“Problems and prospects of kinnow production under drip irrigation System in Haryana”

BY
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(2008A17M)

Thesis submitted to the Chaudhary Charan Singh Haryana Agricultural University in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

IN

EXTENSION EDUCATION

COLLEGE OF AGRICULTURE
CHAUDHARY CHARAN SINGH
HARYANA AGRICULTURAL UNIVERSITY
HISAR - 125004

2011

CERTIFICATE-I

This is to certify that this thesis entitled **"Problems and prospects of kinnow production under drip irrigation System in Haryana"** submitted for the degree of **Master of Science**, in the subject of **Extension Education** to the Chaudhary Charan Singh Haryana Agricultural University, Hisar, is a bonafide research work carried out by **Rajnish Kumar, Admn. No. 2008A17M,** under my supervision and that no part of this dissertation has been submitted for any other degree.

The assistance and help received during the course of the investigation have been fully acknowledged.

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CERTIFICATE-II

This is to certify that this thesis entitled, **"Problems and prospects of kinnow production under drip irrigation System in Haryana"** submitted by **Rajnish Kumar**, **Admn. No, 2008A17M** to the Chaudhary Charan Singh Haryana Agricultural University, Hisar, in partial fulfillment of the requirements for the degree of **Master of Science** in the subject of **Extension Education** has been approved by the student's advisory committee after an oral examination on the same.

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ACKNOWLEDGEMENT

Before expressing my vote of thanks to any individual, I express my heartiest devotion to "Guru Jambheshwar Bhagwan" for the graceful blessings at every step without whose blessing the study would have remained a dream only.

I feel great pride and privilege in expressing my heartfelt gratitude and inginite indebtedness to my esteemed Major Advisor, Dr. R.S.Hudda, Professor and Head, Department of Extension Education, CCS HAU, Hisar for his valued guidance, noble inspirations, throughout the course of study. I am highly thankful to him for inculcating in me a spirit of independence and critical thinking.

I feel honored to have this opportunity to express my sincere thanks and deep regards to the learned members of my Advisory Committee, Dr. A. K. Godara, Associate Professor, Department of Extension Education, Dr. K. S. Suhag, Professor Deptt. of Agril. Economics, Dr. H. K. Bajaj, Professor Department of Nemetology and Dr. Lajpat Rai, Head and Professor, Department of statistic, for their meticulous suggestions, valuable discussions and multifarious help during the course of research programme.

No words of mine can adequately express my vole of thanks Head of Dept. of Extension Education, Dr. R. S. Hudda for his round the clock help, innovative ideas, constant and judicious guidance and untiring help throughout the course of investigation without which this study would have been less complete. I offer my thanks to the Dr. P.S. Sherawat professer, Dr. D.K. Sivryan and Dr. S. K. Mehta, Associate professor Department of Extension Education for valuable guidance.

My heartfelt feelings coupled with sincere thanks goes to all the faculty members and non-teaching staff of the Department of Extension Education for their timely help and co-operation. I am extremely thankful to the respondents, whose support and help paved me to the final target.

Every researcher owes a great deal to one's friends and I am no exception to it. I am proud to have them with me any time, I needed them. From the core of my heart, I wish to thank my best friends Ramesh Bishnoi, Veerpal Soni, Rajnish Virak, Kamlesh Bishnoi, Deepak, Rajkamal Bishnoi, Dr. Dalip Bishnoi, Dr. Nirmal Bishnoi, Dr. Jaswinder kaur siddhu, Dr. Anil bana, Dr.Vijender Bishnoi, Dr. Seeshpal godara, Dr. Jagdeesh, Dr. Gurmanpreet, Dr. Amritpal, Dr. Devender Bishnoi, Vivek beniwal, Balraj gora, Rakesh sharma, Sandeep Patlan, Pawan Kasaniya, Rajesh dahiya, Neetu sindhu, Sunil beniwal, Pawan chahar, Madan lal, Vinod Godara, Vinod Bahana, Manoj Bishnoi, Rakesh and Akshay Kumarvats for all their love, support, inspiration and encouragement provided to me during the research period rendering this period most precious and valuable period of my life. No words can replace my feelings and heartiest regards towards my respectable parents as I cant step forward without their good wishes.

The very idea of the work having been completed makes me happy to thank all those who helped me directly or indirectly and to whom I have been able to express my love and affection as an individual.

Hisar **RAJNISH KUMAR**

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CHAPTER - I

INTRODUCTION

Among the various horticultural crops, fruits are the most nutritious and protective food. It is generally stated that the living standard of people can be judged by the production as well as consumption of fruits.

Indian government has laid great emphasis on the development of horticulture in general and fruit crops in particular. Fruits have great nutritive value in human diet. They contain many of the essential nutrients i.e. vitamins, minerals and other elements. But the consumption of fruits in India is very low. Per capita per day consumption of fruits in our country is only 46 gram as against recommended consumption of 85 grams per head per day (Chand, 1993). It is apparent that the present level of fruit production has to be almost doubled in order to attain the recommended level of consumption. All possible efforts and resources are being directed to develop new and viable technologies, create favourable market and provide better transport, storage and processing facilities to make horticulture a profitable business enterprise (Singh, 1994).

India is the second largest producer of fruits after China, with a production of 71516000 MT of fruits from an area of 6329000 hectares. A large variety of fruits are grown in India, of which mango, banana, citrus, guava, grape, pineapple and apple are the major ones. In addition to these, fruits like papaya, sapota, annona, phalsa, jack fruit, ber, pomegranate in tropical and sub tropical group and peach, pear, almond, walnut, apricot and strawberry in the temperate group are also grown in a sizable area. Although fruit is grown throughout the country, the major fruit growing states are Maharashtra, Tamil Nadu, Karnataka, Andhra Pradesh, Bihar, Uttar Pradesh and Gujarat.

Citrus is an important genus of the family Rutaceae in the plant kingdom. Kinnow mandarin, the first generation hybrid of (king X willow leaf),is the most common citrus fruit grown commercially in North India, particularly in Punjab, Haryana and the adjoining areas of Rajasthan.

Citrus fruits occupy a prominent place in international market among various fruit crops. Among citrus fruits grown in India, mandarins are undoubtedly most popular and are extensively grown throughout the country. Kinnow (a mandarin hybrid) is the most important commercial citrus crop in India (Randhawa and Srivastava, 1986). Among the citrus fruits, cultivation of Kinnow mandarin has become comparatively more prominent and popular, particularly with the fruit growers of North-Western Region. This is on account of its adaptability to different agro-climatic conditions, heavy bearing potential and excellent juice

quality characteristics (Chopra and Joshi, 1971). Area under Kinnow plantation has extensively increased in the states of Punjab, Haryana, Rajasthan and Utter Pradesh.

Haryana state which has been divided into two regions depending on the agro climatic conditions. First region of state is north- east where annual rainfall average is 550-1100 mm. Other region is south ï west and central area in which the annual rainfall is 250 mm to 550 mm. In Haryana area, production and productivity of fruit crops is 41500 ha, 3039000 MT and 7.3 MT/ ha, respectively. and ranks 13th in citrus production **(**Anonymous 2011).

Sirsa is the most famous district for producing the Kinnow in Haryana. And also front runner district in the production of Kinnow. The state government has recently started a Kinnow grading and packing plant at Abubshahar in the district and would soon set up a food processing plant there. Under the National Horticulture Mission, assistance is provided for creating water sources through construction of community tanks, farm ponds / reservoirs with plastic lining. The National Horticulture Mission also envisages coverage of large areas under improved varieties of horticulture crops. The assistance for cultivation spreads over a period of the three years in the ratio of 50:30:20 in the first, second and third year and. maintenance of the water source will be the responsibility of the community or farmers group (Anonymous, 2008).

Planting water resources owing to over exploitation of ground water in Haryana State pose major threats for maintenance of crop activity. Further the southern part of Haryana is dry and its ground water is brackish, soil is sandy and barren in some parts of the region. Furthermore Kinnow is brackish water sensitive plant and these plants being perennial in nature require water throughout the year but due to non-availability of water particularly in the dry spell plants get dried (Anonymous, 2009).

Hence Drip Irrigation is my solution under such conditions for cultivation of Horticultural crops, as it is basically precise, slow and artificial application of water in the form of discrete continuous drops. Through this system irrigation water reaches the root drop by drop and hence is economic method of irrigation (Singh, 1995).

Drip Irrigation has been popularized in Haryana and 3112 ha. has been covered under Drip Irrigation System to improve product quality and maximize scare irrigation water use. Drip and sprinkler irrigation form essential input for improving productivity and quality of horticultural produce. Under NHM the assistance for it is 90 % of the cost of installation (i.e. 90 % of Rs.13000/ acre) (Anonymous, 2008).

With the background in view, this study entitled ñProblems and prospects of Kinnow production under Drip Irrigation System in Haryanaò was undertaken in the Sirsa and Hisar districts of Haryana state with the following specific objectives:-

1. **To measure the attitude of Kinnow growers towards Drip Irrigation System.**
2. **To study the prospects of Kinnow production under Drip Irrigation System.**

3. **To identify problems encountered by the Kinnow growers under Drip Irrigation System.**
4. **To establish association between attitude and personality traits of Kinnow growers.**

Scope and importance of the study

A study of attitude, problem and prospects of farmers towards Drip Irrigation System, intends to evaluate the existing level of attitude of farmers towards Drip Irrigation System. In this way, it will be possible to know the level of variation and the factors which cause the variation in the level of attitude, problem and prospects study will have wider implication and importance. An understanding of such factors that influence the level of attitude of farmers regarding Drip Irrigation System can be of great value for extension workers administrators, policy makers and others.

Through the attitude of various factors, the extension personnel, administrators can come to know the behavior of farmers about Drip system in particular area, behavior of farmers about Drip system in particular area in order to discover their problem, the scientific ways for solving their prevailing problems, for their physical ï economic, social benefits through the responsible agencies.

Limitation of the study

The research studies in social sciences have to face some limitations and the present research study is not an exception to this rule. The study has the following limitations.

1 The investigaion being a studentôs project for partial fulfillment of M.Sc. degree had the usual resource constraints (like mobility, funds) due to which study could not be conducted on the large sample of farmers.

2 The study was conducted in Sirsa and Hisar district and two block selected purposively

3 The findings of the study are based on the stated views of the respondents to the specially constructed schedule. No other effects were made to verify the responses of the respondents concerning the dependent and independent variables.

CHAPTER - II

REVIEW OF LITERATURE

In a scientific investigation, a comprehensive review of relevant literature is imperative. Besides giving knowledge of work already done in the area and providing an insight in to methods and procedure, it provides a basis for operational definitions of major concepts.

The fact that dawned on the investigator as he started the task of receiving the literature was that there were only a few studies available in the field of attitude, problems and prospects of kinoow growers towards Drip Irrigation System. The available literature relevant to this study has been reviewed in this chapter under the following sub-heading:

2.1 Socio-personal characteristics of the fruit growers.

2.2 Attitude of farmer towards technology.

2.3 Problems encountered by farmer in adoption of technology.

2.4 Prospects of fruit production under Drip Irrigation System.

2.5 Association of attitude and personality traits of fruits growers.

2.1 Socio-personal characteristics of the fruit growers.

Patel (2011) reported that nearly half (48.57 per cent) of the farmers were in middle age group and observed that nearly half (48.57 per cent) of the farmers were educated up to secondary school level and indicated that among various information sources, maximum farmers were found to use Non Government Organizations with a mean score of 4.37 and ranked first.

Jat (2010) revealed that slightly more than half (52.78 per cent) of the respondents were found in the middle age group and observed that majority (74.31 per cent) of the respondents of tribal farm women were having illiterate while, 15.97 per cent respondents were educated up to primary school education and great majority (81.95 per cent) of the respondents did not participate in any type of the social organizations.

Suthar (2010) observed that more than one-third (35.00 per cent) of drip owners were having higher secondary level of education and indicated that two third (60.00 per cent) of the drip owners were having membership in more than one organization.

Athawale (2009) reported that (55.84 per cent) of respondents were found in middle age group and reported that (45.85 per cent) of respondents had education up to higher secondary level reported that majority 70.00 per cent of the respondents had membership in

one organization. Reported that two third (60.00 per cent) of the respondents utilized medium sources of information

Shashidara *et al.* (2007) reported that the adoption of Drip Irrigation management practices had non-significant association with age, education, land holding, area under Drip Irrigation, annual income and social participation.

Jaloriya (2006) revealed that more than two-thirds (66.67 per cent) of the green gram growers had medium level utilization of source of information followed by 18.33 per cent with high level and 15.00 per cent with low level utilization of source of information and indicated that nearly two-third of the respondents (65.00 per cent) was having medium level of risk preference ability.

Prajapati (2006) found that 40.00 per cent of the farmers were members in one organization and displayed that nearly two-third (65.00 per cent) of the respondents had medium level of risk preference and reported that 47.00 per cent of the farmers were literate on the other hand 40.50 per cent farmers were educated up to primary level.

Ashwar (2005) indicated that 58.33 per cent of the farmers had low level of social participation.

Kaid (2004) concluded that majority of the respondents (87.50 per cent) had tube-well as a source of irrigation.

Kalia and Singh (2004) stated that the quantity of gas produced was directly related to the amount of cattle dung feed in the digester.

Patel (2004) revealed that more than half of farmers 57.00 per cent were from medium extension contact group and remaining 18.00 per cent were from higher extension contact group.

Jat *et al.* (2003) reported that village Nambardars, progressive farmers and relatives were the most utilized sources of information by the opium poppy cultivators. Besides radio and television were the two important channel of information input.

Dabhi (2002) indicated that nearly half (47.00 per cent) of the member of participatory irrigation management society belonged to the middle age group and concluded that majority of the members of PIMS and non-members had medium contact with extension agencies and indicated that almost all the members (94.00 per cent) of participatory irrigation management society (PIMS) had medium to high level of techno-economic changes as a result of PIMS.

Gour (2002) reported that 57.00 per cent of the dairy farmers had low level of organizational participation, while 42.44 per cent had high level of organizational participation.

Chinchmalatpure (2001) revealed that 41.60 per cent of the project affected farmers belonged to middle age group. revealed that slightly more than half (50.40 per cent) of the respondents were found literate.

Jadhao (2001) revealed that 38.34 per cent of the farmers were having medium risk preference. While, 37.50 per cent farmers were having high risk preference and 24.16 per cent of the farmers were having low risk preference.

Singh and Tyagi (2001) reported that Gujarat dairy farmers were found higher extension contact than Haryana farmers.

Timbadia (2001) stated that majority (72.00 per cent) of the drip owners, had medium level of risk preference ability.

Goswami (2000) found that farm size, area under irrigation effect the terracing on the underrated land of farmers.

Vankar (2000) concluded that majority (76.67 and 65.00 per cent) of the farmers of unirrigated and irrigated villages were fall in middle age group and reported that, two third of farmers of unirrigated villages (60.00 per cent) and irrigated villages (66.67 per cent) had primary level of education.

Chander (1998) explained that 70 per cent of the respondents were in middle age group followed by of (18%) old age and young (12.1), literate from primary to high school (65%), possessing small to medium farm size (80%), low to medium SES (70%), low mass media exposure (51%), had medium level of extension contact (50%), medium level of economic motivation (61%), scientific orientation (56%) and risk preferences (72%).

Bhatia (1997) found that 36 per cent of the respondents belong to medium level of income group followed by low (33.0%) and high (31.0%).

Bahuguna (1996) stated that by the Drip Irrigation System 95 per cent of the irrigation water can be used efficiently and 30 to50 per cent production may be increased.

Ratan (1996) found that adoption level of Drip Irrigation was positively and non-significantly associated with education and land holding.

Singh (1995) mentioned that by the Drip Irrigation System water reaches to root, drop by drop and hence is economic method of irrigation.

Kukrety and Singh (1994) found that just more than half (54 %) of the respondents were of old age, poorly educated and possessed medium socio-economic status.

Shareef-Ud-Din (1994) indicated that 69.17 per cent of the respondents possessed less than one hectare land, cosmopolite, having low level of extension contact and participation.

Tandel (1994) indicated that more than two third (65.15 per cent) of the sugarcane technology adopters had irrigated their land by tube well, while 27.30 per cent of the farmers had utilized canal irrigation facility.

