovativeness is found in this area because the farmers of this area are educated and progressive in nature.
This finding was in concurrence with the findings of Chavada (2005) and Satasiya (2008).

Table 6. Distribution of the respondents according to their psychological characteristics

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Innovativeness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low innovativeness</td>
<td>18</td>
<td>15.00</td>
</tr>
<tr>
<td></td>
<td>Medium innovativeness</td>
<td>59</td>
<td>49.17</td>
</tr>
<tr>
<td></td>
<td>High innovativeness</td>
<td>43</td>
<td>35.83</td>
</tr>
<tr>
<td>2.</td>
<td>Risk orientation</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low risk orientation</td>
<td>23</td>
<td>19.17</td>
</tr>
<tr>
<td></td>
<td>(Below 7.69)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium risk orientation</td>
<td>81</td>
<td>67.50</td>
</tr>
<tr>
<td></td>
<td>(7.69 to 14.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High risk orientation</td>
<td>16</td>
<td>13.33</td>
</tr>
<tr>
<td></td>
<td>(Above 14.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean = 10.92 S.D. = 3.23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.1.4.2 Risk orientation

The data presented in Table 6 (2) clearly indicated that 67.50 per cent respondents belonged to medium risk orientation group, followed by 19.17 and 13.33 per cent respondents were from low and high risk orientation, respectively.

Therefore, it can be concluded that majority of the respondents opted for medium risk in adoption of recommended crop production technology of castor as intercrop with groundnut.
Similar findings were reported by Sahay (2004) and Dalsaniya (2010).

5.1.5 SITUATIONAL CHARACTERISTICS

5.1.5.1 Irrigation potentiality

The data in Table 7 (1) reported that 39.17 per cent respondents having bore well as irrigation facility. Whereas, 20.83 per cent respondents were found using well and canal for irrigating their crops. Only 16.67 per cent respondents had canal to irrigate their crops. Remaining 15.00 and 8.33 per cent respondents had well and check dams as irrigation source, respectively.

Therefore, it can be concluded that majority 75.00 per cent of the farmers had well, bore well and well with canal as irrigation sources. This might be due to the fact that in the study area, the bore well is the main irrigation source of common to most of the farmers.

This finding was in line with the findings of Jadav (2001) and Bharad (2007).

5.1.5.2 Cropping intensity

The data presented in Table 7 (2) revealed that 60.83 per cent respondents had medium cropping intensity, followed by 22.50 and 16.67 per cent respondents were high and low cropping intensity, respectively.

This might be due to the fact that climatic conditions, structure and soil texture are suitable for castor as intercrop with groundnut.

This finding was in conformity with findings of Jadav (2001) and Kumbhani (2009).
Table 7. Distribution of the respondents according to their situational characteristics.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Irrigation Potentiality</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well</td>
<td>18</td>
<td>15.00</td>
</tr>
<tr>
<td></td>
<td>Canal</td>
<td>20</td>
<td>16.67</td>
</tr>
<tr>
<td></td>
<td>Well + Canal</td>
<td>25</td>
<td>20.83</td>
</tr>
<tr>
<td></td>
<td>Bore well</td>
<td>47</td>
<td>39.17</td>
</tr>
<tr>
<td></td>
<td>Check Dam</td>
<td>10</td>
<td>8.33</td>
</tr>
<tr>
<td>2.</td>
<td>Cropping intensity</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low cropping intensity</td>
<td>20</td>
<td>16.67</td>
</tr>
<tr>
<td></td>
<td>(Below 170.41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium cropping intensity</td>
<td>73</td>
<td>60.83</td>
</tr>
<tr>
<td></td>
<td>(170.41 to 240.80)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High cropping intensity</td>
<td>27</td>
<td>22.50</td>
</tr>
<tr>
<td></td>
<td>(Above 240.80)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean = 205.60</td>
<td></td>
<td>S.D. = 35.19</td>
</tr>
</tbody>
</table>

5.2 KNOWLEDGE LEVEL OF THE RESPONDENTS ABOUT RECOMMENDED CROP PRODUCTION TECHNOLOGY OF CASTOR AS INTERCROP WITH GROUNDNUT

As discussed in the methodology to measure the knowledge of respondents about recommended crop production technology of castor as intercrop with groundnut. A teacher made knowledge index was developed and used. The knowledge score of respondents about recommended crop production technology of castor as intercrop with groundnut was calculated as sum of the correct responses and
converted in to percentages. The respondents were classified into three categories based on mean and S.D.

Low knowledge group = mean - 1(S.D.)

(Below 50.39 Score)

Medium knowledge group = mean + 1(S.D.)

(50.39 to 74.60 Score)

High knowledge group = mean + 2(S.D.)

(Above 74.60 Score)

The knowledge of respondents about the recommended crop production technology of castor as intercrop with groundnut is presented in Table 8 and depicted in Figure 4.

Table 8. Distribution of respondents based on their knowledge about recommended crop production technology of castor as intercrop with groundnut.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Knowledge score</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Below 50.39</td>
<td>24</td>
<td>10.00</td>
</tr>
<tr>
<td>Medium</td>
<td>50.39 to 74.60</td>
<td>78</td>
<td>33.33</td>
</tr>
<tr>
<td>High</td>
<td>Above 74.60</td>
<td>18</td>
<td>7.50</td>
</tr>
<tr>
<td>Mean = 62.49</td>
<td>S.D. = 12.10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the Table 8 and Figure 4, it is clear that the percentage of the respondents were from medium knowledge group with respect to recommended crop production technology of castor as intercrop with groundnut. The respondents in high and low knowledge group were (20.00 and 15.00 per cent) of respondents were in high and low knowledge group, respectively.
Fig. 4 Knowledge level of respondents about recommended crop production technology of castor as intercrop with groundnut
This might be due to fact that the respondents had medium social participation, medium risk orientation and medium extension participation. These factors had favorably helped the respondents in getting more knowledge about recommended crop production technology of castor as intercrop with groundnut.

This finding is in line with the findings of Javia (2004), Patel (2005), Tavethiya (2006), Jadeja (2008) and Satasiya (2008).

5.3 EXTENT OF ADOPTION OF RESPONDENTS ABOUT RECOMMENDED CROP PRODUCTION TECHNOLOGY OF CASTOR AS INTERCROP WITH GROUNDNUT

The data regarding the extent of adoption of respondents about recommended crop production technology of castor as intercrop with groundnut were collected. As discussed in the methodology, the teacher made adoption index was developed and used to measure the adoption of recommended crop production technology of castor as intercrop with groundnut. The scale developed by Chattopadhyay (1974) was used with slight modification. Extent of adoption of respondents was calculated based on maximum score obtained by them. The respondents were classified into three categories on the basis of mean and standard deviation.

Low adoption = Mean – S.D.  
(Below 52.83 Score)

Medium adoption = Mean ± S.D.  
(52.83 to 76.84 Score)

High adoption = Mean + S.D.  
(Above 76.84 Score)
These data regarding adoption about recommended crop production technology of castor as intercrop with groundnut are presented in Table 9 and also depicted diagrammatically in Figure 5.

From the perusal of the data in Table 9 and Figure 5, it is clear that 60.00 per cent of the respondents had medium extent of adoption about recommended crop production technology of castor as intercrop with groundnut. The considerable amount (21.67 and 18.33 per cent) of respondents were in low and high adoption group.

**Table 9. Distribution of respondents based on their adoption about recommended crop production technology of castor as intercrop with groundnut**

<table>
<thead>
<tr>
<th>Categories</th>
<th>Adoption score</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Below 52.81</td>
<td>26</td>
<td>21.67</td>
</tr>
<tr>
<td>Medium</td>
<td>52.81 to 76.83</td>
<td>72</td>
<td>60.00</td>
</tr>
<tr>
<td>High</td>
<td>Above 76.83</td>
<td>22</td>
<td>18.33</td>
</tr>
<tr>
<td>Mean</td>
<td>64.82</td>
<td>S.D. = 12.01</td>
<td></td>
</tr>
</tbody>
</table>

It can be concluded that the majority of the respondents were in medium extent of adoption of the recommended crop production technology of castor as intercrop with groundnut, followed by low and high group, respectively. This might be due to fact that the majority of the respondents had medium level of knowledge regarding recommended crop production technology of castor as intercrop with groundnut, social participation and risk orientation.
Fig. 5 Extent of adoption of respondents about recommended crop production technology of castor as intercrop with groundnut.
This finding was in conformity with findings of Patel et al. (2000), Vekaria et al. (2000), Jadav (2001), Barad (2004), Sahani (2006), Bharad (2007), and Sathaya (2008).

To ascertain the practicewise extent of adoption of recommended crop production technology of castor as intercrop with groundnut by the respondents, the recommended practices of castor as intercrop with groundnut were divided into 16 practises (as given in the methodology) and weightages of all practises were assigned to make a total of 100 for all production technologies of castor as intercrop with groundnut. On the basis of practicewise scores obtained in adopting a particular practice, the mean score was worked out for all individual practice. These mean scores were again converted into percentage for all the recommended practices. The ranks were assigned to each practice. The results are presented in table 10 and also depicted in fig 6.

