KNOWLEDGE AND ADOPTION OF RECOMMENDED CULTIVATION PRACTICES OF CAULIFLOWER GROWERS IN BELGAUM DISTRICT OF KARNATAKA

Thesis submitted to the
University of Agricultural Sciences, Dharwad
In partial fulfillment of the requirements for the
Degree of

MASTER OF SCIENCE

IN

AGRICULTURAL EXTENSION EDUCATION

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I. INTRODUCTION

Indian subcontinent is endowed with salubrious climate which permits growing of vegetables throughout the year. Vegetables play an important role in balanced nutrition as they are valuable source of carbohydrates, proteins, vitamins and minerals. The Per capita consumption of the vegetables in India is 160 g per day per person as against recommendation of 280 g per day per person. According to this statistics, we need to produce approximately 0.3 mt of vegetables per day to the present day population. The present earning through vegetable export is little over Rs. 300 crores.

Nature has endowed our country with vast diversity of land, soil and agro-climatic conditions which enables to produce varied types of vegetable crops. Now, it is universally accepted that vegetables are cheaper sources of proteins, vitamins, carbohydrates, minerals and dietary fibres (Anonymous, 1997). The area and production of vegetables are increasing year after year after the green revolution. There is substantial increase in production and productivity of vegetable crops. Owing to growing of improved varieties and adoption of improved cultivation technologies. India's share in the world production of vegetables is about seven per cent (Anon., 1999a).

Further, the country has made quantum jump since independence scoring more than five times increase in vegetable production. However, the production of different vegetables is comparatively low in comparison with that of other developed countries (Anon., 1999b).

Horticulture crops cover large varieties of fruits, vegetables, flowers plantation and spice crops. Among these, vegetable cultivation is the major attraction to farmers as it is comparatively more remunerative than field crops. The wider adaptability of vegetables to different kinds of abiotic stresses like water, soil, weather etc. offers enormous scope for growing vegetables in stress and waste land areas. They are also playing an important role in commerce and economy particularly through export trade.

Vegetables are grown in every part of our country under varied agro-climatic and soil conditions in plains as well as in hilly regions. At present, India produces about 70 different varieties of leafy fruity and starchy tuber varieties of vegetables. Currently, in India vegetables are being grown in 6.23 million ha accounting for producing 66.58 mt which is second highest in the world next only to China. The production of vegetables in India is 72.73 million tonnes in the year 1997-98 and has increased to 98.50 million tones in the year 2000-01. More than 40 kinds of vegetables belonging to different groups namely solanaceous, cucurbitacious, leguminous, cruciferous (cole crops) root crops and leafy vegetables are grown in India in tropical, subtropical and temperate regions. Important vegetables grown in India are tomato, onion, brinjal, cabbage, cauliflower, okra, peas *etc.* India contributes about 13 per cent of the world vegetable production and occupies first position in the cauliflower, second in onion and third in cabbage in the world.

World scenario of cauliflower

The world output of cauliflower ranges from 4.63 million tonnes in the year 1979-81 to 8.86 million tonne in 1989-91 and 15.72 million tonnes in the year 2001. The major producer of cauliflower and cabbage in the world are India and china. India stands at 1st position in cauliflower with 0.26 m ha and production of 6.5 million tonnes (2001). Cauliflower is also cultivated in Italy, Spain, Poland and Mexico.

India's scenario

Cauliflower is one of the popular vegetable which had its origin in cyprus and Mediterranean coast. Cauliflower is rich in vitamin C and mostly cultivated in northern India as it requires cooler climate to grow. Its annual output in India ranges at around 10 lakh tonnes from an area of more than 2 lakh hectares. At present, Bengal and Bihar are the largest producers of cauliflower in India followed by Orissa, Uttar Pradesh, Haryana, Madhya Pradesh, Assam and Gujarath.

The scientists of the national research Centre on plant Biotechnology and University of Hydrabad and Banaras Hindu Unievrsity introduced a gene into a popular variety of

cauliflower, pusa snowball K-1 and produced a variety which is resistant to diamond back moth attack.

Karnataka's scenario

Karnataka is one of the state with great potential for horticultural development. The state is blessed with ten agro-climatic regions suitable for growing variety of fruits and vegetables round the year. The horticultural crops grown in Karnataka can be grouped into four broad categories, *viz.,* 1) Fruits, 2) Vegetables, 3) Spices/plantation crops and 4) Commercial flowers. Apart from these, cultivation of potential value crops like aromatic and medicinal plants has also been taken up in certain areas.

The major districts growing horticulture crops in the state are Kolar, Belgaum, Coorg, Bangalore, Shimoga, Hassan, Bijapur, Dharwad, Dhakshina Kannada, Mysore, Tumkur, Bagalkot and Chitradurga. The major crops grown in these districts are mango, banana, citrus, grapes, guava, sapota, papaya, pomegranate, jack, ber, anola, potato, tomato, onion, okra, green leafy vegetables, beans, radish, carrot and others.

In Karnataka, vegetables are grown in area of 2,15,293 ha with the production of 43,43,000 tonnes with maximum productivity of 23.49 tones per ha. The total area and production of cauliflower in Karnataka state is 3039 ha with a production of 47141 tonnes. Among these, Belgaum occupies 1st position in area and production of 1105 h and 16726 tonnes with respect to cauliflower production.

Status of vegetable crops in North Karnataka

The northern Karnataka is comprised of Bidar, Bellary, Gulbarga, Raichur, Koppal, Bijapur, Bagalkot, Belgaum, Dharwad, Gadag, Haveri and Uttar Kannada districts with a geographical area of 99.56 lakh hectares. Among these districts. Dharwad, Haveri and Gadag districts produce vegetables like brinjal, beans, chilli, onion, garlic, okra, cucumber *etc.* Belgaum district is known for its vegetable crops.

In spite of the progress made, the productivity of horticultural crops in general is still quite low and the post-harvest losses particularly in case perishable commodities, is more and improvement in the quality of produce and also their marketing is the need of the hour to increase our share in the global market.

Several studies have been conducted on vegetable crops to know the knowledge and adoption of recommended cultivation practices but very few research studies have been conducted on cauliflower crop. In this regard the present study was undertaken with the following specific objectives.

1. To study the knowledge of farmers about the recommended cultivation practices of cauliflower.
2. To know the extent of adoption of recommended cultivation practices by cauliflower growing farmers.
3. To study the socio-economic profile of cauliflower growing farmers.
4. To study the marketing behaviour of cauliflower growers.
5. To list the factors contributing for high yielding of cauliflower

SIGNIFICANCE OF THE STUDY

Present study tries to identify the prevailing gaps in farmers' practices and recommended cultivation practices. The analysis of personal, socio-economic factors may substantiate the presence of gaps to a considerable extent. The identified gaps may help to give directions to the field level workers to manipulate the appropriate factors so as to increase the adoption level. An attempt has also been made to study the constraints faced by the cauliflower growers, there by the efforts can be made to eliminate those constraints in order to increase their knowledge and adoption level of recommended cultivation practices. The results of the study are expected to be useful to the extension personnel and the

administrators to know the extent of knowledge and adoption behaviour of cauliflower growers. And also the results could be used to bridge the gap through intensive training and by organizing other extension activities.

LIMITATION OF THE STUDY

Due to the limitation of the time and other resources at the disposal of the researcher, the study was confined to only two taluks of Belgaum district. Further, opinion expressed by the respondents with regard to the various issues of the study may not be totally free from personal bias and prejudice. Hence, the results of the study cannot be generalized beyond the limits of the study area.

II. REVIEW OF LITERATURE

Review of literature was undertaken keeping in view the variables considered for the study. It was rather difficult to find adequate research studies exclusively relating to recommended practices of cauliflower cultivation. Therefore, studies related to other crops were also reviewed and presented covering all aspects of the investigation comprehensively under the following headings;

2.1 Knowledge of farmers about recommended cultivation practices of cauliflower

2.2 Adoption of farmers about recommended cultivation practices of cauliflower

2.3 Socio-economic profile of cauliflower growers

2.4 Marketing behaviour of cauliflower growers

2.5 Factors contributing for high yielding of cauliflower

2.1 KNOWLEDGE OF FARMERS ABOUT RECOMMENDED CULTIVATION PRACTICES OF CAULIFLOWER

Aswathaiah *et al.* (1972) reported in their study on chilli cultivation of Dharwad district found that majority of the farmers did not follow any plant protection measures due to lack of knowledge about seed treatment, 75.80 per cent of farmers had no knowledge.

Chandrabhan Singh (1979) in high study on knowledge and adoption of improved practices in chilli cultivation by small farmers in Gowribidanur taluk of Karnataka, reported that majority of small farmers had low overall knowledge and only 15.00 per cent had high knowledge about the recommended chilli cultivation practices.

Patil and Jadhav (1987) found that a majority of the onion growers (53.00%) did not have correct knowledge of chemical fertilizers.

Sunil (1988) conducted study on knowledge, adoption behaviour and consultancy of potato growers of Dharwad taluk of Karnataka and reported that majority (37.50%) of the respondents were found in medium knowledge category followed by high (35.0%) and low (27.50%) knowledge level category respectively.

Jagadal (1989) indicated that comparatively less per cent of cabbage growers (30.84%) in Belgaum district of Karnataka state were observed in medium level of knowledge category, whereas more than one third of the respondents could appear in both low (35.83%) and high (33.33%) level of knowledge about cultivation practices of cabbage.

Ravishankar (1995) conducted study on knowledge, adoption and constraint analysis of potato farmers in Chikkamagalur district of Karnataka and found that majority (473.00%) of respondents had medium level of knowledge about potato cultivation practices followed by low (34.00%) and high (23.00%), respectively.

Basavaprabhu (1996) conducted a study on knowledge level and adoption behavour of vegetable growers with respect to IPM in Bangalore urban and Kolar district of Karnataka revealed that, majority of the vegetable growers belonged to medium knowledge level category with 44.44 per cent.

Raghavendra (1997) in his study on arecanut growers in south Canara district reported that, all the arecanut growers had complete knowledge about the suitability of season for fertilizer application, cultural operation, harvesting and processing while majority of the growers had incorrect knowledge about recommended practices like fertilizer dose (63.67 per cent), age of the mother palm considered for seed purpose, number of leaves considered for seed selection (56.00 per cent), pit size (52.00 per cent), irrigation intervals (51.33 per cent), majority of them had partial knowledge about the improved varieties (47.17 per cent) and plant protection (43.00 per cent).

Ramamurthy *et al*. (1997) conducted a study on knowledge level of turmeric production by farm women in Erode district of Tamil Nadu state reported that, majority of the farm women (56.67 per cent) had medium level of knowledge followed by low (30.80 per cent) and high (12.50 per cent) level of knowledge.

Vijaya Kumar (1997) in his study on rose in Bangalore district indicated that, almost all the rose growers had adopted the practices like time of harvesting (100 per cent) and varieties (93 per cent). Great majority of the rose growers adopted the practices such as, use of weedicides (81 per cent) and spacing between rows (72 per cent). While majority of rose growers had adopted practices like number of prunings (64 per cent), plant protection measures for insects (57.5 per cent), diseases (47.5 per cent), spacing between plants (47 per cent) and recommended level of fertilizer application (32.5 per cent).

Waman and Patil (1998) conducted a study in Nasik district of Maharashtra and revealed that, less than 50 per cent of Onion growers had knowledge about identification of various pests and diseases (42.00 per cent) and control measures for these pests and diseases (36.00 per cent) during storage period of onion produce.

Vijay Kumar and Narayana gowda (1999) conducted a study on rose growers in Bangalore district of Karnataka state and found that, majority (57 per cent) of the farmers had adoption scores ranging between 16 to 19 and 36 per cent of them had scores ranging from 10 to 13. The maximum score was 19 indicating that the adoption level was above the average level.

Kubde *et al*. (2000) conducted a study in Pune district of Maharashtra and reported that, the potato growers had partially adopted recommended spacing (97 per cent), plant protection measures (82.0 per cent) manures (64.5 per cent) and fertilizers (55.5 per cent).

Karpagam (2000) conducted a study on turmeric growers in Erode district of Tamil Nadu state and found that, majority (70.00 per cent) of respondents had medium level of knowledge about turmeric cultivation practices followed by high (20.83 per cent) and low (9.17 per cent) respectively.

Atchuta Raju and Radha Krishnamurthy (2001) conducted a study in Guntur district of Andhra Pradesh on knowledge level of betel vine growers observed that 66.67 per cent of the betel vine growers possessed medium knowledge while 17.50 per cent and 15.83 per cent had low and high knowledge about the recommended technologies, respectively.

Venkatesh (2002) conducted a study in Kolar district of Karnataka and reported that majority of the vegetable growers belonged to high knowledge level category with 36.67 per cent.

Venkataramalu (2003) conducted study on the knowledge level adoption and marketing behaviour of chilli growers in Guntur district of Andhra Pradesh and found that majority (72.50%) of the farmers had medium level of knowledge followed by low (14.17%) and high (13.33%) level of knowledge respectively.

Sunil Kumar (2004) conducted a study on knowledge and adoption of production and post harvest technology of tomato in Belgaum district of Karnataka and revealed that, majority of the tomato growers belonged to medium knowledge level category with 49.17 per cent.

2.2 ADOPTION LEVEL OF CAULIFLOWER GROWERS ABOUT RECOMMENDED CULTIVATION PRACTICES

Sunil (1988) conducted study on knowledge, adoption behaviour and consultancy pattern of potato growers of Dharwad (taluk) of Karnataka and reported that majority (37.50%) of the farmers were found to be high adoptions followed by low (31.66%) and medium (30.83%) adopters, respectively.

Sunil Halakatti (1988) conducted study on knowledge, adoption behaviour and consultancy pattern of potato growers of Dharwad (taluk) of Karnataka and reported that majority (37.50%) of the respondents were found to be high adopters followed by low (31.66%) and medium (30.83%) adopters respectively.

Vijay Kumar (1989) conducted a study on adoption pattern and certain aspects of marketing of potato by farmers in Malur taluk, Kolar district of Karnataka and reported that, majority (38.33%) of the farmers had low adoption level followed by medium (35.00%) and high (26.67%) level adoption category respectively.

Vijay Kumar (1989) in his study on adoption of improved practices of potato, reported that among seven recommended practices, only two practices namely, improved seed and seed treatment were followed by cent per cent of farmers. It was also observed that majority of the farmers had adoption optimum spacing (97.00%) and recommended seed rate (95.00%) where as the other recommended practices namely application of farm yard manure, fertilizers and plant protection chemicals were adopted by 39, 31 and 55 per cent, respectively.

Hanchinal *et al.* (1991) revealed that 17.00 per cent of the potato growers Dharwad taluk completely adopted plant protection practices, while 82.00 per cent of them partially adopted and one per cent had not adopted plant protection practices. They also reported that lack of knowledge about recommended quantity of chemical for control of pests and high cost of plant protection chemicals was reason for partial adoption of pest control practices.

Ravishankar (1995) conducted a study on knowledge, adoption and constraint analysis of potato farmers in Chikkamagalur district of Karnataka and found that majority of the respondents belonged medium adoption category followed by high (30.00%) and low (27.00%) adoption category, respectively.

Basavaprabhu (1996) conducted a study on knowledge level and adoption behaviour of vegetable growers with respect to integrated pest management in Bangalore urban and Kolar district of Karnataka, revealed that, majority of the vegetable growers belonged to medium adoption level category with (47.77%).

Bhople *et al.* (1997) in their study conducted in Akola district of Maharashtra reported that majority of the respondents have used improved varieties and adhered to recommended sowing time, planting, spacing and irrigation interval for both brinjal and tomato majority of the fruits and vegetables farmers were found to be making partial use of practices related to soil type, seed rate, application of FYM, chemical fertilizers and plant protection measure.

Nirmala Devi and Manoharan (1997) conducted a study on adoption level of guava cultivators and reported that, 39.17 per cent of them had moderate level of adoption followed by low (33.33%) and high (27.50%) levels of adoption.

Subashini *et al.* (1997) conducted a study on tapioca growers in south Arcot district of Tamil Nadu state and reported that, majority of the tapioca growers (43.00%) were found to be medium adopters followed by low (31.67%) and high (25.00%) adopters.

Waman and Patil (1998) study was conducted in Nasik district of Maharashtra revealed that 39.33 per cent of onion growers could identifies the pest and disease and only 32.00 per cent of onion growers adopted control measures for these pests and diseases of onion during storage period.

Vijay Kumar and Narayana Gowda (1999) conducted a study on rose growers in Bangalore district of Karnataka state and found that, majority (57.00%) of the farmers had adoption scores ranging between 16 to 19 and 36 per cent of them had scores ranging from 10 to 13. The maximum score was 19 indicating that the adoption level was above the average level.

Kubde *et al*. (2000) in their study in Pune district of Maharashtra reported that, the potato growers had partially adopted recommended spacing (97 per cent), plant protection measures (82.0 per cent) manures (64.5 per cent) and fertilizers (55.5 per cent).

Vedamurthy (2002) in his study on arecanut growers of Shimoga district reported that, majority of the arecanut growers adopted cultural practices (90.66 per cent) while 68.00 per cent of the growers adopted age of the seedlings, 73.00 per cent adopted the advocated spacing and 59.33 per cent of growers fully adopted the recommended practices of harvesting and processing.

Venkatesh (2002) conducted a study in Kolar district of Karnataka and reported that majority of the vegetable growers, belonged to medium adoption level category with 42.00 per cent.

Venkataramalu (2003) conducted study on the knowledge level, adoption and marketing behaviour of chilli growers in Guntur district of Andhra Pradesh and found that, majority (68.33%) of the respondents were found to be medium adoption category followed by low (20.00%) and high (13.33%) adoption category respectively.

Sunil Kumar (2004) conducted a study on knowledge and adoption of production and post harvest technology of tomato in Belgaum district of Karnataka and revealed that, majority of the tomato growers belonged to medium knowledge level category with 49.17 per cent.

2.3 SOCIO-ECONOMIC PROFILE OF CAULIFLOWER GROWERS

2.3.1 Age

Sheela (1991) conducted a study in Bidar district on dairy practicing women and reported that 55.86 per cent of the women were middle aged, 30.17 per cent were young and only 13.97 per cent belonged to the old age group.

Raghuprasad (1992) conducted a study in Chitradurga district and observed that 85.33 per cent of the sericulturists were middle aged. Only 9.33 per cent and 5.33 per cent of the sericulturists belonged to young and old age groups.

Ravishankar (1995) in study on knowledge and adoption and constraint analysis of potato farmers in Chikkamagalur district revealed that 51 per cent of potato farmers belonged to middle age groups followed by old (26.00%) and young (23.00%) age group.

Vijaya Kumar (1997) conducted a study in Bangalore district and indicated that, 38 per cent of the rose growers belonged to the young age group, whereas 45 per cent of them belonged to middle age group and only 17 per cent of them belonged to old age group.

Chandre Gowda (1997) conducted a study in the eastern dry zone of Karnataka among chrysanthemum growing farmers and reported that, 59.0 per cent of the farmers belonged to middle age group.

Angadi (1999) conducted a study in Bagalkot district of Karnataka state and reported that, majority (65 per cent) of the pomogranate growers were middle aged. The respondents below 35 years of age were 18.75 per cent while 16.25 per cent were of old age.

Karpagam (2000) conducted a study on Erode district of Tamil Nadu state and indicated that, majority (70.83 per cent) of the turmeric growing farmers belonged to middle aged group.

Babanna (2001) conducted a study on arecanut growers in Shimoga district and stated that 38.40 per cent of growers belonged to old age, 35 per cent of them are middle aged and 26.66 per cent of the growers were young.

Vedamurthy (2002) in his study on arecanut growers in Shimoga district focused that 25.33 per cent of the growers were old aged, 40 per cent of middle aged and 34.66 per cent were young aged group.

Sunil Kumar (2004) conducted a study in Belgaum district and indicated that, majority (53.30 per cent) of the tomato growers belonged to middle age group.

Shashidhar (2004) reported that majority of the respondents fell under middle age (48.33%) category followed by young age (31.66%) and old age (20.00%) groups.

It could be inferred from the above studies that, majority of the farmers belonged to middle age group.

2.3.2 Education

Angadi (1991) reported that 30 per cent of the pomegranate growers had studied upto middle school followed by 20.62 per cent who had studied upto high school, while 22.50 per cent of the respondents were illiterate, only 3.75 per cent of them had received primary education, graduation was done by nearly 12 per cent farmers.

Karpagam (2000) conducted study in Tamil Nadu state found that majority of the respondents were educated upto high school (29.17%) followed by middle school (19.17%) and only 1.77 per cent of the respondents were post graduate.

Shakuntala and Chaman (2000) in their study on socio-economic characteristics of rural families in Bangalore rural district of Karnataka state revealed that, 33.33 per cent of the family heads had education up to high school followed by middle school (22.17 per cent) and illiterates (18.67 per cent).

Dhamodaran and Vasanth Kumar (2001) found that majority of the respondents (35.83%) had high school education, followed by middle school (25.00%), primary (16.67%) and collegiate level (15.00%).

Palaniswamy and Sriram (2001) conducted a study on scale to measure extension participation of tamarind farmers and revealed that, majority of the farmers belonged to medium education level (53.06 per cent) while 21.77 and 25.17 per cent belonged to low and high education levels respectively.

Vedamurthy (2003) in his study on arecanut growers of Shimoga district in Karnataka noticed that 38.66 per cent of the farmers were studied upto high school. Almost equal percentage of farmers educated upto primary school (13.33%) and college (14.66%) whereas only 8 per cent of the respondents were illiterate and 6.66 of the farmers were graduates.

Shadhidhara (2003) in his study on drip irrigation in Shimoga and Davanagere district noticed that 31.11 per cent were studied upto high school, 30.00 per cent had the graduation and 24.44 per cent educated upto pre-university, whereas middle and primary school education was possessed by 8.89 and 5.56 per cent.

Venkataramalu (2003) in his study in chilli growers in Gutur district of Andhra Pradesh revealed that majority of them studied up to primary school (25.83%) followed by illiterate (22.50%) and high school.

From the above review of literature, it could be inferred that, majority of the farmers had education upto middle school to high school level.

2.3.3 Farming experience

Chandre Gowda (1997) in his study on chrysanthemum in eastern dry zone of Karnataka reported that, majority of the farmers had low farming experience (48.33 per cent) followed by medium (34.67 per cent) and high (17.00 per cent) farming experience respectively.

Sawant (1999) conducted a study on effectiveness of different mode of presentation of information on mushroom cultivation in Maharashtra on farmers and reported that, 78 per cent of the respondents belonged to the group which had farming experience between three to fifteen years.

Vijaya Kumar and Narayana Gowda (1999) in their study in Bnagalore district reported that, majority of the rose growers had low level of farming experience (61.00 per cent).

Hanchinal (1999) in their study in Haveri district of Karnataka reported that, majority of the farmers had medium farming experience (46.67%) followed by high (44.16) and low (9.17%) respectively.

Natikar (2001) in their study found that, majority of the respondents belonged to medium farming experience (48.00%) followed by high (45.00%) and low (7.00%) farming experience respectively.