Chahal (1992) revealed that 57 per cent of the respondents were middle aged, followed by young (27%) and old aged (16%), 62 per cent of them educated up to matric, possessed low to medium socio-economic status, cosmopolite, had low level of extension contact and participation.

Sivanappan (1983) found that the adoption of various conservation measures could increase yields by 15 to 50 per cent in dry tracts where raifed farming has been adopted. By introducing improved methods such as sprinkler and Drip Irrigation, it was possible to save about 30 to 60 per cent of water without affecting the yield.

2.2 Attitude of farmer towards technology.

Soother (2010) reported that majority (69.00 per cent) of drip users had medium level of adoption of Drip Irrigation management practices.

Prajapati (2006) observed that slightly more than three-fourth (77.00 per cent) of the respondents had medium level of knowledge while 12.30 and 10.50 per cent of the respondents had low and high level of knowledge about watershed crop production technology, respectively.

Dabhi (2002) indicated that majority (59.00 per cent) of the members of Participatory Irrigation Management Society (PIMS) and a vast majority (83.00 per cent) of the non-members was found to have moderately favourable attitude towards PIMS and opined that a nearly three fourth (74.00 per cent) of the members of PIMS and more than half (56.00 per cent) of the members had medium level of knowledge of recommended water management practices.

Timbadia (2001) found that a large majority (76.66 per cent) of the drip users were found to have moderately favourable attitude towards Drip Irrigation System.

Desai (1997) revealed that majority (66.86 per cent) of the respondents were found to have moderately favourable attitude towards Drip Irrigation System.

Hall *et al.* (1993) pointed that renewable source of energy played an important role in sustaining ecological and consequently in promoting socio- economic development.

Bhuva and patel (1981) concluded that majority of farmers (72 per cent) possessed highly favourable attitude while (28 per cent) of the farmers had unfavourable attitude towards krisi mela.

Singh and Singh (1971) highlighted that farmers had quite favourable attitude towards chemical fertilizer, improved farm implements and green manuring.

Supe (1969) argued that economic motivation was positively and significantly associated with rational behavior.

Majumdar and Majumdar (1967) stated that one of psychology factor; attitude is the best predictor of adoption.

Kumar (1966) discovered that attitude of the farmers was significantly correlated with their social participation.

Singh (1961) concluded that majority of farmers have quite favourable attitude towards the soil conservation programme.

2.3 Problems encountered by farmer in adoption of technology.

Kalsariya *et al.* (2003) reported that the higher initial cost of installation of Drip Irrigation set, uneven distribution of water due to insufficient pressure, Drip Irrigation is not suitable for all the crops, difficulties in interculturing, maintenance of Drip Irrigation sets were the major constrains faced by the farmers.

Timbadia (2001) observed the major constraints were frequent clogging of dripper due to saline substance or other reasons, spare parts of Drip Irrigation System are costly in rural area, lack of services after scale from the company dealers, damaged caused by the rats to the system in the adoption and management of Drip Irrigation System.

Singh *et al.* (1998) concluded that the problems of field channels tapping of water, lack of water regulation, non availability of technical information, high cost of inputs, non availability of credit in time, etc. were some of the major constraints faced by the farmers in adoption of water management technology.

Sharma (1995) working on attitude of farmers towards sprinkler irrigation system pointed out higher initial cost, less subsidy and loss of water at higher temperature as major problems.

Singh (1995) stated that Rajasthan being second largest state, still there is very less progress in the field of Drip Irrigation System.

Busuttil (1993) indicated that the major constraints confronted by the agricultural sector include lack of sufficient water, lack of financing facilities, the low level of education standard of the farming community, the structure of land ownership and land fragmentation.

Sharma (1993) reported that among the various problems in production of fruits, the important one are: (i) Low risk bearing of the growers to introduce new species and varieties. (ii) Scattered production (iii) Lack of irrigation facilities (iv) Lack of suitable plant material like seed, root stock and cultivars. (v) High cost of inputs like fertilizers and insecticides. (vi) Non-existence of storage facilities (vii) Absence of linkage between growers and experts etc.

Yadav (1993) found less subsidy, high initial cost and less of water on high temperature as most important problems in the adoption of sprinkler and Drip Irrigation System.

Choudhary (1991) explored major problems as unavailability of input, high cost of input, lack of knowledge about recommended improved practices and less guidance provided by extension perssonel in the adoption of recommended production technology of gram.

Kaur et al., (1989) listed the problems faced by the farmers in bringing about the diversification in agriculture as marketing of produce (39.68), labour shortage (25.46 percent), lack of technical advice (17.46 percent). Lack of knowledge (15.87 percent) and non-availability of pesticides and credit facilities (6.35 percent). Only 3.17 per cent and 4.76 per cent quoted non-availability of fertilizers and ensured price as the problems, respectively.

Problem of supply of electricity and natural hazards were reported by 1.59 per cent.

Thakur (1987) stated that for increasing the area under horticultural crops, important among the production problems like weed control, thinning of blossoms, development in fruits and control of diseases and insects / pest needed the attention and reported that 85 per cent of the produce in charging many unauthorized charges from the producers and not making the payments in time. Since the fruit marketing needs a special preparation of produce for the market, all the producers are not in a position to spend from their own source for arranging the marketing input e.g. labour for picking, assembling, grading, packing and transportation. Storage facilities provided by govt. in the producing areas and in the terminal areas are not being properly utilized mainly because of fear of fall in price.

James (1984) found that lack of awareness about the Drip Irrigation System and high initial cost are the major problems in adoption of Drip Irrigation System.

2.4 Prospects of fruit production under Drip Irrigation System.

Agrawal and Agrawal (2007) studied that the growth parameters like plant height, basal girth and spread was better under drip irrigated plants compared with the control in pomegranate. Water use efficiency and water savings were also found to be highest under Drip Irrigation with 60 per cent water and lowest under basin irrigation.

Shirahatti et. al. (2007) pointed out that a field experiment was conducted at Agricultural Research Station, Hanumanmatti for comparing the drip and furrow irrigation methods on the hybrid cotton yields in the red sandy loam soil of northern Karnataka. The results of the experiment indicated that by applying same quantity and 50 per cent of water as of surface irrigation (control), the yield was increased by 28 and 10 per cent respectively. When the water applied through Drip Irrigation was 25 per cent of the control, the yield was reduced by just 2.5 per cent, but in this case highest water use efficiency was observed. The soil moisture distribution along the vertical direction increased and laterally it was decreased.

Singh *et al*. (2006) studied the effects of various fertigation treatments on the growth, yield and quality of pomegranate cv. *Ganesh* and reported that the seasonal water requirement for 20 per cent wetted areas was less in drip fertigation than in surface fertigation.

Sulochanamma *et al*. (2005) reported the response of pomegranate cv. *Ganesh* to different evaporation replenishment rates (0.6, 0.8 and 1.0 IW/CPE) under drip and basin irrigation with or without mulch (groundnut shells). Plant height, stem girth and plant spread as well as number and yield of A and B grade fruits were higher under Drip Irrigation than basin irrigation.

Bryla (2006) determined the effects of irrigation with different drip configurations on growth of newly planted high bush blueberries (*Vaccinium corymbosum* L.) plants and showed that irrigation by buried drip were larger and produced significantly more whips than

those irrigated by drip placed at the soil surface. The size and whip number of those irrigated by suspended drip were intermediate.

Lanier et al., (2004) also reported that incidence of disease was lower under Drip Irrigation than surface irrigation.

Gaur and Kumar (2003) conducted an experiment in New Delhi, India, for performance evaluation of drip fertigation system on young lemon plants (*Citrus aurantiifolia*). Nitrogen (240 g plant^{-1}) in the form of urea was applied in various split rates (4, 6, 8 and 10 times) through Drip Irrigation System. Influences of drip fertigation were studied in terms of plant growth parameters (height, girth, and canopy cover area), water application uniformity, fertilizer application efficiencies, leaf N status and emitter's clogging. Frequent applications of N (8 applications at 30 g plant^{-1}) gave the best fertilizer application efficiency but on the other hand it considerably reduced the water application uniformity because of higher clogging of emitters. Plant leaf N contents varied between 0.616 to 4.883%, under different sets of treatments. Results demonstrate that sustainable leaf N status could be achieved by more frequent N applications.

Prasad *et al.* (2003) reported that pomegranate plants treated with Drip Irrigation were more vigorous than those treated with basin irrigation.

Dwivedi *et al*. (2001) reported that the effects of various Drip Irrigation treatments on the growth and leaf nutrient status of pomegranate cv. *Ganesh*. The nutrient status and salinity of the soil were also investigated. Some of the treatments gave better results than the conventional method of irrigation.

Timbadia (2001) indicated that 70.67 per cent of the drip owners had medium level of adoption, followed by 16.00 per cent had low and 13.33 per cent who had high level of adoption of Drip Irrigation management practices.

Behnia (1999) revealed from Isfahan Province showed that Drip Irrigation reduced water consumption from 50-66 per cent of surface irrigation supply and increased yield by 21-24.5 per cent in pomegranate. The introduction of drip did not cause any water stress during growth, even with trees of 10 to 16 years old age.

Dijkstra (1997) conducted a study among rural households in Nyandarua, Kisii and Taita, three regions in the Kenyan highlands where commercial horticulture has developed successfully. Substantial purchasing power of the urban population has allowed transport over distances of hundreds of kilometers and horticulture has become the most vital source of cash revenues on the farm. It is noted that horticulture could become a promising source of income for farmers in other parts of Africa.

Tomlinson and Coetzee (1997) showed that no statistical differences occurred between fertigation and conventional fertilizer application in terms of yield and fruit size distribution in Midnight Valencia oranges (on rough lemon root stock). However, differences

in vegetative growth were obtained. It was greatest in the double line drip treatment with fortnightly fertilization intervals which might be reflected in fruit production in subsequent seasons. Fruits from single line drip fertigation had higher T.S.S., acidity and juice content than those from the micro jet and double line drip treatments.

Chhabra (1996) discussed the prospects of floriculture industry in India and reported that floriculture is fast emerging as a major venture on the world scene. The business of flowers has so much flourished that floriculture industry now one of the few industries with very bright prospects. In, India there is ample scope for even small and medium entrepreneurs to exploit the global ôbloom boomö.

Bachchhav (1995) conducted fertigation study in grapes and reported that fertigation reduced the days for complete bud sprouting, produced uniform bunch emergence on the branches per vine and also increased fruit thickness, weight and quality than conventional fertilizer application.

Kumar and Bojappa, (1994) reported that the drip irrigated sweet oranges trees produced fruits with significantly higher fresh or dry weight, greatest volume, rind weight, pulp weight and juice content as compared to the fruits from the flood irrigated trees. With regard to economy in water use, the present investigation indicated sufficiently that water could be saved (34.2 % water saving) considerably by drip method of irrigation as compared to the traditional type of flood irrigation in citrus.

Yadav (1993) found that 65 per cent of total 80 respondents were in medium knowledge level about sprinkler irrigation system.

2.5 Association of attitude and personality traits of fruits growers.

Patel (2004) found that nearly 55.00 per cent respondents possessed medium level of adoption about various KVK practices. Whereas, 26.00 per cent respondents had low level of adoption and only 19.00 per cent farmers were found high level of adoption.

Timbadia (2001) indicated that 70.67 per cent of the drip owners had medium level of adoption, followed by 16.00 per cent had low and 13.33 per cent had high level of adoption of Drip Irrigation management practices.

Vankar (2000) revealed that nearly half (48.33 per cent) of the respondents of unirrigated villages had low level of change whereas about two third (61.67 per cent) of the respondents of irrigated villagers had medium level of socio-techno-economic change.

Paroda (1996) pointed out the certain impediments limiting exports of horticultural products from India included lack of suitable varieties in some of the crops to meet specific market-demands, insufficient production, low production resulting in high production, lack of emphasis on quality of produce, inadequate information on post-harvest technology, lack of infrastructure facilities etc.

Kapoor (1990) also observed that percentage of the low educated farmers of

belonging to high, medium or low category referring to magazines/periodicals and newspapers were found negligible. However, they have used radio and television as a source of information. He was also found that 56.66% of small farmers of high level experience consulted their son in the decision making. The majority of farmers of low level experience consulted their father and mother. Further, farmers with less experience consulted progressive farmers.

Sharma and Khan (1998) found that more than half of trained farmers (55%) having more favourable attitude, while 58.33 per cent of untrained farmers were found to have less favourable attitude towards modern agriculture. They also reported that education, perception about change, land holding, annual income, motivation, scientific orientation and risk preference were having positive and significant relationship with the attitude of farmers towards modern agriculture while age was found to have negative correlation.

CHAPTER - III

MATERIALS AND METHODS

The value and utility of any research study considerably depends upon its research design and methodology. This chapter explains the methodological steps and procedures adopted for conducting the present study. The measurement of variables and other relevant information concerning the procedural aspects of investigation have been explained under this chapter and the same have been presented in the following sequence:

3.1 Locale of the study

3.2 Sampling plan

3.3 Variables and their measurement techniques

3.4 Construction of interview schedule

3.5 Collection of data

3.6 Analytical procedure

3.1 Locale of the Study

The study was conducted in the native state of the researcher i.e. Haryana state, which is situated between 27^0 39ô to 30^0 55ô N latitude and 74^0 27ô 8ôô to 70^0 36ô 5ôô E. longitude.

3.2 Sampling plan

The sampling for the study was done from the two different universes. The sampling plan number one from the target adopter of the Drip Irrigation System for Kinnow production. The sampling plan number two included the extension functionaries of the selected area for the study of prospects of Kinnow production under Drip Irrigation System.

3.2.1 Sampling plan No. 1

3.2.1.1 Selection of districts

The state of Haryana comprises of 21 districts out of these Sirsa, Hisar, Fathehabad and Bhiwani districts have sizeable area under Kinnow production. Out of these, Sirsa and Hisar districts were purposively selected as it has maximum number of Kinnow growers under Drip Irrigation Systems.

Fig.: 3.1: Map of State

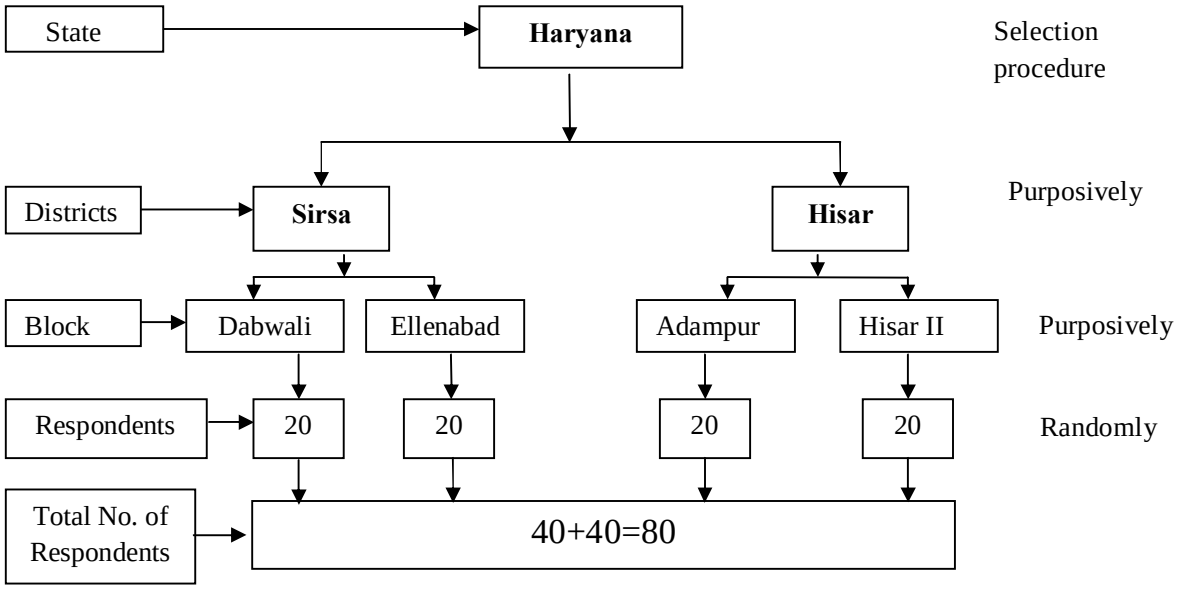


Figure 3.2: Sampling Plan No. 1

3.2.1.2 Selection of Blocks

Two blocks Dabwali and Ellenabad from Sirsa district and Adampur and Hisar-II from Hisar district were selected again purposively, as these blocks have maximum Kinnow growers under Drip Irrigation Systems in their respective district.