The data presented in table 10 and fig. 6 clearly indicated that the level of adoption was found very high (more than 70 per cent) in practises like, sowing time (rank I), harvesting (rank II), preparatory tillage (rank III), interculturating (rank IV), improved varieties (rank V), thinning and gap filling (rank VI) and irrigation (rank VII).

The probable reason for the above facts might be that all above practises are low cost and have high importance for getting higher yield.

The moderate level of adoption (more than 50 per cent) was found in practises like depth of sowing (rank VII), seed treatment (rank IX), FYM/compost (rank X) and chemical fertilizers (rank XI).
### Table 10. Practicewise adoption of the respondents about recommended crop production technology of castor as intercrop with groundnut

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of practices</th>
<th>Total score (100)</th>
<th>Mean score obtained</th>
<th>Percent</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Soil testing</td>
<td>4.00</td>
<td>1.26</td>
<td>31.50</td>
<td>XVI</td>
</tr>
<tr>
<td>2</td>
<td>Preparatory tillage</td>
<td>4.30</td>
<td>3.44</td>
<td>80.00</td>
<td>III</td>
</tr>
<tr>
<td>3</td>
<td>Improved varieties</td>
<td>9.50</td>
<td>7.33</td>
<td>77.15</td>
<td>V</td>
</tr>
<tr>
<td>4</td>
<td>FYM/compost</td>
<td>5.40</td>
<td>3.55</td>
<td>65.74</td>
<td>X</td>
</tr>
<tr>
<td>5</td>
<td>Chemical fertilizers</td>
<td>11.45</td>
<td>6.09</td>
<td>53.18</td>
<td>XI</td>
</tr>
<tr>
<td>6</td>
<td>Seed rate</td>
<td>10.55</td>
<td>4.20</td>
<td>39.81</td>
<td>XIII</td>
</tr>
<tr>
<td>7</td>
<td>Seed treatment</td>
<td>10.05</td>
<td>6.76</td>
<td>67.26</td>
<td>IX</td>
</tr>
<tr>
<td>8</td>
<td>Sowing time</td>
<td>6.25</td>
<td>5.68</td>
<td>90.88</td>
<td>I</td>
</tr>
<tr>
<td>9</td>
<td>Thinning and gap filling</td>
<td>4.75</td>
<td>3.58</td>
<td>75.36</td>
<td>VI</td>
</tr>
<tr>
<td>10</td>
<td>Sowing distance</td>
<td>5.20</td>
<td>2.12</td>
<td>40.76</td>
<td>XII</td>
</tr>
<tr>
<td>11</td>
<td>Depth of sowing</td>
<td>2.90</td>
<td>1.97</td>
<td>67.93</td>
<td>VIII</td>
</tr>
<tr>
<td>12</td>
<td>Interculturing</td>
<td>4.25</td>
<td>3.34</td>
<td>78.58</td>
<td>IV</td>
</tr>
<tr>
<td>13</td>
<td>Weed control</td>
<td>5.00</td>
<td>1.83</td>
<td>36.60</td>
<td>XV</td>
</tr>
<tr>
<td>14</td>
<td>Plant protection measures</td>
<td>7.20</td>
<td>2.74</td>
<td>38.05</td>
<td>XIV</td>
</tr>
<tr>
<td>15</td>
<td>Irrigation</td>
<td>5.50</td>
<td>3.94</td>
<td>71.63</td>
<td>VII</td>
</tr>
<tr>
<td>16</td>
<td>Harvesting</td>
<td>3.70</td>
<td>3.26</td>
<td>88.10</td>
<td>II</td>
</tr>
</tbody>
</table>

The low level of adoption (less than 50 per cent) was found in practices like sowing distance (rank XII), seed rate (rank XIII), plant protection measures (rank XIV), weed control (rank XV) and soil testing (rank XVI).
Fig. 6 Practice wise adoption of respondents about recommended crop production technology of castor as intercrop with groundnut
The probable reason for the above facts might be that of technical guidance, high price of insecticides and fungicides. The soil testing laboratory is situated in the district. Hence, this practice was less adopted by the respondents.

5.4 RELATIONSHIP BETWEEN KNOWLEDGE LEVEL OF RESPONDENTS ABOUT RECOMMENDED PRODUCTION TECHNOLOGY OF CASTOR AS INTERCROP WITH GROUNDNUT AND THEIR SELECTED CHARACTERISTICS

In order to ascertain the relationship between the level of knowledge of the farmers and each of their selected characteristics, the correlation co-efficient (r) were calculated. The empirical hypotheses were stated for testing the relationship and its significance on zero order correlation are given in Table 11.

5.4.1 Age and knowledge

The data presented in Table 11 were used for testing null hypothesis (H1: 1) that there was no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and age of the respondents.

The calculated value of correlation co-efficient (r = 0.188) was found significant at 0.05 level. Thus, null hypothesis was rejected.

It can be concluded that there was negative and significant relationship between knowledge of recommended production technology of castor as intercrop with groundnut and age of the respondents. The direction of relationship was
negative and significant which indicated that knowledge of respondents increased significantly with decreased in their age up to certain level.

This might be due to fact that the young age farmers played appreciable role in seeking latest technological know how farm decisions, further; the young farmers might be progressive in nature and always eager to take risk. Thus, young age played an important role in shaping the positive knowledge towards recommended crop production technology of castor as intercrop with groundnut.

This finding was in conformity with the findings of Nurzaman et al. (2001), and Jadav et al. (2003).

5.4.2 Education and knowledge

The data shown in Table 11 used for testing null hypothesis (H1: 1) that there was no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and education of the respondents.

The calculated correlation co-efficient value (r = 0.2743) was found significant at 0.01 level. Thus, the null hypothesis was rejected.

It can be concluded, that there was positive and highly significant relationship between knowledge of recommended crop production technology of castor as intercrop with groundnut and education of the respondents. It means knowledge of respondents increase significantly with an increase in education.

This might be due to the fact the educated farmers generally have high extension participation, high innovativeness, and also have progressive out look and rational thinking. Thus,
they understand the importance of recommended crop production technology of castor as intercrop with groundnut. This finding was in line with that of Sanoo (2004) and Chaudhary (2006).

5.4.3 Size of land holding and knowledge

The data presented in Table 11 were used for testing null hypothesis (H1: 2) that there was no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and size of land holding of the respondents.

The calculated correlation coefficient value (r = 0.2234) was significant at 0.05 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and significant relationship between knowledge of recommended crop production technology of castor as intercrop with groundnut and size of land holding of the respondents. It means knowledge of respondents increase significantly with an increase in size of land holding.

This might be due to the fact that most of the respondents were from medium size land holding which had not influenced the knowledge of respondents about recommended crop production technology of castor as intercrop with groundnut.

This finding was in conformity with the findings of Patel (2005).

5.4.4 Annual income and knowledge

The data presented in Table 11 were used for testing null hypothesis (H1: 2) that there was no relationship between the knowledge of recommended crop production technology of
castor as intercrop with groundnut and annual income of the respondents.

The calculated correlation co-efficient value \( r = 0.1258 \) was found non significant at 0.05 level. Thus, the null hypothesis was accepted.

It can be inferred that there was positive and non significant relationship between knowledge and their annual income. It means knowledge of respondents was not related with annual income of the respondents.

It can be concluded that respondents irrespective of annual income were going for adoption of recommended technologies to ensure higher production and thus, they did not have any concern with their annual income to know and adopt the recommended crop production technology of castor as intercrop with groundnut.

This finding was in conformity with the findings of Tavethiya (2006) and Kumbhani (2009).

5.4.5 Social participation and knowledge

The data in Table 11 were used for testing null hypothesis (H1: 2) that there was no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and social participation of the respondents.

The calculated correlation co-efficient value \( r = 0.1981 \) was found significant at 0.05 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and significant relationship between knowledge of respondents about recommended crop production technology of castor as intercrop with groundnut and their social participation. It means
knowledge of respondents increase significantly with an increase in social participation.

This might be due to fact that, those who have participated in the programmes organized by various organizations might have been in close contact with various sources of information. These organizations might have facilitated them for getting latest information about recommended crop production technology and castor as intercrop with groundnut.

This finding was in conformity with Barad (2004), Chavada (2005) and Tavethiya (2006).

5.4.6 Localite-cosmopolite value orientation and knowledge

The data shown in Table 11 used for testing null hypothesis (H1: 3) that there was no relationship between the knowledge of recommended crop production technology and castor as intercrop with groundnut and localite-cosmopolite value orientation of the respondents.

The calculated correlation co-efficient value ($r = 0.2107$) was significant at 0.05 level. Thus, null hypothesis was rejected.

It can be concluded that there was positive and significant relationship between knowledge of respondents and their localite cosmopolite value orientation. It means knowledge of respondents increase significantly with an increase in localite-cosmopolite value orientation.

The probable reason might be that respondents keeps frequent contacts with Village Level Workers (VLWs) were also went out side their village and visiting an agricultural institutes. These phenomena created favorable attitude towards improved castor as intercrop with groundnut practices. Those farmers who went outside their village got more information about these
practices, which led them to have more knowledge recommended crop production technology of castor with groundnut.