Bheemappa (2001) conducted study in TBP area and found that majority of the respondents had medium level of farming experience (51.67%) followed by high (45.83%) and low (2.50%) farming experience respectively.

Above review of literature revealed that, the majority of the farmers belonged to medium farming experience category.

2.3.4 Land holding

Raghuprasad (1992) in his study on sericulturists reported that 86.0 per cent of the respondents were big land holders followed by small land holders (10.67%) and few (3.33%) were marginal land holders.

Naik (1994) conducted a study on awareness of farmers in different seed supply agencies in Dharwad district stated that 43.75 of the respondents belonged to big farmers category, followed by 30.42 and 25.83 per cent of the respondents as small and marginal land holders, respectively.

Saravanakuamr (1996) conducted a study on farmers in Dharmapuri district of Tamil Nadu reported that 64.18 per cent of farmers belonged to medium category

Vijaya Kumar (1997) in his study on rose growers in Bangalore district revealed that, 75 per cent of the rose growers belonged to small farmers category followed by medium (23 per cent) and big (2 per cent) farmers category.

Angadi (1999) in his study in Bagalkot district of Karnataka found that, majority of the pomegranate growers (62.50 per cent) had medium farm size and 31.25 per cent had big farm size. Only 6.25 per cent had low land holding.

Karpagam (2000) conducted a study on turmeric growers in Erode districts of Tamil Nadu observed that, majority of the respondents (40.83 per cent) had medium land holding and 31.66 per cent of the respondents had semi medium land holding.

Shakuntala and Chaman (2000) conducted a study on rural families in Bangalore rural district of Karnataka reported that majority (87.00%) of the farmers belonged to small farmers category and 61 per cent of farmers belonged to medium farmers.

Natikar (2001) in his study reported majority of the subscriber (63.00%) farmers belonged to big farmers category with land holding of more than 25 acres, whereas 21, 11 and 4.4 per cent belong to medium semi-medium and small farmers category, in respect of their land holding.

Nagaraj (2002) conducted study on knowledge of improved cultivation practices of sugarcane and their extent of adoption by farmers in Bhadra command area in Davangere district, Karnataka and found that, majority the respondents belonged to medium land holding (48.75%) followed by semi medium land holding category(30.00%) .

Shashidhara (2003) in his study on socio-economic profile of drip irrigation farmers in Shimoga and Davanagere district of Karnataka state revealed that, comparatively more number of farmers (46.67 per cent) belonged to semi medium category followed by medium (32.22 per cent) and small land holding categories (18.89 per cent).

Raghavendra (2004) conducted study on knowledge of improved cultivation practices of sugarcane and their extent of adoption by farmers in Bhadra command area in Davangere district , Karnataka and found that, majority of the respondents belonged to medium land holding (48.75%) followed by semi medium land holding category (30.00%).

From the above studies, it could be concluded that, majority of farmers had semi medium land holding.

2.3.5 Annual income

Phadtare *et al.* (1992) conducted a study on drip irrigation farmers in Sangli district of Maharashtra and reported that out of every 10 farmers, six had annual income upto Rs. 50,000 while one fifth of farmers had income ranging from Rs. 50,000 to one lakh.

Chandran (1997) conducted a study on tapioca growers of Ernakulam district in Kerala and found that 33.33 per cent of the respondents belonged to low income category, while 40.00 and 26.67 per cent were under medium and high income category respectively.

Vijaya Kumar (1997) in his study on rose growers in Bangalore reported that, about half of the growers (51 per cent) belonged to medium income category.

Babanna (2001) in his study on arecanut growers of Shimoga district in Karnataka revealed that 61.60 per cent of the respondents belonged to medium income category while 23.40 and 15.00 per cent were under low and high income category respectively.

Vedamurthy (2002) in his study on arecanut growers of Shimoga district in Karnataka noticed that 48.66 per cent of the respondents belonged to high income category, while 34.00 per cent and 17.34 per cent were noticed in medium and low income category respectively.

Shashidhara (2003) in his study revealed that 42.44 per cent of the respondents belonged to medium level of income (Rs. 1-2 lakh) and in low income category 30.00 per cent of respondents were noticed, whereas 27.70 per cent of the farmers belonged to high income group.

Sunil Kumar (2004) conducted a study tomato growers in Belgaum district of Karnataka and found that, majority of the respondents belonged to medium income category (48.33 per cent).

Shashidhara (2004) conducted a study on drip irrigation farmers in Bijapur district of Karnataka and reported that, 49.17 per cent of the farmers belonged to medium income category.

The above studies revealed that, more number of farmers belonged to medium income category.

2.3.6 Cosmopoliteness

Kashem and Hossain (1992) in their study on sugarcane growers in bagladesh reported that majority of sugarcane growers had medium level of cosmopoliteness.

Kadian and Ramkumar (1999) conducted study on factors associated with knowledge level of dairy farmers revealed that cosmopoliteness helps to develop interaction, mutual understanding and outside contact which leads to higher knowledge.

Anitha (2004) indicated that more than one-fourth (28.30%) of farm women had high cosmopoliteness followed by medium (44.20%) category and low (27.50%) cosmopoliteness groups.

Suresh (2004) reported that 45.00 per cent of respondents had low level of cosmopoliteness, 44.17 per cent of them had medium level and 10.83 per cent had high level of cosmopoliteness.

Shashidhar (2004) conducted study on influencing factors and constraints in drip irrigation by horticulture farmers of Bijapur district of Karnataka and found that 41.50 per cent of the farmers visited town occasionally followed by 37.50 per cent once in 15 days. Whereas, respondents visited to town for the personal or domestic purpose were 54.10 per cent followed by 35.00 per cent for new technology or agriculture purpose.

2.3.7 Mass media participation

Patil (1995) noticed that 47.50, 20.00 and 18.75 per cent of commercial growers of sunflower were daily users of radio, television and newspapers, respectively. On the contrary,

43.75, 25.00 and 3.75 per cent of seed producers were regularly using radio, newspapers and television, respectively.

Sakharkar (1995) indicated that 61.00 and 43.00 per cent of the respondents possessed radio and television, respectively. Among them 13.66 and 12.02 per cent of them were regularly listeners of the general and agricultural programmes from radio 39.23 and 30.00 per cent of them were regular viewers of general and agricultural programmes from television. Further, he reported that as high as 63.08 and 58.33 per cent of the respondents regularly read newspapers and farm magazines, respectively.

Saravanakumar (1996) observed that 23.33 per cent of the mango growers of Dharmapuri district subscribed for news paper and farm magazines and read them regularly, while 42.50 and 42.86 per cent of the respondents regularly listened and viewed the agricultural programmes, respectively.

Shakuntala and Chaman (2000) found that entertainment assess radio and television were possessed by 59.00 per cent of rural families.

Ramanna *et al.* (2000) revealed that 48 per cent of the hybrid sunflower growers had medium level of mass media exposure while 12.00 and 40.00 per cent of respondents had low and high level of mass media exposure.

Shakuntala and Chaman (2000) found that entertainment access radio and television were possessed by 59.00 per cent of rural families.

Dhamodaran and Vasantha Kumar (2001) noticed that above half (53.33%) of the respondents had medium level of mass media exposure, followed by 40.00 per cent of the respondents with high level of mass media exposure.

Vedamurthy (2002) in his study on arecanut growers of Shimoga district in Karnataka observed that relatively a more number of growers (48%) were medium mass media users while 37.00 per cent had high mass media use and 27.33 per cent were of low mass media users.

Shashidhara (2003) in his study reported that 41.11 per cent of the respondents belonged to medium level of mass media participation, followed by low level 35.56 per cent of mass media participation, whereas 23.33 per cent of respondents were noticed in high mass media participation

Venkataramalu (2003) indicated that 22.50 and 74.17 per cent of the respondents possessed radio and television respectively. Among them 10.00 and 4.17 per cent of them regularly listeners of news and entertainment form radio, 55.83 and 26.00 per cent of them were regular various of news and adverstiment from television. Further, the reported that 41.67 and 28.33 per cent of the respondents regularly read news paper and success stories of farm magazines, respectively.

Moulasab (2004) conducted study on mango growers of North Karnataka and found that, 74.17 per cent of the respondents are subscribers of television followed by 32.50 and 6.67 per cent of the respondents possess farm magazines and news papers, respectively. Among these, 43.33 per cent of the respondents are occasional viewers of television.

2.3.8 Organizational participation

Lokhande and Wonglikar (1990) observed that, 45 per cent of grape growers were having medium level of organizational participation followed by 35 per cent had high level and 20 per cent had low levels of organizational participation.

Srinivasareddy (1995) found that, 57 per cent of mango growers had medium level followed by low level (33.00%) and high (10.00%) levels of organizational participation.

Suresh *et al.* (1995) stated that, 90 per cent of small farm youth had low to medium organizational participation, while one-fourth (26%) of big farm youth had medium to high organizational participation.

Shivalingaiah *et al.* (1996) in their study conducted in Bangalore rural and Kolar districts of Karnatalka reported that, 90 per cent of small farm youth had low to medium organizational participation. While 26 per cent of farm had medium to high organizational participation and 68 per cent from youth had high participation in farm activities while high per cent (42%) of big farm youth had low participation in farm activities.

Thangavel *et al.* (1996) found that, 38 per cent of the respondents in dry and nearly 24 per cent in wet area showed medium level of organizational participation. 34 and 42 per cent of the respondents found in high level of organizational participation in both areas and rest had low level of organizational participation.

Sai Krishna (1998) conducted a study in Raichur district on Andhra migrant farmers reported that, six per cent of the respondents were members of milk co-operative society, only 1.33 per cent of farmers were office bearers. Only 3.33 per cent of farmers were the members of village Panchayat and no one was its office bearer and two per cent of migrant farmers were members of youth club and co-operative bank.

Nagoor Meeran *et al.* (1999) found that, 78 per cent of the respondents were found to have low level of organizational participation. Agricultural credit societies, local shrimp farmers association and caste association were the some of important organizations in which the respondents participated.

Puthirapathap *et al.* (1999) found that, majority of the respondents were under medium category for organizational participation.

Siddappa (1999) found that 6.87 per cent and 6.25 per cent of the pomegranate growers were members of fruit growers association and youth club respectively. Only 4.37 per cent and 3.75 per cent of the respondents were the members of taluk panchayat and gram panchayat respectively.

Vijay Kumar (2000) conducted study on sugarcane growers in Belgaum district of Karnataka and found that, 29.00 per cent of the respondents were members of co-operative societies and 2.00 per cent are office bearers. Whereas, 8.00 per cent of the farmers were members of youth club and 5.33 per cent of the respondents were members of gram panchayat.

Sandesh (2004) found that, 39.17 per cent of the respondents were members co-operative societies only 3.33 per cent of the respondents were members of taluka panchayat and 0.83 per cent are members of zilla panchayata, among these 57.50 per cent of the respondents regularly participating in cooperative societies.

2.3.9 Extension participation

Saravanakumar (1996) observed that majority of the respondents never participated in various extension activities namely, demonstration (83.34%), training programmes (70.83%) and discussion meeting (67.50%), only 68.33 per cent and 54.17 per cent of the mango growers participated occasionally in field day and conducted tour, respectively.

Vijaya Kumar (1997) in his study in Bangalore district observed that, majority of the rose growers participated in extension activities like field days (31.00 per cent) and Krishimela (42.33 per cent). Most of the farmers never participated in group discussion meetings and training programmes.

Angadi (1999) in his study on pomegranate growers in Bagalkot district of Karnataka reported that, majority of the respondents had not participated in various extension activities (98.76 per cent), group meetings (75.23 per cent) and training programmes (72.50 per cent). Only 43.75 and 38.13 per cent of the respondents participated regularly in ‘method demonstration’ and ‘Krishimela’ respectively.

Gupta (1999) reported that, about 74.00 per cent respondents were aware of training programmes of which only 36.00 per cent respondents had participated in the training programmes. Whereas, 56.00 per cent of respondents were aware of demonstrations and

only 4.66 per cent of farmers had participated, but none of the respondents had participated in field days and field visits.

Mamatha and Hiremath (2000) reported that, small, medium and Artisan category of farm women participated in trainings, demonstrations and other extension activities in varied levels ranging from 4.5 to 17.5 per cent.

Venkataramalu (2003) indicated that majority of the farmers participated in discussion with village extension workers (70.00%), Krishimela (62.50%) and some exhibitions on agriculture (61.67%).

Raghavendra (2004) conducted study on knowledge and adoption level of post harvest technology by red gram cultivators in Gulbarga districts and found that, 24.66 per cent of the respondents were participated regularly in agricultural exhibitions, demonstrations (22.67%) conducted in their villages.

Sunil Kumar (2004) in his study in Belgaum district of Karnataka revealed that, nearly 23.00 per cent of respondents participated regularly in agricultural exhibition followed by 20.83 per cent in demonstrations. Majority of them never attended in activities like training (66.67 per cent), educational tour (94.17 per cent) and field visits (92.05 per cent).

Shashidhara (2004) conducted a study on drip irrigation farmers of Bijapur district and revealed that, 45.83 per cent of the respondents participated in group meetings followed by exhibition (41.66 per cent) and 18.33 per cent of the respondents participated in Krishimela.

2.3.10 Innovativeness

Ananda (1992) conducted a study on drip irrigation efficiency among grape growers of Bangalore district in Karnataka and focused that 40.00 per cent of the drip irrigation adopters had medium innovative proneness, whereas 30.00 per cent each were grouped under low and high innovative proneness categories.

Balasubramani (1997) conducted a study on rubber growers in Dakshina Kannada district of Karnataka state and reported that, 37.00 per cent were found in medium innovativeness category followed by 35.00 and 28.00 per cent in high and low innovativeness category, respectively.

Kumar (1998) conducted a study on banana growers in Bangalore district of Karnataka state and pointed out that, 40 per cent of the banana growers had less innovativeness followed by 37 per cent of them had medium and 23 per cent of them had high innovativeness.

Babanna (2001) conducted a study on arecanut growers in Shimoga district in Karnataka and focused that 34.10 per cent farmers were of medium innovative proneness category followed by 33.33 per cent of them having high and 32.66 per cent of them possessed low innovative proneness.

Natikar (2001) conducted a study on attitude and use of farm journal by the subscriber farmers and their profile North Karnataka and revealed that, 73.75 per cent of the subscriber farmers belonged to medium innovativeness category followed by low (15.63 per cent) and high (10.62 per cent) innovativeness categories.

Shashidhara (2003) in his study on socio-economic profile of drip irrigation farmers in Shimoga and Davanagere district of Karnataka found out that, majority of the farmers belonged to medium innovativeness category (47.50 per cent) followed by low (31.66 per cent) and high (20.83 per cent) innovativeness category, respectively.

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

Suresh (2004) indicated that the milk producers in Chittor district in Andhra Pradesh had medium, high and low innovativeness in the order of 55.00, 24.58 and 20.42 per cent, respectively.

From the above studies it could be inferred that, majority of the farmers belonged to medium innovativeness category.

2.3.11 Economic motivation

Sheela (1991) in her study on diary practicing women reported that majority (67.00%) of the respondents had medium level of economic motivation. Only 18.0 and 15.0 per cent of the respondents had low an high level of economic motivation.

Sreenivas Reddy (1995) conducted a study on knowledge and adoption of recommended mango cultivation practices in Kolar district of Karnataka state. Reported that, 40.0 per cent of the mango growers had high level of economic motivation followed by medium (34.0 per cent) and low (26.0 per cent) economic motivation, respectively.

Saravanakumar (1996) conducted a study on mango growers in Krishnagiri taluk of Dharmapuri district of Tamil Nadu. Found out that, majority of the respondents (60.83 per cent) had medium economic motivation while 16.67 per cent and 22.50 per cent of the farmers belonged to low and high level of economic motivation, respectively.

Chandran (1997) in her study on tapioca growers in Ernakulam district of Kerala state revealed that, 46.66 per cent of the respondents belonged to medium economic motivation cateogry.

Sawant (1999) in his study on effect of different modes of presentation of information of mushroom cultivation on Maharashtra state reported that, 78 per cent of the respondents belonged to medium economic category.

Siddappa Angadi (1999) conducted study on pomegranate growers and reported that majority of pomegranate growers gad medium level of economic motivation (50.63%) whereas, 28.75 and 20.68 per cent of the respondents belonged to high and low economic motivation categories respectively.

Natikar (2001) in his study on attitude and use of farm journals by the farmers and found out that, majority of the respondents (65.0 per cent) had medium economic motivation. While 18.75 per cent and 16.25 per cent of the respondents belonged to high and low level of economic motivation, respectively.

Sandesh (2004) in his study reported that, majority (51.67%) of the respondents belonged to medium level of economic motivation. Whereas, 28.33 per cent and 20.00 per cent of the respondents belonged to high and low level of economic motivation categories, respectively.

The above studies revealed that, majority of the farmers belonged to medium economic motivation category.

2.3.12 Risk orientation

Verma (1993) found that majority (64.00% and 50.67%) of the member and non-member dairy farmers had medium orientation towards admitting risk. There were 20.67 per cent members and 16.00 per cent non-members who had high risk preference ability as against 14.87 per cent members and 33.33 per cent non-members who had low risk preference ability.

Ravishankar (1995) in his study observed that 65 per cent of the respondents had medium level of risk bearing capacity followed by high (20.00%) and low (15.00%) level of risk orientation respectively.

Saravanakumar (1996) in his study in Krishnagiri taluk of Dharmapuri district in Tamil Nadu observed that, majority of the mango growers (70.83 per cent) belonged to medium level of risk orientation followed by low (15.0 per cent) and high (19.17 per cent) level of risk orientation, respectively.

Gupta (1999) observed that majority (64.00%) of the respondents were average risk bearing followed by low (24.67%) and high (11.33%) risk bearing.

Sawant (1999) conducted a study on different modes of presentation of information on mushroom cultivation in Maharashtra observed that, majority (75.00 per cent) of the respondents had medium risk bearing capacity while 17 per cent had high risk bearing capacity.

Natikar (2001) conducted a study on attitude and use of farm journals in North Karnataka and indicated that, 67.50 per cent of the subscriber farmers belonged to high risk orientation category followed by medium risk orientation (16.86 per cent) and low risk orientation (15.63 per cent) categories.

Vijay Kumar (2001) indicated that 38.34, 35.00 and 26.66 per cent of total respondents fell under low, medium and high risk taking ability categories, respectively.

Babanna (2001) conducted a study on arecanut growers of Shimoga district in Karnataka and pointed out that 37.50 per cent of arecanut growers belonged to medium category followed by 31.66 per cent of them had high risk orientation. The remaining 30.80 per cent of them were having low risk orientation.

Dhamodaran and Vasanthakumar (2001) revealed that, majority of the respondents (81.67%) had medium level of risk orientation, followed by 18.33 per cent of the respondents with high level of risk orientation.

Nagaraja (2002) observed that majority (74.58%) of the respondents were found to possess medium risk orientation, whereas 15.83 per cent and 9.58 per cent of the respondents were found belonged to high and low level of risk orientation respectively.

Subramanyam (2002) revealed that, 75.00 per cent of the trained farmers had medium risk preference followed by high (13.34%) and low (11.66%) levels of risk preference.

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

Shashidhara (2003) in his study on drip irrigation in Shimoga and Dharwad district reported that, an equal per cent of respondents had low 36.67 per cent and high (35.50%) risk orientation and the remaining 27.78 per cent possessed medium risk orientation.

Bhagyalaxmi *et al.* (2003) revealed that majority of the respondents (75.56%) had medium risk orientation followed by low (15.56%) and high (13.33%) risk orientation categories.

Venkataramalu (2003) reported that majority of the farmers had medium level of risk bearing (73.33%) capacity.

Suresh (2004) indicated that, majority of respondents had medium level of risk taking ability followed by low and high level at the rate of 62.02, 24.58 and 13.34 per cent, respectively.

Shashidhar (2004) revealed that majority of the farmers (70.83%) had medium level of risk bearing ability and low (15.00%) level of risk orientation.

From the above studies it can be concluded that, majority of the farmers had medium risk bearing capacity.

2.4 MARKETING BEHAVIOUR OF CAULIFLOWER GROWERS

2.4.1 Mode of marketing of cauliflower

Hugar and Hiremath (1984) studied the efficiency of alternative channels in marketing of vegetables in Belgaum city of Karnataka state and found that the price spread in the case of cabbage (48.3%) and brinjal (52.79%) were lower when sold through cooperative society compared to those (50.29 and 54.74%) when sold through commission agents.

Kiresur (1987) in his study on marketing of vegetables in Dharwad and Hubli markets found the existence of two channels namely channel-I : producer → seller → commission agent → wholesaler → retailer → consumer and Channel-II producer saler → village merchant → commission agent cum → wholesaler → retailer → consumer.

Subramanyam (1988) identified there channels for marketing of vegetables in Karnataka namely procedure → commossion agent at the market (chennel-II), producer → pre-harvest contactor (channel-II) and producer → retailer (channel-III).

Verma *et al.* (1998) idetnified four marketing channels for veegtables in jaipur and choma markets of Rajasthan as given under

Channel – I : Producer → retailer → consumer

Channel – II : Producer → commission agents → retailer → cpnsumer

Channel – III : Producer → wholesaler → retailer → consumer

Channel – IV : Producer → commission agent → wholsaler → retailer → cpnsumer

Chandran (1997) in her study in Ernaculum district of Kerala State found that majority of the tapioca growers (70.70%) sold their produce to the consumer through the middlemen and 16.66 per cent marketed their producer through the channel of middleman → processing unit → trader → consumer, a meager 1.67 per cent sold their produce to the consumer through the processing unit and norespondents sold the producer directly to the consumer.

Vijaya Kumar (1997) in his study on rose in Bangalore district of Karnataka state and reported that, cent per cent of the farmers sold their produce to the whole salers and no respondents sold their produce to any contractors.

Kumar (1998) conducted a study on banana growers in Bangalore district of Karnataka state and reported that, majority of the banana growers sold their produce to the consumers through middleman (54.0 per cent) and 22.33 per cent of them sold to whole salers.

Pant and Kumar (1999) identified single most important channel for tomato marketing in Rajasthan (producer → commission agent cum wholsaler → retailer → consumer).

Patil *et al.* (1999) reported that above 99.50 per cent of cabbage and cauliflower in the market of Banasakantha district (North Gujarath) were sld from producers to consumers through wholsaler cum – commission agemts and retailers.

Vasudev and Chowdary (1999) identified two marketing channels which were predominant in marketing of tomato in all the three regions of Andhra Pradesh *viz.,*

Channel – I : Producer → commission agent → secondary wholsaler → retailer → consumer

Channel – II : Producer → commission agent → primary wholesaler → retailer → consumer.

Karpagam (2000) in his study on turmeric growers in Erode district of Tamil Nadu state reported that, 62.50 per cent of the produce was sold in regulated market followed by 32.50 per cent of the produce was sold to commission agents and only 5.00 per cent of the produce was sold to co-operative society.