3.2.1.3 Selection of respondents

A list of all the beneficiaries, who have installed Drip Irrigation System at their farm up to March, 2007, was prepared from each of the four selected blocks. From each block 20 Kinnow growers using Drip Irrigation System for Kinnow production were selected, randomly. In this way a total number of 80 Kinnow growers using Drip Irrigation System were selected for the present study.

3.2.2 Sampling plan No. 2

The extension functionaries working in these districts, selected for sampling plan No. 1, were constituted the universe for sampling plan No. 2. A sample of two scientists working in K.V.K., four scientists from department of Horticulture College of Agriculture Hisar, three extension functionaries each from Deputy Director of Agriculture Office and District Horticulture Office from each selected districts, were selected randomly. Thus, formulating a total number of 20 extension experts were selected as respondents for the study of prospects of Kinnow production under Drip Irrigation System.

3.3 Variables and their Measurement Techniques

3.3.1 Sampling plan No. 1

A variable can be defined as a thing which is observed and of such a nature that each single observation can be defined into one and only one of a number of mutually exclusive classes Edwerd Advert(1957).

The dependent and independent variables are included in sampling plan number one of the study and the instruments utilized for their measurement have been presented here under:

3.3.1.1 Independent Variables

Ten important background factors affecting the adoption of Drip Irrigation System by Kinnow growers constituted the independent variables for the present study. The operational concept of each variables and their measurement techniques have been presented as under:

3.3.1.1.1 Age

It refers to the chronological age of respondents at the time of data collection. It was measured by direct questioning to the respondents. The respondents were categorized into three age groups viz., young (below 35 years), middle (35 to 50 years) and old age (above 50 years). The scoring was done as under.

Categories	**Scores**
Young	1
Middle	2
Old	3

3.3.1.1.2 Socio-Economic Status

It refers to the position of the respondent in the society as determined by various social and economic factors viz. education, occupation, caste, size of land holding, material possession, size of family, type of house, farm power and social participation etc.

It was measured by using the socio economic status scale developed by Trivedi (1963) with some modifications and scoring was done as per standard of the scale. The respondents were categorized into low, medium and high socio economic status categories on the basis of equidistance method of computing categories.

3.3.1.1.3 Education

It refers to the respondentôs academic qualifications acquired through formal schooling. It was measured with the help of socio-economic status scale developed by Trivedi (1963). The respondents were categorized into low medium and high categories by following the equidistance method of computing the categories and scoring was done according to the scale as under:

Categories	Scores
Illiterate	0
Can read only	1
Can read and write	2
Primary	3
Middle	4
High School	5
Graduate and above	6

3.3.1.1.4 Extension Contacts

It is generally considered as frequency of contacts with extension workers. It is likely to affect the knowledge, understanding and attitude of respondents. Keeping this fact in view the information about extension contact of the respondents was collected. For the purpose of present study, the extension contact was operationalized as the extent of contact made by the farmers with the extension experts of state department of agriculture and scientists of Chaudhary Charan Singh Haryana Agricultural University Hisar. The contact ranged from simply knowing their designation to frequent personal meeting with extension personnel, participation in extension activities and attending training. This was assessed by using schedule developed by Bhati (1985). The scale and scoring pattern has been given in Appendix-1. Categorized into low, medium and high categories of extension contact, on the basis of equidistance method of minimum and maximum possible score range.

3.3.1.1.5 Irrigation Facilities

It refers to the sources of irrigation facilities available at the farmersô field. For measurement of variable, an index was developed containing questions related to source of irrigation. The respondents were categorized into low, medium and high categories of irrigation facilities on the basis of score obtained by following the equidistance method of computing the categories. The scoring was done as under:

Irrigation facilities	Scores obtained
No irrigation	0
Tubewell irrigation	1
Canal irrigation	2
Both canal and tubewell irrigation	3

3.3.1.1.6 Mass media exposure:

The mass media exposure was operationalized as frequency of exposure and the use of different mass media like radio, television, newspapers, farm magazines, agricultural film shows, farmersô fairs etc. for obtaining agricultural information. Farmersô responses were obtained through scale developed by Bhati (1985). The scale and scoring pattern has been

given in appendix 1. The scores obtained by the respondents for all the questions were summarized in order to arrive at their final mass media exposure scores. These scores were divided into low, medium and high categories with the help of equidistance method of categorization.

3.3.1.1.7 Risk Orientation

It refers to the risk taking capacity of the respondents in bringing about changes in his traditional methods of farming to modern progressive farming. It is the venturesome means of the respondent. It was measured by using risk orientation scale developed by Supe (1969). The scale contains 6 items (3 positive and 3 negative). The responses were optioned on five point continuum ranging from óstrongly agreeô to óstrongly disagreeô through óagreeô, óneutralô and ódisagreeô. These categories were assigned the scores of 5 to 1 for positive statements and 1 to 5 for negative ones. The respondents were divided into low, medium and high risk orientation categories by using equidistance method. The scoring was done as under:

Risk orientation	**strongly agree**	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**
For positive statement	5	4	3	2	1
For negative statement	1	2	3	4	5

3.3.1.1.8 Change Proneness

It refers as the disposition of the farmers to accept or to reject a change. The change proneness was measured by using the scale developed by Moulik (1965). The scale consisted of 3 items and each item has 3 parts with varying degree of change proneness. The responses were checked by reading the statement of change proneness. The farmers were also categorized as low, medium and high level of change proneness by using equidistance method. Scoring procedure of change proneness is given below:

Response	**Most likely**	**Least likely**
Favourable statement	2	1
Unfavourable statement	1	2

3.3.1.1.9 Fatalism / Scienticism

Fatalism has been defined as a belief that human situation and acts are predetermined by some supernatural power and can never or little be influenced by individual violation or by act any one else. On the other hand, scienticism has been defined as belief that human situation are results of natural and / or social forces, can be understood and changed by violation or by human action (Chattopadhyaya, 1963).

The variable was measured by using scienticism scale developed by Chattopadhyaya (1963). The scale consisted of six items and rating was done against five-point continuum.

The respondents were categorized into three categories by following equidistance method into low, medium and high category on the basis of their fatalism / scienticism score.

Fatalism / Scienticism	strongly agree	Agree	Undecided	Disagree	Strongly disagree
For positive statement	5	4	3	2	1
For negative statement	1	2	3	4	5

3.3.1.1.10 Social participation:

It refers to degree with which the respondents were involved in formal organization either as a member or as an office bearer. Thus, social participation is a voluntary sharing in a person to group and groupsô relationship beyond the immediate household. Participation during the past and present was taken into account while quantifying the variable. It was measured with help of the items included in the socio-economic status scale developed by Trivedi (1963) with some modifications. The respondents were categorized into three categories into low, medium and high category on the basis of their social participation score by following equidistance method

3.3.1.2 Dependent variable

3.3.1.2.1 Attitude

The tern attitude means a subjective or mentet state of preparation for action or way of thinking or be having it has been defined by different anther in different ways. Guliford (1954) conceptualized attitude as personal disposition common to individuals but possessed in different degrees, which impels them to react to objects, situations in ways which can be called favourable or unfavourable. Attitudes are evaluative statements or judgments either favourable or unfavourable concerning objects, people, or events (Robbins, 1989). They reflect how one feels about something.

Thurstone (1946) defined attitude as ótthe degree of positive or negative affect associated with some psychological objectô. For the present study, the psychological statements on different dimensions of Drip Irrigation System for Kinnow production were drowning corresponding to which respondentsô agreement or disagreement were recorded using the attitude scale, developed by Arshad (2003), with some modification.

In this study, the attitude scale developed by Arshad (2003) with modification was used to measure the attitude of the Kinnow growers towards Drip Irrigation System for Kinnow production. This attitude with 52 items was sub-divided into five major groups, viz., technical aspect, economic aspect, social aspect, input management and water management. These statements are placed in a random sequence against three rating points ótstrongly agree, agree and strongly disagreeô with a score of 2, to 0 for positive statements and the 0 to 2 for negative statements. Thus, each item received a scale of its own. The total score of a respondent was obtained by summing the score of all the statements. The maximum possible

score which a respondent could get was the total number of statements in the scale multiplied by 2 i.e. 52 X 2 = 104 and minimum possible score was the number of statements in the scale multiplied by 0 i.e. 52 X 0 = 0.

3.3.1.2.2 Prospects

Prospects mean future probability of success. For this study it means future of the Kinnow production under Drip Irrigation System in terms of probability of higher production, good quality fruit and higher economic return with minimum problems. Prospects depend on the agro- climatic condition, facilities and infra-structure for cultivation, availability of market, actual and perceived economic returns, and the nature of the constraints and also the inner feeling of individual with regard to prospects of Kinnow production under Drip Irrigation System.

It is also expectations from Kinnow production under Drip Irrigation System in future. This variable was measured by constructing a structured schedule. After discussion the prospects of Kinnow production under Drip Irrigation System with the faculty of department of Horticulture, extension functionaries and progressive farmers, seventeen statements were prepared highlighting the prospects of Kinnow production under Drip Irrigation System. The farmers were asked to give their responses on three point continuum i.e. more bright, somewhat bright and not at all bright and the scores of 2, 1 and 0 were assigned, respectively. To see overall prospects of Kinnow production under Drip Irrigation System the respondents were further divided into three categories i.e. low, medium and high categories of prospects on the basis of equidistance method of computing categories.

3.3.1.2.3 Problems

It refers to social, economical, technical and other related problems which may impede/restrict the respondent in the Kinnow production under Drip Irrigation System. For measuring problems, a schedule was developed. A comprehensive list of possible constraints perceived by the respondents was prepared after consulting available literature, having detailed discussion with extension scientist, extension personnel and progressive farmers. And finally twenty five statements were included into the schedule and the respondents were asked to response on three point continue i.e. very series, series and not series, about the nature of the problem. The weights were also assigned in descending order i.e. 2, 1 and 0 respectively.

The score for each statement were worked out and the mean score of each problem were calculated and ranks were assigned accordingly.

3.4 Construction of Interview Schedule

Detailed and simple structured interview schedule was constructed to cover various items, which were framed on the basis of information obtained from relevant literature, experts from Deptt. of Agril. Engineering, Collage of Agriculture Engineering & Technology, Deptt. of Horticulture, Collage of Agriculture, Chaudhary Charan Singh Haryana Agricultural University Hisar and experts from the state department of horticulture, Haryana working on National Horticulture Mission etc. The interview schedule was framed in three parts. The part (I) included questions on general profile of the selected Kinnow growers and other independent variables. The part (II) of the schedule was developed for getting information about dependent variables, viz. Attitude, problem and prospects from Kinnow grower using Drip Irrigation System. Part (III) was developed for to study prospects of Kinnow production under Drip Irrigation from extension functionaries working in the area of the study by Extension Functionaries for farmers.

3.5 Collection of Data

The data were collected by holding personal interview with the respondents at their farm / home and office. Greater reliance was placed on free and informal interview with the respondents. The interview of each individual was taken separately so that other were not influenced by the reply of that particular respondent.

3.6 Analytical Procedures

The data, so collected, will be tabulated and analyzed. The appropriate statistical tools such as, Frequency, Mean, Standard Deviation, Correlation Coefficient, multiple regression were applied keeping in the objectives of the study and to draw the meaningful conclusion. The facilities of central computer of the university were availed for advanced statistical analysis.

3.6.1 Percentage:

Simple comparisons were made on the basis of percentage.

3.6.2 Mean score:

It was obtained by adding the weight of all the respondents or statements then dividing by the total number of respondents.

$$\overline{X} = \frac{\Sigma Xi}{n}$$

Where,

$\overline{X}$	=	Arithmetic mean
×	=	Summation
X_i	=	Each individual score
n	=	Total number of respondents

3.6.3 Standard deviation:

Mean and S.D. were used in categorization of respondents in different categories.

$$S.D. = \sqrt{\frac{\sum_{i=1}^{n} (X_i - \overline{X})^2}{N-1}}$$

Where,

$\overline{X}$ = Mean of the score

× = Summation

X_i = Individual score

n = Total number of respondents

3.6.4 Correlation coefficient:

It is to find out the relationship between independent and dependent variable and was calculated by employing the following formula suggested by Snedecor and Cochran (1968).

$$r = \frac{\Sigma X_i Y_i - \frac{\Sigma(X)\Sigma(Y)}{n}}{\sqrt{\left(\frac{\Sigma X_i^2 - (\Sigma X_i)^2}{n}\right)\left(\frac{\Sigma Y_i^2 - \Sigma(Y)^2}{n}\right)}}$$

Where, n = number of respondents

× X Y = sum of product of X and Y

X and Y = dependent and independent variables correlated.

× X = summation of overall dependent variables

× Y = summation of overall independent variables

X^2 = Sum of all squared values of dependent variables.

Y^2 = Sum of all squared values of independent variables.

Significance of observed correlation coefficient was tested by using

$$t_{cal} = \frac{r}{\sqrt{1-r^2}} \qquad \sqrt{N-2}$$

If $|t_{cal}| \geq$ to then observed correlation coefficient is significant to 5% value of t for N-2 d.f.

3.6.5 Multiple regression analysis

Multiple regression equation was fitted to find out the amount of variation caused by independent variables constituting personality traits of respondents on dependent variables

CHAPTER - IV

RESULTS

This chapter deals with the findings and their interpretations emerged on the basis of statistical analysis of the data. The findings of this study have been presented in the light of experiences gained during the study.

The results have been presented under the following sections in the light of the objectives of the study. Each section gives a detailed account of the findings.

4.1 Profile of respondents.

4.2 Kinnow growersô attitude towards Drip Irrigation System.

4.3 Relationship between Kinnow growersô personality traits and their attitude towards Drip Irrigation System.

4.4 Problems encountered by the Kinnow growers under Drip Irrigation System.

4.5 Prospects of Kinnow production under Drip Irrigation System.

4.1 Profile of Respondents

Before presenting the findings, it was considered appropriate to give a brief account of respondents with regard to their socio personal and psychological traits. The distribution of the respondents on the basis of their socio-personal traits is presented in the Table - 4.1 The profiles of respondents in details have been given in different following sub-heads:

4.1 Profile of Kinnow growing farmers using Drip Irrigation System

4.1.1 Age

The data in the Table 4.1 shows that near to half (42.50 %) of Kinnow growers fall in the middle age group (36 ï 50) years. There were 27.50 per cent and 30.00 per cent of young below 36 years and old age (above 50) years, respectively, with the mean score of 2.025.

4.1.2 Social participation

The data in Table 4.1 reveals that more than half of the respondents (57.50 %) belonged to the high level of the social participation followed by (31.20 %) had medium level of the social participation and remaining 11.30 per cent had low level of social participation. It shows that most of the respondents of Drip Irrigation System had high to medium social participation. The mean score of social participation of the respondents was 1.050.

4.1.3 Education

The Table 4.1 highlights that about half of the respondent (52.50 %) possessed high level of education whereas, 38.80 per cent of the respondents had medium level and only 8.80 per cent respondents were found to have low level of education up to primary level. This

shows that the group was quite heterogeneous with respect to their formal education. The average education of the respondents was 4.262.

4.1.4. Socio-Economic Status

The Table 4.1further shows that about two third of the respondents (67.50 %) were of the middle level of socio-economic status. It is further evident from the table that near about one fourth of respondents (23.80%) was in the high category of socio-economic status. Whereas, remaining 8.70 per cent of the respondents were in low socio-economic status category. The average socio-economic status of the respondents was 37.025.

4.1.5. Extension Contact

The Table 4.1 indicates that more than half of the respondents (52.50 %) had high level of extension contact followed by medium level with more than one-third of the respondents (36.20 %) and remaining 11.30 per cent of respondents were found to have low extension contact. It shows that most of the Kinnow growers using Drip Irrigation System have medium to high extension contact. The average extension contact of the respondents was 7.537.