This finding was in conformity with Kulkarni (2008).

**Table 11. Correlation between knowledge of the respondents about recommended crop production technology of castor as intercrop with groundnut**

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Name of the independent variables</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td>0.21885</td>
</tr>
<tr>
<td>2.</td>
<td>Education</td>
<td>0.2796</td>
</tr>
<tr>
<td>3.</td>
<td>Size of land holding</td>
<td>0.5286</td>
</tr>
<tr>
<td>4.</td>
<td>Annual income</td>
<td>0.5286</td>
</tr>
<tr>
<td>5.</td>
<td>Social participation</td>
<td>0.3861</td>
</tr>
<tr>
<td>6.</td>
<td>Localite-cosmopolite value orientation</td>
<td>0.5184</td>
</tr>
<tr>
<td>7.</td>
<td>Extension participation</td>
<td>0.3861</td>
</tr>
<tr>
<td>8.</td>
<td>Mass media exposure</td>
<td>0.2645</td>
</tr>
<tr>
<td>9.</td>
<td>Innovativeness</td>
<td>0.3861</td>
</tr>
<tr>
<td>10.</td>
<td>Risk orientation</td>
<td>0.2925</td>
</tr>
<tr>
<td>11.</td>
<td>Irrigation potentiality</td>
<td>0.1806</td>
</tr>
<tr>
<td>12.</td>
<td>Cropping intensity</td>
<td>0.3861</td>
</tr>
</tbody>
</table>

* Significant at 0.05 level $r = 0.1740$

** Significant at 0.01 level $r = 0.2280$

NS = Non significant
5.4.7 Extension participation and knowledge

The data presented in Table 11 were used to examine the hypothesis (H1: 3) that there was no relationship between knowledge of recommended crop production technology of castor as intercrop with groundnut and extension participation of the respondents.

The calculated correlation coefficient was \( r = 0.3061 \) significant at 0.01 level. Thus, null hypothesis was rejected.

It can be concluded that there was a significant relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and extension participation of the respondents. In means knowledge of respondents increase significantly with an increase in extension participation.

This might be due to fact that the respondents who have participated in various extension activities might have acquired higher knowledge and better understanding and ultimately they might have known more about different recommended crop production technology of castor as intercrop with groundnut.

Similar finding had been reported by Sahoo (2004) and Jadeja (2008).

5.4.8 Mass media exposure and knowledge

The data presented in Table 11 were used to examine the hypothesis (H1: 4) that there was no relationship between knowledge of recommended crop production technology of mass media exposure and extension participation of the respondents.
The calculated correlation co-efficient value \( r = 0.2046 \) was found significant at 0.05 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and significant relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and mass media exposure of the respondents. It means knowledge of respondents increase significantly with an increase in mass media exposure.

This might be due to the fact that respondents having higher exposure to mass media including magazine could get more useful information for their farming. They could get more benefits of the mass media. Thus, mass media played vital role for the enhancement of knowledge in relation to recommended crop production technology of castor as intercrop with groundnut.

This finding was in conformity with the findings of Tavethiya (2006) and Dalsaniya (2010).

5.4.9 Innovativeness and knowledge

The data presented in the Table 11 were used for testing null hypothesis (H1: 4) that there was no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and innovativeness of the respondents.

The calculated correlation co-efficient value \( r = 0.3364 \) was found significant at 0.01 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and highly significant relationship between the knowledge of recommended
crop production technology of castor as intercrop with groundnut and innovativeness of the respondents.

This means that as the innovativeness of the respondents increased their level of knowledge about recommended crop production technology of castor as intercrop with groundnut which might be due the frequent contacts with extension functionaries in their jurisdiction and outside.

This finding was in line with findings of Patel (2005) and Kumbhani (2009).

5.4.10 Risk orientation and knowledge

The data presented in Table 11 were used for testing null hypothesis (H1: 4) that there was no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and risk orientation of the respondents.

The calculated correlation co-efficient value ($r = 0.2925$) was found significant at 0.01 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and highly significant relationship between knowledge of recommended crop production technology of castor as intercrop with groundnut and risk orientation of the respondents. It means knowledge of respondents increase significantly with an increase in risk orientation.

The probable reason for this result could be that area under study is rainfed. The rainfall is erratic, scanty and uncertain. The frequent drought is common feature in the area under study. Under such situation, risk is inevitable which develop risk-bearing capacity among respondents.
This finding was in conformity with the findings of Tavethiya (2006) and Chauhan (2008).

5.4.11 Irrigation potentiality and knowledge

The data presented in Table 11 were used for testing null hypothesis (H1: 5) that there was no relationship between the knowledge of recommended crop production technology of castor as intercrop with groundnut and irrigation potentiality of the respondents.

The calculated correlation coefficient value \( r = 0.1806 \) was found significant at 0.05 level. Thus, null hypothesis was rejected.

It can be concluded that there was positive and significant relationship between knowledge of recommended crop production technology of castor as intercrop with groundnut and irrigation potentiality of the respondents. It means knowledge of respondents increase significantly with an increase in irrigation potentiality.

The probable reason for this result could be that the integrated irrigation system would have definitely have given more yield. As a result the income might have been increased. This might have motivated them in acquiring more knowledge regarding the recommended crop production technology of castor as intercrop with groundnut.

This finding was in line with the findings of Jadav (2001) and Chavada (2005).

5.4.12 Cropping intensity and knowledge

The data presented in Table 11 were used for testing null hypothesis (H1: 5) that there was no relationship between the
knowledge of recommended crop production technology of castor as intercrop with groundnut and cropping intensity of the respondents.

The calculated correlation co-efficient value \( r = 0.2688 \) was found significant at 0.01 level. Thus, null hypothesis was rejected.

It can be concluded that there was positive and highly significant relationship between crop intensity and knowledge of recommended crop production technology of castor as intercrop with groundnut. It means knowledge of respondents increase significantly with an increase in crop intensity.

This might be due to the fact the cropping intensity as per the recommended package of practices for the castor as intercrop with groundnut crop would have increased the yield. So, the experience might have influenced the knowledge of respondents about recommended crop production technology of castor as intercrop with groundnut.

This finding was in conformity with the findings of Jadav (2001) and Satasiya (2008).

5.5 RELATIONSHIP BETWEEN ADOPTION OF RESPONDENTS ABOUT RECOMMENDED CROP PRODUCTION TECHNOLOGY OF CASTOR AS INTERCROP WITH GROUNDNUT AND THEIR SELECTED CHARACTERISTICS.

In order to ascertain the relationship between extent of adoption of the farmers and their selected characteristics the correlation coefficient (‘r’ value) were calculated. The empirical hypotheses were stated for testing the relationship and their
significant on zero order correlation. The results of correlation are given in Table 12.

5.5.1 Age and extent of adoption

The data presented in Table 12 were used to testing null hypothesis (H2: 1) that there was no relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and age of the respondents.

The calculated correlation co-efficient value ($r = -0.2137$) was found significant at 0.05 level. Thus, null hypothesis was rejected.

It can be concluded that there was negative and significant relationship between adoption of respondents about recommended crop production technology of castor as intercrop with groundnut and their age. The direction of relationship was negative and significant which indicated that adoption of respondents about recommended crop production technology of castor as intercrop with groundnut increased significantly with decrease in their age.

The probable reason for this might be that majority of the young respondents were educated and having more social participation and having good knowledge regarding recommended crop production technology of castor as intercrop with groundnut.

This finding was in line with the findings of Kotadiya (2006) and Kamani (2007).

5.5.2 Education and extent of adoption

The data in Table 12 were used for testing null hypothesis (H2: 1) that there was no relationship between adoption of
recommended crop production technology of castor as intercrop with groundnut and education of the respondents.

The calculated correlation co-efficient value \( r = 0.2318 \) was found significant at 0.01 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and highly significant relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and education of the respondents. It means adoption of respondents increase significantly with an increase in education.

The probable reason might be that the educated respondents understand the importance of innovations could have quickly and easily adopted the production technology. They might have also kept faith in new research and possessed higher change proneness.

This result was supported by the findings of Kamani (2007) and Satasiya (2008).

5.5.3 Size of land holding and extent of adoption

The data presented in Table 12 were used for testing null hypothesis (H2: 2) that there was no relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and size of land holding of the respondents.

The calculated correlation co-efficient value \( r = 0.1291 \) was found non significant at 0.05 level. Thus, null hypothesis was accepted.

It can be concluded that there was positive and non significant relationship between adoption recommended crop
production technology of castor as intercrop with groundnut and size of land holding of the respondents.

This might be due to the fact that irrespective of size of land holding majority the respondents inclined to adopt the recommended crop production technology of castor as intercrop with groundnut, equally for getting higher yield and income.

This finding was supported by the finding of Ranganathan et al. (2001).

5.5.4 Annual income and extent of adoption

The data presented in Table 12 were used for testing null hypothesis (H2: 2) that there was no relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and annual income of the respondents.