Moulasab (2004) in his study on mango growers of North Karnataka reported that, 58.50 percent of the fruits were sold to whole salers, followed by 28.33 per cent of the farmers to pre-harvest contractors and only 7.67 per cent of the farmers sold their fruits with the help of retailers.

Sunil Kumar (2004) in his study on tomato growers in Belgaum district of Karnataka reported that, majority of the farmers (65.30 per cent) sold their produce through middle man.

2.4.2 Problems in production and marketing of cauliflower

Singh *et al.* (1988) reported that lack of adequate supply of inputs high transportation cost, storage of railway wagons, low prices lack of industrial uses of potato, large surplus and

diseases sales were the major problems in potato marketing and storage in Farukhabad district of Uttar Pradesh.

Kadam and Borse (1993) revealed that, the problems of banana growers in Jalgaon district were; lack of cultural and marginal requirement of the crop in relation to variety of soil climate, problem of availability of rhizomes, perishability of the banana fruit, disease and pest control in the field and marketing of banana fruits.

Shaikh *et al* (1993) conducted a study in Purandar Tahsil of Pune district of Maharashtra and expressed that, all the custard apple growers were facing the problems of non-availability of improved variety and grafts. Whereas, more than 75 per cent growers opined about the shortage of irrigation facilities in summer and control of mealy bugs and non-availability of credit for irrigation project and marketing problems.

Pamer *et al.* (1994) reported that spoilage was the major problem (68.46%) during marketing of vegetables in South Gujarat followed malpractices in weighment (49.41%) lack of credit facilities (24.40%) and inadequate transportation facilities (23.81%).

Ravishankar (1995) conducted a study in Chickamagalore district of Karnataka and reported that, the constraints faced by the potato growers were lack of technical guidance, more pests and diseases, high cost of fertilizers, high cost of plant protection chemicals, non-availability of seed materials and fertilizers in time.

Sreenivas Reddy (1995) conducted a study in Kolar district of Karnataka and reported that, the problems faced by the mango growers were the incidence of pests and diseases, high cost of fertilizers and plant protection chemicals, heavy rains during fruit development stage, flower and fruit drop and non-availability of labour for various cultural operations.

Sharma *et al.* (1995) in their study on marketing of vegetable in Himachal Pradesh reported that, costly wooden boxes, time consuming manual grading, distant markets, high transportation charges, malpractices in the market and lack of market information were the major problems faced by growers in storage, transpiration and marketing of vegetables.

Bonny (1996) surveyed the constraints in commercial production of vegetables in Pandichery and Puthur, Kerala and reported that increased cost of plant producton chemicals was perceived as the most important factors by respondents followed by in adequate market facilities poor storage and other post harvest facilities insufficient capital and high labour costs.

Patil *et al.* (1997) in their study on marketing efficiency of Anand vegetable market in Gujarat reported that lack of storage facilities, delay in payment of sale proceeds, high cold storage charges, monopoly of few middlemen and need of timely disposal of these perishable products etc., were the major problems faced by the cabbage and cauliflower growers.

Vijaya Kumar (1997) in his study in Bangalore district observed that, the problems faced by rose growers of Bangalore district were lack of storage facilities, inadequate local markets and exploitation by whole salers.

Kumar (1998) in his study on banana growers in Bangalore district reported that, the farmers faced the problems like technical guidance, pests and diseases, high investment, low price for the fruits, fluctuation in the prices and exploitation by the middleman.

Ravishankar and Katteppa (1998) in their study on potato in Chikkamagalur district of Karnataka state reported that, the farmers faced the problems like lack of technical guidance, more pests and diseases incidence, less storage facilities, high cost of transportation and high commission charges.

Narappanavar and Bavur (1998) examined the problems in storage transpiration and dissemination of market information in potato, marketing in Dharwad district of Karnataka state the results of the study revealed that farmers were not facing severe problems in transportation because of large number of tractors in the village. Similarly, farmers were making suitable arrangements for storage of potato on the farm itself.

Atibudhi (1999) reported that the capital available with small and marginal farmers was not adequate to meet the production expenses, some of them were forced to depend upon commission agents for arranging transportation, packing etc in Cuttack district of Orissa. This enabled the commission agents to cheat the innocent cultivars by charging exorbitant prices for such facilities. Therefore, it is necessary to provide the credit for marketing operations by treating them as a part of cost of cultivation.

Vasudev and Chowdary (1999) identified problems of productions and marketing of tomato in there regions of Andhra Pradesh, lack of grading facilities, absence of market information and spoilage and malpractices were the major problems in tomato. They have conducted that providing these facilities can improve the marketing efficiency and will help the farmers in realizing better prices.

Karpagam (2000) conducted study on turmeric growers of Tamil Nadu state and reported the problems of price fluctuation, high cost of inputs and scarcity of labour, very few respondents expressed the problem of non-availability of credit.

Sunil Kumar (2004) in his study on tomato growers in Belgaum district of Karnataka reported that, majority of the farmers (75.83 per cent) faced the problem of technical knowledge and guidance about improved cultivation practices as well as post-harvest technology. Whereas 65.00 per cent of the respondents faced the problem of high fluctuation in market price, followed by high transportation cost (62.53%), labour shortage and high wages (55.83%) and lack of irrigation facilities and power shortage (46.66%).

2.5 FACTORS CONTRIBUTING FOR HIGH YIELDING OF CAULIFLOWER

Kalyani *et al.* (1992) reported that, maximum crop growth dry matter production and uptake of major nutrients in cauliflower was obtained with half of inorganic N along with azospirillum. Similar response to azospirillum inoculation has also been reported in cabbage by Jeevajothi (1993) and Verma *et al.* (1997).

Mondal *et al.* (1993) evaluated the growth and productivity of potato under different fertilizers management with FYM. It was manifested that FYM had a marked effect on tuber yield, tuber bulking rate and nutrient availability. Better net production values were recorded at 75 per cent recommended dose of NPK along with 10t FYM per ha.

Sharma (1993) reported that irrigation to cabbage crop at 2.00 1w/CPE ratio (15 days interval) significantly increased the head diameter, dry matter.

Wange *et al.* (1995) in his study observed that significant increase in diameter, hard weight and yield with increased applications of nitrogen in cabbage.

Chavan *et al.* (1997) recorded the highest ascorbic acid (241.2 mg/ 100 g) of green chillies when N was applied at 75 kg per ha through FYM and 75 kg per hectare through urea.

III. METHODOLOGY

The present study was conducted during the year 2004-05 in the Belgaum district of Karnataka.

The methodology followed in conducting this research is furnished under the following headings.

3.1 Locale of the study

3.2 Selection of villages

3.3 Selection of respondents

3.4 Variables and their measurements

3.5 Procedures followed in data collection

3.6 Statistical tools used in the study

3.1 LOCALE OF THE STUDY

In Karnataka state, Belgaum district is having maximum area under cauliflower cultivation and ranks first in area and production. Hence this district has selected purposively for the study. Further in Belgaum district, Belgaum and Hukkeri taluks with maximum area under cauliflower cultivation have been selected purposively as locale of the study.

3.2 SELECTION OF VILLAGES

In selection of villages, same criteria of maximum area under cauliflower cultivation was considered. Belgaum district comprises of 10 taluks out of these, two taluks Belgaum and Hukkeri were selected based on maximum area under cauliflower, further 6 villages from each taluk where maximum area under cauliflower were selected. In all 12 villages were selected for the study.

3.3 SELECTION OF RESPONDENTS

From each selected village a list of farmers cultivating cauliflower was prepared with the help of agricultural Assistant. Then 10 cauliflower growers from each village were randomly selected to constitute the total sample size of 120 respondents.

3.4 VARIABLES AND THEIR MEASUREMENTS

3.4.1 Dependent variables

Knowledge and adoption as the dependent variables considered for the study.

3.4.1.1 Knowledge

It refers to the factual information possessed by a farmer regarding recommended cultivation practices of cauliflower.

The “Teacher made test” suggested by Anastasi (1961) was employed to measure the knowledge level of respondents. All the important operations of cauliflower cultivation were listed separately in consultation with the experts. The questions and answers were carefully framed by referring to the package of practices of the University of Agricultural Sciences, Dharwad. The answers elicited from the farmers were quantified by giving one score to correct and zero to wrong answer.

Based on the total scores, the respondents were grouped into three categories as low, medium and high using mean and standard deviation as measures of check.

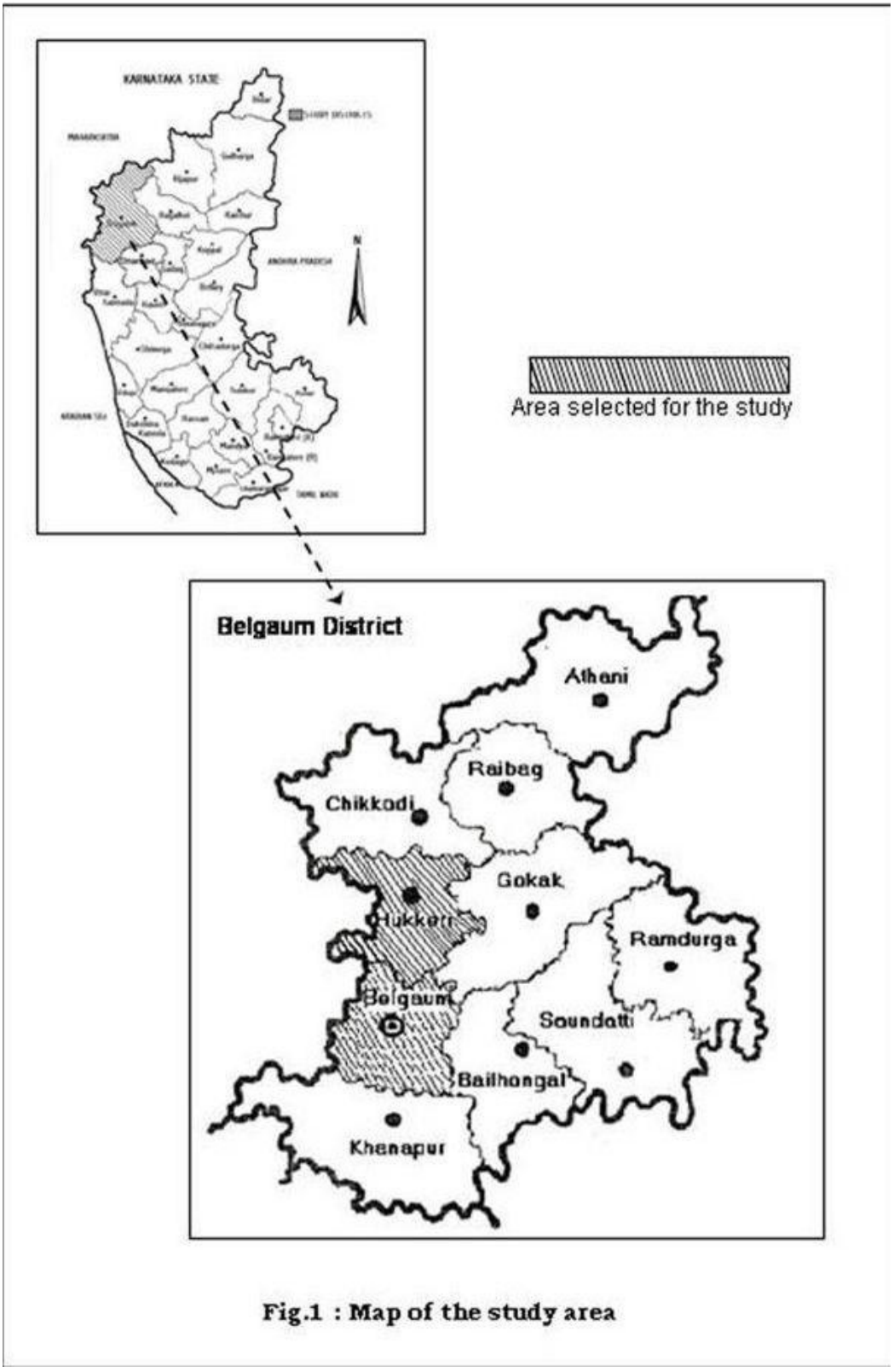

Fig 1: Map of the study area

Knowledge category	
Low	($<\bar{X}$ – S.D)
Medium	($\bar{X} \pm$ S.D)
High	($>\bar{X}$ + S.D)

3.4.1.2 Adoption

It refers to the adoption of recommended cultivation practices of cauliflower by the farmers as recommended by the Agriculture University package.

All the important operations in cauliflower cultivation were listed. A total number of 15 common recommended practices were selected based on the judgment of the specialists. The proper answers for these items were obtained with the help of package of practices and cauliflower specialists of the University of Agricultural Sciences, Dharwad. The answers elicited from the farmers were compared and quantified by giving one score for adoption and zero for non adoption.

Based on the total scores, the respondents were grouped into three categories as low, medium and high by using mean and standard deviation as a measure of check.

Category	Score
Low	($<\bar{X}$ – S.D)
Medium	($\bar{X} \pm$ S.D)
High	($>\bar{X}$ + S.D)

3.4.2 Independent variables

Age

Education

Farming experience

Land holding

Annual income

Cosmopoliteness

Mass media participation

Social participation

Extension participation

Innovativeness

Economic motivation

Risk orientation

3.4.2.1 Age

It is referred to the chronological age of the respondents in completed years at the time of investigation. The procedure followed by Prita (2001) was used to categorise the respondents into three groups.

Category	Age (Years)
Young	18-30
Middle	31-50
Old	Above 50

3.4.2.2 Education level

The respondents were categorized into seven categories and their frequencies and percentage were found out. The scoring pattern according to Trivedi (1963) and also followed by Vijaykumar (2000) with slight modification was adopted.

Category		Score
Illiterate		0
Primary school	(1 to 4^{th})	1
Middle school	(5^{th} to 7^{th})	2
High school	(8^{th} to 10^{th})	3
PUC	(10^{th} to 12^{th})	4
Graduate		5
Post-graduate		6

The maximum and minimum scores obtained were 6 and 0, respectively.

3.4.2.3 Farming experience

It refers to total number of years of experience in cultivating cauliflower by the farmers. The experience of the farmer in completed years at the time of investigation was considered and the procedure followed by Padmaiah (1995) and Hanchinal (1999) was used to categorize into three groups and taking mean standard deviation as measure of check.

Category	Farming experience (years)
Low	Up to 10
Medium	10 to 20
High	Above 20

3.4.2.4 Land holding

It refers to the number of acres of land possessed by the farmer. The criterion prescribed by the Karnataka land Reforms Act 38 of 1966 (part –B) 99, 195-96 under section 2(a) 32 as one acre of irrigated or garden land was equated to 3 acres of dry land.

The criterion prescribed by Ministry of Rural Development, Government of India vide circular No. 280-12/16/19 RD-III (Vol. II) dated 15^{th} November 1991 and as followed by Shashidhara (2003) was used and the respondents were grouped into different categories.

Category	Land holding (in acres)
Marginal farmers	Up to 2.50
Small farmers	2.51 to 5.00
Semi-medium farmers	5.01 to 10.00
Medium farmers	10.01 to 25.00
Big farmers	Above 25.00

3.4.2.5 Annual Income

Annual income of the respondents was determined by considering the total income of the family from all the sources in one year and expressed interms of rupees. The procedure followed by Venkatesh (2002) was used. Based on the total annual income of the respondents were categorized into different groups.

Annual income
< Rs. 20,000/ annum
Rs. 20,000 to 75,000/ annum
Rs. 75,000 to 1,00,000/ annum
> Rs. 1,00,000/ annum

3.4.2.6 Cosmopoliteness

It is the degree to which an individual is oriented outside to his immediate social system. The cosmopolite farmer is likely to be a unique individual, in that he is motivated to look beyond this environment when most others are content to maintain a localistic frame of reference.

Two dimensions of the variables considered in this case were;

1. The frequency of visit to the nearest town
2. The purpose of visit to the town

Above two dimensions indicated extent of cosmopoliteness of the respondents were quantified by using frequencies and percentages and the procedure as followed by Shashidhar (2004), was used.

3.4.2.7 Mass media participation

It refers to the extent to which the farmer is exposed to different mass media such as newspaper, radio, farm magazines and television.

The procedure suggested by Trivedi (1963) and followed by Sunil Kumar (2004) with little modification was followed for measuring mass media participation of the respondents.

Sl. No.	Activities	Frequency of participation		
		Regular	Occasionally	Never
1.	Reading newspaper	2	1	0
2.	Listening to farm radio programme	2	1	0
3.	Reading farm magazines, extension leaflets or any other literature on Agriculture/Horticulture	2	1	0
4.	Watching TV programmes relating to agriculture activities	2	1	0

Further, the respondents were asked for their ownership or subscription for the above sources and the scores were given as follows.

Sl. No.	Source	Owner/ subscriber	Non-owner/non-subscriber
1.	Radio	1	0
2.	Television	1	0
3.	Newspaper	1	0
4.	Farm magazine	1	0

The data obtained was calculated by using frequency and percentage.

3.4.2.8 Organizational participation

It is the degree of involvement of the respondents from mere membership to organizational positions and their active participation in the activities of local formal organizations like gram panchayat, taluka panchayat, zilla panchayat. Farmers service co-operative society, Youth club etc. This was quantified using the procedure followed by Trivedi (1963) and as followed by Saravanakumar (1996) with slight modifications. The items and weightages used were as under.

Items	Score
Member in the organization	1
Office bearer	2
Participation in the activities of organization	
Never	0
Occasionally	1
Regularly	2

The data obtained was further quantified by using frequency and percentages.

3.4.2.9 Extension participation

It refers to the extent of participation of farmers in different extension activities. This variable was quantified by following the procedure as used by Sunil Kumar (2004) with slight modification. A list of extension activities was prepared and the respondents were asked to indicate their extent of participation in each of the activity. The scoring procedure followed was as follows.

Sl. No.	Activities	Regularity of attending		
		Regular	Occasionally	Never
1.	Training programmes	2	1	0
2.	Demonstration	2	1	0
3.	Field visits	2	1	0
4.	Group meetings	2	1	0
5.	Exhibitions	2	1	0
6.	Education tour	2	1	0

The data obtained was calculated by using frequency and percentage.

3.4.2.10 Innovativeness

It refers to the behavioural pattern of an individual who has interest and desire to seek changes in farming techniques and willing to introduce such changes into his operation when practicable and feasible and also it refers to the degree to which a farmer is eager in adopting the innovation in cauliflower cultivation early in his field.

Forced choice method of self rating scale developed by Moulik and Rao (1965) and as followed by Vijayakumar (1997) with slight modification was administered for quantification of the degree of farmers self evaluation with regard to their innovativeness. This scale consisted of three sets of statements and each set containing three short statements with weights of 2, 1, 0 indicating “strongly agree”, “agree” and “disagree”. The total score would range from 0 to 36. Based on the scores obtained, the respondents were grouped into three categories using mean and standard deviation as measure of check.

Category	Score
Low	$(< \bar{X} - S.D)$
Medium	$(\bar{X} \pm S.D)$
High	$(> \bar{X} + S.D)$

3.4.2.11 Economic motivation

It refers to the values or attitude for which the farmer attached greater importance to profit maximization. This was quantified by using the scale developed by Supe (1969) and as followed by Natikar (2001) was used.The scale consists of six statements, of which first five statements were positive and the last one was negative. The responses were recorded on five point continuum ranging from strongly agree, agree, undecided, disagree and strongly disagree with scores of 5,4,3,2,1 for positive statements and 1,2,3,4,5 for negative statements

respectively. Maximum and minimum scores obtainable by the individual on the scale were 30 and 6. Based on the scores, farmers were grouped into three categories by using mean and standard deviation as measure of check.

Category	Score
Low	($< \overline{X} - S.D$)
Medium	($\overline{X} \pm S.D$)
High	($> \overline{X} + S.D$)

3.4.2.12 Risk orientation

Risk orientation was operationalized as the degree to which the farmer is oriented towards risk and uncertainty in facing problems in farming.

In the present study, risk orientation of respondents was measured with the help of a scale developed by Supe (1969) and as followed by Natikar (2001) was used. The scale contained six statements of which first and fifth statements were negatively keyed. Modification in the scoring procedure was made by giving a weightage of 2 for the 'Yes' response and 1 for 'No' response for positive statement. This was reversed in case of negative statements. The aggregate of weights over six statements was the total score of a respondent on this variable. The possible score ranges from 6 to 12.

Based on the total score obtained by the respondents on risk taking ability, they were grouped into three categories, keeping the mean and standard deviation as measuring check.

Category	Score
Low	($< \overline{X} - S.D$)
Medium	($\overline{X} \pm S.D$)
High	($> \overline{X} + S.D$)

3.5 MARKETING PATTERN FOLLOWED BY THE RESPONDENTS

To study the marketing pattern of the respondents, they were asked to indicate the nature of marketing, it includes where, when, to whom and through which channel, they sell their produce of cauliflower. Responses obtained from the farmers were expressed in frequencies and percentages.

3.5.1 Problems faced by the respondents

The problems faced in cultivation and marketing of cauliflower growers of the study area were listed out during pre-test and also in consultation with the extension personnel of State Department of Horticulture. For the responses obtained from the cauliflower growers, frequency and percentages were calculated for each constraint faced by the respondent.

3.6 FACTORS CONTRIBUTING FOR HIGH YIELDING OF CAULIFLOWER

The factors contributing for high yielding of cauliflower were listed in consultation with university package as well as concerned subject matter specialist. Further, the respondents were asked to indicate their responses for each of the factor and later frequency and percentage were used to quantify the data.

3.7 PROCEDURE FOLLOWED IN DATA COLLECTION

The data in line with the objectives of the study was collected with the help of structured interview schedule. The procedure followed for developing and administering the interview schedule are explained below.

3.7.1 Development of interview schedule

An interview schedule was developed in consultation with University package and also with the experts in the field. The schedule was divided into four parts. In the first part, the general information of the respondents and information about socio-psychological and economic characteristics of the respondents was elicited. The second part was designed to collect information about the knowledge and adoption level of the farmers about the recommended cultivation practices of cauliflower. The questions related to marketing pattern and problems faced by farmers were included in the third part. And in the fourth part the factors which have contributed for high yielding were included.

3.7.2 Administration of interview schedule

The data was collected by personal interview method using the structured schedule. They were contacted individually at their residence and also on farm. The filled in interview schedules were scrutinized and tested immediately after the interview for their completeness in all respects.

3.8 STATISTICAL TOOLS USED IN THE STUDY

The data collected from the respondents were scored, tabulated and analyzed by using suitable statistical methods. The statistical methods used in the present study are described below.

Frequency and percentage were used to interpret the categories of personal, socio-economic characteristics and knowledge and adoption level of the respondents. They were also used for interpreting the marketing behaviour, problems and suggestions given by the respondents. Further, mean and standard deviation were used to categorize the variables into different categories.

IV. RESULTS

Findings of the present investigation in line with the objectives set forth are presented under the following headings.