Table 4.1 Profile of Kinnow growing farmers using Drip Irrigation System N=80

Sr. No.	Attributes	Categories	Score / range	Frequency	Percentage	Mean
1	Age	Young	< 35 year	22	27.50	
		Middle	35 to 50 year	34	42.50	2.025
		Old	> 50 year	24	30.00	
2	Education	Low	<2	07	08.80	
		Medium	2 to 4	31	38.80	4.262
		High	>4	42	52.50	
3	Social	Low	<2	09	11.30	
	Participation	Medium	2 to 4	25	31.20	1.050
		High	>4	46	57.50	
4	Socio_	Low	<34	19	23.80	
	Economic	Medium	34 to 42	54	67.50	37.025
	Status	High	>42	07	08.70	
5	Extension	Low	<4	09	11.30	
	Contact	Medium	5 to 7	29	36.20	7.537
		High	8 to 11	42	52.50	
6	Mass	Low	<2	01	01.30	
	Media	Medium	2 to 4	30	37.50	4.862
	Exposure	High	>4	69	61.20	

7	Risk	Low	<8	00	0.00	
	Orientation	Medium	8 to 16	13	16.30	19.150
		High	>16	67	83.70	
8	Fatalism/	Low	<8	00	00.00	
	Scienticism	Medium	8 to 16	51	63.80	15.800
		High	>16	29	36.20	
9	Irrigation	Low	<2	00	00.00	
	Facilities	Medium	=2	24	30.00	2.700
		High	>2	56	70.00	
10	Change	Low	<6	00	00.00	
	Proneness	Medium	6 to 12	06	07.50	14.387
		High	>12	74	92.50	

4.1.6. Irrigation Facilities

Evident from the Table 4.1 majority of the respondents (70.00 %) were having both canal and tube well irrigation facilities and 30.00 per cent of them had only canal irrigation facilities at their field. None of the respondent had only tube well irrigation at their farm might be due to Kinnow plants are susceptible to tube well water. The average irrigation facilities of the respondents were 2.700.

4.1.7. Risk Orientation

The Table 4.1 reveals that a great majority of the respondents (83.70 %) were under high category of the risk orientation followed by medium category with 16.30 per cent of respondents. None of the respondent was found under the low category of risk orientation. The average risk orientation of the respondents was 19.150.

4.1.8. Mass-media exposure

The Table 4.1 indicates that about two-third of the respondents (61.20 %) belong to the high category of the mass-media exposure followed by medium category (37.50 %). It is further seen that only (1.30 %) of the respondents had high mass media exposure. The average mass media exposure of the respondents was 4.862.

4.1.9. Change Proneness

The Table 4.1 highlights that majority of the respondents (92.50 %) had high level of the change proneness and remaining 7.50 per cent of the respondent had medium level of change proneness. It shows that most of the respondents having Drip Irrigation System have high risk orientation. The average change proneness of the respondents was 14.387.

4.1.10. Fatalism/ Scienticism

The Table 4.1 shows that about two-third of the farmers (63.80 %) belong to the medium level of the fatalism/scienticism followed by high level (36.20 %) of the

fatalism/scienticism. None of the respondent had low level fatalism/scienticism. It shows that most of the respondents of Drip Irrigation System have high scienticism. The average fatalism/scienticism of the respondents was 15.80.

4.2 Kinnow growers' attitude towards Drip Irrigation System.

The attitude scale developed by Arshed (2003) was used with some modification for the present study. The lowest and highest possible score of a respondent on the scale would be 0 to 104 respectively.

4.2.1 Overall attitudes of Kinnow growers towards Drip Irrigation System for Kinnow production.

It is evident from Table 4.2 that majority of respondent (72.50 %) had most favourable attitude towards Drip Irrigation System. However, the remaining 27.50 per cent were having favourable attitude however, none of the respondent had unfavourable attitude towards Drip Irrigation System. The results regarding the overall attitude of Kinnow growers towards Drip Irrigation System revealed that all the respondents had highly favourable and positive attitude towards Drip Irrigation System. It shows that farmers understand the importance of judicious use water for crop production. This might be due to the fact that the farmers have realized by experience the importance of Drip Irrigation System as improved water saving farm technology. Bhogle (2004). who found that most of the farmers had favourable attitude towards the viable and effective technology.

Table 4.2 Overall attitudes of Kinnow growers towards Drip Irrigation System for Kinnow production. N=80

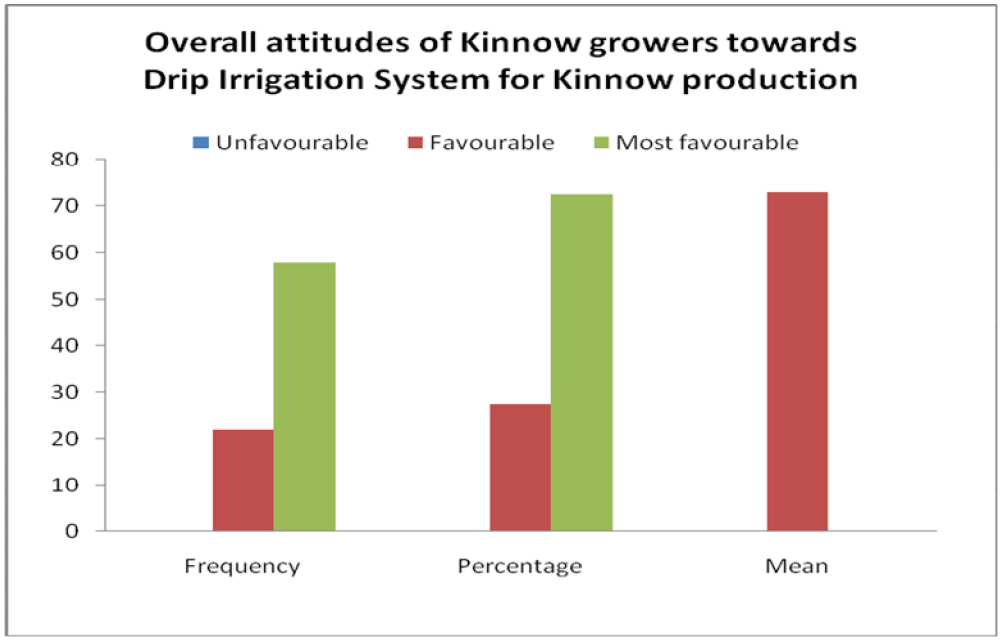
Sr. No.	Attitude	Score / range	Frequency	percentage	Mean
1.	Unfavourable	<34	00	00.00	
2.	Favourable	34-68	22	27.50	73.063
3.	Most favourable	>68	58	72.50	

4.2.2 Aspectwise attitude of Kinnow growers' towards Drip Irrigation System.

The data obtained from the Kinnow growers five major aspects i.e. technical aspect, economical aspect, social aspect, input management and water management of attitude towards Drip Irrigation System were further analyzed and the results so obtained have been presented in Table 4.3

4.2.2.1 Technical aspect

It is seen from the Table 4.3 that more than two third of respondents (63.80 %) had favourable and positive attitude towards technical aspect of Drip Irrigation System for Kinnow production. One third of respondent (33.70 %) had most favourable attitude towards


Overall attitudes of Kinnow growers towards Drip Irrigation System for Kinnow production
Unfavourable
Favourable
Most favourable
80
70
60
50
40
30
20
10
0
Frequency
Percentage
Mean

technical aspect of Drip Irrigation System and remaining only 2.50 per cent of respondents had unfavourable attitude toward technical aspects of Drip Irrigation System.

4.2.2.2 Economical aspect

The respondents belonging to favourable and most favourable attitude towards economical aspect of Drip Irrigation System for Kinnow production were found to be 71.20 and 25.00 per cent, respectively. Whereas, only 3.80 per cent had unfavourable attitude (Table 4.3).

4.2.2.3 Social aspect

The Table 4.3 further revealed that more than half (57.50%) of the respondents had most favourable and 40.00 per cent of them had favourable attitude and only 2.50 per cent of farmer had unfavourable attitude towards social aspects of Drip Irrigation System for Kinnow production. The study has brought to surface that most of the respondents (97.50%) of the opinion that the Kinnow production under Drip Irrigation System will improve the social status of farmers in the society.

4.2.2.4 Input management aspect

A great majority of respondents (83.70%) were found to have most favourable attitude towards input management aspect of Drip Irrigation System for Kinnow production and 16.30 per cent had favourable attitude. None of the farmer had unfavourable attitude towards input management aspect of Drip Irrigation System for Kinnow production. This shows that farmer is highly impressed with the input management capacity of the Drip Irrigation System technology for Kinnow production.

4.2.2.5 Water management aspect

A perusal of the data presented in Table 4.3 shows that near about two third (61.20 %) respondents had most favourable attitude and 37.50 per cent had favourable attitude about water management aspect. Only 1.30 per cent of respondents had unfavourable attitude towards water management aspect of Kinnow production under Drip Irrigation System.

Even through the number of respondents with unfavourable attitude for water management aspect is very low even, steps may be taken to improve the technology for fully acceptance as this technology is mainly meant for water management aspect.

4.2.3 Item wise attitude score of respondents

4.2.3.1 Item wise attitude score of respondents regarding technical aspect.

The mean score of each statement was obtained by adding the weights given to the statement by respondent divided by the total number of the respondent. The mean score were worked out for each statement and rank positions were assigned on the basis of their mean score.

Table 4.3 Aspects wise Kinnow growers attitude towards Drip Irrigation System. N=80

Sr. No.	Attributes	Categories	Scale /Frequency range		Percentage	Mean
1	Technical aspect	Unfavourable	<13	20	2.50	
		Favourable	13-26	51	63.00	25.300
		Most favourable	>26	27	33.70	
2	Economical aspect	Unfavourable	<8	3	3.80	
		Favourable	8-16	57	71.20	14.525
		Most favourable	>16	20	25.00	
3	Social aspect	Unfavourable	<7	02	02.50	
		Favourable	7-14	32	40.0	14.875
		Most favourable	>14	46	57.50	
4	Input management	Unfavourable	<3	00	00.00	
	aspect	Favourable	3-6	13	16.30	07.600
		Most favourable	>6	67	83.70	
5	Water management	Unfavourable	<5	01	01.30	
	aspect	Favourable	5-10	30	37.50	10.73
		Most favourable	>10	49	61.20	

It is apparent from Table 4.4 that the highest mean was for the statement ñIn Drip Irrigation there is no effect of high wind velocity on equal distribution of water as in case of sprinkler irrigationò (mean = 1.94), followed by the statement ñDrip Irrigation is highly effective in sandy soilò (mean score = 1.64). ñThe Drip System is not beneficial where hard crust of soil form after irrigationò (mean score = 1.59) occupied 3rd position. ñClogging of dripper is frequentò (mean score = 1.56) and ñSuitable fertilizers are available for use with Drip Irrigation Systemò (mean score = 1.55) occupied rank 4th and 5th, respectively.

It also appears from the Table 4.4 that the statement ñDrip System is useful in minimizing soil erosionò, ñIt is water efficient technologyò and ñDrip Irrigation System is good for fruit orchardsò occupied jointly 6th position with a mean score 1.54. ñPVC pipes are damaged due to cultivation operationò (mean score = 1.49). ñDrip Irrigation is equally effective in all types of soilò (mean score = 1.44), ñDrip Irrigation System is a simple technologyò with (mean score = 1.40), ñPressure gauge is used by farmers to check the cleaning need of filtersò (mean score = 1.36), ñDrip System improves the quality of fruit cropsò (mean score = 1.34) and ñFarmer regularly flushes the lateral lineò with mean score 1.19 occupied 8th, 9th, 10th, 11th and 12th ranks, respectively. The statement ñDrip Irrigation System does not interfere with the movement of farm machineryò and ñPost installation

service is easily availableò and occupied rank 13th with a mean score 1.16 followed by ñDrip Irrigation hinders the development of root zone of the plants and ultimately reduces the fruit productionò (mean score = 1.14), ñSub main line and cleaning of filtersò (mean score = 1.13), and ñDrip Irrigation System is a useless technologyò (mean score = 0.05) were found 14th, 15th, and 16th ranks, respectively.

Table 4.4 Mean attitude score of respondent regarding technical aspect. N=80

Sr. No	Item	Mean	Rank
A	**Technical aspect**	Technical	
1.	In Drip Irrigation there is no effect of high wind velocity on equal distribution of water as in case of sprinkler irrigation.	1.94	1
2.	Drip Irrigation is highly effective in sandy soil.	1.64	2
3.	The Drip System is not beneficial where hard crust of soil form after irrigation.	1.59	3
4.	Clogging of dripper is frequent.	1.56	4
5.	Suitable fertilizers are available for use with Drip Irrigation System.	1.55	5
6.	Drip System is useful in minimizing soil erosion.	1.54	6
7.	It is water efficient technology.	1.54	6
8.	Drip Irrigation System is good for fruit orchards.	1.54	6
9.	PVC pipes are damaged due to cultivation operation	1.49	7
10.	Drip Irrigation is equally effective in all types of soil.	1.44	8
11.	Drip Irrigation System is a simple technology.	1.40	9
12.	Pressure gauge is used by farmers to check the cleaning need for filters.	1.36	10
13.	Drip System improves the quality of fruit crops.	1.34	11
14.	Farmer regularly flushes the lateral line	1.19	12
15.	Drip Irrigation System does not interfere with the movement of farm machinery.	1.16	13
16.	Post installation service is easily available	1.16	13
17.	Drip Irrigation hinders the development of root zone of the plants and ultimately reduces the fruit production.	1.14	14
18.	Sub main line and cleaning of filters.	1.13	15
19.	Drip Irrigation System is a useless technology.	0.05	16

4.2.3.2 Mean attitude score of respondent's economic aspect.

From the economical aspect data presented in Table 4.5 showed that ñDrip Irrigation System causes no hindrance in farming operationò got 1st rank with mean score 1.63 followed by the statement ñThere is no need to make irrigation channels and check basin for Drip Irrigation Systemò with mean score 1.55 and 3rd rank was occupied by ñThere is minimum loss of fertilizer through Drip Irrigation methodò mean score 1.53. The statement ñLand leveling is not essential for Drip Irrigation Systemò (mean score = 1.48), ñDrip Irrigation achieves higher and better quality crop yieldò (mean score = 1.47), ñDrip Irrigation System is only pump show of Govt. department as it is not good than conventional irrigation system in Kinnow orchardsò (mean score = 1.46), ñDrip Irrigation saves the crop from frostò (mean score = 1.44), ñParts are not easily available in market as in case of defectò (mean score = 1.34), ñThis technology improves economic condition of farmerò (mean score = 1.29), and ñDrip Irrigation System is also beneficial for commercial crops like cotton, sugar cane etcò (mean score = 1.03) had got 4th, 5th, 6th, 7th, 8th, 9th and 10th ranks, respectively.

Table 4.5 Mean attitude score of Kinnow growers regarding economic aspect.

N=80

Sr. No.	Economical aspect	Mean	Rank
1	In Drip Irrigation System there is no problem in farming operation.	1.63	1
2	There is no need to make irrigation cannels and check basin for Drip Irrigation System.	1.55	2
3	There is minimum loss of fertilizer through Drip Irrigation method.	1.53	3
4	Land leveling is not essential for Drip Irrigation System.	1.48	4
5	Drip Irrigation achieves higher and better quality crop yield.	1.46	5
6	Drip Irrigation System is only pump show of govt. department as it is not good than conventional irrigation system in Kinnow orchards.	1.45	6
7	Drip Irrigation saves the crop from frost.	1.44	7
8	Parts are not easily available in market as in case of defect.	1.34	8
9	This technology improves economic condition of farmer.	1.29	9
10	Drip Irrigation System is also beneficial for commercial crops like cotton, sugar cane etc.	1.03	10

4.2.3.3 Mean attitude score of Kinnow growers regarding social aspect.

Table 4.6 shows that ñDrip Irrigation System enhances the social status of farmerò occupied top rank with mean score 1.61 followed by ñDrip Irrigation System is socially acceptable technologyò with mean score 1.58, ñDrip Irrigation System increases the working efficiency of farmerò with mean score 1.56 occupied 3rd rank. The statement ñDrip Irrigation

System owning farmers have high social participationò (mean score = 1.54), ñSocial contact of farmer increases by adopting Drip Irrigationò (mean score = 1.51), ñFarmers having Drip Irrigation System purchase better agriculture implementsò (mean score = 1.47), and ñDrip Irrigation System technology improves the living standard of the farmersò (mean score = 1.45), listed 4th, 5th, 6th and 7th ranks, respectively. ñThis technology has no effect on the social sphere of the farmersò and ñInstallation of Drip Irrigation System on farm increases the reputation of farmers among the fellow farmersò with same mean score 1.33 occupied 8th ranks. The remaining social aspects of attitude ñFarmers having Drip Irrigation System purchase more agriculture landò and ñFarmers have no interest in Drip Irrigation Systemò got 8th and 9th ranks with mean score 1.20 and 0.24, respectively.