The calculated correlation co-efficient value ($r = 0.1584$) was found non significant. Thus, null hypothesis was accepted.

It can be inferred that there was positive and non significant relationship between adoption recommended crop production technology of castor as intercrop with groundnut and annual income of the respondents. It means adoption of respondents was not related with annual income of the respondents.

This might be due to the fact that the respondents who had higher income might have other sources of income. This might have showed the non significant relationship of annual income and adoption of recommended crop production technology of castor as intercrop with groundnut.

This finding was supported by finding of Chavada (1998) and Kamani (2007).
### Table 12. Correlation between adoption of the respondents about recommended crop production technology of castor as intercrop with groundnut and independent variables

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Name of the independent variables</th>
<th>‘r’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td>-0.2137*</td>
</tr>
<tr>
<td>2.</td>
<td>Education</td>
<td>0.2318**</td>
</tr>
<tr>
<td>3.</td>
<td>Size of land holding</td>
<td>0.1291NS</td>
</tr>
<tr>
<td>4.</td>
<td>Annual income</td>
<td>0.1584NS</td>
</tr>
<tr>
<td>5.</td>
<td>Social participation</td>
<td>0.2057*</td>
</tr>
<tr>
<td>6.</td>
<td>Localite-cosmopolite value orientation</td>
<td>0.1982*</td>
</tr>
<tr>
<td>7.</td>
<td>Extension participation</td>
<td>0.3123**</td>
</tr>
<tr>
<td>8.</td>
<td>Mass media exposure</td>
<td>0.2192*</td>
</tr>
<tr>
<td>9.</td>
<td>Innovativeness</td>
<td>0.3767**</td>
</tr>
<tr>
<td>10.</td>
<td>Risk orientation</td>
<td>0.1839*</td>
</tr>
<tr>
<td>11.</td>
<td>Irrigation potentiality</td>
<td>0.1411NS</td>
</tr>
<tr>
<td>12.</td>
<td>Cropping intensity</td>
<td>0.2913**</td>
</tr>
</tbody>
</table>

* Significant at 0.05 level $r = 0.1740$

** Significant at 0.01 level $r = 0.2280$

NS = Non significant

#### 5.5.5 Social participation and extent of adoption

The data presented in Table 12 were used for testing null hypothesis (H2: 2) that there was no relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and social participation of the respondents.
The calculated correlation co-efficient value \((r = 0.2057)\) was found significant at 0.05 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and significant relationship between adoption recommended crop production technology of castor as intercrop with groundnut and social participation of the respondents. It means adoption of respondents increase significantly with an increase in social participation.

The probable reason for this might be that more social participation provides more in-depth information and better understanding to the respondents, which led them to adopt the recommended crop production technology of castor as intercrop with groundnut in a better way.

This finding was in conformity with the findings of Barad (2004), Satasiya (2008) and Dalsaniya (2010).

5.5.6 Localite-cosmopolite value orientation and extent of adoption

The data in Table 12 were used for testing null hypothesis \((H2: 3)\) that there was no relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and localite-cosmopolite value orientation of the respondents.

The calculated correlation co-efficient value \((r = 0.1982)\) was found significant at 0.05 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and significant relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and localite-
cosmopolite value orientation of the respondents. It means adoption of respondents increases significantly with an increase in localite-cosmopolite value orientation.

The probable reason might be that respondents who kept frequent contacts with extension functionaries and those who were had higher adoption extravert in nature and visiting an agricultural institutes. These phenomena created favorable adoption towards recommended crop production technology of castor as intercrop with groundnut.

This finding was supported by finding of Satasiya (2008).

5.5.7 Extension participation and extent of adoption

The data in Table 12 were used for testing null hypothesis (H2: 3) that there was no relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and extension participation of the respondents.

The calculated correlation coefficient value ($r = 0.3123$) was found significant at 0.01 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and highly significant relationship between adoption recommended crop production technology of castor as intercrop with groundnut and extension participation of the respondents. It means adoption of respondents increase significantly with an increase in extension participation.

The probable reason might be that due to more participation in extension activities the respondents acquired more knowledge and other facilities like extension services, availability of credit, input supply facilitated them for higher
adoption of recommended crop production technology of castor as intercrop with groundnut.

The finding was in conformity with the findings of Ranganathan et al. (2001), Sahoo (2004) and Kumbhani (2009).

5.5.8 Mass media exposure and extent of adoption

The data presented in Table 12 were used for testing the null hypothesis (H2: 4) that there was no relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and mass media exposure of the respondents.

The calculated correlation co-efficient value ($r = 0.2192$) was found positive and significant. Thus, null hypothesis was rejected.

It can be inferred that there was positive and significant relationship between adoption recommended crop production technology of castor as intercrop with groundnut and mass media exposure of the respondents. It means adoption of respondents increase significantly with an increase in mass media exposure.

The probable reason for this result could be that more than half of the respondents were from the medium income group and medium education which helped in use of mass media technology.

This finding was in line with the findings of Tavethiya (2006) and Dalsaniya (2010).

5.5.9 Innovativeness and extent of adoption

The data presented in Table 12 were used for testing null hypothesis (H2: 4) that there was no relationship between
adoption of recommended crop production technology of castor as intercrop with groundnut and innovativeness of the respondents.

The calculated correlation co-efficient value \( r = 0.3767 \) was found significant at 0.01 level. Hence, null hypothesis was rejected.

It can be inferred that there was positive and highly significant relationship between adoption recommended crop production technology of castor as intercrop with groundnut and innovativeness of the respondents. It means adoption of respondents increase significantly with an increase in innovativeness.

The probable reason might be that due to more innovative they tried out different castor production technology for more yield.

This finding was in conformity with the findings of Sahoo (2004) and Kamani (2007).

5.5.10 Risk orientation and extent of adoption

The data presented in Table 12 were used for testing null hypothesis (H2: 4) that there was no relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and risk orientation of the respondents.

The calculated correlation co-efficient value \( r = 0.1839 \) was found significant at 0.05 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and significant relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and risk
adoption of recommended crop production technology of castor as intercrop with groundnut and innovativeness of the respondents.

The calculated correlation co-efficient value \( r = 0.3767 \) was found significant at 0.01 level. Hence, null hypothesis was rejected.

It can be inferred that there was positive and highly significant relationship between adoption recommended crop production technology of castor as intercrop with groundnut and innovativeness of the respondents. It means adoption of respondents increase significantly with an increase in innovativeness.

The probable reason might be that due to more innovative they tried out different castor production technology for more yield.

This finding was in conformity with the findings of Sahoo (2004) and Kamani (2007).

5.5.10 Risk orientation and extent of adoption

The data presented in Table 12 were used for testing null hypothesis (H2: 4) that there was no relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and risk orientation of the respondents.

The calculated correlation co-efficient value \( r = 0.1839 \) was found significant at 0.05 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and significant relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and risk
orientation of the respondents. It means adoption of respondents increase significantly with an increase in risk orientation.

The probable reason for this result could be that respondents secured benefits of high production while taking risk in adoption of recommended crop production technology of castor as intercrop with groundnut.

The finding was in conformity with the findings of Jadav (2001), Kamani (2007) and Chauhan (2008).

5.5.11 Irrigation potentiality and extent of adoption

The data in Table 12 were used for testing null hypothesis (H2: 5) that there was no relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and irrigation potentiality of the respondents.

The calculated correlation coefficient value ($r = 0.1411$) was found non significant. Thus, null hypothesis was accepted.

It can be inferred that there was positive and non significant relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and irrigation potentiality of the respondents. It means adoption of respondents was not related with irrigation potentiality of the respondents.

This might be due to the fact that with increase in irrigation potentiality means availability of irrigation water, the respondents might had irrigated their crops at different critical stages which might have resulted in higher yield and income. Thus, irrigation potentiality should no relationship with adoption of recommended crop production technology of castor as intercrop with groundnut.
5.5.12 Cropping intensity and extent of adoption

The data in Table 12 were used for testing null hypothesis (H2: 5) that there was no relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and cropping intensity of the respondents.

The calculated correlation coefficient value \( r = 0.2913 \) was found significant at 0.01 level. Thus, null hypothesis was rejected.

It can be inferred that there was positive and highly significant relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and crop intensity of the respondents. It means adoption of respondents increase significantly with an increase in crop intensity.

The probable reason might be that due to the increase in crop intensity, the respondents might have received more production per unit area which might have generated more income in a less or irregular rainfall situation.

This finding was supported by the finding of Barad (2004).

5.6 CONSTRAINTS FACED BY RESPONDENTS IN ADOPTION OF RECOMMENDED CROP PRODUCTION TECHNOLOGY OF CASTOR AS INTERCROP WITH GROUNDNUT

In the process of agricultural development, the prime mover is considered to be the improved farming technology. The benefit of such technology is actually derived only when farmers in their local situations efficiently utilize it. The farmers are very much eager to get maximum benefits from the agricultural technology. However, many of them could not do so, because a large number of impediments are coming in that way, creating
large adoption gap culminating in low yield. The constraints in adoption of recommended crop production technology of castor as intercrop with groundnut faced by respondents were to understand and to overcome them.