4.1 Knowledge level of farmers about the recommended cultivation practices of cauliflower

4.2 Adoption level of recommended cultivation practices by the cauliflower growing farmers

4.3 Socio-economic profile of cauliflower growing farmers.

4.4 Marketing behaviour of cauliflower growers

4.5 Problems in production and marketing of cauliflower growers

4.6 Factors contributing for high yielding of cauliflower as perceived by farmers

4.1 KNOWLEDGE LEVEL OF FARMERS ABOUT RECOMMENDED CULTIVATION PRACTICES OF CAULIFLOWER

4.1.1. Knowledge level of farmers about individual recommended cultivation practices of cauliflower

The data in Table 1 reveals that, the knowledge of cauliflower growers about individual cultivation practices of cauliflower. It is interesting to note that only 24.16 per cent of respondents had knowledge about recommended varieties (like early snowball, snowball and late snowball). Whereas, cent per cent of the respondents had correct knowledge about non-recommended varieties of private seed companies.

Majority of the cauliflower growers had knowledge about sowing time (81.66%), seed rate (65.00%) and seed treatment (61.66%).

Regarding recommended cultural practices in nursery 78.33 per cent of respondents had correct knowledge about method of sowing in nursery (broadcasting). Whereas, 80.00 per cent of the respondents had knowledge about fertilizer application to nursery and. 90.00 per cent of the respondents had knowledge about period of nursery while, 75.00 per cent had knowledge about provision of shade to seed bed till the germination of seed.

Majority of respondents had correct knowledge about transplanting age of seedlings to the main field (78.30%), FYM application to the main field (71.66%), spacing for short duration (71.66%), spacing for long duration (65.83%), application of recommended fertilizer to main field (58.33%), top dressing by nitrogenous fertilizer (65.00%) and had knowledge about time of top dressing (63.33%).

In case of special cultural practices like intercropping with mustard; 71.66 per cent of the respondents had knowledge of practice of intercropping (25:1 i.e., 1 row of mustard for every 25 rows of cauliflower) and 90 per cent of the respondents had the knowledge of crop rotation with knol cole crop.

Ninety per cent of respondents had knowledge about insects and pests and 60 per cent of the respondents had correct knowledge about control measure as recommended. Whereas 96.60 per cent of respondents had awareness about diseases and 63.30 per cent of respondents had knowledge about the control measures for these diseases.

Further, 73.30 per cent of respondents had knowledge about preparation of NSKE (neem seed kernel extract). Whereas, 36.60 per cent of respondents had knowledge about recommended yield/acre (60 to 80 tones/acre).

Table 1 : Knowledge of cauliflower growers about individual recommended cultivation practices

n=120

Sl. No.	Practices	Frequency	Percentage
1.	Varieties		
	Recommended (Early snowball, snowball, late snowball)	29	24.16
	Varieties of private companies	120	100.00
2.	Sowing time		
	a. Short duration (August-September)	98	81.66
	b. Long duration (October-November)	60	50.00
3.	Seed rate (100 g/acre)	78	65.00
4.	Seed treatment (mercuric chloride)	74	61.66
5.	Nursery		
	Recommended		
	a. Method of sowing in nursery (broadcasting)	94	78.33
	b. Fertilizer application to nursery (and 3 kg of 15:15:15 complex fertilizer	96	80.00
	c. Period of nursery (4 weeks)	108	90.00
	d. Provision of shade to seed bed till the germination of seed	90	75.00
6.	Age of transplanted seedlings to the main field (4 weeks after raising nursery)	94	78.30
7.	FYM (recommended 10 t/acre)	86	71.66
8.	Spacing in the main field		
	a. Short duration i) row to row (45 cm)	86	71.66
	ii) plant to plant (45 cm)		
	b. Long duration i) row to row (60 cm)	79	65.83
	ii) plant to plant (45 cm)		
9.	Fertilizer per acre (recommended)		
	N: 60 kg	70	58.33
	P: 40 kg		
	K: 50 kg		

10.	Top dressing of nitrogenous fertilizer		
	a. Recommended quantity (50% i.e., 30 kg/acre)	78	65.00
	b. Time for top dressing (4 weeks after transplanting)	76	63.33
11.	Intercropping with mustard as a major of plant protection (25:1 i.e., 1 row of mustard for every 25 rows of cauliflower)	86	71.66
12.	Crop rotation with knol cole crop once in three years	108	90.00
13.	Pests (Diamond back moth, mites, leaf miner etc.)		
	a. Awareness	108	90.00
	b. Control measures as recommended	72	60.00
14.	Diseases (block rot, collor rot, leaf scorching downy mildew)		
	a. Awareness	116	96.60
	b. Control measures as recommended	76	63.30
15.	Preparation of NSKE	88	73.30
16.	Recommended yield/acre	44	36.60

4.1.2 Overall knowledge level of cauliflower growers about recommended cultivation practices

The data in Table 2 and Fig. 1 indicates that, 61.66 per cent of respondents possessed medium level of knowledge followed by 22.50 per cent and 15.84 per cent fell under low and high category respectively.

4.2 ADOPTION OF RECOMMENDED CULTIVATION PRACTICES BY THE CAULIFLOWER GROWERS

4.2.1 Adoption level of farmers about individual recommended cultivation practices of cauliflower

The data in table 3 depicts that, adoption of individual recommended cultivation practices by cauliflower growers.

Table 2 : Overall knowledge level of cauliflower growers about recommended cultivation practices

n=120

Sl. No.	Category	Frequency	Percentage
1.	Low (Up to 14.21)	27	22.50
2.	Medium (14.21 - 22.39)	74	61.66
3.	High (above 22.39)	19	15.84
	Total	**120**	**100.00**

Mean = 18.308 SD = 4.09

It is observed that none of the respondents adopted the recommended varieties of the agricultural university (early snowball, snowball and late snowball). Whereas, hundred per cent of the respondents adopted non-recommended varieties produced by the private seed companies (namdhari-60, goldan-80, sungrow, English variety garami).

In case of sowing time, 75.00 per cent of respondents followed the time of sowing of short duration varieties (August to September). Whereas, 16.60 per cent of respondents had adopted sowing time of long duration varieties (October to November). While, 51.66 per cent of respondents adopted recommended seed rate (100 g/acre).

In nursery, 60.00 per cent of respondents had adopted the method of sowing (broadcast) and 75.00 per cent of respondents had adopted the practice of fertilizer application to nursery (3 kg of 15:15:15 complex fertilizer) and 83.33 per cent of respondents had adopted the recommended period for nursery maintenance (4 weeks), whereas 70 per cent of respondents adopted the practice of providing shade to seed bed till the germination of seed.

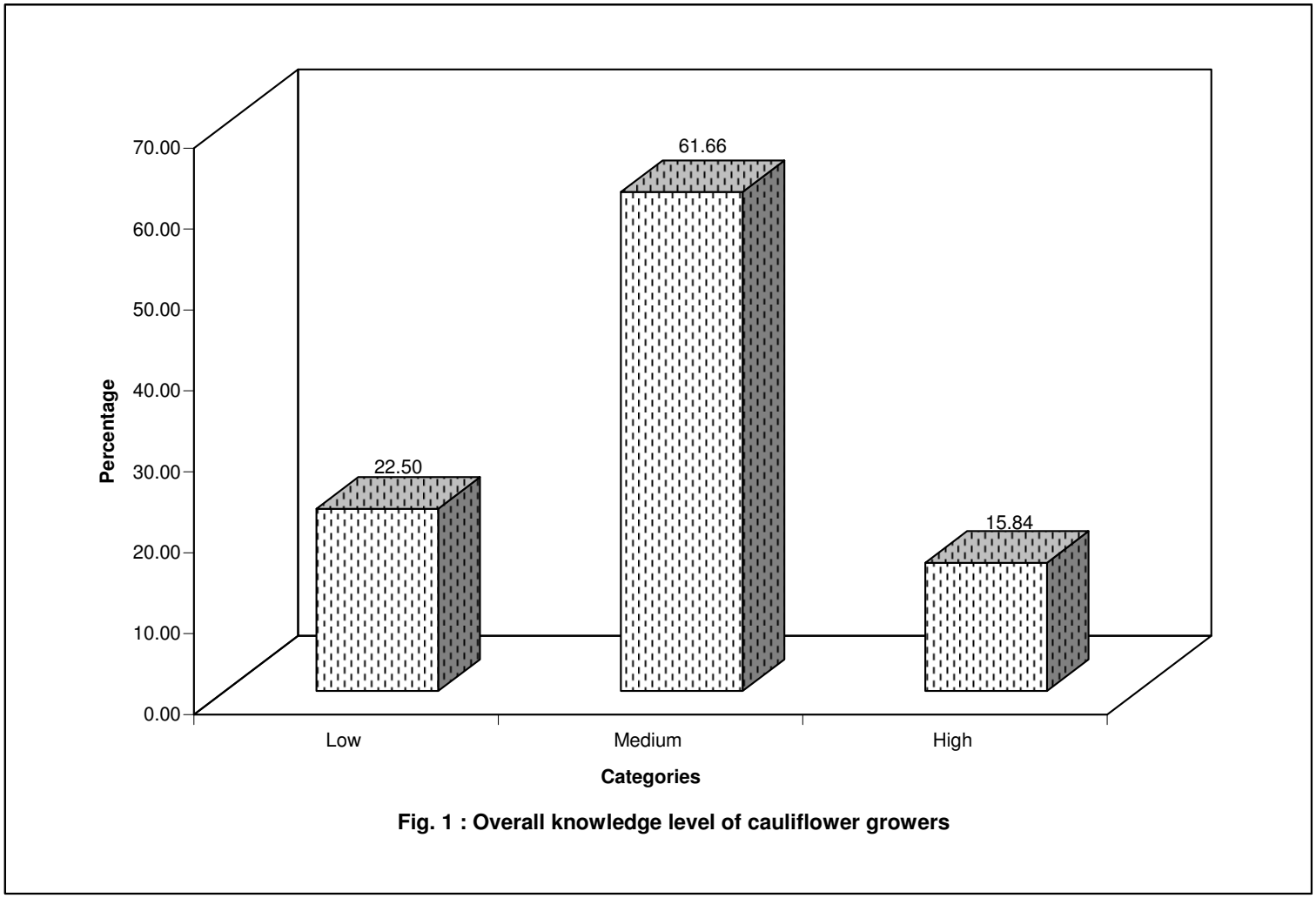

Fig. 1 : Overall knowledge level of cauliflower growers

Fig. 1: Overall knowledge level of cauliflower growers

Table 3 : Adoption of individual recommended cultivation practices by cauliflower growers

n=120

Sl. No.	Practices	Frequency	Percentage
1.	Varieties		
	Recommended (Early snowball, snowball, late snowball)	-	-
	Non-recommended varieties of private companies	120	100.00
2.	Sowing time		
	a. Short duration (August-September)	90	75.00
	b. Long duration (October-November)	20	16.60
3.	Seed rate (100 g/acre)	62	51.66
4.	Seed treatment (mercuric chloride)	-	-
5.	Nursery		
	Recommended		
	a. Method of sowing in nursery (broadcasting)	72	60.00
	b. Fertilizer application to nursery (and 3 kg of 15:15:15 complex fertilizer)	90	75.00
	c. Period of nursery (4 weeks)	100	83.33
	d. Provision of shade to seed bed till the germination of seed	84	70.00
6.	Age of transplanted seedlings to the main field (4 weeks after raising nursery)	93	77.50
7.	FYM (recommended 10 t/acre)	43	35.83
8.	Spacing in the main field		
	a. Short duration i) Row to row (45 cm)	68	56.66
	ii) Plant to plant (45 cm)		
	b. Long duration i) Row to row (60 cm)	63	52.50
	ii) Plant to plant (45 cm)		
9.	Fertilizer per acre (recommended)		
	N: 60 kg	54	45.00
	P: 40 kg		
	K: 50 kg		

10.	Top dressing of nitrogenous fertilizer a. Recommended quantity (50% i.e., 30 kg/acre)	54	45.00
	b. Time for top dressing (4 weeks after transplanting)	56	46.60
11.	Intercropping with mustard as a major of plant protection (25:1 i.e., 1 row of mustard for every 25 rows of cauliflower)	40	33.30
12.	Crop rotation with knol cole crop once in three years	68	56.60
13.	Pests (Diamond back moth, mites, leaf miner etc.) Control measures as recommended	70	58.30
14.	Diseases (block rot, collor rot, leaf scorching downy mildew) Control measures as recommended	68	56.66
15.	Preparation of NSKE	60	50.00

Regarding transplanting, 77.50 per cent of the respondents had adopted the recommended time for transplanting of seedlings to the main field (i.e., 4 weeks after raising nursery).

Majority of the respondents adopted the recommended spacing (56.66%) followed by recommended FYM application (38.83%), chemical fertilizers (45.00%), top dressing with nitrogenous fertilizer (45.00%) and time of top dressing (46.66%).

The data in the table 3 also indicates that, 33.30 per cent of the respondents adopted the practice of intercropping with mustard as a major of plant protection (25:1 i.e., 1 row of mustard for every 25 rows of cauliflower), whereas 56.60 per cent of respondents adopted the crop rotation with knol cole crop once in three years, while 58.30 per cent of respondents followed the control measures to pests (diamond back moth, leaf minor) and 56.66 per cent of respondents were adopted control measures for disease (black rot, color rot, leaf scorching, downy mildew) as per the recommendation. Nearly half of the respondents had adopted NSKE preparation (neem seed kernel extract).

4.2.2 Overall adoption level of cauliflower growers about recommended cultivation practices

The data in table 4 and Fig. 2 revealed that, 53.30 per cent of respondents belonged to medium adoption category, while 31.50 per cent and 15.00 per cent of respondents belonged to low and high adoption category respectively.

4.3 SOCIO-ECONOMIC PROFILE OF CAULIFLOWER GROWERS

The data in table 5 reflects the socio-economic profile of cauliflower growers.

4.3.1 Age

It can be seen from table 5 and Fig. 3 that, 51.60 per cent of respondents were middle aged whereas, 38.30 per cent were young age and 10.00 per cent were old age.

4.3.2 Education

The data in table 5 and Fig. 4 indicates that, 26.60 per cent of the cauliflower growers studied upto high school, followed by 21.70 per cent studied upto PUC, 20.00 per cent studied upto middle school and very less percentage 8.30 per cent and 3.30 per cent of them studied up to primary and post graduate level, respectively.

Table 4 : Overall adoption level of cauliflower growers about recommended cultivation practices

n = 120

Sl. No.	Category	Frequency	Percentage
1.	Low (Up to 9.99)	38	31.50
2.	Medium (9.99-17.77)	64	53.50
3.	High (above 17.77)	18	15.00
	Total	**120**	**100.00**

Mean = 13.88 SD = 3.89

4.3.3 Farming experience

It can be noticed from Table 5 that, 56.6 per cent of respondents belonged to medium farming experience category (10 to 20 years) followed by high farming experience 33.30 per cent (above 20 years) and low 10.00 per cent (upto 10 years) farming experience.

4.3.4 Land holding

It is clear from table 5 that, 46.00 per cent of respondents had medium land holding (10.01 to 25.00 acres) followed by semi-medium (28.50%) small (13.30%) marginal farmers (8.30%) and big farmers (3.30%).

4.3.5 Annual income

It can be viewed from table 5 that, 35.00 and 31.60 per cent of them had an annual income between Rs, 75,000 to 1,00,000 and above Rs. 1,00,000 respectively. Rest of them 23.30 per cent had an income between Rs. 20,000 to Rs. 75,000 per annum whereas only 10.00 per cent of them had income below Rs. 20,000 per annum.

4.3.6 Cosmopolitiness

a) Number of visits to town

The data presented in table 5 and Fig. 8 indicated that, 40.50 per cent of the respondents visited the nearest town, ‘once in fortnight’ followed by 30.33 per cent and 18.84 per cent of the respondents visited the town ‘once in month’ and ‘once in a week’ respectively. The remaining 10.33 per cent visited the town ‘occasionally’.

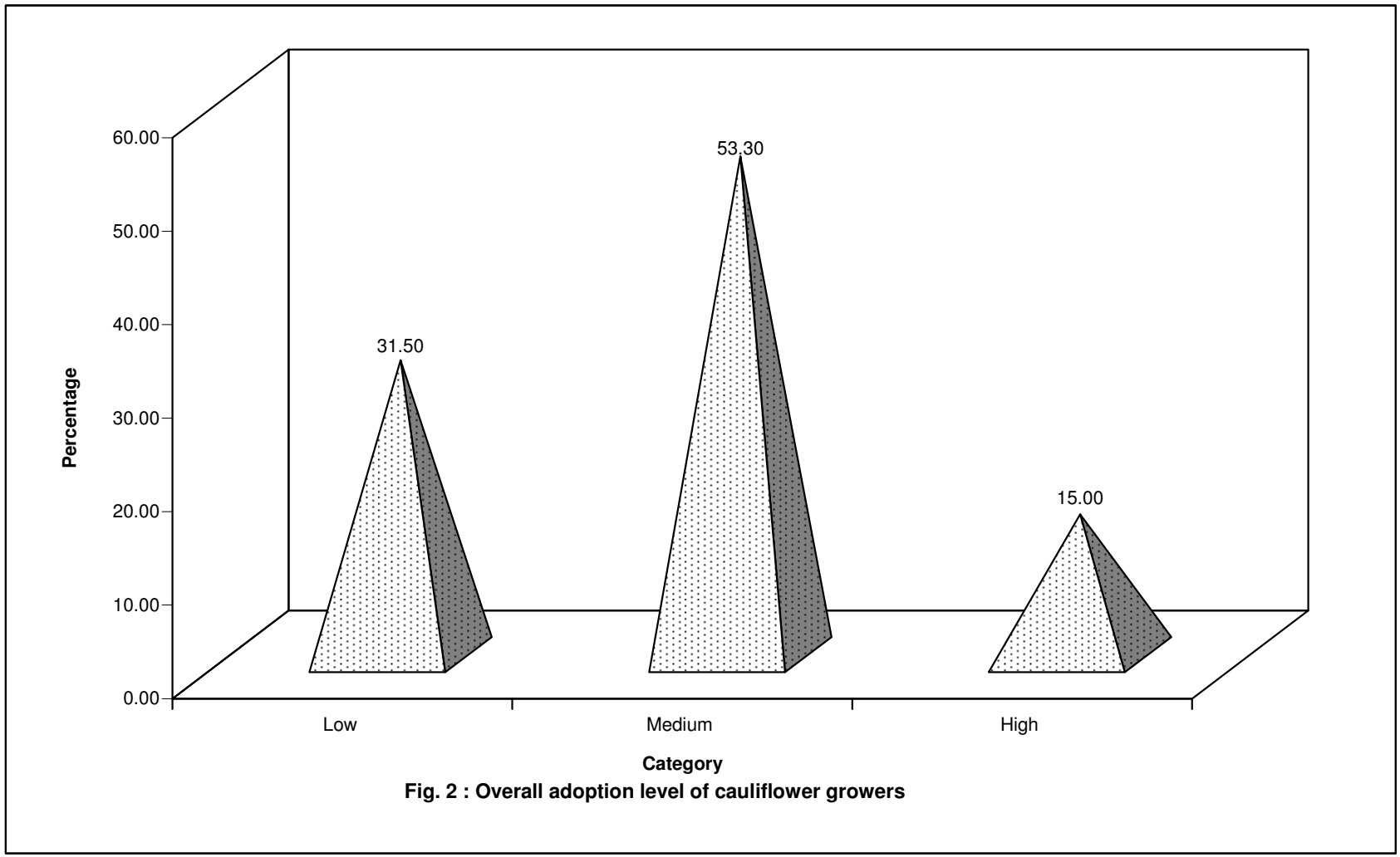

Fig. 2 : Overall adoption level of cauliflower growers

Fig. 2 : Overall adoption level of cauliflower growers

Table 5: Socio-economic profile of cauliflower growers

n = 120

Sl. No.	Variable	Category	Frequency	Percentage
1.	Age	Young age (18-30 yrs)	46	38.30
		Middle age (31.50 yrs)	62	51.60
		Old age (above 50 yrs)	12	10.00
2.	Education	Illiterate	8	6.60
		Primary	10	8.30
		Middle school	24	20.00
		High school	32	26.60
		PUC	26	21.70
		Graduate	16	13.30
		PG	4	3.30
3.	Farming experience	Low (up to 10 yrs)	12	10.00
		Medium (10-20 yrs)	68	56.60
		High (above 20 yrs)	40	33.30
4.	Land holding	Marginal farmers (0-2.5 acres)	10	8.30
		Small farmers (2.51-5.0 acres)	16	13.30
		Semi-medium farmers (5.01-10 acres)	34	28.30
		Medium farmers (10.01-25 acres)	56	46.70
		Big farmers (> 25 acres)	4	3.30
5.	Annual income	Low < Rs. 20,000.	12	10.00
		Semi-medium Rs. 20,000 – 75,000	28	23.30
		Medium Rs. 75,000 – 1,00,000	42	35.00
		High Rs. > 1,00,000	38	31.60
6.	Cosmopoliteness	**a. Number of visit to town**		
		Once in a week	25	20.84
		Once in a fortnight	45	37.50
		Once in a month	40	33.33
		Occasionally	10	8.33

		b. Purpose of visit		
		Visits related to Agriculture	43	35.84
		Personal/domestic	67	55.83
		Entertainment	10	8.33
6.	Economic motivation	Low (up to 18.56)	27	22.50
		Medium (18.56 – 25.40)	63	52.50
		High (above 25.40)	30	25.00
7.	Risk orientation	Low (up to 7.70)	42	35.00
		Medium (7.70 – 10.98)	66	55.00
		High (above 10.98)	12	10.00
8.	Innovativeness	Low (up to 21.51)	35	29.16
		Medium (21.51– 30.89)	54	45.00
		High (above 30.89)	31	25.83

b) Purpose of visit

It was observed that, 50.83 per cent of the respondents visited the town for personal/domestic purpose followed by 43.84 per cent of them visited for want of new technology or information related to agriculture, whereas 5.33 per cent visited the town for entertainment purpose.

4.3.7 Economic motivation

It can be inferred from Table 5 and Fig. 9 that, 52.50 per cent of the respondents belonged to medium level of economic motivation category. Whereas 25.00 per cent and 22.50 per cent of respondents belonged to high and low level of economic motivation category respectively.

4.3.8 Risk orientation

It can be observed from Table 5 and Fig. 10 that, 55.00 per cent of respondents belonged to medium level of risk bearing ability, whereas 35.00 and 10.00 per cent of them had low and high risk bearing ability respectively.

4.3.9 Innovativeness

It can be revealed from Table 5 Fig. 11 that, 45 per cent of respondents belonged to medium level of innovativeness category, while 29.16 and 25.83 per cent of respondents belonged to low and high level innovativeness category respectively.

4.3.10 Extension participation

The data in Table 6 Fig. 12 depicts the extension participation of cauliflower growers. Regarding training programmes, 66.67 per cent of the respondents never participated, 21.66 per cent of the respondents participated occasionally where as 11.66 per cent of the respondents participated regularly.