Table 4.6 Mean attitude score of Kinnow growers regarding social aspect. N=80

Sr. No.	Social aspect	Mean	Rank
1.	Drip Irrigation System enhances the social status of farmer.	1.61	1
2.	Drip Irrigation System is socially acceptable technology	1.58	2
3.	Drip Irrigation System increases the working efficiency of farmer.	1.56	3
4.	Drip Irrigation System owning farmers have high social participation.	1.54	4
5.	Social contact of farmer increases by adopting Drip Irrigation.	1.51	5
6.	Farmers having Drip Irrigation System Purchase better Agriculture implements.	1.46	6
7.	Drip Irrigation System technology improves the living standard of the farmers.	1.45	7
8.	This technology has no effect on the social sphere of the farmers.	1.33	8
9.	Installation of Drip Irrigation System on farm increases the reputation of farmers among the fellow farmers.	1.33	8
10.	Farmers having Drip Irrigation System Purchase more Agriculture land.	1.20	9
11.	Farmers have no interest in Drip Irrigation System.	0.24	10

4.2.3.4 Mean attitude score of Kinnow growers regarding input management aspect.

Among the input management aspects ñDrip Irrigation effectively introduces fertilizer in the root zone with the irrigation waterò Fetched top position mean score 1.59 followed by ñBy adopting Drip Irrigation farmer are realizing the importance of micro irrigation technologyò with mean score 1.53.

The remaining statements ñTraining of technical knowledge is required for operating Drip Irrigation Systemò, ñEnhance the sense of economic use of water among the farmersò

and ñFarmer is reluctant to repair Drip Systemò with mean score 1.51, 1.50 and 1.41 occupied 3rd, 4th and 5th rank, respectively.

Table 4.7 Mean attitude score of respondents regarding input management aspect.

N=80

Sr. No.	Input management	Mean	Rank
1.	Drip Irrigation effectively introduces fertilizer in the root zone with the irrigation water.	1.59	1
2.	By adopting Drip Irrigation farmer are realizing the importance of micro irrigation technology.	1.53	2
3.	Training of technical knowledge is required for operating Drip Irrigation System.	1.51	3
4.	Enhance the sense of economic use of water among the farmers.	1.50	4
5.	Farmer is reluctant to repair Drip System.	1.48	5

4.2.3.5 Mean attitude score of Kinnow growers regarding water management aspect.

The Table 4.8 Shows that the statement ñFarmers are also adopting the idea of water harvesting and storage by using Drip Irrigationò occupied 1st rank with 1.68 mean score followed by ñSurface runoff of irrigation water can be eliminated by Drip Irrigation Systemò (mean score = 1.63). The statements ñUnder limited water resources Drip Irrigation is economical than

Table 4.8: Mean attitude score of respondents regarding water management aspect.

N=80

Sr. No.	Water management	Mean	Rank
1.	Farmers are also adopting the idea of water harvesting and storage by using Drip Irrigation.	1.68	1
2.	Surface runoff of irrigation water can be avoided by Drip Irrigation System.	1.63	2
3.	Under limited water resources Drip Irrigation is economical than conventional irrigation system.	1.61	3
4.	In Drip Irrigation System, quantity of water can be controlled according to crop requirement.	1.60	4
5.	Higher water application efficiency normally be obtained by Drip Irrigation	1.54	5
6.	With judicious use of Drip Irrigation, evaporation losses and deep percolation of water is very low.	1.40	6
7.	Drip Irrigation applies water frequently at very low rate to achieve efficiency.	1.29	7

conventional irrigation systemò, ñIn Drip Irrigation System, quantity of water can be controlled according to crops needò. ñHigher water application efficiency normally be obtained by Drip Irrigationò, ñWith judicious use of Drip Irrigation evaporation losses and deep percolation of water is very lowò and ñDrip Irrigation applies water frequently at very low rate to achieve efficiencyò had 3rd, 4th, 5th, 6th and 7th ranks with mean score 1.61, 1.60, 1.54, 1.40, and 1.29, respectively.

4.3 Relationship between Kinnow growers' personality traits and their attitude towards Drip Irrigation System.

In this section the correlation analysis was computed to find out the relationship between respondentsô background variables and their attitude towards Kinnow production under Drip Irrigation System. The multiple regression analysis was also done to know the contribution of variables. The background variables included in the present study were age, education, socio-economic status, social participation, extension contact, mass media exposure, risk orientation, fatalism/ scienticism, irrigation facilities, and change proneness. The correlation coefficients were worked out to determine the nature and extent of relationship caused by the independent variable on the attitude of Kinnow growers toward Drip Irrigation System.

4.3.1 Correlation between independent variable and attitude of Kinnow growers towards Kinnow production under Drip Irrigation System.

The zero order correlation was computed to determine the relationship between background variable of respondents with the attitude regarding Drip Irrigation System and the result have been presented in Table 4.9

Table 4.9 Correlation between independent variables and attitude of Kinnow growers towards Drip Irrigation System. N=80

S. No.	Independent variables	Correlation coefficient
1	Age	-0.151
2	Education	0. 279*
3	Social participation	0.164
4	Socio-economic status	0.192
5	Extension contact	0.076
6	Mass media exposure	0.113
7	Risk orientation	0.495**
8	Fatalism scienticism	0.295**
9	Irrigation facilities	-0.005
10	Change proneness	0.294**

** Significant at the 0.01 level of probability.
* Significant at the 0.05 level of probability.

Table 4.9 shows that risk orientation, fatalism scienticism and change proneness were found highly significant and positively associated with the attitude of farmers toward Drip Irrigation System. Whereas, education was found significantly and positively associated with the attitude of farmers toward Drip Irrigation System. It means that these variables have contributing in formulating positive attitude of farmers towards Drip Irrigation System and also important factors to alter the attitude of the farmers toward the Drip Irrigation System. The result arrived so might be because of the fact that as level of formal education increased the people get exposed to various media and they could read and hear the pros and cons of the Drip Irrigation System which have helped in forming their positive attitude towards Drip Irrigation System.

The study further revealed that socio-economic status, social participation, extension contact and mass-media exposure were found positively and non-significantly correlated with attitude of the farmers towards Drip Irrigation System. The results seems to be natural because the farmers who adopted the Drip Irrigation System at their field used more socio-economic status, social participation, extension contact and mass-media exposure and receive benefit from Drip Irrigation System. The findings are in conformity with the findings of Kumar (2003).

The respondentõs age and irrigation facilities were found to be non-significant and negative relationship with attitude of the farmers regarding Drip Irrigation System. These findings predicted that farmers who are old in age and having good irrigation facilities had not shown particular interest in adoption of Drip Irrigation System. Similar finding has been reported by Kumar (2003).

4.3.2 Multiple regression coefficient of Kinnow growers' independent variable with the attitude towards Drip Irrigation System for Kinnow production.

The data was further examined by using multiple regression analysis to know the contribution of different independent variable towards attitude of Kinnow growers. It is evident from the Table 4.10 that the regression coefficient of risk orientation was found to be positives and highly significant (at 0.01 level of probability) with the attitude of Kinnow growers towards Drip Irrigation System. In other words, one unit change in the education may lead to a corresponding change of 1.196 unit in the attitude of the respondent. Whereas, education, social participation and change proneness were positively significant at 0.05 level of probability. The remaining variables age, extension contact, socio-economic status, mass-media exposure, fatalism/ scienticism and irrigation facilities were not found to have the predication variable of significant level.

The data also showed that multiple regression coefficient of age and extension contact showed negative trend, this lead to the conclusion that an increase in these variable by one unit would lead to decrease in the favourable attitude of the Kinnow growers towards the

Kinnow production under Drip Irrigation System. Thus, this can be inferred that experienced Kinnow growers with relatively more extension contact unfavourable attitude towards Kinnow production under Drip Irrigation System. This might be due to the fact that Drip Irrigation System technology is for the water deficit area whereas, Sirsa and Hisar districts are having well established canal water irrigation system. These results are also in agreement with the findings of this study that Kinnow growers were given the highest profit to the input management aspect of this technology followed by water management as evident from the data regarding aspect wise attitude towards Drip Irrigation System.

It was further revealed that ten independent variables included in the study jointly explained 58.36 per cent variation in attitude of the respondents, when other factors kept constant. This shows that there may be some other variables responsible for variation of 41.64 per cent in attitude of the respondents towards Kinnow production under Drip Irrigation System.

Table 4.10 Regression between independent variables and attitude of Kinnow growers towards Drip Irrigation System. N=80

S.No.	Independent variables	Regression coefficient	
		B value	t value
1	Age	-1.161	-0.79
2	Education	1.916*	2.211
3	Social participation	1.897*	2.143
4	Socio-economic status	0.014	0.056
5	Extension contact	-0.512	-1.151
6	Mass media exposure	0.667	0.794
7	Risk orientation	1.693**	4.472
8	Fatalism scienticism	0.616	1.697
9	Irrigation facilities	0.726	0.349
10	Change proneness	1.698*	2.463

R-square value: 0.5836
** Significant at the 0.01 level of probability.
* Significant at the 0.05 level of probability.

4.4 Problems encountered by the Kinnow growers under Drip Irrigation System.

In the light of the objectives of the study, it was imperative to determine the problem encountered by Kinnow growers while using the Drip Irrigation System for Kinnow production. To identify the seriousness was of problems encountered by the respondents in adopting the Drip Irrigation System for Kinnow production a schedule consisting of 23 statements categorized into four types i.e. financial problems, technical problems, production problems and input management problems had been determined with the help of weighted

score, the respondents were asked to give their responses on three point continuum i.e. very series, series and not series about the nature of the problem and the weights of 3, 2 and 1 were assigned, respectively. The score so obtained on all the items were summed up. The summed score was the respondentsô problem score. Accordingly, on this the respondents were distributed in low, medium and high problem categories.

The score for each statement were also worked out and the mean score of each problem were calculated and ranks were assigned accordingly and data are presented Table 4.11

4.4.1 Problem encountered by the Kinnow growers under Drip Irrigation System.

4.4.1.1 Financial problems

The data in Table 4.11 shows that 51.25 per cent respondents belong to high financial problems category. While 43.75 per cent observed to be in the medium financial problem category towards financial aspect of Drip Irrigation System for Kinnow production. Whereas, only 5.00 per cent belonged to low problems category.

4.4.1.2 Technical problems

It is evident from the Table 4.11 that more than half of respondents (56.25 %) had high technical problems towards of Drip Irrigation System for Kinnow production. Wherever, 37.50 per cent of respondent had medium technical problems and remaining only 6.25 per cent of respondents had low technical problems toward technical of Drip Irrigation System in Kinnow production.

4.4.1.3 Production problems

The study revealed that 45.00 per cent of the respondents had high production problem and 38.75 per cent of them had medium problems and only remaining 16.25 of farmer had low production problems towards of Drip Irrigation System for Kinnow production. (Table 4.11)

4.4.1.4 Input management problems

The Table shows that near about two third of respondents (60.00 %) found to have high input management problems of Drip Irrigation System for Kinnow production and 31.25 per cent had medium problems and only remaining 8.75 per cent of farmer had low problems towards input management aspects of Drip Irrigation System for Kinnow production. (Table 4.11)

4.4.1.5 Overall problems.

A perusal of Table 4.11 shows that 95.00 per cent of respondents belonged to high overall problem category followed by 3.75 per cent in medium overall problem category and only 1.25 per cent in low overall problem category. This shows that most of the respondents perceive high level of problems under Drip Irrigation System for Kinnow production. It suggests that extension functionaries working under National Horticulture Mission should take remedial measure to reduce the impact of these problems. (Table 4.11)

Table 4.11: Problems encountered by the Kinnow growers under Drip Irrigation System. N=80

Attributes	Categories	Scale/ Range	Frequency	Percentage	Mean
Financial problems	Low	<6	04	05.00	
	Medium	7-9	35	43.75	1.59
	High	>10	41	51.25	
Technical problems	Low	<18	05	06.25	
	Medium	19-25	30	37.50	4.92
	High	>26	45	56.25	
Production problems	Low	<6	13	16.25	
	Medium	7-9	31	38.75	2.46
	High	>10	36	45.00	
Input management	Low	<6	07	08.75	
Problems	Medium	7-9	25	31.25	2.50
	High	>10	48	60.00	
Overall problems	Low	<31	01	01.25	
	Medium	32-40	03	03.75	8.72
	High	>41	76	95.00	

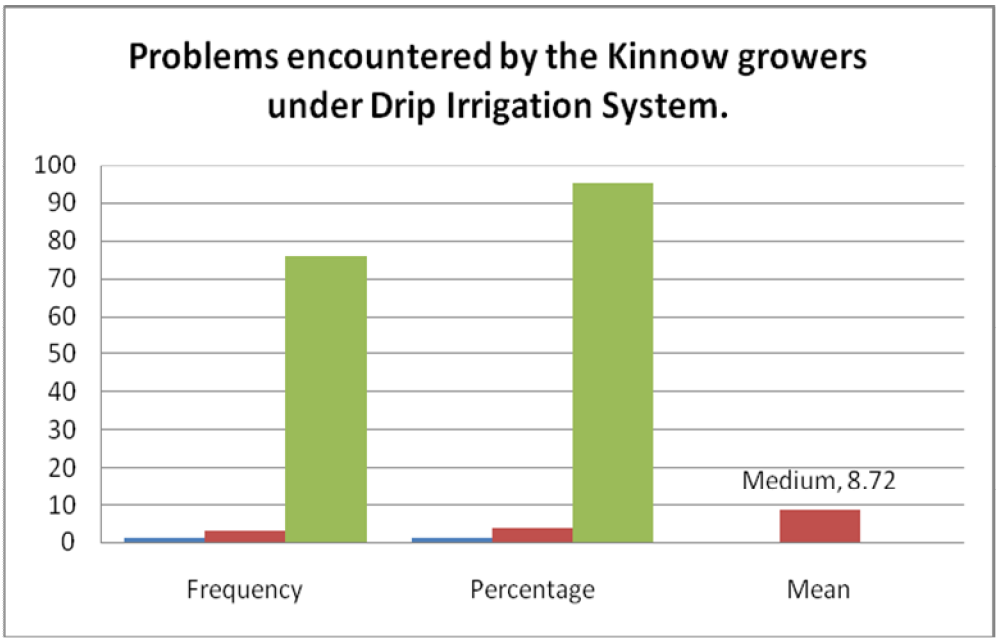
4.4.2. Extent of problems encountered by Kinnow growers under Drip Irrigation System.

The data obtained from the Kinnow growers on different aspects of problems under Drip Irrigation System were further analyzed and the weighted score for each statement were worked out and ranks were assigned accordingly. The results so obtained have been presented in Table 4.12

Table 4.12: Extent of problems encountered by Kinnow growers under Drip Irrigation System.