The parts of constraints were kept open ended in the questionnaire. The responses were recorded in the schedule itself. The constraints under each of the practice required to be rated by each and every respondent. The frequency was calculated for each constraint and converted in to percentage and rank was given. The higher ranks indicated higher perception of the respondents for that constraint and vice versa. The results are presented in Table 13.

The highest percentage observed in constraints were: high price of chemical fertilizers (90.00 per cent), less supply of electricity (87.50), high price of improved and hybrid seeds (85.83 per cent), high cost and lack of skilled labours as well as high cost of threshing and harvesting (81.66 per cent), scarcity of FYM/compost fertilizers (80.00 per cent), non-availability of chemical fertilizers in required quantity in time (78.33), high price of insecticides/pesticides and fungicides (75.00 per cent), non-availability of irrigation water at important growth stages of castor (72.50 per cent) and insufficient demonstration of improved technologies on farmers’ fields (70.83 per cent).

The probable reason for the above facts might be that the economic conditions of the farmers inhibit them to purchase high cost of farm inputs.

The moderate percentage observed in constraints were: non-availability of improved seeds in required quantity in time and lack of knowledge about the recommended doses of fungicides/pesticides (65.83 per cent), irregular visit of village
level workers and non-availability of finance in time (61.66 per cent), poor quality of seed (59.16 per cent) and lack of marketing infrastructure facilities (56.66 per cent).

Table 13. Constraints faced by the respondents in adoption of recommended crop production technology of castor as intercrop with groundnut

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Constraints</th>
<th>Frequency</th>
<th>Per cent</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>High price of improved and hybrid seeds</td>
<td>103</td>
<td>85.83</td>
<td>III</td>
</tr>
<tr>
<td>2.</td>
<td>Non-availability of improved seeds in required quantity in time</td>
<td>79</td>
<td>65.83</td>
<td>XI</td>
</tr>
<tr>
<td>3.</td>
<td>Scarcity of FYM/Compost fertilizers</td>
<td>96</td>
<td>80.00</td>
<td>VI</td>
</tr>
<tr>
<td>4.</td>
<td>Non-availability of chemical fertilizers in required quantity in time</td>
<td>94</td>
<td>78.33</td>
<td>VII</td>
</tr>
<tr>
<td>5.</td>
<td>High price of chemical fertilizers</td>
<td>108</td>
<td>90.00</td>
<td>I</td>
</tr>
<tr>
<td>6.</td>
<td>High price of insecticides/pesticides and fungicides</td>
<td>90</td>
<td>75.00</td>
<td>VIII</td>
</tr>
<tr>
<td>7.</td>
<td>Lack of knowledge about the recommended doses of fungicides/pesticides</td>
<td>79</td>
<td>65.83</td>
<td>XI</td>
</tr>
<tr>
<td>8.</td>
<td>Lack of training on improved technologies</td>
<td>45</td>
<td>37.50</td>
<td>XX</td>
</tr>
</tbody>
</table>

n = 120
<table>
<thead>
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<th></th>
<th>Constraint</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>High charges and lack of skilled labours</td>
<td>98</td>
<td>81.66</td>
<td>IV</td>
</tr>
<tr>
<td>10</td>
<td>Irregular visit of village level workers</td>
<td>74</td>
<td>61.66</td>
<td>XIII</td>
</tr>
<tr>
<td>11</td>
<td>Insufficient demonstration of improved technologies on farmers' fields</td>
<td>85</td>
<td>70.83</td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>Non-availability of finance in time</td>
<td>74</td>
<td>61.66</td>
<td>XIII</td>
</tr>
<tr>
<td>13</td>
<td>Non-availability of irrigation water at important growth stages of castor</td>
<td>87</td>
<td>72.50</td>
<td>IX</td>
</tr>
<tr>
<td>14</td>
<td>Less supply of electricity</td>
<td>105</td>
<td>87.50</td>
<td>II</td>
</tr>
<tr>
<td>15</td>
<td>High charges of threshing and harvesting</td>
<td>98</td>
<td>81.66</td>
<td>IV</td>
</tr>
<tr>
<td>16</td>
<td>Poor quality of seed</td>
<td>71</td>
<td>59.16</td>
<td>XV</td>
</tr>
<tr>
<td>17</td>
<td>Lack of storage facility</td>
<td>48</td>
<td>40.00</td>
<td>XIX</td>
</tr>
<tr>
<td>18</td>
<td>Lack of knowledge about critical stages</td>
<td>58</td>
<td>48.33</td>
<td>XVII</td>
</tr>
<tr>
<td>19</td>
<td>Lack of marketing infrastructure facilities</td>
<td>68</td>
<td>56.66</td>
<td>XVI</td>
</tr>
<tr>
<td>20</td>
<td>Fear of reduction in the yield of castor as intercrop with groundnut</td>
<td>58</td>
<td>48.33</td>
<td>XVII</td>
</tr>
</tbody>
</table>

Less important constraints faced by the farmers were: lack of knowledge about critical stages and Fear of reduction in the yield of castor as intercrop with groundnut as compared to sole groundnut crop (48.33 per cent), lack of storage facility (40.00
and lack of training on improved technologies (37.50 per cent).

The perusal of data presented in Table 13 revealed that the most important problems as expressed by most of the respondents were; high price of chemical fertilizers (Rank I), less supply of electricity (Rank II), high price of improved and hybrid seeds (Rank III), high cost and lack of skilled labour as well as high cost of threshing and harvesting (Rank IV), scarcity of FYM/compost fertilizers (Rank VI), non-availability of chemical fertilizers in required quantity in time (Rank VII), high price of insecticides/pesticides and fungicides (Rank VIII) and non-availability of irrigated water at important growth stages of castor (Rank IX).

These finding were in line with the finding of Satasiya (2008).

5.7 SUGGESTIONS FROM THE RESPONDENTS TO OVERCOME THE CONSTRAINTS IN ADOPTION OF RECOMMENDED CROP PRODUCTION TECHNOLOGY OF CASTOR AS INTERCROP WITH GROUNDNUT

For ascertaining the suggestion to overcome the constraints in adoption of recommended crop production technology of castor as intercrop with groundnut, the suggestions were invited openly from respondents. The frequency was calculated for each suggestion and converted in to percentage and rank was given. The suggestions along with their percentages are presented in Table 14.

The most important suggestions offered by the respondents to overcome the constraints in adoption of recommended crop production technology of castor as intercrop with groundnut
were: remunerative price of the product should be made available (91.66 per cent), the projects for increasing availability of irrigation water should be implemented (85.00 per cent), chemical fertilizers should be made available at subsidized rate (80.83 per cent), there must be regular electric supply at the time of critical irrigation (75.00 per cent), cost of threshing and harvesting should be reduced by innovation of improved machinery (70.83 per cent).

The comparatively less important suggestions as expressed by the respondents were: demonstration of new farm technology should layout on farmers’ field (62.50 per cent), improved and certified seed should be provided by government at local place (53.33 per cent), effective soil moisture conservation technology should be developed (47.50 per cent), farmer should be protected by crop insurance, if crops fail (44.16 per cent), sufficient and timely credit facility should be made available (42.50 per cent), market facilities should be strengthened (40.00 per cent), village level workers should be frequently contacting the farmers to make them aware about the new farm technology (35.83 per cent), more number of training programme should be organized for the farmers in relation to this cropping system (31.66 per cent) and agriculture literature should be provided (26.66 per cent).

It can be concluded that important suggestions offered by respondents were: remunerative price of the product should be made available (Rank I), the projects for increasing availability of irrigation water should be implemented (Rank II), chemical fertilizers should be made available at subsidized rate (Rank III), there must be regular electric supply at the time of critical stages of crops for irrigation (Rank IV) and cost of threshing and
harvesting should be reduced by innovation of improved machinery (Rank V).