Majority of the respondents participated in the training programmes occasionally *viz.,* group meetings (40.83%), demonstrations (32.50%), training programme (21.66%) and

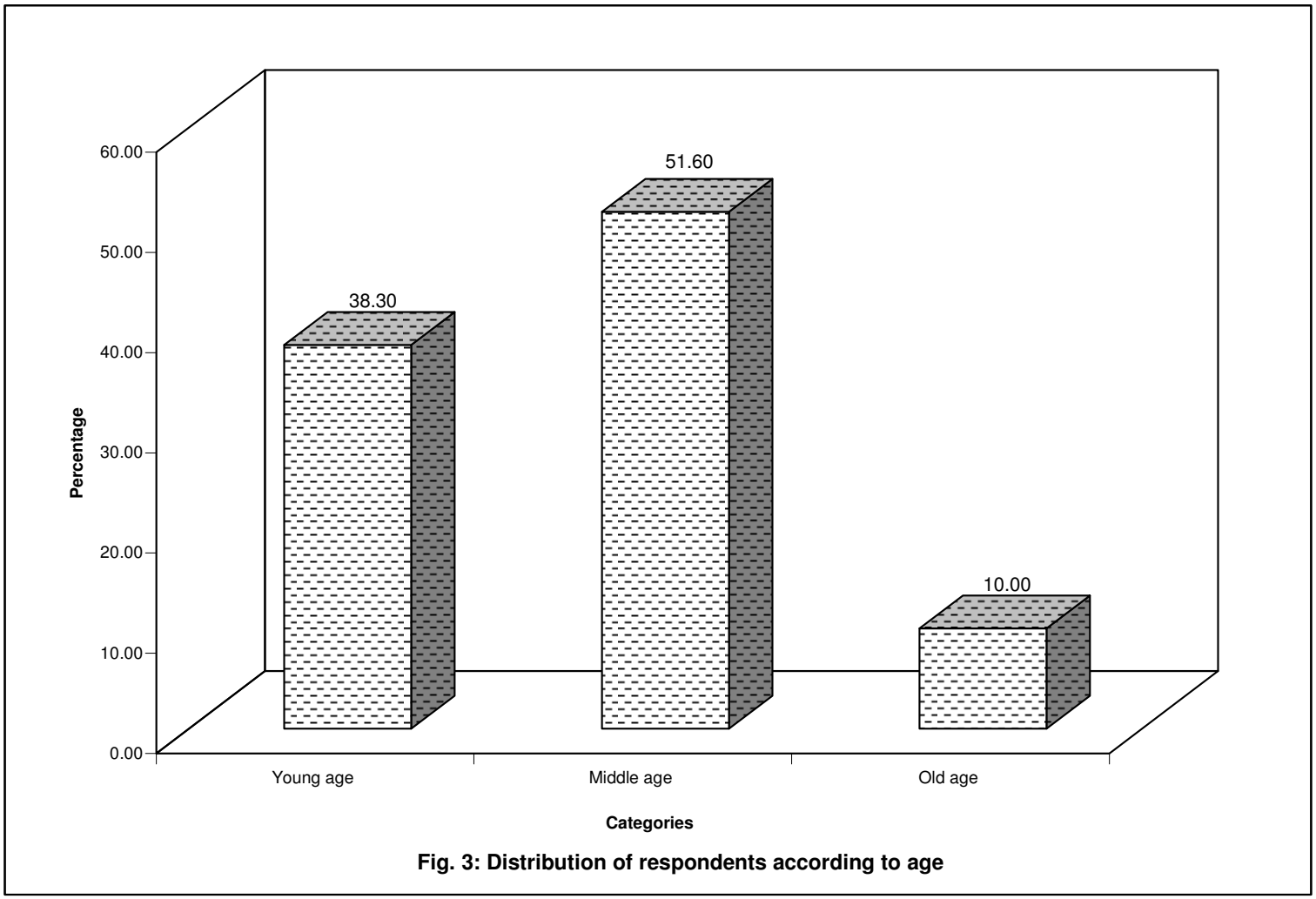

Fig. 3: Distribution of respondents according to age

Fig. 3: Distribution of respondents according to age

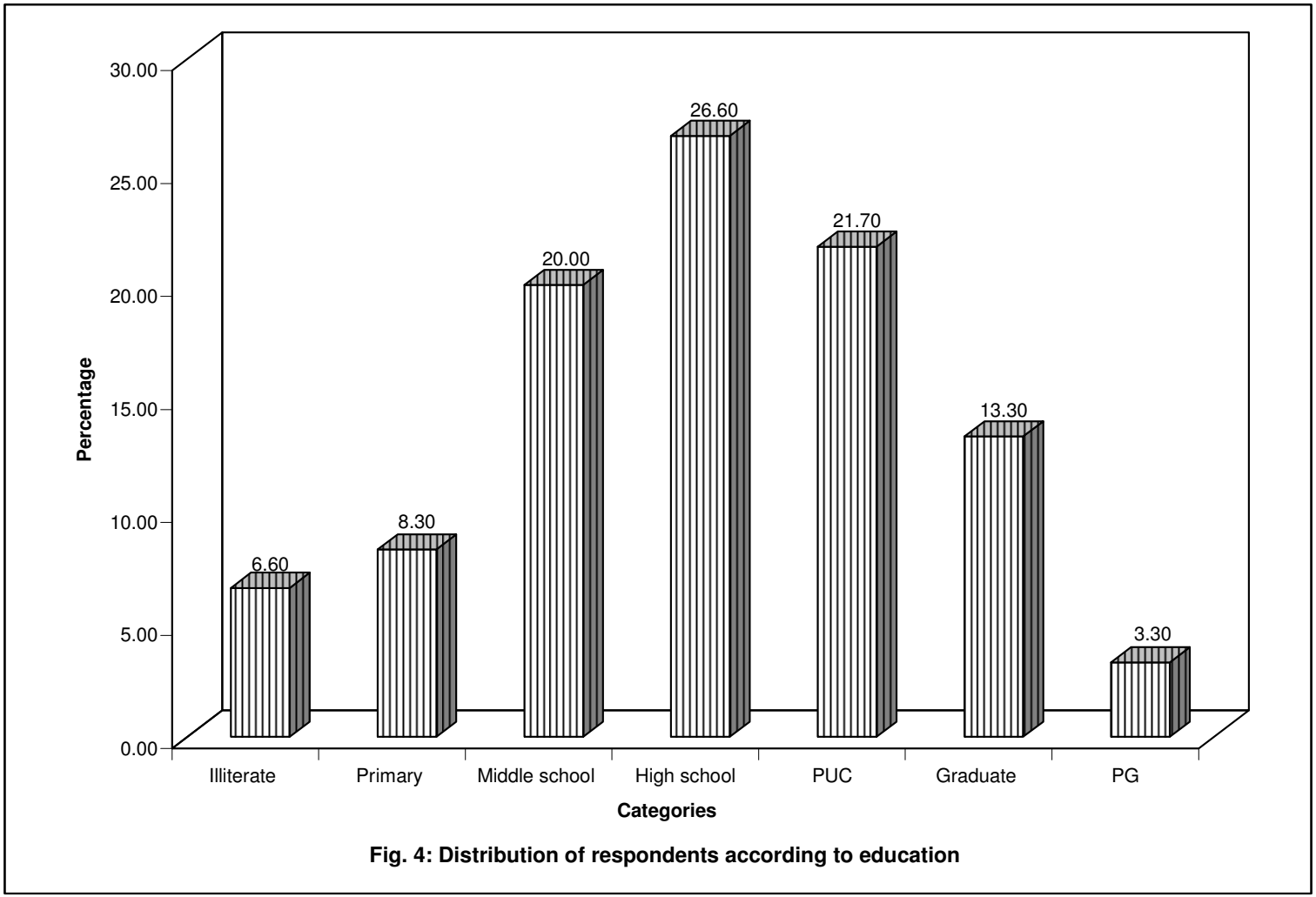

Fig. 4: Distribution of respondents according to education

Fig. 4: Distribution of respondents according to education

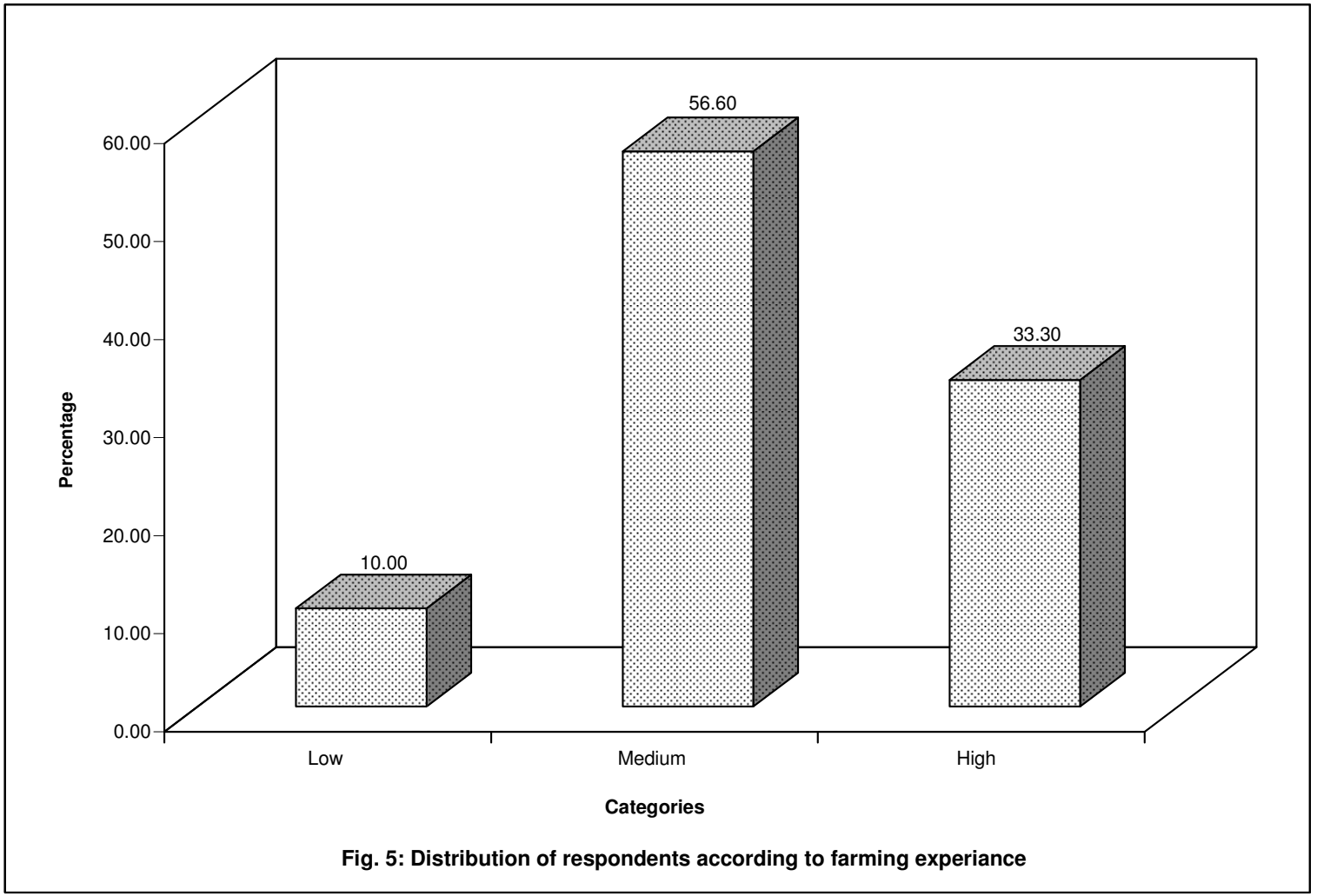

Fig. 5: Distribution of respondents according to farming experiance

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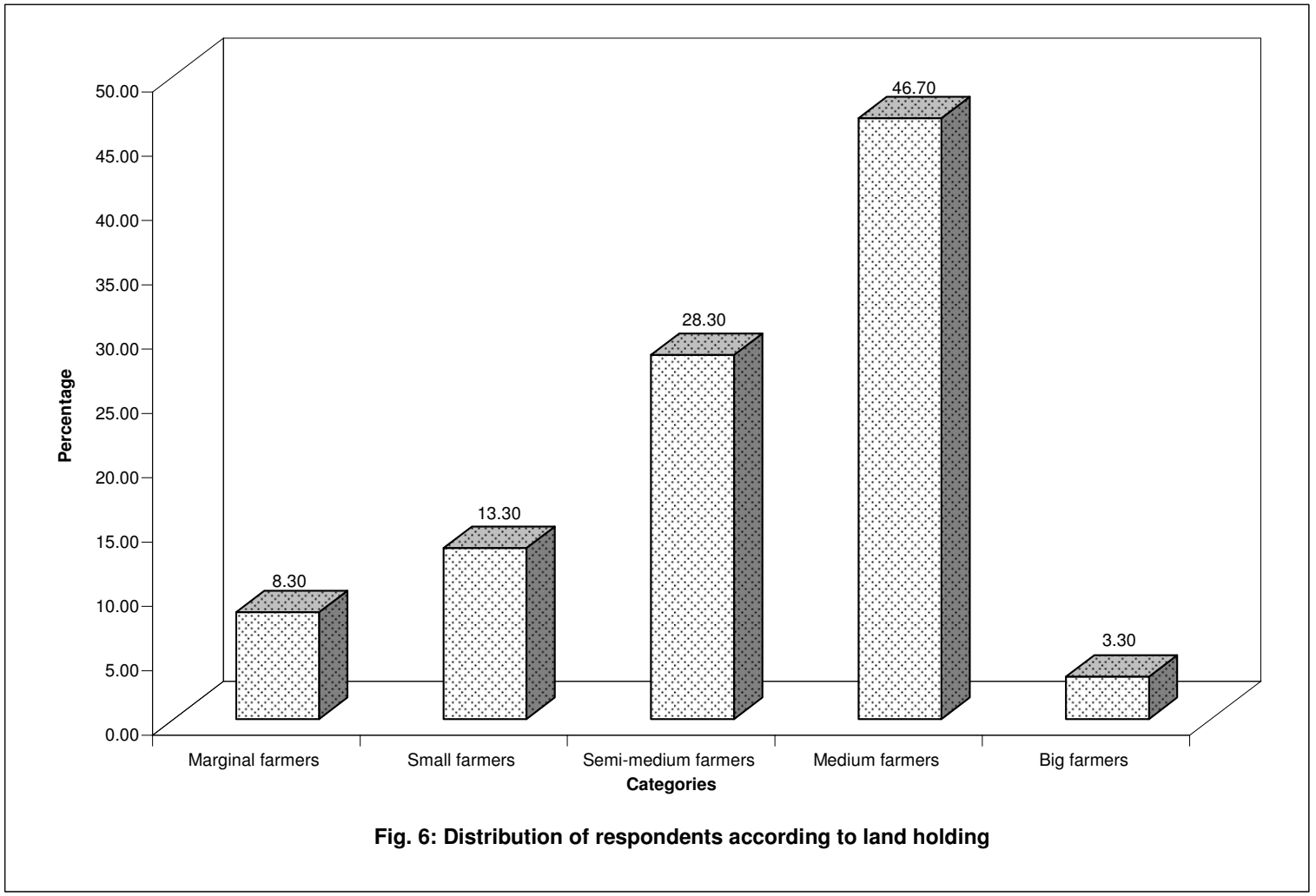