Sr. No.	Statement	W. Score	Rank
A	**Financial problems**		
1.	Initial cost of Drip Irrigation System is very high.	215	1
2.	Maintenance cost is high.	191	2
3.	Subsidy is very less as compared to investment.	175	3
4.	Lesser the area under Drip Irrigation System higher the initial cost /acre.	171	4

B	**Technical problems**		
1.	Installation of Drip System is very cumbersome.	205	1
2.	Drip lines choked due to salty water.	202	2
3.	The parts are not easily and timely available in market for replacement.	201	3
4.	Majority of farmers are not fully aware about of Drip Irrigation System.	197	4
5.	High power motor required for proper maintenance of water pressure.	192	5
6.	Not suitable in the areas of hard soil.	190	6
7.	Its adoption requires high technical competence know how.	189	7
8.	Lack of technical guidance.	186	8
9.	Lack of knowledge of current advances for Kinnow production under Drip Irrigation System	181	9
10.	Rodents damages pipes of the Drip System.	178	10
11.	The performance of Drip Irrigation deteriorates over the time.	174	11
C	**Production problems**		
1.	Drip set create problems in intercultural operation.	206	1
2.	The plants grown with Drip Irrigation System easily get uprooted under high wind conditions.	198	2
3.	The Drip Irrigation System is very good at the initial stage of plants but fails to supply sufficient irrigation to the fully grown plants.	193	3
4.	Farmer and labour are not skilled in Kinnow production under Drip Irrigation System	154	4
D	**Input management problems**		
1.	Algae growth in stored water.	223	1
2.	No specific information is available on the frequency and duration the system should operate during different stages of crops.	200	2
3.	No specific information is available on the amount &time of fertilizer application through Drip Irrigation System for different crops	198	3
4.	Non availability of inputs on proper time at village level	181	4


Problems encountered by the Kinnow growers under Drip Irrigation System.
100
90
80
70
60
50
40
30
20
10
0
Medium, 8.72
Frequency
Percentage
Mean


DRIP IRRIGATION MIXTURE PUMPSET

4.4.2.1 Financial problems.

It is apparent from Table 4.12 that among problems related financial aspects of know production under Drip Irrigation System the statement ñInitial cost of Drip Irrigation System is very highò was found to be highest as it ranked first with Weighted Score = 215, followed by the statement ñMaintenance cost is high.ò (Weighted Score = 191). The problem ñSubsidy is very less as compared to investmentò (Weighted Score = 175) occupied 3rd position. The statement ñLesser the area under Drip Irrigation System higher the initial cost /acre.ò (Weighted Score = 171) occupied 4th position.

4.4.2.2 Technical problems.

On the technical aspect data presented in Table 4.12 showed that ñInstallation of Drip System is very cumbersome.ò got 1st rank with Weighted Score 205 followed by ñDrip lines choked due to salty water.ò with Weighted Score 202 and 3rd was secured rank with mean score 201 by ñThe parts are not easily and timely available in market for replacement.ò The statement ñMajority of farmers are not fully aware about of Drip Irrigation Systemò (Weighted Score = 197), ñHigh power motor required for proper maintenance of water pressure.ò and ñNot suitable in the areas of hard soil.ò (Weighted Score = 192), ñIts adoption requires high technical competence know how.ò (Weighted Score = 190), ñLack of technical guidance.ò (Weighted Score = 189), ñLack of knowledge of current advances for Kinnow production under Drip Irrigation Systemò (Weighted Score = 186), ñRodents damages pipes of the Drip System.ò (Weighted Score = 181), and ñThe performance of Drip Irrigation deteriorates over the time.ò (Weighted Score = 178) were secured 4th, 5th, 6th, 7th, 8th, 9th and 10th ranks, respectively.

4.4.2.3 Production problems.

An examination of the data presented in Table 4.4 indicated that production problems namely, ñDrip set create problems in intercultural operation.ò (Weighted Score = 206), was ranked first with highest weighted score followed by the statement ñThe plants grown with Drip Irrigation System easily get uprooted under high wind conditions.ò (Weighted Score = 198). ñThe Drip Irrigation System is very good at the initial stage of plants but fails to supply sufficient irrigation to the fully grown plants.ò (Weighted Score = 193) occupied 3rd position. ñFarmer and labour are not skilled in Kinnow production under Drip Irrigation Systemò (Weighted Score = 154) occupied rank 4.

4.4.2.4 Input management problems.

It is apparent from Table 4.12 that the highest problem of Kinnow production under Drip Irrigation System was ñAlgae growth in stored water.ò With weighted Score = 223, followed by ñNo specific information is available on the frequency and duration the system should operate during different stages of cropsò (Weighted Score = 200) ñNo specific information is available on the amount &time of fertilizer application through Drip Irrigation

System for different cropsò (Weighted Score = 198) occupied 3rd position and ñNon availability of inputs on proper time at village levelò (Weighted Score = 181) occupied 4th rank.

4.5 Prospects of Kinnow production under Drip Irrigation System.

The data of perception of the Kinnow growers using Drip Irrigation System on their field for Kinnow production and also from the experts of horticulture department of CCS HAU, Hisar HDOôS progressive farmers and Kinnow experts from the KVKôS of the concerned districts were collected the results so obtained were presented under following heads.

4.5.1 Prospects of Kinnow production under Drip Irrigation System as perceived by growers

4.5.1.1 Overall prospects of Kinnow production under Drip Irrigation System as perceived by growers

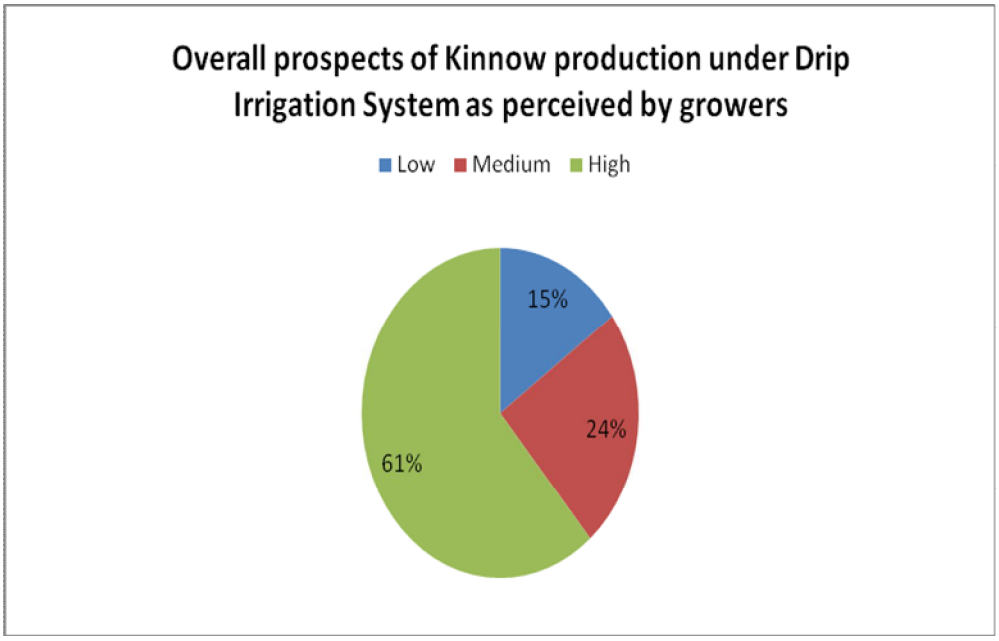
The Table 4.13 reveals that a great majority (61.25 %) of respondents perceived high prospects of Kinnow production under Drip Irrigation System followed by 23.75 per cent medium prospects. Only 15.00 per cent perceived low prospects of Kinnow production under Drip Irrigation System. This shows that most of the respondents perceived high to medium level of prospects under Drip Irrigation System for Kinnow production and the future of Kinnow production under Drip Irrigation System is bright under these circumstances.

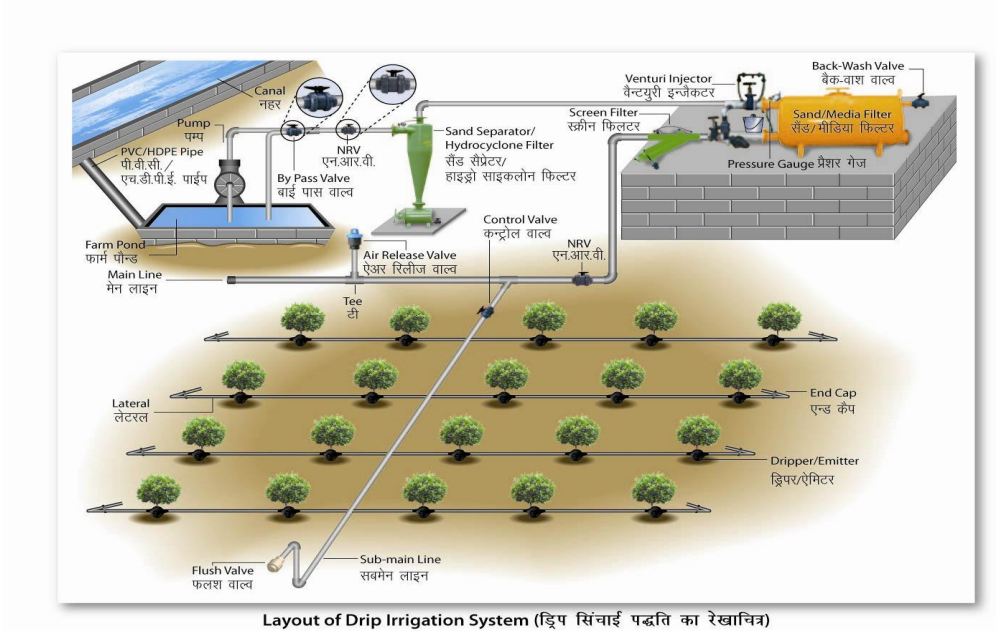
Table 4.13 Overall prospects of Kinnow production under Drip Irrigation System as perceived by growers.

Sr. No.	Prospect	Score / range	Frequency	Percentage	Mean
1.	Low	<28	12	15.00	
2.	Medium	29-39	19	23.75	11.17
3.	High	>40	49	61.25	

4.5.1.2 Aspect wise statement for prospects of Kinnow production under Drip Irrigation System as perceived by growers.

The Table 4.14 future elaborates the specific areas to which the Kinnow growers perceived more relevant in relation to prospect of Kinnow production under Drip Irrigation System. The weighted score achieved by most of the technology and production related items was more than 200 i.e. more than 2 on a 3 point continuum, which presents a very encouraging scenario. The rank order of different items revealed that the Kinnow growers were of the opinion that ñDrip Irrigation System for Kinnow production sustain till the subsidy is provided for tank, plantation and Drip System under NHMò and ñBetter from conventional Kinnow production up to when the subsidy is providedò with weighted score 223 and occupied 1st rank. This shows that the technology may not sustain without financial help to farmer due to high initial cost and poor condition of Indian farmers. However, the





Layout of Drip Irrigation System (ड्रिप सिंचाई पद्धति का रेखाचित्र)

farmers were of the opinion that the statement ñBetter credit facilities are available at presentò (weighted score 220) occupied 2nd rank. The technology related statements ñHigh water efficient technologyò (weighted score 219) and ñBetter fruit quality jointlyò (weighted score 218), fetched 3rd, and 4th ranks, respectively. The 5th rank was obtained by statements ñLabour efficient technologyò and ñBetter economic returnsò (weighted score 215). ñDemand is increasingò (weighted score 211) and ñBetter for water deficient areaò (weighted score 205) were got 6th and 7th ranks, respectively. The remaining aspects of prospects have also got higher prospects weighted score which shows that in view of Kinnow growers the future of Kinnow production under Drip Irrigation System is bright. ñHigh price of Kinnow produceò and ñPurchasing power of people is increasingò (weighted score 198) were jointly 8th rank. ñBetter technical support is availableò (weighted score 196), ñFruit consumption of people is increasingò (weighted score 194), ñBetter market facilities are available at presentò (weighted score 186), ñBetter input management facilities are availableò (weighted score 180),

Table 4.14: Aspect wise prospects of Kinnow production under Drip Irrigation System

Sr. No.	Statement	W. Score	Rank
1.	Drip Irrigation System for Kinnow production sustain till the subsidy is provided for tank, plantation and Drip System under NHM	223	1
2.	Better from conventional Kinnow production up to when the subsidy is provided	223	1
3.	Better credit facilities are available at present	220	2
4.	High water efficient technology	219	3
5.	Better fruit quality	218	4
6.	Labour efficient technology	215	5
7.	Better economic returns	215	5
8.	Demand is increasing	211	6
9.	Better for water deficient area	205	7
10.	High price of Kinnow produce.	198	8
11.	Purchasing power of people is increasing	198	8
12.	Better technical support is available	196	9
13.	Fruit consumption of people is increasing	194	10
14.	Better market facilities are available at present	186	11
15.	Better input management facilities are available	180	12
16.	Better for only those who residing near the city	176	13
17.	Better fruit and juice quality	175	14

ñBetter for only those who residing near the cityò (weighted score 176) and ñBetter fruit and juice qualityò, (weighted score 175) were obtained 9th, 10th, 11th, 12th, 13th, 14th ranks, respectively.

On the basis of results obtained it can be concluded that prospects of Kinnow production under Drip Irrigation System may be very high in future. However, efforts should be made to provide better technical support, and ranked and facilities to the farmer. Similar results were also obtained by Ashok Kumar (2004) and Kebebe et al. (2000) who concluded crops, vegetables and commercial crops are found to be relatives more bright as compound to pulsar and oil seeds.

4.5.2 Prospects of Kinnow production under Drip Irrigation System as perceived y experts.

4.5.2.1 Overall prospects of Kinnow production under Drip Irrigation System as perceived by experts.

Table 4.15 reveled that a great majority of the Kinnow experts (70.00%) perceived medium level of prospects of Kinnow production under Drip Irrigation System followed by (30.00%) Kinnow experts perceived high level of prospects. None of the Kinnow experts was perceived low level of prospects of Kinnow production under Drip Irrigation System.

This indicates that Kinnow experts of the opinion that Drip Irrigation System is a efficient technology for Kinnow production and farmers may adopted this technology for Kinnow production as all the experts rate the prospects of the technology medium to higher side.

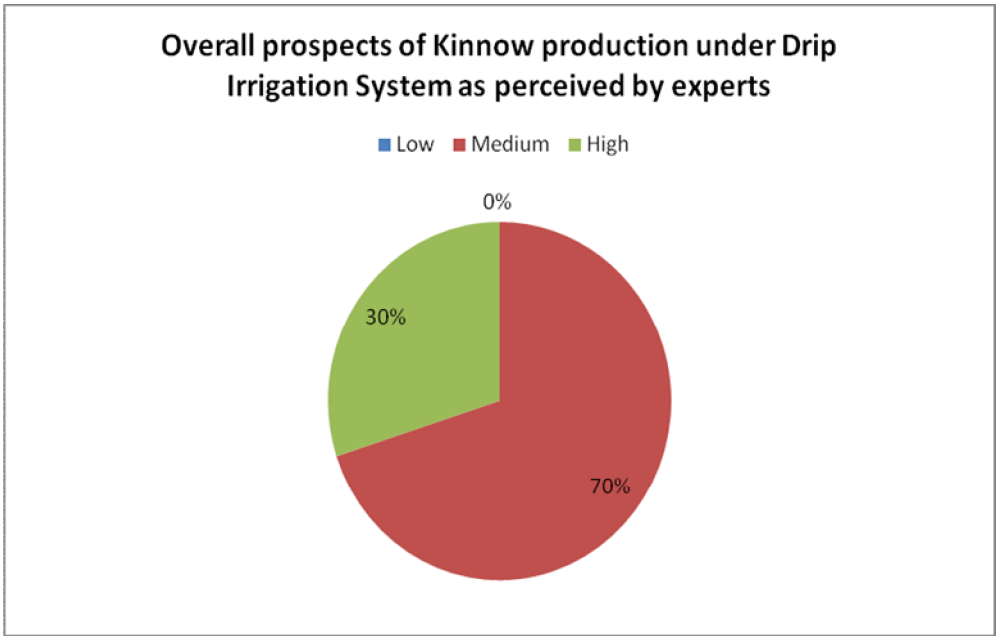
Table 4.15 Overall prospects of Kinnow production under Drip Irrigation System as perceived by experts. N=20

Sr. No.	Prospect	Score / range	Frequency	Percentage
1.	Low	<28	00	0.00
2.	Medium	29-39	14	70.00
3.	High	>40	06	30.00

4.5.2.2 Aspect wise prospects of Kinnow production under Drip Irrigation System as perceived by experts

On the basis of aspects wise data analysis in Table 4.16, the picture of prospects of Kinnow production under Drip Irrigation System in view of Kinnow experts is so satisfactory as the weighted score of all the seventeen aspects was more than 30 i.e. more then 2 on a 3 point continuum. Hence, it can be safely concluded that Drip Irrigation System flourish in the water deficit area for the production of Kinnow.