Table 14. Suggestions from the respondents to overcome the constraints in adoption of recommended crop production technology of castor as intercrop with groundnut

\[ n = 120 \]

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Suggestions</th>
<th>Frequency</th>
<th>Per Cent</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Chemical fertilizers should be made available at subsidized rate</td>
<td>97</td>
<td>80.83</td>
<td>III</td>
</tr>
<tr>
<td>2.</td>
<td>Cost of threshing and harvesting should be reduced by innovation of improved machinery</td>
<td>85</td>
<td>70.83</td>
<td>V</td>
</tr>
<tr>
<td>3.</td>
<td>Sufficient and timely credit facility should be made available</td>
<td>51</td>
<td>42.50</td>
<td>X</td>
</tr>
<tr>
<td>4.</td>
<td>Remunerative price of the product should be made available</td>
<td>110</td>
<td>91.66</td>
<td>I</td>
</tr>
<tr>
<td>5.</td>
<td>Market facilities should be strengthened</td>
<td>48</td>
<td>40.00</td>
<td>XI</td>
</tr>
<tr>
<td>6.</td>
<td>Effective soil moisture conservation technology should be developed</td>
<td>57</td>
<td>47.50</td>
<td>VIII</td>
</tr>
<tr>
<td>7.</td>
<td>Agriculture literature should be provided</td>
<td>32</td>
<td>26.66</td>
<td>XIV</td>
</tr>
<tr>
<td></td>
<td>Proposal</td>
<td>Yes (%)</td>
<td>No (%)</td>
<td>Recommendation</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------------------------------------------------------</td>
<td>---------</td>
<td>--------</td>
<td>----------------</td>
</tr>
<tr>
<td>8</td>
<td>More number of training programme should be organized for the farmers in relation to this cropping system</td>
<td>38</td>
<td>31.66</td>
<td>XIII</td>
</tr>
<tr>
<td>9</td>
<td>Demonstration of new farm technology should layout on farmers’ field</td>
<td>75</td>
<td>62.50</td>
<td>VI</td>
</tr>
<tr>
<td>10</td>
<td>There must be regular electric supply at the time of critical stages of crops for irrigation</td>
<td>90</td>
<td>75.00</td>
<td>IV</td>
</tr>
<tr>
<td>11</td>
<td>Village level workers should be frequently contacting the farmers to make them aware about the new farm technology</td>
<td>43</td>
<td>35.83</td>
<td>XII</td>
</tr>
<tr>
<td>12</td>
<td>Farmer should be protected by crop insurance, if crops fail</td>
<td>53</td>
<td>44.16</td>
<td>IX</td>
</tr>
<tr>
<td>13</td>
<td>Improved and certified seed should be provided by government at local place</td>
<td>64</td>
<td>53.33</td>
<td>VII</td>
</tr>
<tr>
<td>14</td>
<td>The projects for increasing availability of irrigation water should be implemented</td>
<td>102</td>
<td>85.00</td>
<td>II</td>
</tr>
</tbody>
</table>
It is clear from the (Table 14) about the suggestions made by the majority of the farmers that these suggestions are based on the facilities have been availed but are not sufficient and satisfied up to the extent of their expectations.

Thus, it can be concluded from the facts mentioned above that the facilities to the respondents' are already being provided by the human resources or by natural resources needs to be strengthened and tailored according to the requirements of respondents. The other suggestions offered by the farmers need to be looked in to account very carefully by the appropriate agencies to improve the productivity of crop.

The finding was in conformity with the findings of Verma (2000) and Jadav (2001).
CHAPTER VI
SUMMARY AND CONCLUSIONS

In this chapter, a detailed description of the impact of the summary conclusions, implications and suggestions for further research is included. This chapter is divided into the following sections:

6.1 Summary
6.2 Conclusions
6.3 Implications
6.4 Suggestions for the further research

SUMMARY

The agricultural sector has undergone an expansion in infrastructure, number of various farms, the knowledge of farmers and their adaptability to new technologies. This page is a study on how elearning and the use of the internet can help in the dissemination of knowledge on various aspects of farming. E-learning is the most important component of this study as it is an interactive process. It is equally important to know the level of adoption of this process. The level is not only to prepare extension strategy for the farmer but also to identify and analyze the aspects where e-learning can be used. It would also help us understand the farmer's level of knowledge and adoption of e-learning as it is connected with the level of adoption of various farming techniques.
CHAPTER VI
SUMMARY AND CONCLUSIONS

In this chapter, a nutshell description of the study in respect of the summary, conclusion, implication and suggestions for the further research is included. This chapter has been divided into the following subheads.

6.1 Summary
6.2 Conclusions
6.3 Implications
6.4 Suggestions for the further research

6.1 SUMMARY

Despite considerable advance in agricultural production technology as well as expansion in infrastructure for increasing productivity of various crops, the gap between know how already attained and their application in the field is still quite large. There is a wide scope for increasing the castor production per unit area. Castor is the most important non-edible oil seed crop. The castor as intercrop is popular in Saurashtra region. There are many problems experienced by the farmers in adoption of recommended crop production technologies. In this content, it is right time to examine the technological knowledge of farmers with respect to castor as intercrop with groundnut. It is equally important to know the level of adoption of this practice. This would be useful to prepare extension strategy if there is communication gap. It would also be useful to increase the adoption level by identification and analysis of the factors responsible for it. Hence, it felt necessary to take up the study entitled “Knowledge and adoption of castor as intercrop with
groundnut in South Saurashtra Agro Climatic Zone of Gujarat was undertaken with following specific objectives.

1. To study the personal, socio-economic, communication, psychological and situational characteristics of the respondents.

2. To measure the knowledge level of respondents about recommended crop production technology of castor as intercrop with groundnut.

3. To know the extent of adoption of respondents about recommended crop production technology of castor as intercrop with groundnut.

4. To ascertain the relationship between knowledge level of respondents about recommended crop production technology of castor as intercrop with groundnut and their selected characteristics.

5. To ascertain the relationship between adoption of recommended crop production technology of castor as intercrop with groundnut and their selected characteristics.

6. To identify constraints faced by respondents in adoption of recommended crop production technology of castor as intercrop with groundnut.

7. To seek the suggestions from the respondents to overcome the constraints in adoption of recommended crop production technology castor as intercrop with groundnut.

The theoretical orientation was developed for the study on the basis of reviewed literature having direct or indirect bearing on the present study. The various concepts utilized in the study
were operationalized, the tentative paradigm was laid down, and working hypothesis were formulated.

Knowledge and adoption (dependent variables), setting and selection of respondents, analysis of data and the various statistical measures were used to test the hypotheses.

The statistical measures such as percentage, standard deviation, mean score and correlation co-efficient were used.

To measure knowledge level of respondents about recommended crop production technology of castor as intercrop with groundnut, a teacher made knowledge index was developed and used. The format of knowledge test is given in Appendix part II.

To measure the extent of adoption of respondents about recommended crop production technology of castor as intercrop with groundnut, the adoption index was developed and used. The scale developed by Chattopadhyay (1974) was used with slight modification. The selected independent variables such as age, education, size of land holding, annual income, social participation, localite-cosmopolite value orientation, extension participation, mass media exposure, innovativeness, risk orientation, irrigation potentiality and cropping intensity were measured by scales developed by the researchers and with the help of responses to appropriate questions with schedule (Appendix part I).

Based on the empirical measures on interview schedules with questions on dependent and independent variables were used for collecting the data from the respondents. A sample of 120 respondents representing 24 villages of Keshod, Vanthali, Manavadar, Dhoraji, Jetpur and Upleta talukas of South Saurashtra was drawn by using multistage purposive sampling
techniques. The respondents were personally interviewed with the help of structured interview schedule. The data were collected and analyzed in light of objectives of the study. The following important conclusions were drawn based on the findings of the study.

6.2 CONCLUSIONS

6.2.1 Characteristics of the respondents

Majority of the respondents belonged to medium extension participation (68.33 per cent), medium risk orientation (67.50 per cent), medium size of land holding (65.83 per cent), medium annual income (61.67 per cent) and medium cropping intensity (60.83 per cent).

More than one half of respondents belonged to medium mass media exposure (56.66 per cent), medium localite-cosmopolite value orientation (56.66 per cent), primary level of education (55.00 per cent), medium social participation (52.50 per cent) and middle age group (50.83 per cent).

As less than one half of respondents belonged to medium innovativeness (49.17 per cent) and bore well irrigation potentiality (39.17 per cent).

6.2.2 Respondents’ knowledge

Majority (65.00 per cent) of the respondents had medium level of knowledge about the recommended crop production technology of castor as intercrop with groundnut. Whereas, 20.00 per cent and 15.00 per cent respondents had low and high levels knowledge about recommended crop production technology of castor as intercrop with groundnut, respectively.
6.2.3 Respondents' adoption

Majority (60.00 per cent) of the respondents had medium adoption about the recommended crop production technology of castor as intercrop with groundnut. Whereas, 21.67 per cent had low and 18.33 per cent had high extent of adoption of recommended crop production technology of castor as intercrop with groundnut, respectively.

6.2.4 RELATIONSHIP BETWEEN DEPENDENT VARIABLES AND THEIR SELECTED CHARACTERISTICS

6.2.4.1 Relationship between knowledge level of respondents about recommended crop production technology of castor as intercrop with groundnut and their selected characteristics

The characteristics of the respondents like education, extension participation, innovativeness, risk orientation and cropping intensity had positive and highly significant relationship with the knowledge of respondents about recommended crop production technology of castor as intercrop with groundnut.

The characteristics of the respondents like size of land holding, social participation, localite-cosmopolite value orientation, mass media exposure and irrigation potentiality were positively and significantly related with the knowledge of farmers about recommended crop production technology of castor as intercrop with groundnut.

There was no significant relationship with the knowledge about recommended crop production technology of castor as intercrop with groundnut and their annual income. Age was negatively and significantly related with the knowledge of
Factors related with knowledge of respondents about recommended crop production technology of castor as intercrop with groundnut. (Final paradigm)

Fig. 7 Factors related with knowledge of respondents about recommended crop production technology of castor as intercrop with groundnut. (Final paradigm)
Factors related with extent of adoption of respondents about recommended crop production technology of castor as intercrop with groundnut. (Final paradigm)

Fig. 8 Factors related with extent of adoption of respondents about recommended crop production technology of castor as intercrop with groundnut. (Final paradigm)
respondents about recommended crop production technology of castor as intercrop with groundnut.