Fig. 6: Distribution of respondents according to land holding

Fig. 6: Distribution of respondents according to land holding

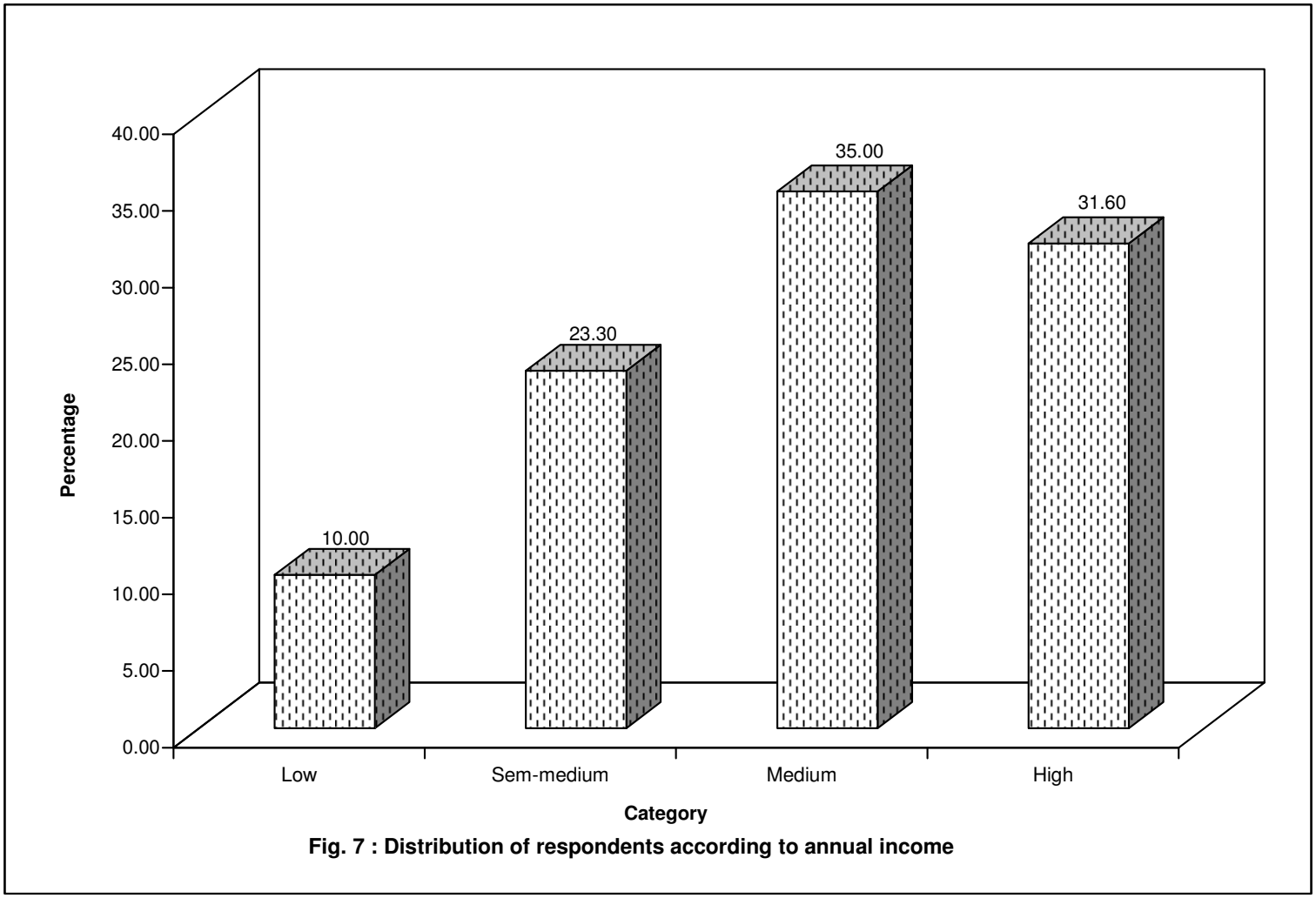

Fig. 7 : Distribution of respondents according to annual income

Fig. 7 : Distribution of respondents according to annual income

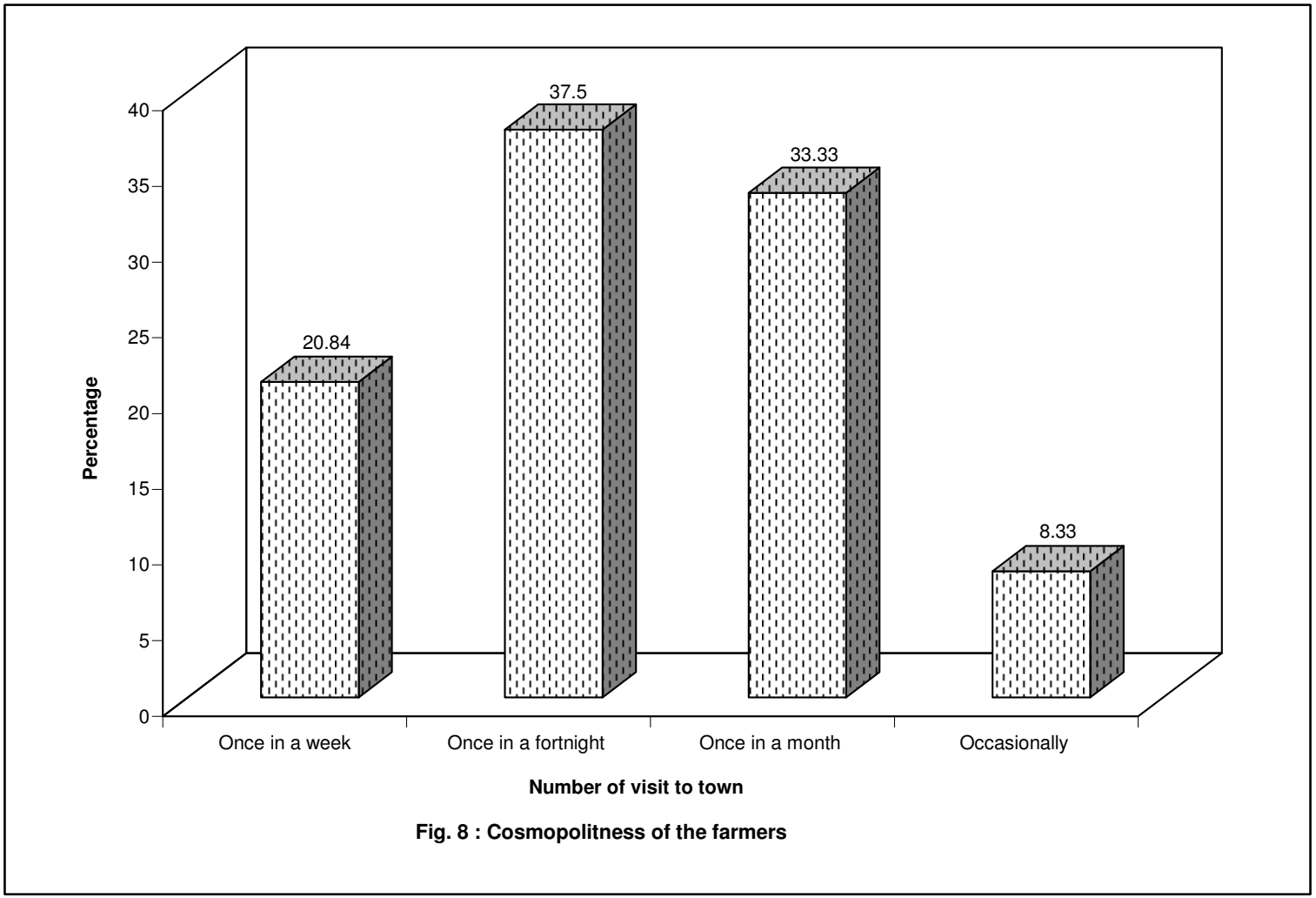

Fig. 8 : Cosmopolitness of the farmers

Fig. 8 : Cosmopolitness of the farmers

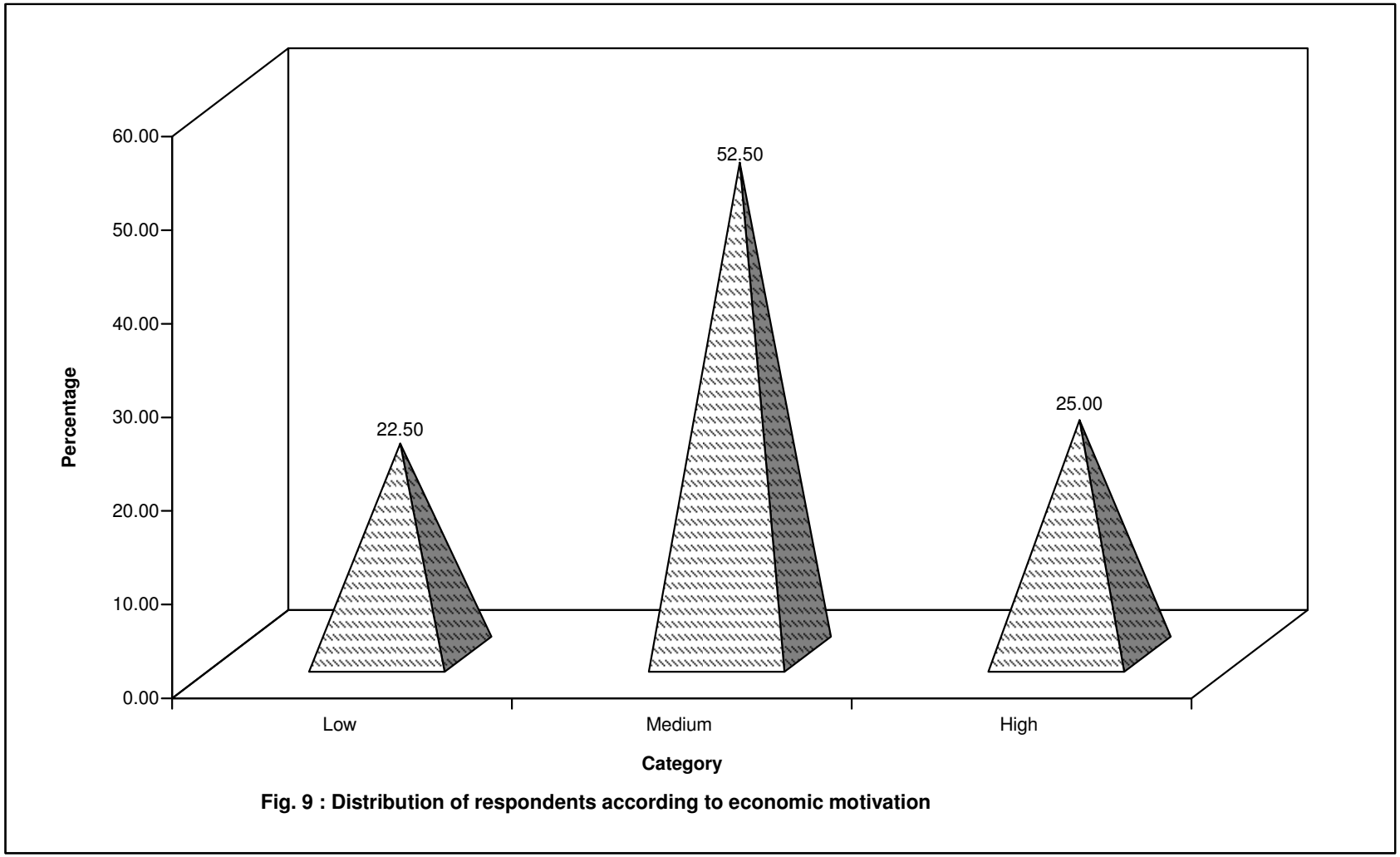

Fig. 9 : Distribution of respondents according to economic motivation

Fig. 9 : Distribution of respondents according to economic motivation

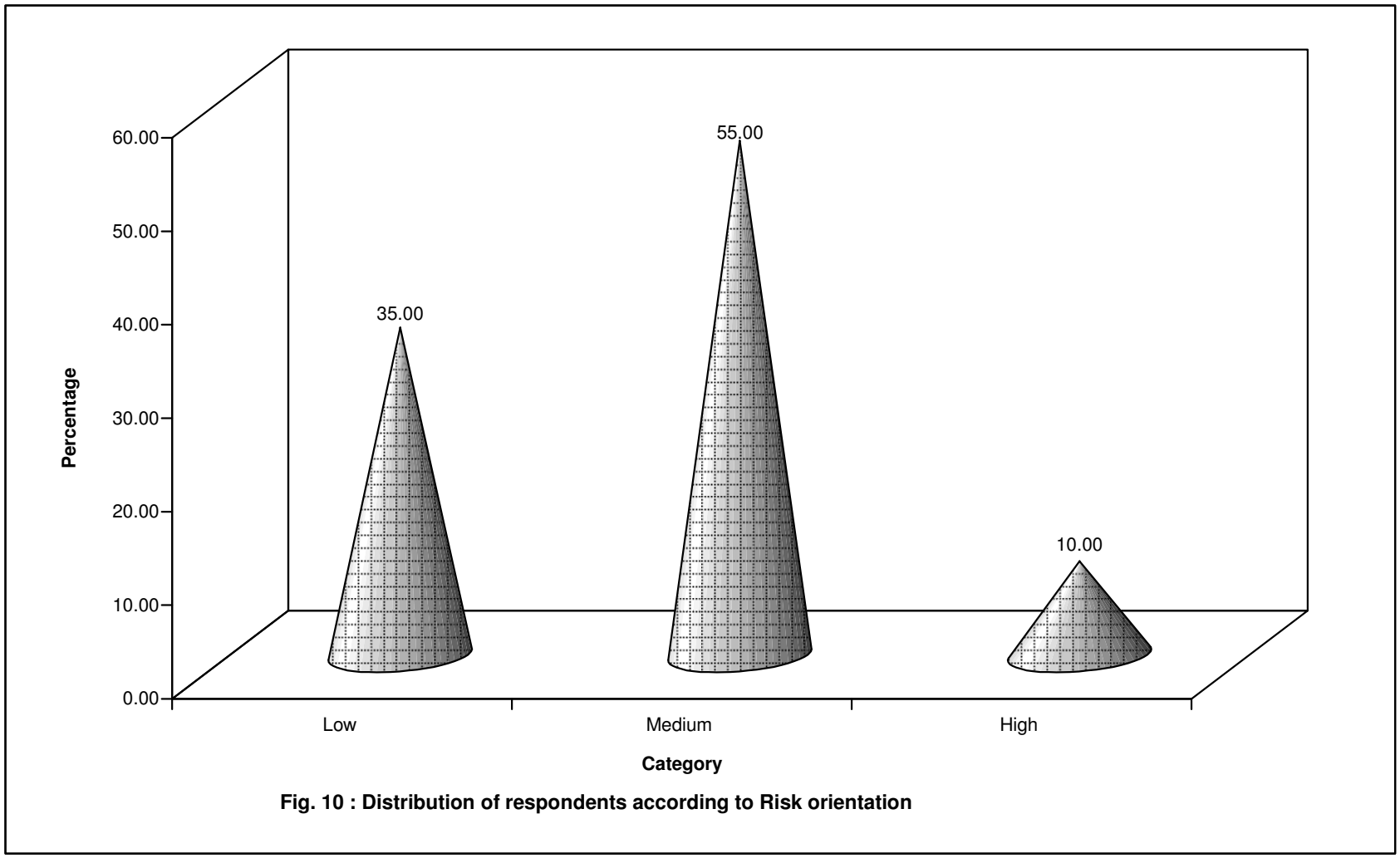

Fig. 10 : Distribution of respondents according to Risk orientation

Fig. 10 : Distribution of respondents according to Risk orientation

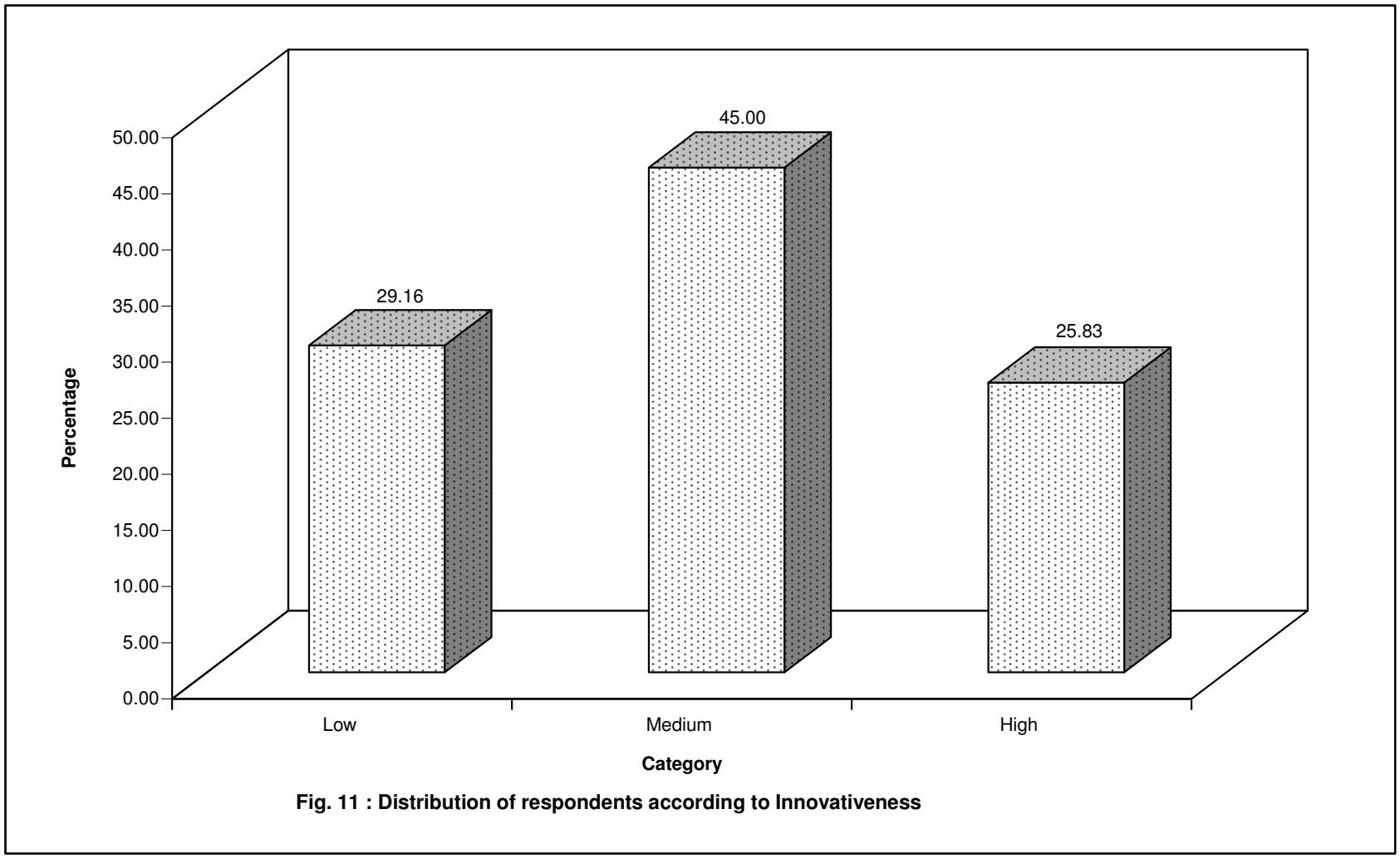

Fig. 11 : Distribution of respondents according to Innovativeness

Fig. 11 : Distribution of respondents according to Innovativeness

exhibitions on agriculture (20.00%). Whereas, 22.50 per cent, 20.83 per cent and 17.50 per cent of them participated "regularly" in respect of exhibitions on agriculture, demonstrations and group meetings, respectively. Further, half of the respondents never participated in extension activities at all.

In case of demonstration 46.67 per cent of the respondents never participated whereas 32.50 per cent of the respondents participated occasionally while 20.83 per cent participated regularly in demonstration.

4.3.11 Mass media participation

It can be seen from Table 7 Fig. 13 that, 84.16 per cent of the respondents are owning radio and 56.60 per cent of the respondents listening agriculture related radio programmes 'occasionally', 29.16 per cent of the respondents listening 'regularly' whereas, 14.16 per cent of the respondents 'never' listen radio programmes.

Table 6 : Extension participation

n = 120

Sl. No.	Activities	Extent of participation					
		Regular		Occasional		Never	
		F	%	F	%	F	%
1.	Training programmes	14	11.66	26	21.67	80	66.67
2.	Demonstration	25	20.83	39	32.50	56	46.67
3.	Field visits	6	5.00	3	2.50	111	92.50
4.	Group meetings	21	17.50	49	40.83	50	41.67
5.	Exhibitions (related to agriculture)	27	22.50	24	20.00	69	57.50
6.	Educational tour	5	4.16	2	1.67	113	94.17

Further, 88.30 per cent of the respondents never read farm magazines while, 7.50 per cent of the respondents read 'occasionally' whereas, 4.16 per cent of the respondents read 'regularly'. A perusal of the table further indicates that, 40.00 per cent of the respondents owning television and 48.30 per cent of the respondents 'never' watch television programmes related to agriculture activities whereas, 30.80 per cent of the respondents watching television 'occasionally' while, 20.80 per cent of the respondents watch 'regularly'.

4.3.12 Organizational participation

The data in Table 8 and Fig. 14 depicts that 49.16 per cent of the respondents were members of farmers service cooperative society and 35 per cent and 27.50 per cent of the respondents participated occasionally and regularly in the activities of farmers service

Table 7 : Mass media participation

n = 120

Sl. No.	Categories	Subscriber/ owner		Mass media participation					
				Regular		Occasional		Never	
		F	%	F	%	F	%	F	%
1.	Reading news paper	17	14.16	17	14.17	32	26.67	71	59.16
2.	Listening to farm radio programme	101	84.16	35	29.17	68	56.67	17	14.16
3.	Reading farm magazines	34	28.30	5	4.16	9	7.50	106	88.34
4.	Watching TV programmes relating to agricultural activities	48	40.0	25	20.83	37	30.83	58	48.34

cooperative societies respectively. It is interesting to note that, 99.16 per cent and 97.50 per cent of the respondents never participated in Zilla panchayath and Taluka panchayath activities.

4.4 MARKETING BEHAVIOUR OF CAULIFLOWER GROWERS

Table 9 revels that, 83.30 per cent of the cauliflower growers marketed through commission agents while 16.60 per cent of them practiced self marketing.

The reasons quoted by cauliflower growers to market their produce through commission agents were, as they get more buyers through commission agents (83.30%), good price (38.30%) and availability of storage faculties (16.60%).

In can be also observed that, the respondents expressed some of the constraints in marketing through commission agents were fear of getting cheated by commission agents (71.60%) and exploitation by the commission agent (78.33%).

In case of self marketing the reasons indicated by the growers were, can realize higher profit (16.60%), nearest distance of market (13.30%) buying other necessary material (13.30%) and availability of trucks or carts (3.30%). The constraints faced in self marketing were heavy hire charges (15.00%), more transportation cost (13.30%) lakh of market knowledge (16.60%). Further, cent per cent of the cauliflower growers were using gunny bag for packing.

The suggestions expressed by the cauliflower growers for improving the marketing were establishment of more number of markets (68.30%), need for good transportation facility (86.60%) and establishment of good storage facilities (71.60%).

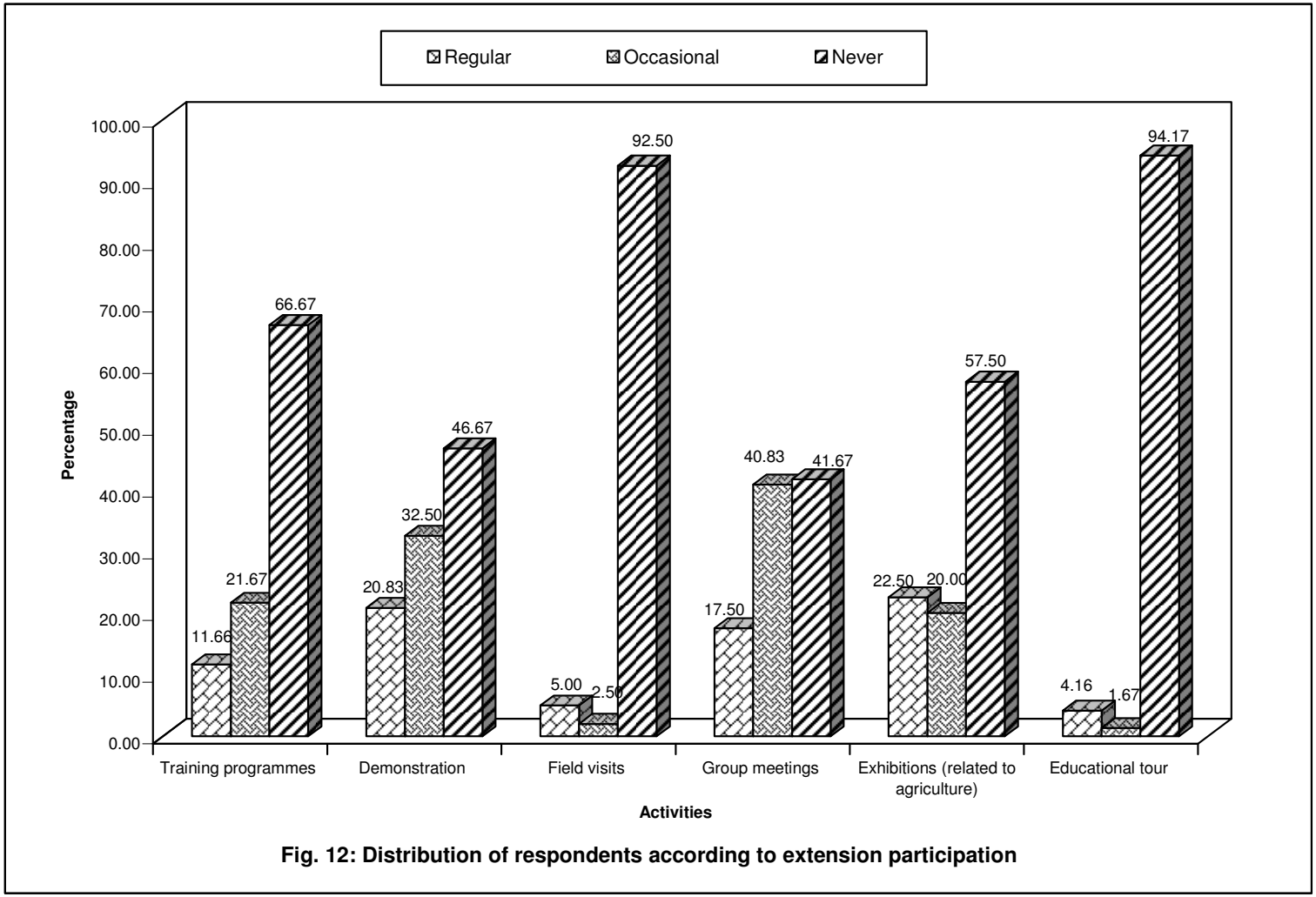

Fig. 12: Distribution of respondents according to extension participation

Fig. 12: Distribution of respondents according to extension participation

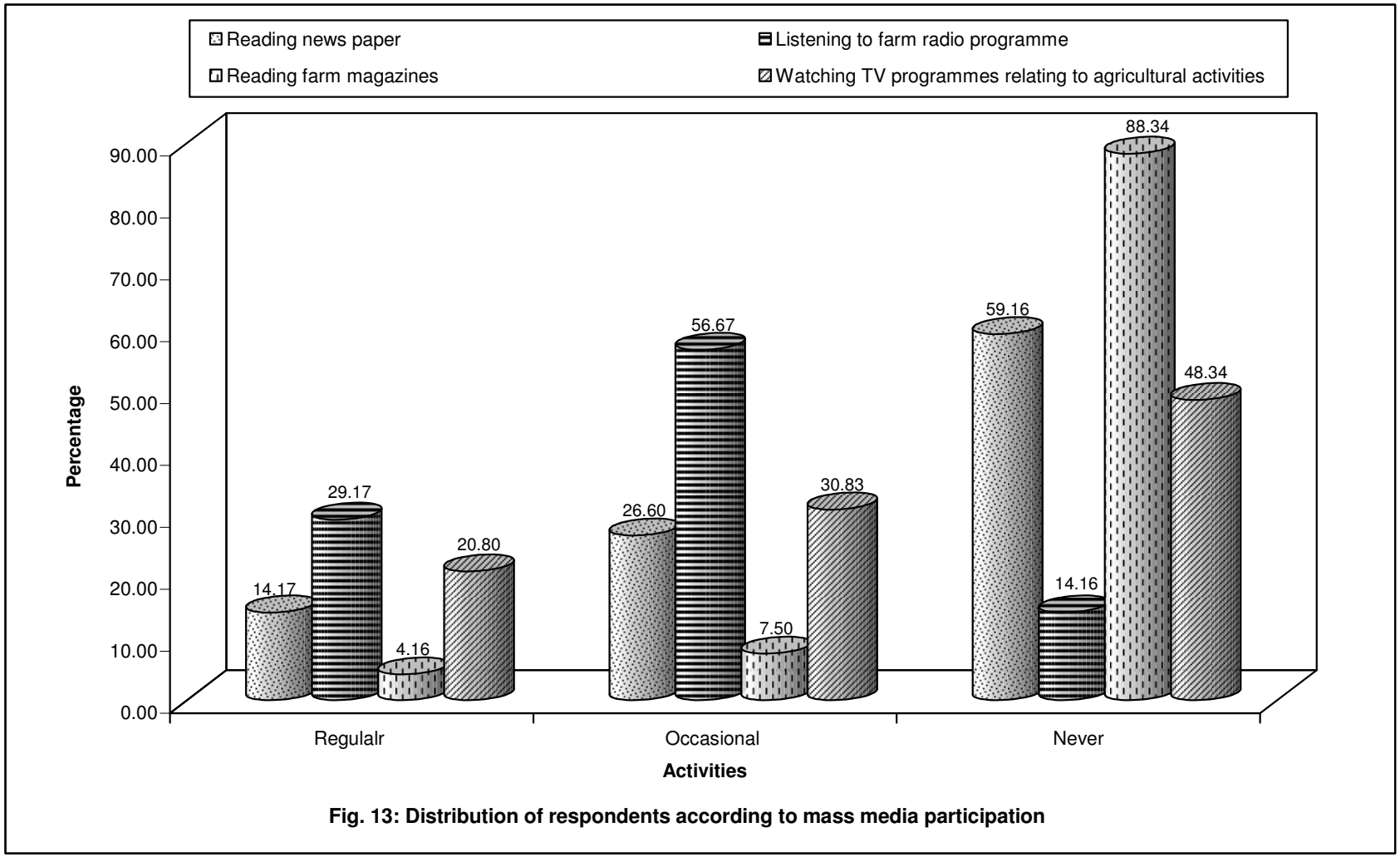

Fig. 13: Distribution of respondents according to mass media participation

Fig. 13: Distribution of respondents according to mass media participation

Table 8 : Organizational participation

n = 120

Sl. No.	Categories	Member	Office bearer	Organizational participation					
				Regular		Occasional		Never	
				F	%	F	%	F	%
1.	Gram panchayat	6 (5.00)	1 (0.83)	4	3.33	3	2.5	113	94.17
2.	Taluka panchayat	3 (2.50)	-	3	2.50	-	-	117	97.50
3.	Zilla panchayat	1 (0.83)	-	-	-	1	0.83	119	99.17
4.	Farmers service co-operative society	59 (49.17)	-	33	27.50	42	35.00	45	37.50
5.	Youth club	8 (6.67)	-	10	8.33	6	5.00	104	86.67

Table 9: Marketing behaviour of cauliflower growers

n=120

Sl. No.	Particulars	Frequency	Percentage
1.	Nature of marketing:		
	a. Marketed through Retail outlets	20	16.60
	b. Commission agents	100	83.30
2	Reasons for self marketing		
	a. Can realize higher profit	20	16.60
	b. Nearest distance of market	16	13.30
	c. Availability for trucks or cart	4	3.30
	d. Buying other necessary material	16	13.30
3	Constraints in self marketing		
	a. More transportation cost	16	13.30
	b. Heavy hire charges	18	15.00
	c. Inadequate local markets	20	16.60
	d. Lack of market knowledge	20	16.60
	e. Lack of security	14	11.60
4.	Reasons for marketing through commission agents		

	a. To get more buyers through commission agents	100	83.30
	b. Availability of storage facilities	20	16.60
	c. To get good price	46	38.30
5.	Constraints in marketing through commission agents		
	a. Fear of getting cheated by commission agent	86	71.60
	b. Exploitation by commission agent	94	78.33
6.	Method of packing		
	Gunny bag	120	100.00
7.	Suggestions for improving cauliflower marketing		
	a. Establishment of more number of markets	82	68.30
	b. Need for good transportation facility	104	86.60
	c. Establishment of good storage facility	86	71.60

4.4.1 Problems in production and marketing of cauliflower growers

The data in Table 10 indicates the constraints faced by cauliflower growers in production and marketing of cauliflower. It was found that, high cost of fertilizers (85.00%), problem of pest (80.00%) problem of disease (78.30%) limited and irregular power supply (38.30%) and high cost of plant protection chemicals (38.30%) were major production problems. While fluctuations in prices (81.60%) exploitation by the middlemen (71.66%) and poor transportation facilities (36.60%) were the major marketing problems.