The Table 4.16 indicated that ñHigh water efficient technologyò (weighted score =58) occupied 1st rank in view of experts. Moreover, ñBetter for water deficient areaò with weighted score =57 obtained 2nd rank. The aspects ñPurchasing power of people is increasingò


Overall prospects of Kinnow production under Drip Irrigation System as perceived by experts
Low
Medium
High
0%
30%
70%

(weighted score= 56), ñBetter technical support is availableò (weighted score =53), ñDrip Irrigation System for Kinnow production sustain till the subsidy is provided for tank, plantation and system under NHMò (weighted score= 51), ñLabour efficient technologyò (weighted score =49), ñBetter economic returnsò (weighted score =48),ñDemand is increasingò (weighted score =47), ñFruit consumption of people is increasingò (weighted score =45), ñHigh price of Kinnow produceò (weighted score 41), ñBetter credit facilities are available at presentò (weighted score =38) and ñBetter from conventional Kinnow production up to when the subsidy is providedò (weighted score =37) were got ranks 3rd, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th and 12th, respectively. However, the facilities related aspects such as ñBetter market facilities are available at presentò and ñBetter input management facilities are availableò (weighted score =34) were jointly obtained 13th Rank. Remaining three statement ñBetter fruit qualityò (weighted score =33), ñBetter for only those who residing near the cityò (weighted score =31), and ñBetter fruit and juice qualityò, (weighted score =30) were got 14th, 15th, 16th ranks, respectively.

Table 4.16: Aspect wise prospects of Kinnow production under Drip Irrigation System as perceived by experts N=20

Sr. No.	Statement	W. Score	Rank
1.	High water efficient technology	58	1
2.	Better for water deficient area	57	2
3.	Purchasing power of people is increasing	56	3
4.	Better technical support is available	53	4
5.	Drip Irrigation System for Kinnow production sustain till the subsidy is provided for tank, plantation and system under NHM	51	4
6.	Labour efficient technology	49	5
7.	Better economic returns	48	5
8.	Demand is increasing	47	6
9.	Fruit consumption of people is increasing	45	7
10.	High price of Kinnow produce.	41	8
11.	Better credit facilities are available at present	38	9
12.	Better from conventional Kinnow production up to when the subsidy is provided	37	10
13.	Better market facilities are available at present	34	11
14.	Better input management facilities are available	34	11
15.	Better fruit quality	33	12
16.	Better for only those who residing near the city	31	13
17.	Better fruit and juice quality	30	14

CHAPTER -V

DISCUSSION

The Drip Irrigation System constitutes an important technology of water deficit and salty under ground water problem affected district of Sirsa, Fathehabad, Hisar, Bhiwani and Mahindergarh districts of Haryana, specially, for fruit production with limited water resources. The study in had was directed to determine the Kinnow growersô attitude and prospects of Drip Irrigation System for Kinnow production, to determine the problems faced by the farmers in adoption of Drip Irrigation System for Kinnow production, and to determine the relationship between the presently traits of Kinnow growers and their attitude towards Kinnow production under Drip Irrigation System. Based on the results available from the study it is reveled that looking at the average profile of it can be concluded that majority of them were in middle to old age groups, belonged to high to medium education status, social participation and extension contact, with high mass-media exposure, risk orientation, irrigation facilities, change proneness and fatalism/ scienticism, having medium socio-economic status.

As the production of Kinnow under Drip Irrigation System is a technical work, which require judicious use of available recourses to them, therefore, experienced and educated farmer having rapports with experts, craze to adopt new technology for their betterment were the main characteristics of Drip Irrigation System using Kinnow growers. These findings are in line with findings of Kumar (2004) who reported middle-aged farmer with medium to high socio-economic status, risk orientation and mass media exposure were maximum engaged in Horticulture farming. The available reports on social participation indicated contrary to this study that those farmer who participated in community activities, their adoption was comparatively higher than those who did not participate at all (Singh,1978 and Kumar, 2004). This might be due to reason that Kinnow production under Drip Irrigation System might be full time job for the farmer and no extra time available for them for social activities.

The high educational and extension contact status from the respondents may create awareness about water use efficiency which ultimately lead to the change of surface Irrigation Systems to Drip Irrigation System. However, the adoption of Drip Irrigation has not involved an adequate Irrigation management and thus, these Irrigation facilities have not reached high values of efficiency as compared to potential efficiency of Drip Irrigation System. An adequate Irrigation facilities have not reached high values of efficiency as compared to the potential efficiency of Drip Irrigation System. An adequate Irrigation scheduling is necessary in order to increase the efficiency values (Canals et al., 2011). Hence, it would be worthwhile

to take effective steps to generate specific Agronomic package of practices for Kinnow production under Drip Irrigation System.

The study revealed that the attitude of Kinnow growers towards Drip Irrigation System had most favourable to favourable. It indicated that Kinnow growersô attitude towards Drip Irrigation System was favourable and positive Similarly, Kumar (2004) and Singh (2001) found that more than 80.00 per cent of respondents had strongly favourable attitude towards Horticulture and vegetable farming in Haryana.

Taking an overall stock of the mean attitude score it was found that ñIn Drip Irrigation System there is no effect of high wind velocity an equal distributional of water as in case of sprinkler irrigationò got first rank with mean score 1.94 followed by ñDrip Irrigation is highly effective in sandy soilò having second rank with mean score 1.64 and the third rank with mean score 1.68 was obtained by ñFarmers are adopting the idea of water harvesting and storage by using Drip Irrigation Systemò. Some of the other important aspects of attitude were ñDrip Irrigation is highly effective in sandy soilò, ñIn Drip Irrigation System there is no problem in farming operationò, ñSurface runoff of irrigation water can be avoided by adopting Drip Irrigation System, ñUnder limited water resources Drip Irrigation is economical than Conventional Irrigation System ñDrip Irrigation System enhance the social status of farmersò, and ñIn Drip Irrigation System, quantity of water can be controlled according to crop requirementsò, ñDrip Irrigation System effectively introduces fertilizer is the root zone with the irrigation waterò. The remaining aspects of attitude have also got higher attitude mean score.

These findings are in agreement with the observations made by Kumar (2003) who reported that a great majority of the farmers have favourable attitude towards water efficient Irrigation technology. Korkcu et al., (2010) reported that water losses as a result of evaporation from soil surface, runoff, and deep percolation were minimum in drip irrigation as it may apply irrigation water more efficiently, at slow rater and to limited areas. Moreover, they advocated that drip irrigation generally achieved higher and better quality crop yields, maintained moisture in the active root zone continousally at an optimum level, introduced fertilizer effectively into the root zone with the irrigation water, and regulated their rate and composion to meet the plantôs requirement, with high availability and due losses to establish the relationship between Kinnow growersô personality traits and their attitude towards Drip Irrigation System, the zero order correlation was computed. It was found that risk orientation, fatalism scienticism and change proneness were found highly significant and positively associated. Education had positive and significant correlation with the attitude of farmers toward Drip Irrigation System.

These results are in consonance with the observations of Kumar (2003) and Kumar (2004) who found that risk orientation, change proneness and educational status were likely to

influence the attitude of farmers on positive side. Therefore, a farmer who is having higher educations has courage to face the problem in farming and who have interest and desire to seek changes in farming techniques, would have positive attitude towards the Drip Irrigation System for Kinnow production. This is also a pointer to the fact that the field functionaries should in the initial stages, try to obtain the participations of educated farmer in the extension programmes taken up for Kinnow production under Drip Irrigation System.

The study shows that the socio-economic status had positive but non significant correlation with attitude of the farmer towards Drip Irrigation System. Since socio-economic status included several important traits, viz., occupation, education, land holding, social participation, farm power, material possession, etc., it was likely to influence the attitude of farmers towards Drip Irrigation System on positive side.

The study has established a positive but non significant correlation with social participation, extension contact and mass media exposure. These variable leads to awareness of respondents about new information and it is helpful in developing the attitude towards the technology.

The study revealed that the respondents age and irrigation facilities had negative but non significant relationship with attitude of the Kinnow growers towards Drip Irrigation System. These results are in conformitry with the observation of Shashidara et al., (2007) who reported that the age, land holding and irrigation facilities had no relation with the adoption of Drip Irrigation System. This might be due to the fact that higher age of respondents negatively affect the scientific temperament of the farmers moreover, sufficient irrigation facilities leads to non-adoption of costly Drip Irrigation System technology.

The results of the study indicated that risk orientation had positive and highly significant ñbò values in case of attitude of Kinnow growers towards Drip Irrigation System. Whereas, the age and extension contact of respondents had negative but non-significant partial regression coefficients. The value of coefficient of determinant (R^2) indicated that all the ten variables jointly explained 58.36 per cent variation in the attitude of Kinnow growers towards Drip Irrigation System. Though more than of half variation has been explained by these variables, yet it would be worthwhile to look for some more variables comprising personality traits of the Kinnow growers so that a higher level of variation in the attitude towards Drip Irrigation System could be explained. Interestingly, what this researcher observed in the process of data collection was the fact that the Kinnow was produced as a commercial crop by most of the resourceful farmers. The area being canal water deficit and under ground water is not of good quality, the attitude of farmer towards Drip Irrigation System for Kinnow production under the help of National Horticulture Mission was found very high. Being water efficient technology coupled with enhancement of the social status

which in turn, led to build positive attitude towards drip irrigation technology for Kinnow production.

Based on the findings of this study, it can be inferred that a great majority of the Kinnow growers faced high level of overall problem. A few of them perceived medium to low level of problems.

The overall examination of problems the study shows that major problems related to input were initial cost of Drip Irrigation System and its maintenance cost is very high. However, these constraints are taken care under National Horticulture Mission by the Govt. Similar results were also reported by Singh, et al., (2002) and Henry et al., (2005). The problems related to technical guidance indicated by study were installation of drip system is very cumbersome, the drip lines chocked due to salt in water and parts are not easily and timely available in market for replacement.

Proper training of Kinnow growers in Kinnow production techniques under Drip Irrigation System may be of great value in tackling the above technology related problems. It is a disquieting revelation of the study that despite the claims of extension agencies under NHM to have used the important extension techniques of demonstration and trials, the farmers perceived installation Drip Irrigation System is very cumbersome and frequent problem of line choking. Likewise, non availability of parts easily and timely also does not speak well about the networking for maintenance and spare parts availability under NHM support.

Other serious problems identified related to production by the study were drip set create problems in intercultural operation, the plants grown with Drip Irrigation System easily get up rooted under high wind condition and Drip Irrigation System fails to supply sufficient irrigation to the fully grown plants. These problems would be overcome by minor changes in planning and layout Drip System with appropriate number of drippers followed by proper scheduling of water supply for different age of plants for sufficient irrigation water which helps in hassle free farm operation and proper development of plant root system.

The problem of algae growth in stored water, no specific information is available on the frequency and duration the system should operate during different stages of crops and no specific information is available on the amount and time of fertilizer application through Drip Irrigation System at different stage of plants were also reported by the large number of Kinnow growers. This is pointer to the fact that being a new method of irrigation and fertigation, the Horticulturist should develop and provide the Drip Irrigation System specific cultural practices for different stages of crops to the farmers. The technology specific information should be regularly disseminated to farmer through different potent sources such as radio, television, farmer meetings, demonstration and trails etc.

Hand outs and leaflets may also be used however, these should be prefared in simple and local language which should be distributed to the Kinnow growers in the meetings. Moreover, field functionaries need to help the Kinnow growers at every stage of plants so that they get maximum teaching opportunities for promotion of recommended practices. In order to build up an effective rapport with the growers the field functionaries should undertake sufficient farm and home visits. These visits should necessarily be undertaken at the critical stages in the process of Kinnow production, particularly, when growers may need guidance and discussion with experts.

Similar constraints were also reported by Desai *et al.* (1997) and Kalasariya *et al.* (2003) while studying on sprinkler irrigation system it was found that, ñheavy initial investment for the installation of sprinkler irrigation systemò (82.50 %) was ranked first. Also, "difficulties in getting loans" (74.17%), "rate of interest in loans in high" (67.50 %), "inadequate credit facilities for the farmers" (62.50%) and " unavailability of technical guidance in time" (60.84%) were ranked second, third, fourth and fifth constraints, respectively. Some of the other constraints were "less efficiency of the sprinkler due to high wind velocity" (56.67 %), "high maintenance cost of this system" (47.50 %), "unavailability of spare parts in the local market" (42.50%), "presence of highly acidic or salty water" (35.84 %), "irregular supply of electricity in the area" (30.00 %), "high technical competence is required for operation of sprinkler irrigation system" (25.00 %), " due to high temperature more water loss in sprinkler irrigation system " (22.50%). Whereas, the problems like, "less subsidy as compared to investment" (20.83 %), "uneven distribution of water in tall growing cropsò (16.33%) and "non-availability of spare parts at proper time in the village market" (9.16%) were reported by few farmers. In general, they concluded that most important problems of sprinkler irrigation system faced by the farmers in adoption and operation of sprinkler irrigation system were, heavy initial investment for the installation of sprinkler irrigation system, difficulties in getting loans, rate of interest in loans in high and unavailability of technical guidance in time. Whereas, the minimum problems faced by the farmers were, less subsidy as compared to investment, uneven distribution of water in tall growing crops and non-availability of spare parts at proper time in the village market.

The overall prospects of Kinnow products under Drip Irrigation System was high to medium level as perceived by Kinnow growers, whereas ,the Kinnow experts perceived medium level of prospects of Kinnow production under Drip Irrigation System there is slight difference in the perception of experts and producer of Kinnow under Drip System this difference may be due to fact that experts or scientist stile want to test this technology on deferent aspects such as fruit quality, life of the plant and their yield and profitability in comparison to conventional method. Undoubtedly, among various methods, Drip Irrigation has proved successful in exhibiting high water productivity by saving Irrigation water from 25

to 60 per cent in various orchards crops and vegetable crops along with 10-60 per cent increase in yield as compared to conventional method of Irrigation. It is one of the latest methods of Irrigation which is becoming popular in areas with water scarcity and salt problems. The fertilizer has become the state of the art in orchard crops and vegetables because nutrients can be applied to plants in the correct dosages and at the time appropriate for the specific stage of plant growth (Singh, 2010). But the fertiligation and water requirement by Kinnow plant at deferent stages of growth are still has to be standardized to improve the nutrient and water use efficiency.

It is brought out from the study, the aspects wise prospects of Kinnow production under Drip Irrigation System a great majority of respondents perceived it as high water efficient technology, better for water deficit area, purchasing power of people is increasing and better technology support is available.

Whereas, the great majority Kinnow grower were of the opinion that Drip Irrigation System for Kinnow production sustain till the subsidy is provided for tank, plantation and Drip System under National Horticulture Mission, better from conventional Kinnow production up to when the subsidy is provided, better credit facilities are available at present, high water efficient technology, better for fruit quality and labour efficient technology.

The critical analysis of perception of experts and Kinnow growers it is safely concluded in the light of experience gained during the study that Drip Irrigation System for Kinnow production is a water efficient, technology for the area of water scarcity and salt problems. Moreover, at present better technical support with lucrative financial support under National Horticulture Mission from the Govt. is available to the farmers from promoting the Drip Irrigation System for Kinnow production.

On the basis of results of study there seems to be great prospects of the Kinnow production under Drip Irrigation System. The attention is therefore required to develop improved plant materials with high quality characteristics, productivity, resistance to pest, disease and tolerant to a biotic stresses and technologies for improving the efficiency of water and nutrients by reducing variability in yield, quality and reducing pre and post harvest crop losses are the needs of the hour, coupled with the refinement of the Drip Irrigation technology in terms of installation cost, maintenance cost, simplicity of technology (adoption and operation) and proper water storage techniques (Table 4.12).