6.2.4.2 Relationship between adoption of respondents about recommended crop production technology of castor as intercrop with groundnut and their selected characteristics

The characteristics of the respondents like education, extension participation, innovativeness and cropping intensity had positive and highly significant relationship with the adoption of recommended crop production technology of castor as intercrop with groundnut.

The characteristics of the respondents like social participation, localite-cosmopolite value orientation, mass media exposure and risk orientation had positive and significant relationship with the adoption of recommended crop production technology of castor as intercrop with groundnut.

There was no significant relationship between the adoption of recommended crop production technology of castor as intercrop with groundnut and their annual income, size of land holding and irrigation potentiality. Age was negatively and significantly related with the adoption of recommended crop production technology of castor as intercrop with groundnut.

6.2.5 CONSTRAINTS FACED BY THE RESPONDENTS IN ADOPTION OF RECOMMENDED CROP PRODUCTION TECHNOLOGY OF CASTOR AS INTERCROP WITH GROUNDNUT

The important constraints faced by respondents were:

1) High price of chemical fertilizers
2) Less supply of electricity
3) High price of improved and hybrid seeds
4) High cost of threshing and harvesting as well as high cost and lack of skilled labours
5) Scarcity of FYM/compost fertilizers
6) Non-availability of chemical fertilizers in required quantity in time
7) High price of insecticides/pesticides and fungicides
8) Non-availability of irrigation water at important growth stages of castor
9) Insufficient demonstration of improved technologies on farmers’ fields

**6.2.6 SUGGESTIONS TO OVERCOME THE CONSTRAINTS FACED BY THE RESPONDENTS IN ADOPTION OF RECOMMENDED CROP PRODUCTION TECHNOLOGY OF CASTOR AS INTERCROP WITH GROUNDNUT**

Out of 14 suggestions given by the respondents to overcome the constraints in adoption of recommended castor production technology the five most important suggestions expressed by respondents were:

1) Remunerative price of the product should be made available
2) The projects for increasing availability of irrigation water should be implemented
3) Chemical fertilizers should be made available at subsidized rate
4) There must be regular electric supply at the time of critical stages of crops for irrigation
5) Cost of threshing and harvesting should be reduced by innovation of improved machinery
The tentative paradigm was developed in the beginning of the thesis while arriving at the conceptual framework of this study (Fig. 1 & 2). Now final form of paradigm based on the findings of this study is presented in the Fig. 7 & 8 showing only those independent variables which had significant relationship with respondents’ knowledge and adoption of recommended crop production technology of castor as intercrop with groundnut.

6.3 IMPLICATIONS

On the respondents’ knowledge and adoption of recommended crop production technology of castor as intercrop with groundnut as well as suggestions to overcome the constraints. There are some measures emerging on for increasing the castor production per unit area. Extension personnel should make use of the level of knowledge on different aspects about recommended crop production technology of castor as intercrop with groundnut, while conducting respondents training programmes in general and particularly in this area.

For providing better ground for increasing the knowledge and adoption of recommended crop production technology of castor as intercrop with groundnut, the extension personnel should make concentrated efforts while imparting the training to the respondents about There must be regular electric supply at the time of critical stages of crops for irrigation such as plant protection, weed management, application of fertilizers and manures.

To improve the knowledge of respondents about recommended crop production technology of castor as intercrop with groundnut the extension agencies should make more efforts
to bring up the positively related characteristics such as education, size of land holding, social participation, localite- cosmopolite value orientation, extension participation, mass media exposure, innovativeness, risk orientation, irrigation potentiality and cropping intensity in order of its priority.

To raise the respondents’ knowledge and adoption of recommended crop production technology of castor as intercrop with groundnut they should be facilitated with latest technical know - how and motivate them to participate in the extension activities. Besides, the extension agencies and input agencies working in the area should make concentrated efforts to organize extension activities such castor crop demonstration, farmers’ day, farmers’ training and to persuade them to participate actively in these activities. They should also be advised to participate more actively in the social organizations.

For providing proper research support scientists working in the field of oil seeds research should consider the respondents’ problems, which prevent them in adopting the recommended crop production technology of castor as intercrop with groundnut. Oil Seeds Research Scientists should plan properly for fast use of castor research strategy accordingly, which may solve the problem of the respondents. The research area in oil seeds will be to develop methods for post harvest management of castor crop. Scientists consider respondents’ problems which hinder them to adopt recommended crop production technology of castor as intercrop with groundnut.

The remunerative prices of castor should be made available to the farmers by declaring support price. For extension support the management scheme should be geared up promptly to
transmit latest messages for respondents giving stress to the plant protection measures and soil testing.

6.4 **SUGGESTIONS FOR THE FURTHER RESEARCH**

The present study has thrown light on the new areas for further research work.

The area of research could be extended further and size of sample of respondents could also be increased in any future study to draw more valid and generalized conclusions. Similar studies may also be conducted from time to time in different areas. The technological gap in adoption of respondents about recommended crop production technology of castor as intercrop with groundnut may be studied.

Moreover on the basis of the knowledge level of recommended crop production technology of castor as intercrop with groundnut, training needs of the respondents about recommended crop production technology of castor as intercrop with groundnut may also be emphasized. Some characteristics of respondents other than those considered in this study might be affecting knowledge and adoption of recommended crop production technology of castor as intercrop with groundnut. These characteristics should be identified and their relationship with the knowledge and adoption of the respondents be ascertained.
REFERENCES
REFERENCES


Sharma A. K., Jha, S. K., Vinod Kumar, Sachan, R. C. and Arvind Kumar (2005). Utilization patterns of communication sources and channels by rapseed-


APPENDICES
APPENDIX

KNOWLEDGE AND ADOPTION OF CASTOR AS INTERCROP WITH GROUNDNUT IN SOUTH SAURASHTRA AGRO CLIMATIC ZONE OF GUJARAT

INTERVIEW SCHEDULE

Respondent Number: -

Name of the farmer: ___________________________ Date: -

Village: _______ Taluka: _______ District: _______

Part-I

Personal, socio-economic, communication, psychological and situational characteristics of the farmers

(A) Personal

1. Age_________

2. Education:
   0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 or above 12

(B) Socio-economic

1. Size of land holding:
   I. Irrigated: _______ha
   II. Unirrigated: _______ha
   III. Fallow: _______ha
   IV. Total: _______ ha

2. Annual income
   I. Income from agriculture: Rs. ________
   II. Income from other than agriculture: Rs. ________
   III. Total income: Rs. ________
3. Social Participation:

Are you a member and/or holding any position in any organization Yes/ No.

If yes, give details

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Organization</th>
<th>Position</th>
<th>Participation in Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Member</td>
<td>Position</td>
</tr>
<tr>
<td>(A)</td>
<td><strong>In Village:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Village</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Panchayat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cooperative</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Society</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Service</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cooperative</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Society</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Youth Club</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Farmers Club</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(B)</td>
<td><strong>Out Side village:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Taluka Panchayat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>District Panchayat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Farmers Union/Club</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Market Yard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Others</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(C) **Communication:**

1. **Localite-cosmopolite value orientation**

   Give your opinion against each statement by tick mark (✓) in any response category of agreement.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>DA</th>
<th>SDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A farmers can learn everything from the experience of his own village.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>A man can escape numerous troubles and barriers, if he consults friends and neighbours.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>A farmers can fulfill all his needs with the help of his village folks.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Many things that a farmer ought to know are not confined in his village but are a like in other village.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>These days communication has advanced and so as a farmer should know more of out-side life.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SA = Strongly agree
A = Agree
UD = Undecided
DA = Disagree
SDA = Strongly disagree

2. **Extension participation:**

   Did you participate in the following programme? Yes/No
   If yes, answer the following.
### Name of Extension activities

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Extension activities</th>
<th>Yes/No</th>
<th>Weightage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Conducted demonstration on your field?</td>
<td></td>
<td>9.50</td>
</tr>
<tr>
<td>2.</td>
<td>Had discussion with extension workers?</td>
<td></td>
<td>6.84</td>
</tr>
<tr>
<td>3.</td>
<td>Participated on field days on the farmers' fields?</td>
<td></td>
<td>6.63</td>
</tr>
<tr>
<td>4.</td>
<td>Participated in extn. meetings?</td>
<td></td>
<td>6.60</td>
</tr>
<tr>
<td>5.</td>
<td>Have you seen demonstration plot of your neighbour and had discussion with him?</td>
<td></td>
<td>6.16</td>
</tr>
<tr>
<td>6.</td>
<td>Did you participated in krushi mela?</td>
<td></td>
<td>4.84</td>
</tr>
<tr>
<td>7.</td>
<td>Visited any agricultural exhibition?</td>
<td></td>
<td>2.79</td>
</tr>
<tr>
<td>8.</td>
<td>Have you read ext.publications?</td>
<td></td>
<td>1.89</td>
</tr>
<tr>
<td>9.</td>
<td>Listened radio programmes on agriculture</td>
<td></td>
<td>1.50</td>
</tr>
<tr>
<td>10.</td>
<td>Viewed T.V. programmes on agriculture</td>
<td></td>
<td>1.50</td>
</tr>
</tbody>
</table>

### Mass media exposure:

How frequently do you use the following mass media for castor production practices?