4.5 FACTORS CONTRIBUTING FOR HIGH YIELDING OF CAULIFLOWER

A perusal of Table 11 and Fig. 15 reveals the factors contributing for increasing yield of cauliflower were sowing at proper time (90.00%), applying organic manure (81.60%), taking plant protection measures from time to time (78.30%) following blanching practice (70.00%) following irrigation schedule at proper intervals (66.60%) and using high yielding varieties/ hybrids (63.30%).

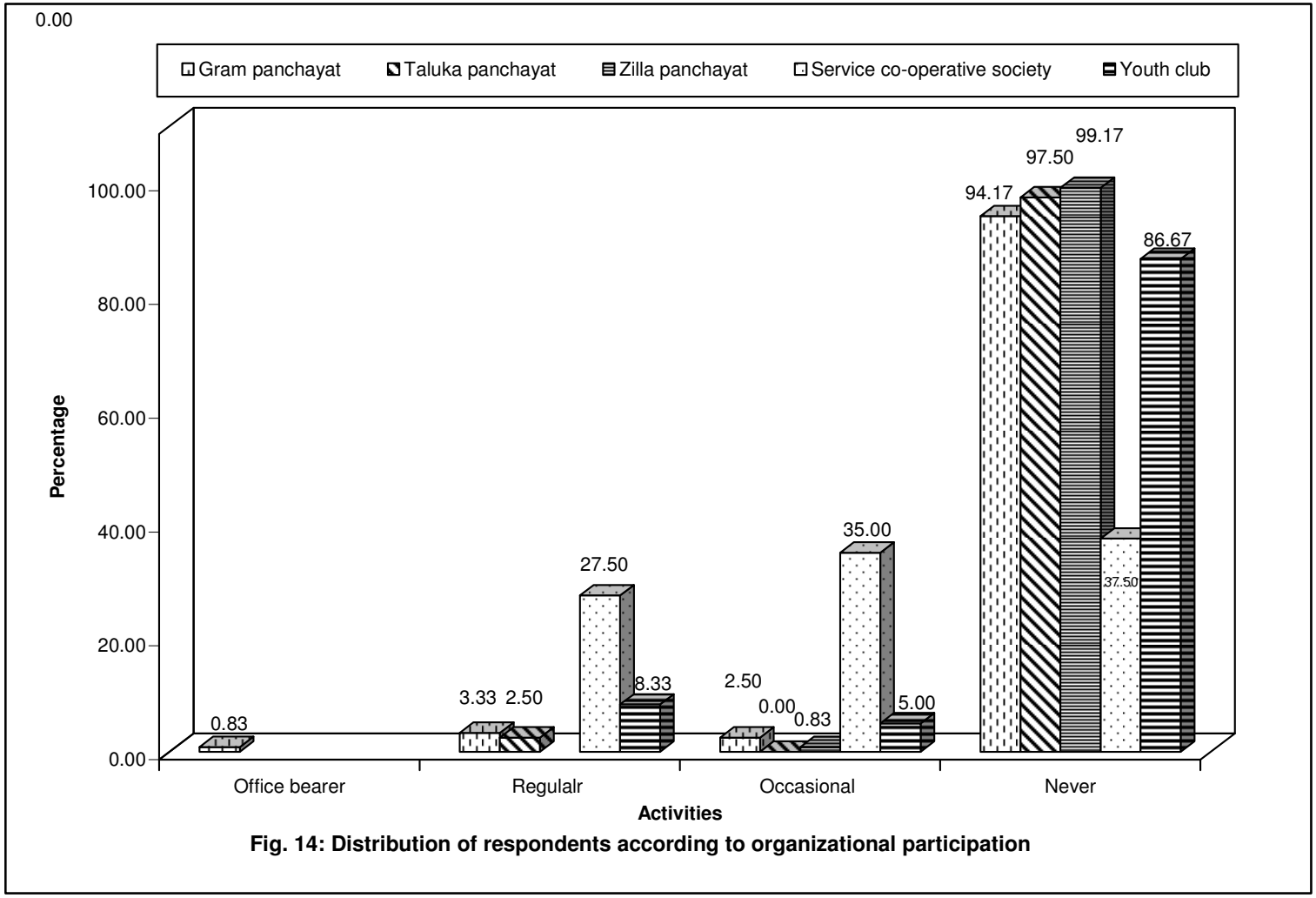

Fig. 14: Distribution of respondents according to organizational participation

Fig. 14: Distribution of respondents according to organizational participation

Table 10: Problems in Production and Marketing of Cauliflower

Sl. No.	Particulars	Frequency	Percentage
1.	Production problems		
	1. Problem of pests	96	80.00
	2. Problem of diseases	94	78.30
	3. High cost of fertilizers	102	85.00
	4. High cost of plant protection chemicals	46	38.30
	5. Limited and irregular power supply	46	38.30
2.	Marketing Problems		
	1.Poor transportation facilities	94	36.60
	2.Fluctuations in the prices	98	81.60
	3. Exploitation by the middleman.	86	71.66

Table 11 : Factors contributing for high yielding as perceived by cauliflower growers

n=120

Sl. No.	Particulars	Frequency	Percentage
1.	Taking sowing at proper time	108	90.0
2.	Applying organic manure in sufficient quantity	98	81.60
3.	Taking plant protection measures from time to time	94	78.30
4.	Blanching	84	70.00
5.	Following irrigation schedules at proper intervals	80	66.60
6.	Following high yielding varieties/hybrids	76	63.30
7.	Following recommended fertilizer dose	50	41.60

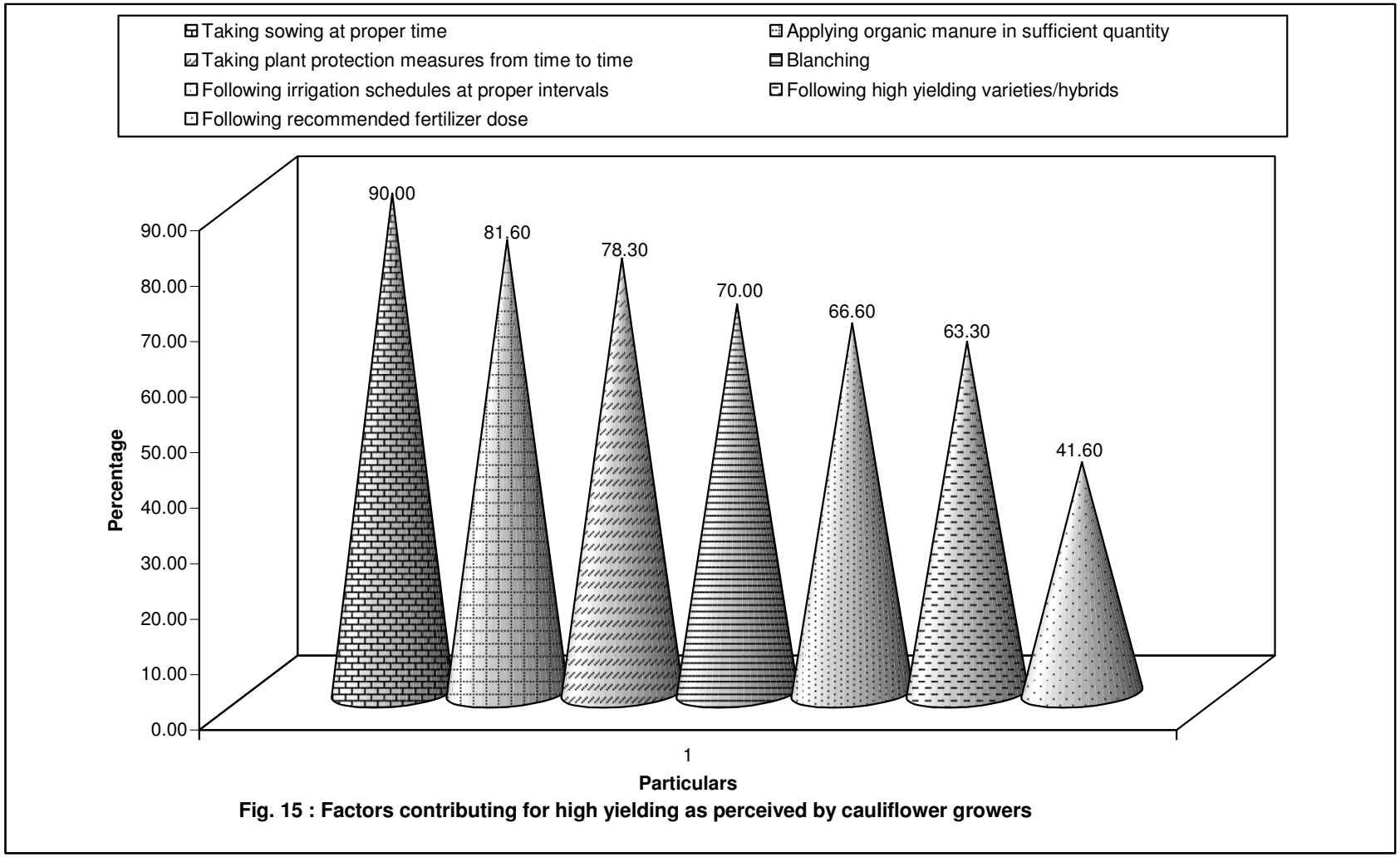

Fig. 15 : Factors contributing for high yielding as perceived by cauliflower growers

Fig. 15 : Factors contributing for high yielding as perceived by cauliflower growers

V. DISCUSSION

The results of the present study are discussed under the following headings.

5.1 Knowledge level of farmers about the recommended cultivation practices of cauliflower

5.2 Adoption level of recommended cultivation practices by cauliflower growing farmers

5.3 Socio-economic profile of cauliflower growers

5.4 Marketing behaviour of cauliflower growers

5.5 Constraints and suggestions of cauliflower growers

5.6 Factors contributing for high yielding of cauliflower

5.1 KNOWLEDGE LEVEL OF FARMERS ABOUT THE RECOMMENDED CULTIVATION PRACTICES OF CAULIFLOWER

5.1.1 Knowledge level of farmers about individual recommended cultivation practices of cauliflower

The data depicted in table 1 indicated that 96.60 per cent of the respondents had knowledge on diseases followed by period of nursery (90.00%), crop rotation with knol cole crop once in three years (90.00%) and knowledge on pest (90.00%), sowing time of short duration varieties (81.66%), fertilizer application to nursery (80.00%) and method of sowing in nursery (78.33%).

Age of transplanting seedlings to the main field (78.30%), provision of shade to seed bed till the germination of seed (75.00%) and preparation of NSKE (78.30%). This trend of results might be due to the fact that, farmers might have acquired knowledge about recommended cultivation practices since the respondents had medium farming experience (10-20 years), better education (middle school to PUC) more land holding (10-25 acre) and better exposure to mass medias and high income (Rs. 75,000 to 1,00,000). All the factors might have influenced the respondents to acquire more knowledge. It is quite natural that, if the individual is having higher education, more land, more farming experience with higher income naturally, one would like to have more knowledge about new technologies and would like earn more profit.

The other important reason might be that since, cauliflower is a commercial and highly remunerative crop in that area. So, farmers might have shown more interest to know the recent information about this crop and hence the results. These findings are in line with the findings of Vijayakumar (1997), Waman and Patil (1998), Kubde (2000) and Raghavendra (2004).

5.1.2 Overall knowledge level of farmers about recommended cauliflower cultivation practices of cauliflower

The results presented in table 2 revealed that, majority (61.66%) of the respondents had overall medium knowledge level about recommended cultivation practices, followed by low (22.50%) and high (15.84%) knowledge level, respectively.

The profile analysis of respondents revealed that, majority of them were middle aged, good education from high school to PUC. Another reason could be the farming experience of the respondents i.e., 56.60 per cent of the respondents had medium level of farming experience. It is a fact that, as the experience increases, the level of knowledge also increases. Respondents with more farming experience would able to know the strengths and weaknesses of the recommended practices of cauliflower cultivation and hence this kind of result.

The other reason could be that majority of the respondents possessed medium land holding (46.70%), medium annual income (47.50%) and visiting to town for agriculture and purpose (35.84%). The cauliflower growers had varying degree of exposure to different mass media especially related to agriculture and horticulture programme and fairly good participation in extension activities. Hence, the results showed that, majority of the cauliflower growers had medium knowledge about recommended cultivation practices.

The findings were in confirmity with the findings of Saravanakumar (1996), Karapagam (2000), Venkataramalu (2003) and Sunil Kumar (2004) who reported that majority of the farmers had medium level of knowledge about recommended cultivation practices of cauliflower.

5.2 ADOPTION LEVEL OF CAULIFLOWER GROWERS ABOUT RECOMMENDED CULTIVATION PRACTICES OF CAULIFLOWER

5.2.1 Adoption of individual recommended cultivation practices of cauliflower growers

The adoption of any technology in general and recommended cauliflower cultivation practices in particular depend on various factors, such as awareness about the complexity of the practices, timely availability of inputs, technologies and characteristics of farmers etc.

The detailed analysis of adoption of individual recommended cultivation practices by the respondents as listed in table 3 reveals that, 83.33 per cent of the farmers are following the recommended period for nursery followed by age of transplanted seedlings to the mainfield (77.50%), sowing time for short duration varieties (75.00%). The possible reason for this might be that, it is easy to follow, convenient and involves less cost, to get more yield.

Forty five per cent of the respondents adopted the recommended fertilizers of N:P:K and 35.83 per cent had applied recommended FYM. The reasons given by the cauliflower growers for FYM application as per recommendation was that it would reduce the pest and disease and improves soil status and the reason for chemical fertilizer application as per recommendation was that recommended fertilizer would give more yield.

Further, it was observed that nearly half of the respondents adopted recommended spacing for short duration and long duration varieties in the main field. The reason might be that, in cauliflower cultivation the intercultivation practices like earthing up and weeding are very important operations for higher yield.

More than half of the cauliflower growers i.e., 58.30 per cent and 56.30 per cent of the respondents adopted control measures for pests and diseases respectively. The reason behind this was if any pests or diseases affect cauliflower crop than it hinders the growth of the crop and severally reduces the yield of the crop. As a result majority of the farmers adopted the recommended plant protection measures.

The above mentions findings were in consonance the findings of Vijay Kumar (1989), Bhople *et al.* (1997) and Veda Murthy (2002).

5.2.2 Overall adoption level of farmers about recommended cauliflower cultivation practices

The data presented in Table 4 reveals that majority of the respondents belong to medium level of adoption category (53.30%) followed by low (31.50%) and high (15.00%) level of adoption category. The reason might be that, cauliflower being the vegetable crop requires more and more knowledge and utmost care. On the category, majority of the farmers had high school level education, medium land holding, medium economic motivation, medium risk bearing ability and medium innovativeness, more exposure to mass media. Hence, all these factors might have influenced them to adopt correct recommended cultivation practices. Further, as the land holding and income increases naturally he will be having more risk bearing ability and more orientation towards economical returns. And also because of good

education and more exposure to mass media might have increased their knowledge level and hence fell in medium adoption category so as to gain more income.

The findings are in conformity with the findings of Basavaprabhu (1996), Venkataramalu (2003), Sunil Kumar (2004) and Moulasab (2004).

5.3 SOCIO-ECONOMIC PROFILE OF CAULIFLOWER GROWERS

5.3.1 Age

The results presented in table 5 revealed that 51.60 per cent of the cauliflower growers were under middle age category followed by young (38.30%) and old age (10%), respectively.

Farmers of middle age with more farming experience work more efficiently than older and younger ones. Further, individuals of 31 to 50 years of age feel more family responsibility than the younger ones.

In conformity to above facts, majority of the cauliflower growers were also in the age group 31 to 50 years.

These results are in line with the findings of Raghuprasad (1992), Vijay Kumar (1997), Chandregowda (1997), Vedamurthy (2002), Raghavendra (2004) and Shashidhar (2004).

5.3.2 Education

A glance at table 5 showed, 26.60 per cent of the respondents had education upto high followed by PUC (21.70%), middle school (20.00%) and graduation (13.30%). Further, it was interesting to note that only 6.60 per cent of the cauliflower growers were illiterates.

In general more than 90.00 per cent of the cauliflower growers were educated. This could be due to the existing common social environment and also relation of importance of education in once life which increases their knowledge and make them to earn more so as to improve their standard of living.

The above findings has got support from the studies conducted by Karpagam (2000), Dhamodharan and Vasanth Kumar (2001) and Nagaraj (2002).

5.3.3 Farming experience

It was observed from the Table 5 that, 56.60 per cent of the cauliflower growers were cultivating cauliflower from 10 to 20 years, belonging to medium category. Whereas 33.30 per cent of the cauliflower growers belonging to high category were cultivating since from more than 20 years and only 10.00 per cent of the farmers belonging to low category were cultivating since from10 years. The relation for growing cauliflower from so many years might be the assurance of good price and more income compare to other crops and also the increased demand of the vegetable crop in that local markets. Hence, majority of them belonged to medium farming category and has the support with the findings of Hanchinal (1999), Bheemappa (2001) and Natikar (2001).

5.3.4 Land holding

It can be seen from the Table 5 that, 46.70 per cent of the cauliflower growers were under medium land holding category (10.01 to 25.00 acres) followed by 28.30 per cent semi-medium land holding (5.01 to 10.00 acres), 13.30 per cent of the small land holding (2.51 to 5.00 acres), 8.30 per cent of the marginal land (up to 2.5 acres) and only 3.30 per cent of big land holding category (> 25.00 acre). The possible reason for this trend might be due to the fact that, being agriculture as main occupation and their way of life, so they always would like to possess more and more acres of land. The other reason may be that, since from so many years they are in the habit of growing cauliflower being a highly remunerative crop might have

increased their economical position and possessed more land and hence, belonged to medium land holding category.

The above mentions findings that is in consonance with the findings of partial accodance with Saravan Kumar (1996), Karpagam (2000), Nagaraj (2002) and Raghavendra (2004).

5.3.5 Annual income

The results presented in Table 5 indicated that, majority (35.00%) of the cauliflower growers fell in medium income category (75,000 to 1,00,000) per year. The possible reason might be that, majority of the cauliflower growers posses medium (10-25 acres) and semi-medium land holding (5-10 acres). It is quite natural to expect that as the land holding increases with higher education, more economic orientation might have made them to earn more and more, hence this kind of results.

These results are in line with the findings of Vijay Kumar (1997), Sunil Kumar (2004) and Shashidhar (2004).

5.3.6 Cosmopolitiness

It could be observed from the data presented in table 5 that 40.50 per cent of the farmers visited town once in fortnight followed by 30.33 per cent visiting once in a month. Whereas, respondents who visited town for their personal or domestic purpose was 50.83 per cent followed by 43.84 per cent for gathering information on new technology or agriculture purpose.

The possible explanation for such behaviour might be that nowadays private agencies and other extension functionaries themselves do contact individual farmers at their own house or on field and provide the required information on the spot itself. As a result farmers might not have visited the town frequently on the contrary the innovative farmers who were always in search of new information visited town for want of agriculture information. The results are in line with the findings of Ratnakar and Reddy (1991) and Shashidhar (2004).

5.3.7 Extension participation

The data in Table 6 revealed that 22.50 per cent of the cauliflower growers were regularly participated in agriculture exhibitions. Whereas, 40.83 per cent and 32.50 per cent of the cauliflower growers occasionally participated in group meetings and demonstrations. This may be due to more contact with extension functionaries as well as more exposure to mass media so as to get new information on agriculture. It is interesting to note that more than half of the respondents have not participated in other extension activities. The reason might be that, as some of the private companies visit the villages frequently to promote their produce and give recent information on spot itself which might have hindered their participation in extension activities.

The results are in accordance with the findings of Saravan Kumar (1996) Venkataramalu (2003), Shashidhara (2004) and Raghavendra (2004).

5.3.8 Mass media participation

It could be observed from Table 7 that, 56.67 and 29.17 per cent of the respondents were listening radio programmes occasionally and regularly viewing television. The possible reason might be that, now a days every farmer is possessing radio and are in the habit of listening radio whenever they get leisure time usually in the evening hours. In rest of the hours, he will be engaged in doing other agricultural operations and thus majority hear radio programmes occasionally and less percentage of them hear regularly who are highly educated and wanted to know the recent technologies.

All most nearing to 30.83 per cent of them view television occasionally, this may be due to the availability of television in the village as well as they get more motivation and entertainment as they could observe and see the movement of objects and hence this kind of

results. It is interesting to note that 59.16 and 88.34 per cent of the respondents never read news papers and farm magazines respectively. The reasons may be that majority of them are not the subscribers. This might have hindered reading by barrowing it from other subscriber farmers.