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Mass media exposure</th>
<th>Regularly</th>
<th>Frequently</th>
<th>Once in a week</th>
<th>Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Radio</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Television</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3.</td>
<td>Newspaper</td>
<td></td>
<td></td>
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<tr>
<td>4.</td>
<td>Printed literature</td>
<td></td>
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</tr>
<tr>
<td>5.</td>
<td>Agril. exhibition</td>
<td></td>
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</tr>
<tr>
<td>6.</td>
<td>Demonstration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Any other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(D) Psychological

1. Innovativeness:
   When would you prefer to adopt an important practice in farming?
   I. As soon as it is brought to my knowledge.
   II. After I have seen some other farmers using it successfully.
   III. Prefer to wait and take my own time.

2. Risk orientation:
   Give your agreement, disagreement or undecideness about each of the statements.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Statement</th>
<th>Agree</th>
<th>Undecided</th>
<th>disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A farmers should grow larger number of crop to avoid greater risk involved in growing one or two crop (-).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>A farmers should rather take more of a chance in making a big profit than to be content with a smaller but less risky profit (+).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>A farmers who is willing to take greater risk than the average farmers usually does better financially (+).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>It is good for a farmer to take risk when he knows his chance of success is fairly high (+).</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
It is better for a farmer not to try new farming methods unless most other farmers have used them with success (-).

Trying an entirely new method in farming involves risk, but it is worth taking (+).

### (E) Situational

1. Irrigation potentiality:

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Source of irrigation</th>
<th>Period of water available</th>
<th>Area Irrigated (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Through out year</td>
<td>Partial available</td>
</tr>
<tr>
<td>1.</td>
<td>Well</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Canal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Well + Canal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Bore Well</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Check Dam</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Cropping intensity:

What was the area under different crop during last year?

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Season</th>
<th>Crop</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Monsoon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Rabi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Winter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part II

Study of knowledge level of respondents regarding the crop production technology of castor as intercrop with groundnut

1. Soil testing:
   Is soil testing useful for good crop production with less expenses on fertilizers? Yes / No.

2. Preparatory tillage:
   The land should be leveled and prepared for sowing by the use of plough/harrow? Right / Wrong.

3. Improved varieties:
   Which are the varieties of castor (suitable for taking castor as intercrop with groundnut)? (GCH-6/ GCH-2/ GCH-5)
   Which are the varieties of groundnut (suitable for taking castor as intercrop with groundnut)? (GG-20/ J-11/ GG-12)

4. FYM/compost:
   ______ quantity of FYM/ compost (ton/ha) is recommended for castor as intercrop with groundnut.
   (10 / 15 / 20 )

5. Chemical fertilizers:
   ______ is recommended dose of chemical fertilizers (kg/ha) in castor. (75-50-0 / 120-50-0 / 180-50-50 )
   ______ is recommended dose of chemical fertilizers (kg/ha) in groundnut. (12.5-25-0 / 25-50-0/ 25-50-12.5)
6. Seed rate:

_____ is recommended seed rate (kg/ha) of castor in castor as intercrop with groundnut. (5-6 /10-12 /18-20)

_____ is recommended seed rate (kg/ha) of groundnut in castor as intercrop with groundnut. (50-60 /80-90 /120-130)

7. Seed treatment:

_____ fungicide is used for seed treatment in castor.

8. Sowing time:

The appropriate time of sowing of castor as intercrop with groundnut is _____

(15th June / 30th July / 10th Oct.)

9. Thinning and gap filling:

In castor as intercrop with groundnut thinning is useful for good crop production? Yes / No.

In castor as intercrop with groundnut gap filling is useful for good crop production? Yes / No.

10. Sowing distance:

The distance between two rows of castor should be _____

(130cm /150cm /180cm)

The distance between two plants of castor should be _____ (40cm /50cm /60cm)

The distance between two rows of groundnut should be _____ (45cm /60cm/ 75cm)

11. Depth of sowing:

The recommended depth of sowing for castor is _____

(1cm / 3 cm/ 5cm)
12. Interculturing:
   The recommended number of interculturing in groundnut before sowing of castor are ________ (2 / 3 / 4)
   The recommended number of interculturing after sowing of castor in castor as intercrop with groundnut (2 / 3 / 4)

13. Weed control:
   Pendimethaline weedicide is recommended for weed control in castor as intercrop with groundnut? Right / Wrong.

14. Plant protection measures:
   (A) Diseases
   What precautions should be followed to control root rot of castor? Tick mark on correct answer.
   (Seed treatment / crop rotation / resistant variety)

   (B) Pests
   Which pesticides is recommended to control castor semi looper? Tick mark on correct answer.
   (Quinalphous / Monocrotophous / Dichlorovosh)

15. Irrigation:
   How many irrigations are recommended for castor as intercrop with groundnut? (5 / 7 / 10)
   Interval between two irrigations? (10days / 18days / 25days)

16. Harvesting:
   At which stage the castor crop was harvested after sowing?
   (70 days / 100 days / 140 days)
Part III

**Study of extent of adoption of respondents regarding the crop production technology of castor as intercrop with groundnut**

1. Soil testing:
   Did you test your soil? Yes / No.

2. Preparatory tillage:
   Before sowing, did you prepare the land by the use of plough/ harrow for leveling the land? Yes / No.

3. Improved varieties:
   Which variety are selected for sowing of castor as intercrop with groundnut?

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Name of crop</th>
<th>Improved Varieties</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Groundnut</td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.</td>
<td></td>
</tr>
</tbody>
</table>

4. FYM/compost:
   Did you apply FYM/ compost in castor as intercrop with groundnut? Yes / No.
   If yes, quantity = _______ tone/ha

5. Chemical fertilizers:
   Did you apply chemical fertilizers in castor as intercrop with groundnut? Yes / No.
If yes, give details

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of crop</th>
<th>Name of fertilizers</th>
<th>Quantity (Kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Castor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Groundnut</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>3.</td>
<td></td>
</tr>
</tbody>
</table>

6. Seed rate:

In castor as intercrop with groundnut how much seeds are required?

Castor: _________ Kg/ha

Groundnut: _________ Kg/ha

7. Seed treatment:

Did you treat seeds of castor and groundnut before sowing?

Yes / No.

If yes, give details

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of crop</th>
<th>Name of fungicides</th>
<th>Quantity (Kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Groundnut</td>
<td>1.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.</td>
<td></td>
</tr>
</tbody>
</table>

8. Sowing time:

The appropriate time of sowing of castor as intercrop with groundnut is _______ month.
9. Thinning and gap filling:
   In castor as intercrop with groundnut did you follow thinning practice? Yes / No.
   In castor as intercrop with groundnut did you follow gap filling practice? Yes / No.

10. Sowing distance:
    What distance between two rows of castor in castor as intercrop with groundnut was followed? _______ cm.
    What distance between two plants of castor in castor as intercrop with groundnut was followed? _______ cm.

11. Depth of sowing:
    What depth of sowing for castor as intercrop with groundnut was followed? _______ cm.

12. Interculturing:
    Did you follow interculturing in groundnut before sowing of castor as intercrop with groundnut? Yes / No.
    If yes, give details
    How many times? _______ times.
    After sowing of castor how many interculturing were followed? _______ times.

13. Weed control:
    Did you follow weeding for castor as intercrop with groundnut? Yes / No.
    If yes, give details
    Hand weeding _______ times
    Weedicides/Herbicides _______ times
14. Plant protection measures:

(A) Diseases

Did you use fungicides for the control of diseases in castor? Yes / No. If yes, give details

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of diseases</th>
<th>Name of fungicides</th>
<th>Quantity (lit/ha) or (Kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(B) Pests

Did you use pesticides for the control of pests in castor? Yes / No. If yes, give details

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of pests</th>
<th>Name of pesticides</th>
<th>Quantity (lit/ha) or (Kg/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

15. Irrigation:

How many irrigations did you apply to castor as intercrop with groundnut? ________ irrigation

Interval between two irrigation? ________ days

16. Harvesting:

At which stage the castor crop was harvested?

Castor: _______ days after sowing.

Symptoms of harvesting: _______.

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Part IV

Constraints faced by respondents in adoption of recommended crop production technology of castor as intercrop with groundnut

I. Constraints

State the constraints experienced by you in adopting recommended crop production technology of castor as intercrop with groundnut.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
<td></td>
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<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
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<tr>
<td>5.</td>
<td></td>
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<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
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</tbody>
</table>

II. Suggestions

What are your suggestions overcome the constraints faced in adopting recommended crop production technology of castor as intercrop with groundnut.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Suggestions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
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<td>3.</td>
<td></td>
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<tr>
<td>4.</td>
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<td>5.</td>
<td></td>
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<tr>
<td>6.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
</tr>
</tbody>
</table>