The above findings got support from the studies conducted by Patil (1995) and Moulasab (2004).

5.3.9 Organizational participation

The data in Table 8 depicts that 49.17 per cent of the respondents were members of service cooperative society and 35.00 per cent and 27.50 per cent of the respondents were occasionally and regularly participate in the activities. The possible reason may be that, these organizations are functioning at the village level and most of them had taken loan from farmers service co-operative society for various agricultural purposes. As a result, they might have participated in the activities.

Majority of the respondents were never participated in the activities of taluka panchayat and zilla panchayat. As these organizations exist at taluka and district level respectively. Hence, majority of them might have felt inconvenient to attend the meetings as well as the participation is open for members only and hence this kind of results.

The findings of the study is in consonance with Saikrishna (1998), Kadam (1999), Siddappa (1999), Vijay Kumar (2000), Sandesh (2004).

5.3.10 Economic motivation

It was evident from the Table 5 that, majority (52.50%) of the cauliflower growers had medium level of economic motivation. Whereas 25.00 and 22.50 per cent of the cauliflower growers belonged to high and low level of economic motivation categories respectively. The possible reason might be that around 50.00 per cent of the farmers possessed medium land holding more annual income, more cosmopolitness. As a result they might have got motivated to increase their economical returns.

The above findings are in line with the findings of the studies conducted by Chandran (1997), Sawanth (1999), Siddappa (1999), Natikar (2001) and Sandesh (2004).

5.3.11 Risk orientation

The results presented in Table 5 indicated that 55.00 per cent of the cauliflower growers belonged to medium risk orientation category followed by low (35.00%) and high (10.00%) risk orientation category respectively.

It should be mentioned here, that the individuals will be vary critical and cautious in understanding different aspects of technology. There is tendency in farmers to take risk based on their income, land holding and other resources. Risk taking varies with socio-economic status of the individuals. In the study most of the respondents belonged to medium annual income category and also had medium land holdings hence these factors might contributed for medium risk taking ability.

These findings are in accordance with the findings of Saravana Kumar (1996), Gupta (1999) Babanna (2001) and Suresh (2004).

5.3.12 Innovativeness

This refers to the degree to which an individual is relatively earlier in adopting the new ideas when compared to other members in society. The results from the Table 5 revealed that, majority (45.00%) of the cauliflower growers belonged to medium innovativeness category followed by low (29.16%) and high (25.80%) innovativeness category, respectively.

The reason might be that, since majority of cauliflower growers belong to medium land holding. Medium income group, medium economic motivation category. This clearly

indicates that, informers standard of living is fairly good. Such of the characteristics naturally might have influenced to accept the innovations quite earlier than the other members. Hence majority belong to medium innovativeness category. Further, cauliflower cultivation involves higher investment and majority of farmers prefers to know and adopt new technologies. If may also be due to various psychological factors acting on individual, which exert more pressure and make him to try had under favourable environment and hence this kind of result.

The findings of the study is in consonance with the findings of Balasubramanians (1997) Natikar (2001) and Shashidhara (2004).

5.4 MARKETING BEHAVIOUR OF CAULIFLOWER GROWERS

A perusal of Table 9 revealed that, 16.60 per cent of respondents practiced self marketing while 83.30 per cent of the farmers sold their produce through commission agents.

The data further revealed the reasons for self marketing as were; to realize higher profit (16.60%), buying other necessary material (13.30%), nearest distances of market (13.30%) and availability for trucks or cart (3.30%).

While reasons expressed for marketing through commission agents were; to get more buyers through commission agents (83.30%), to get good price (38.30%) and availability of storages facilities (16.60%).

Cent per cent of the farmers used gunny bags for packing of cauliflower. The possible reason may be that, the farmers might have found more convenient in transportation rather than other methods of packing. Nearby 80.00 per cent of the cauliflower growers market their produce through commission agents. The reason may be that, they get financial help to purchase seeds, fertilizer, pesticides etc. Through these agents. And also they get more number of buyers, whereas self marketing requires more risks. Hence this kind of results.

The findings are in line with the findings of Chandran (1997), Kumar (1998), Pant and Kumar (1999), Vasudev and Chowdry (1999) and Sunilkumar (2004).

5.4.1 Problems in production and marketing of cauliflower growers

The data in Table 10 revealed the, constraints faced in production and marketing of cauliflower growers were; high cost of fertilizers (85.00%), problem of pest (80.00%), problem of disease (78.30%), high cost of plant production chemical (38.3%) and limited and irregular power supply (38.30%).

The possible reason might be that, the incidence of pest and disease is one of the major problem for reduction in cauliflower yield which was actually experienced by the farmers.

Majority of the cauliflower growers expressed the constraints like, high cost and also non availability of fertilizers and plant protection chemicals. Since the cost of fertilizer and plant protection chemicals does not commensurate with the prevailing low price for produce might have made the farmers to express as the major constraint. Further, the demand of fertilizers and plant protection chemicals increase, particularly in season which creates shortage and non-availability of such inputs in time.

Irregular supply of electricity was one of the constraint expressed by the cauliflower growers. Proper scheduling of irrigation cannot be followed unless there is continuous supply of power and ultimately has effect over yield.

Further, the production problems expressed by the farmers were high cost of fertilizers (85.00%) problem of pest (80.00%), problem of diseases (78.30%), high cost of plant protection chemicals (38.30%) and limited and irregular power supply (38.30%). The cauliflower growers also expressed the marketing problems like fluctuation in price (81.60%), exploitation by middle man (71.66%) and poor transportation facilities (34.60%).

The above findings are in line with the findings of the studies conducted by Ravishankar (1995), Kumar (1998), Vasudev and Chowdry (1999), Siddappa (1999), Kadam (1999), Karpagam (2000) and Sunil Kumar (2004).

5.5 FACTORS CONTRIBUTING FOR HIGH YIELDING OF CAULIFLOWER

From the Table 11 reveals the suggestions given by the growers to increase the cauliflower yield were; taking sowing at proper time, applying organic manure in sufficient quantity (81.6%), takings plant protection measures from time to time to avoid yields loss (78.3%) following blanching practice (70.0%) following irrigation. Schedules at proper intervals (66.6%) using high yielding varieties/hybrids (63.3%).

The possible reason for this might be that, application of organic manure will improve soil structure by increasing the activity of microorganism and contributes for improving the soil fertility and their by helps in getting higher yields. It is no doubt that the timely plant production measures will efficiently control pests and diseases which ultimately contribute for getting higher yields. Life saving irrigations for the crop is minimum requirement to get good yields. Further, use of high yielding varieties as they respond well to fertilizers definitely increase the yield. Therefore, the farmers might have given opinion for such factors which may increase their yield.

VI SUMMARY

Now-a-days there is shift towards commercialization of agriculture and farmers are giving importance to commercial crops rather than other food crops. Vegetable cultivation is one such commercial field, which yields more income to the farmers. Cauliflower is one of the popular vegetable crop and rich in vitamin C, which had its origin in Cyprus and Mediterranean coast. The area is increasing every year in view of good profit, good market and favourable agro-climate condition congenial for crop.

Inspite of all its advantages cauliflower cultivation has not spread over to all parts of Karnataka. Since hardly any research pertaining to this crop has been done so far. Hence, it was felt that, the findings with respect to the level of knowledge and adoption regarding the recommended cultivation practices of cauliflower by the farmers would focus light on those area where the cultivators were found to be lacking and also the reasons for the non adoption. Accordingly the Horticulture Department could plan the adequate strategies to rejuvenate cauliflower cultivation. Keeping this in view, the present study was designed with the following specific objectives.

1. To study the knowledge of farmers about the recommended cultivation practices of cauliflower.
2. To know the extent of adoption of recommended cultivation practices by cauliflower growing farmers.
3. To study the socio-economic profile of cauliflower growing farmers.
4. To study the marketing behaviour of cauliflower growers.
5. To list the factors contributing for high yielding of cauliflower.

The present study was conducted during the year of 2004-05 in two taluks (Belgaum and Hukkeri) of Belgaum district. This district was purposively selected as it ranks first in area and production of cauliflower in Karnataka.

The major findings of the study are as follows

- Cent per cent of the respondents had knowledge and also adopted the popular varieties of private seed companies, whereas, very meager percentage (24.16%) of them had knowledge about recommended varieties of Agriculture University.
- More than 90.00 per cent of respondents had knowledge about sowing time and also followed sowing in time.
- More than 60.00 per cent of them had knowledge about seed rate and seed treatment, but adopted only recommended seed rate.
- Nearly 90.00 per cent of the respondents had knowledge about nursery seed bed preparation practices like method of sowing, fertilizer application to nursery, age for transplanting of seedlings and provision of shade in the nursery. In respect of all the above practices majority adopted at varying level of degrees ranging from 60.00 to 80.00 per cent.
- About 58.33 per cent per cent of the growers had knowledge about use of recommended quantity of chemical fertilizers and nearly 45 per cent of them followed the application of correct dose of chemical fertilizers.
- More than half of the respondents possessed knowledge about maintenance of correct spacing and also adopted the same in their field situation.
- Sixty per cent of the farmers had knowledge about top dressing with nitrogenous fertilizers while, 45.00 per cent of them adopted the same.
- Nearly 70.00 per cent of them know about intercropping with mustard as a major of plant protection and 33.30 per cent of them practiced the same in their field situation.

- More than 90.00 per cent of cauliflower growers had knowledge about occurence of pests and diseases. Whereas, 56.00 to 58.00 per cent of them had adopted the recommended methods of controlling these pests and disease.
- Nearly 70.00 per cent of them had knowledge about preparation of NSKE (neem seed kernel extract) and half of them adopted the same in their field situation.
- Majority of the respondents belonged to muddle age group had medium farming experience and medium land holding.
- About 26.60 per cent of them were educated upto high school.
- Majority of the respondents belonged to medium income category.
- Nearly half of the respondents participated occasionally in extension activities
- 56.60 per cent of them had occasional radio listening behaviour
- Majority of the farmers belonged to medium innovativeness category (45.00%), medium economic motivation category (52.50%) and medium risk orientation category (55.00%)
- Majority (83.30%) of cauliflower growers marketed their produce through commission agents while 16.60 per cent of farmers adopted self marketing
- Majority of the respondents expressed production problems like high cost of fertilizers (85.00%) problem of pests (80.00%).
- Majority of the farmers expressed the marketing problems like fluctuation in price (81.60%) exploitation by middleman (71.66%).

Implications and recommendations

In the light of findings of the study and researchers own observations. The following implications are made for effective cauliflower cultivation.

Majority of the respondents belonged to medium level knowledge category in respect of recommended cultivation practices of cauliflower. Hence it is imperative that the state department of horticulture. Government of Karnataka can make still more efforts to provide the required knowledge about recommended cultivation practices by way of undertaking extension activities like conducting trainings, demonstration and other educational activities.

There is a need for providing guidance on market avenues and price fluctuations from time to time to farmers. Through mass medias like news paper, radio and televisions.

Cent per cent of the farmers adopted the varieties released by the private companies so the Scientists of Agricultural Universities have to take up studies to judge the yield potentiality of these varieties to indicate in package of practice booklet.

About 70.00 per cent of the respondents used neem seed kernel extract in cauliflower for controlling pests and diseases. Hence, there is a scope for creating awareness about the use of biopesticides by organizing educational activities.

Nearly 58.00 per cent of the farmers had knowledge about use of chemical fertilizers but only 45.00 per cent of them adopted recommended fertilizer dose. So, more and more trainings to be organized to create awareness about the use of chemical fertilizers.

FUTURE LINE OF WORK

Meaningful generalizations cannot be made as the present study has been limited to Belgaum district of Karnataka state. Therefore, it is suggested that, further investigation may be taken up in other districts of the state on similar line to make generalizations. The other areas of research on cauliflower could be taken up are.

- Training needs of cauliflower growers

- Study could be taken up to compare with the recommendations made by the agricultural Universities and private organizations
- Case studies of successful cauliflower growers and the cultivation practices followed by them.
- Development of suitable marketing strategy for cauliflower growers

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STUDY ON KNOWLEDGE AND ADOPTION OF RECOMMENDED CULTIVATION PRACTICES OF CAULIFLOWER GROWING FARMERS IN BELGAUM DISTRICT OF KARNATAKA

INTERVIEW SCHEDULE

PART – I

I. General Information

1. Name of the Farmer :

   a. Village :

   b. Taluk :

   c. District :

2. Age :

3. Education level :

   i) Illiterate, ii) Primary School , iii) Middle school iv) High School, v) Pre-University and

   v) Graduation and above

4. Farming Experience : _____years

5. Land holding (acres)

   1. Irrigated : 2. Rainfed : 3. Garden : Total :

6. Annual family income

Sl. No.	Sources of income	Income per year (Rs.)
1.	Agriculture	
2.	Agro-based subsidiary enterprises (like poultry, dairy, goat/sheep rearing etc.)	
3.	Business	
4.	Others (specify)	
	Total	

7. Cosmopoliteness

1. Please indicate the frequency of visit to your nearest town/city

   a. Once in a week b. Once in a fortnight

   c. Once in month d. Occasionally

2. Indicate the purpose of your visit to town/city

   a. Visits relating to agriculture b. Personal/domestic

   c. Entertainment

8. Mass media participation

Sl. No.	Activities	Subscribe /own	Frequency of participation		
			Regular	Occasionally	Never
1.	Reading newspaper				
2.	Listening to farm radio programmes				
3.	Reading farm magazines, extension leaflets or any other literature related to Agriculture/ Horticulture				
4.	Watching TV programmes relating to agriculture				

9. Organizational participation

Indicate your participation in various social organization as member or office bearer

Sl. No.	Institution	Member	Office bearer	Attendance in meeting		
				Regular	Occasional	Never
1.	Gram Panchayat					
2.	Taluka panchayat					
3.	Zilla panchayat					
4.	Farmers service co-op. society					
5.	Youth club					

10. Extension participation

Please indicate your response regarding the awareness about the extension activities organized in your area during last year and your extent of participation in the activities.

Sl. No.	Activities	Extent of participation		
		Regular	Occasionally	Never
1.	Training programmes	2	1	0
2.	Demonstration	2	1	0
3.	Field visits	2	1	0
4.	Group meetings	2	1	0
5.	Exhibitions	2	1	0
6.	Education tour	2	1	0

11. Innovativeness

Please indicate your response to the following statements

Sl. No.	Statements	SA	A	DA
I a)	I try to keep my self upto date with information on new flower cultivation practices but that does not mean that I try out all methods on my farm			
b)	I feel restless till I try out a new flower cultivation practice I heard about			
c)	They talk of many new flower cultivation practices these days but who knows if they are better than old ones			
II a)	From time to time I have heard of several new flower cultivation practices and I have tried out most of them in the last few years			
b)	I usually see what results my neighbours obtained before I try out the new flower cultivation practices			
c)	Somehow I believe that traditional ways of farming is the best			
III a)	I am cautious about trying new flower cultivation practices			
b)	After all, other farmers were wise in their flower cultivation practices and I do not see any reason for changing these practices			
c)	Often new flower cultivation practices are not successful however, if they are promising, I would surely like to adopt them			

12. Economic motivation

Please indicate your response to the following statements

Sl. No.	Statements	SA	A	UD	DA	SDA
1.	A cauliflower grower should work towards higher yield and economic profit					
2.	The most successful cauliflower grower will make more profit					
3.	A grower should try any new ideal technology that may earn in more money					
4.	A grower should grow cash crops to increase monitory profits instead of field crops for home consumption					
5.	It is difficult for the growers children to make a good stand unless he provides them with economic assistance					
6.	A grower must earn for his living but most important thing in life is one in which it can not be defined in economic terms					

13. Risk orientation

Please indicate whether you agree or disagree with the following six statements.

Sl. No.	Statement	Response	
		Agree	Disagree
1.	A cauliflower grower should take over more chance in making big profit than to be content with a smaller but less risky profits		
2.	A grower who is willing to take greater risk than the average one, usually will do it better financially		
3.	A cauliflower grower will take risk when he knows his chance of success is fairly high		
4.	It is better for a cauliflower grower not to try new practices unless most other growers have used these with success		
5.	Trying entirely a new method for cauliflower grower involves risks but it is worthy		
6.	A farmer should grow large number of crops to avoid greater risk involved in growing one or two crops		

PART – II

KNOWLEDGE AND ADOPTION OF RECOMMENDED CULTIVATION PRACTICES IN CAULIFLOWER

Please indicate your response to the following statements

Sl. No.	Statements	Knowledge level		Adoption level	
		Known	Not-known	Full adoption	Non-adoption
1.	Recommended varieties of cauliflower for cultivation.				
	Recommended varieties :				
a.	Early snow ball				
b.	Snow ball				
c.	Late snow ball				
2.	Sowing type				
a.	Short duration varieties : August-September (early snow ball and snow ball)				
b.	Long duration varieties : October-November (late snow ball)				
3.	Seed rate (100 g/acre)				
a.	Recommended seed rate/acre (250-300 g/acre)?				
4.	Seed treatment				
a.	Recommended seed treatment chemical (mercuric chloride) in cauliflower?				
5.	Nursery				
a.	Recommended : Method of sowing in nursery (broadcasting)				
b.	Fertilizer application to nursery (180-300 kg FYM and 3 kg of 15:15:15 complex fertilizer)				
c.	Period of nursery (4 weeks)				
d.	Provision of shade to seed bed till the germination of seeds				

Contd…

6.	Age of transplanted seedlings to the main field Recommended (4 weeks after raising nursery)				
7. a.	What is the recommended quantity of FYM to be applied per acre? Recommended (10 t/acre)				
8. a. i. ii.	Spacing in the main field Recommended spacing Short duration varieties Row to Row (45 cm) Plant to plant (45 cm)				
b. i. ii.	Long duration varieties Row to Row (60 cm) Plant to plant (45 cm)				
9.	Fertilizers per acre Recommended level of fertilizers N : 60 kg P : 40 kg K : 50 kg				
10. a. b. c. d.	Top dressing of nitrogenous fertilizer Recommended quantity (50% i.e., 30 kg/acre) Time for top dressing Recommended (4 weeks after transplanting) Are you aware of intercropping with mustard as a major of plant protection (25:1 i.e., 1 row of mustard for every 25 rows of cauliflower)? Crop rotation with nol-kohl crops once in three years				
11. a. i. ii. iii.	Pest control What are the common insects observed diamond back moth Mites leaf minor				

Contd…

b.	What measures are to be followed to control major pests? Recommended						
	Name of the pest	Chemical used	Concent-ration				
i.	Diamond back moth	NSKE	4%				
ii.	Mites	Phosphomidon (0.05%)	0.5 ml in 1 lit				
iii.	Lepidopteron pests	Quinolphos/ chlorpyriphos (0.05%)	2 ml/lit				
	Followed						
	Name of the pest	Chemical used	Concent-ration				
i.							
ii.							
iii.							
12.	Disease control						
a.	What are the major diseases observed?						
i.	Black rot (bacterial disease)						
ii.	Collor rot / foot rot						
iii.	Leaf scorching						
iv.	Downey mildew						
b.	What control measures did you follow to control major diseases?						
	Name of the disease	Chemical used	Concent-ration				
i.							
ii.							
iii.							
iv.							
13. a.	Do you know the preparation of NSKE? Recommended Maximum number NSKE sprays that can be given (4 times at an interval of 10 days)						
14. a. b. c.	What is the recommended yield per acre? Recommended yield Short and medium duration varieties (60-80 q/acre) Long duration varieties (80-100 q/acres) Yield obtained per acre						

PART – III

Please state the mode of marketing, constraints/problems faced in marketing of cauliflower and what are the avenues identified to overcome these constraints/problems?

i. Nature of marketing

i) Marketing through self retail outlets ii) Commission agents

A. If it is marketed through self retail outlets

i. Place of marketing

ii. Reasons for self-marketing

1. Can realize higher profit
2. Nearest distance from market
3. Availability of truck/cart/other vehicle
4. Buying other necessary materials while visiting the market
5. Others (specify)

iii) Constraints in self marketing

1. Non-availability of truck/other vehicle
2. Non-availability of cart
3. Lack of approach road
4. Heavy hire charges
5. Inadequate local markets
6. Lack of storage facilities
7. Lack of time to go to the market
8. Exploitation by middleman
9. Lack of market knowledge
10. Lack of security
11. Any others (specify)

B. If it is marketed through commission agents

I. Reasons for selling through commission agents

1. To get more buyers through commission agents
2. Availability of storage facilities
3. To get good price

II. Constraints in marketing through commission agents

1. Fear of getting cheated by commission agents
2. Exploitation by commission agents

C. How cauliflower vegetable is packed?

a) Method of packing : Baskets/Gunny bags

D. Suggest ways and means of improving the cauliflower marketing

a)

b)

c)

E. Problems faced by cauliflower growers

a) Production problems

1. Problem of pests
2. Problem of diseases
3. High cost of fertilizers
4. High cost of plant protection chemicals
5. Limited and irregularity of power supply

b) Marketing problems

1. Poor transportation facilities
2. Fluctuation in the prices
3. Exploitation by the middle men

F. Factors influencing for high yielding of cauliflower

1. Taking sowing at proper time

2. Applying organic manure in sufficient quantity
3. Following irrigation schedules at proper intervals
4. Following high yielding varieties
5. Following recommended fertilizer dose
6. Taking plant protection measures in time to time to avoid yield loss
7. Blanching

STUDY ON KNOWLEDGE AND ADOPTION OF RECOMMENDED CULTIVATION PRACTICES OF CAULIFLOWER GROWERS IN BELGAUM DISTRICT OF KARNATAKA

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ABSTRACT

The study was conducted in Belgaum district of North Karnataka during the year 2004-05, by keeping area and production of cauliflower as criterion. In Belgaum district, Belgaum and Hukkeri taluks were purposively selected. Further, from each taluk 60 cauliflower growers were selected making a total sample of 120.

More than 50 per cent of the cauliflower growers had medium level of knowledge about recommended cultivation practices. About 53.30 per cent of the respondents had fallen under medium adoption category and 31.50 per cent of the respondents were under low adoption category.

Majority of respondents belonged to middle age group and had medium farming experience and medium land holding. About 26.60 per cent of the respondents studied upto high school. Majority of the respondents had medium risk orientation (55.00%), medium economic motivation (52.50%) and medium innovativeness (45.00%). Cent per cent of the respondents had knowledge and also adopted the popular varieties of private seed companies. Whereas, very meager percentage (24.16%) of them had knowledge about recommended varieties of Agricultural University. More than 90 per cent of the respondents had knowledge about nursery seed bed preparation practices like method of sowing, fertilizer application, transplanting of seedling and provision of shade in the nursery. About 45 per cent of them followed the application of recommended dose of chemical fertilizers.

Majority of the respondents expressed the production problems like high cost of fertilizers (85.00%), problem of pests (80.00%). Further, majority of the respondents expressed the marketing problems like fluctuation in price (81.60%) and exploitation by middleman (71.66%).