CHAPTER -VI

SUMMARY AND CONCLUSION

India is the second largest producer of fruits after China, with a production of 71516000 MT of fruits from an area of 6329000 hectares. A large variety of fruits are grown in India, of which mango, banana, citrus, guava, grape, pineapple and apple are the major ones. From these, fruits like papaya, sapota, annona, phalsa, jack fruit, ber, pomegranate in tropical and sub tropical group and peach, pear, almond, walnut, apricot and strawberry in the temperate group are also grown in a sizable area. Although fruit is grown throughout the country, the major fruit growing states are Maharashtra, Tamil Nadu, Karnataka, Andhra Pradesh, Bihar, Uttar Pradesh and Gujarat. Haryana state ranks 13th in citrus production. Haryana state which has been divided into two regions depending on the agro climatic conditions. First region of state is north- east where annual rainfall average is 550-1100 mm. Other region is south ï west and central area in which the annual rainfall is 250 mm to 550 mm. In Haryana area, production and productivity of fruit crops is 41500 ha,3039000 MT and 7.3 MT/ ha, respectively. Drip Irrigation is basically precise, slow and artificial application of water in the form of discrete continuous drops. Through this system of irrigation water reaches the root drop by drop and hence is economic method of irrigation. Drip Irrigation has been popularized in Haryana and 3112 ha. has been covered under Drip Irrigation System to improve product quality and maximize scare irrigation water use. Drip and sprinkler irrigation form essential input for improving productivity and quality of horticultural produce. Under NHM the assistance for Drip Irrigation System is 90 per cent of the cost of installation (i.e. 90 % of Rs.13000/ acre) and 100 per cent for the water tank. The present study entitled ñProblems and prospects of Kinnow production under Drip Irrigation System in Haryanaò was undertaken in the Sirsa and Hisar districts of Haryana state with the following specific objectives:-

1. **To measure the attitude of Kinnow growers towards Drip Irrigation System.**
2. **To study the prospects of Kinnow production under Drip Irrigation System.**
3. **To identify problems encountered by the Kinnow growers under Drip Irrigation System.**
4. **To establish association between attitude and personality traits of Kinnow growers.**

The study was conducted in the district of Sirsa and Hisar. These district were selected purposively because of the maximum number of Kinnow growers under Drip Irrigation System. From each purposively selected districts, two blocks were selected

purposively, twenty respondents using Drip Irrigation System technology were selected from each of the four selected blocks thus making a total sample of 80 respondents. A sample of 20 Kinnow experts was also taken randomly from scientists working under KVK of selected districts and department of horticulture, college of Agriculture, Hisar, and extension functionaries working in district Horticulture office as respondents for the study. An interview schedule consisting of measuring devise of dependent and independent variables along with the face data of responses was used for collecting responses of respondents. The data so collected were tabulated, analyzed and interpretation to draw meaningful inferences..

The silent findings of the study are:-

Profile of the respondents

The study can be concluded that majority of them were in middle to old age groups, belonged to high to medium education status, social participation and extension contact, with high mass-media exposure, risk orientation, irrigation facilities, change proneness and fatalism/ scienticism, having medium socio-economic status.

Overall attitudes of Kinnow growers towards Drip Irrigation System for Kinnow production

The present study shows that majority of respondent (72.50%) had most favourable attitude towards Drip Irrigation System. The remaining (27.50%) were having favourable attitude. moreover, none of the respondent had unfavourable attitude towards Drip Irrigation System.

Technical aspect: The study shows that more than two third of respondents (63.80 %) had favourable, one third of respondent (33.70 %) had most favourable and remaining 2.50 per cent of respondents had unfavourable attitude toward technical aspects of Drip Irrigation System for Kinnow production.

Economical aspect: The study reveals that respondents belonging to favourable and most favourable attitude towards economical aspect of Drip Irrigation System for Kinnow production were found to be 71.20 and 25.00 per cent, respectively. Whereas, only 3.80 per cent respondents had unfavourable attitude.

Social aspect: The study shows that more than half (57.50%) of the respondents had most favourable and 40.00 per cent of them had favourable attitude and only 2.50 per cent of Kinnow growers had unfavourable attitude towards social aspects of Drip Irrigation System for Kinnow production.

Input management aspect: A great majority of respondents (83.70%) were found to have most favourable attitude towards input management aspect of Drip Irrigation System for Kinnow production and 16.30 per cent had favourable attitude. None of the respondents had unfavourable attitude towards input management aspect of Drip Irrigation System for Kinnow production.

Water management aspect: The study indicated that near about two third (61.20 %) respondents had most favourable attitude and 37.50 per cent had favourable attitude about water management aspect. Only 1.30 per cent of respondents had unfavourable attitude towards water management aspect of Kinnow production under Drip Irrigation System.

Correlation between independent variable and attitude of Kinnow growers towards Kinnow production under Drip Irrigation System

The present study shows that risk orientation, fatalism scienticism and change proneness were found highly significant and positively associated with the attitude of Kinnow growers toward Drip Irrigation System. Whereas, education were found significantly and positively associated with the attitude of farmers toward Drip Irrigation System.

Multiple regression coefficient of Kinnow growers' independent variable with the attitude towards Drip Irrigation System for Kinnow production

It was further revealed that ten independent variables included in the study jointly explained 58.36 per cent variation in attitude of the respondents, when other factors kept constant. This shows that there may be/are some other factors responsible for variation of 41.64 per cent in attitude of the respondents towards Kinnow production under Drip Irrigation System.

Problem encountered by the Kinnow growers under Drip Irrigation System.

The present study shows that 95.00 per cent of respondents belonged to high problem category followed by 3.75 per cent in medium problem category and only 1.25 per cent in low problem category. This shows that most of the respondents perceive high to medium level of problems under Drip Irrigation System for Kinnow production.

Financial problems: The study shows that 51.25 per cent respondents belong to high financial problems category. While 43.75 per cent observed to be in the medium financial problem category towards financial aspect of Drip Irrigation System for Kinnow production. Whereas, only 5.00 per cent belonged to low problems category.

Technical problems: More than half of respondents (56.25 %) had high technical problems. Wherever, 37.50 per cent of respondents had medium technical problems and remaining 6.25 per cent of respondents had low technical problems in adoption of Drip Irrigation System for Kinnow production.

Production problems: The study revealed that 45.00 per cent of the respondents had high production problem and 38.75 per cent of them had medium problems and only 16.25 of farmers had low production problems towards Drip Irrigation System for Kinnow production.

Input management problems: It reveals that near about two third of respondents (60.00 %) found to have high input management problems, 31.25 per cent had medium problems and remaining 8.75 per cent of farmers had low problems towards input management aspects of Drip Irrigation System for Kinnow production

Overall prospects of Kinnow production under Drip Irrigation System as perceived by growers

The present study shows that more than half (61.25%) of respondent as perceived by Kinnow growers had high level prospects towards Drip Irrigation System. However, the 23.75 per cent were having medium level and remaining 15.00 per cent has the low level of prospects of Kinnow production under Drip Irrigation System.

Overall prospects of Kinnow production under Drip Irrigation System as perceived by experts

The present study reveled that a great majority of the Kinnow experts (70.00%) perceived medium level of prospects of Kinnow production under Drip Irrigation System followed by (30.00%) Kinnow experts perceived high level of prospects. None of the Kinnow experts perceived low level of prospects of Kinnow production under Drip Irrigation System.

CONCLUSION

The study was conducted in Sirsa and Hisar districts, selected purposively on the basis of maximum number of Kinnow growers under Drip Irrigation System. From each districts two blocks were selected purposively, twenty respondents using Drip Irrigation System technology were selected from each of the four selected blocks thus making total sample size of 80 respondents. A sample of 20 Kinnow experts was also taken randomly from scientists working under KVK of selected districts and department of horticulture, college of Agriculture, Hisar, and extension functionaries working in district Horticulture office as respondents for the study of prospects of Kinnow production under Drip Irrigation System.

The study highlighted that majority of the respondents were in middle to old age groups, belonged to high to medium education status, social participation and extension contact, with high mass-media exposure, risk orientation, irrigation facilities, change proneness and fatalism/ scienticism, having medium socio-economic status.

The majority of Kinnow growers had most favourable attitude towards Drip Irrigation System. The remaining were having favourable attitude. moreover, none of the respondent had unfavourable attitude towards Drip Irrigation System.

It is further highlighted that risk orientation, fatalism scienticism and change proneness were found highly significant and positively associated with the attitude of Kinnow growers toward Drip Irrigation System. Whereas, education were found significantly and positively associated with the attitude of farmers toward Drip Irrigation System.

The problems such as initial cost of Drip Irrigation System and its maintenance cost is very high. The problems related to technical aspects were installation of drip system is very cumbersome, the drip lines chocked due to salt in water and parts are not easily and timely available in market for replacement. Other serious problems identified related to production

by the study were drip set create problems in intercultural operation, the plants grown with Drip Irrigation System easily get up rooted under high wind condition and Drip Irrigation System fails to supply sufficient irrigation to the fully grown plants. The problem of algae growth in stored water, no specific information is available on the frequency and duration the system should operate during different stages of crops and no specific information is available on the amount and time of fertilizer application through Drip Irrigation System at different stage of plants were also reported by the large number of Kinnow growers.

The present study shows that more than half of Kinnow growers perceived high level of prospects towards Drip Irrigation System. However, the few of them were having medium and low level prospects.

Whereas, a great majority of the Kinnow experts perceived medium level of prospects of Kinnow production under Drip Irrigation System followed by one third Kinnow experts perceived high level of prospects. None of the Kinnow experts perceived low level of prospects of Kinnow production under Drip Irrigation System.

Suggestion to promote the Kinnow production under Drip Irrigation System

Based on the findings of the study and discussion with the respondents some measures are being be suggested for considerations of the planners, administrators, extension personals and decision makers of the state department of Horticulture to promote Kinnow production under Drip Irrigation System.

1. The findings of the study regarding existing attitude level of the farmers towards Drip Irrigation System will definitely help the planners, executors, researchers and administrators to know that in which segment of the farmers, the attitude is un-favourable that is to be changed in order to augment the adoption of Drip Irrigation System. So in order to increase the favourable attitude towards this system, provision of more subsidized cost for fencing etc must be made or the credit facility should be made available to the farmers at lower interest rate besides these, different sources and methods of information about the Drip Irrigation System must be provided in an effective manner so favourable attitude should be developed to boost-up the adoption of technology.
2. The farmers independent variables namely, education, risk orientation, change proneness were found to have significant relationship with their attitude towards Drip Irrigation System. Therefore, trainers and masters demonstrators should give due attention to increase the score of those variables so that the farmers come forward to adopt the Drip Irrigation System.
3. A campaign should be organized jointly by official of Department of Agriculture and leading manufacturers to update the knowledge and skill of the adopters regarding different aspects of Drip Irrigation System.

4. Success stories of farmers, who have adopted Drip Irrigation System and obtained high yield, should be widely publicized through radio, television, farm magazines and newspapers to create the interest of Kinnow growers in Drip Irrigation System.
5. The variables viz., education, extension contact, risk orientation and change proneness had contributed positively and significantly towards overall attitude of kinnow growers. Therefore, it is suggested that extension agencies should emphasize all such variables in their extension programme as the important components to enhance adoption of Drip Irrigation System for Kinnow production.
6. It is suggested that demonstrations on the mass scale should be conducted on the farmersô field to train them about the use of Drip Irrigation System, proper scheduling of irrigation and fertigation.
7. Field days should be organized at the site of selected demonstrations and the maximum farmers should be invited to show the importance of Drip Irrigation System.

The judicious combination of technology transfer coupled with adequate timely supplies and services of required inputs can be the effective formula to satisfy the farming needs of cultivation by which the farmersô botheration to risk and uncertainties can be lessened. The wholehearted involvement with other development departments, banks, input agencies and other organizations has to be geared up so that the satisfied farmers can be the second line change agents to activate transfer of technology process.

The study area was confined to District Hisar and Sirsa only. Hence, further studies may be conducted on similar topic covering more districts and villages with large sample of respondents so as to have a better picture about the entire state.

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APPENDIX - I

CHAUDHARY CHARAN SINGH
HARYANA AGRICULTURAL UNIVERSITY, HISAR
DEPARTMENT OF EXTENSION EDUCATION
COLLEGE OF AGRICULTURE

INTERVIEW SCHEDULE

Title of Research Project: ***problem and prospects of Kinnow production under drip irrigation system in Haryana.***

Sr. No._____ Date of Interview_____ Name of farmer Sh. _____
S/oSh._____Village _____ Block _____ District _____

PART-I

1 Age

Age é é é Years.

2 Socio Economic Status (SES)

A	**Caste**		**B**	**Occupation**	
1.	Lower caste	(1)	1.	Labour	(1)
2.	Schedule caste	(2)	2.	Caste occupation	(2)
3.	Artisan caste	(3)	3.	Business	(3)
4.	Agricultural caste	(4)	4.	Independent occupation	(4)
5.	Prestige caste	(5)	5.	Cultivation	(5)
6.	Dominant caste	(6)	6.	Service	(6)
C	**House type**		**D**	**Social Participation**	
1.	No house	(0)	1.	No member of any organization	(0)
2.	Hut	(1)	2.	Member of one organization	(1)
3.	Kaccha house	(2)	3.	Member of more than one organization	(2)
4.	Mixed house	(3)	4.	Office holder	(3)
5.	Pacca house	(4)	5.	Wider public leader	(6)
6.	Pacca house with concrete	(5)			
7.	Mension	(6)			
E	**Land holding**		**F**	**Material Possession**	
1.	Land less	(0)	1.	Scoter/ Motorcycle/Cycle	(1)
2.	Less than one acre	(1)	2.	Radio	(1)
3.	Up to 5 acres	(2)	3.	Improved Argil	(1)
4.	6 to10 acres	(3)	4.	Refrigerator	(1)
5.	11 to 15 acres	(4)	5.	Television	(1)
6.	16 to 20 acres	(5)	6.	Any other vehicle	(1)
7	More than 20 acre	(6)	7.	None of these	(0)
G	**Education**		**H**	**Farm power/Mechanization**	
1.	Illiterate	(0)	1.	No draft animal	(0)
2.	Can read only	(1)	2.	1-2 draft animal	(1)
3.	Can read and write	(2)	3.	3-4 draft animal	(2)
4.	Primary	(3)	4.	One or more Prestige animal	(3)
5.	Middle	(4)	5.	5-6 Draft animal	(4)
6.	High School	(5)	6.	Tractor	(5)
7.	Graduate and above	(6)			

I	**Family**				
Type: -	(1) Nuclear	(1)	Size: -	Up to 5 members	(1)
	(2) Joint	(2)		Above 5 member	(2)

3. Extension Contact

(1) Do you know HDO or DHO of your area or village by name? Yes/No

(11) Do you know the office of your DHO or ADC at your district ? Yes/No

(111) Are you a contact farmer ? Yes/No

(1V) What is the level of your acquaintance with HDO? Very good /good/ little/No

(V) Did HDO or employee or Extension worker of Agril. Deptt. ever visit you? If yes, when Yes/No

(a) Within last 3 months
(b) Between 3to 6 months
(c) Between 6 to one year

(VI) Did you ever visit the office of the HDO or any other employee of Deptt. of Agriculture? If yes, then when Yes/No

(a) Within last 3 months
(b) Between 3-6 months
(c) Between 6 to 1 year

(VII) Was any method/ result demonstration ever organized on your field? if yes, when Yes /No

(a) Within last 6 months
(b) Between 6 to 1 year
(c) Between 1 to 2 year

(VIII) Did you ever see any method/result demonstration centers on the field of any other farmer? If yes, when Yes/No

(a) Within last 6 months
(b) Between 6 to 1 year
(c) Between 1 to 2 year

(IX) Did your ever attend any training in the field of Horticulture? If yes, when Yes/No

(a) Within last year
(b) Between 1 to 2 years

4 Irrigation Facilities

(a) None (0)
(b) Tube well (1)
(c) Canal (2)
(d) Both (3)

5. Risk Orientation	**SA**	**A**	**UD**	**DA**	**DSA**
(a) A farmer should adopt the inter cropping to avoid greater risks.					
(b) It is better for a farmer not to try new farming methods unless most of others have used them with success					
(c) It is good for a farmer to take risk when he knows his chance of success is fairly high					
(d) A farmer who is willing to take greater risk than the average, usually do better financially					
(e) A farmer should rather take more of a chance in making a big profit than to be content with a smaller, but less risking profit					
(f) Trying an entirely new method in farming by a farmer involves risk, but it is worth using it					

6. Change proneness		Most Like (2)	Least like (1)
A 1	I try to keep myself upto date with information on new farm practices, but that does not mean that I try out all the new methods on my farm (s)		
2	I feel restless till I try out a new farm practice, I have heard about		
3	They talk of many new farm practices these days but who knows if they are better than the old ones		
B 1	I have heard of several new farm practices time to time and I have tried out most of them in the last few years		
2	I usually wait to see the results my neighbors obtain before I try out the new farm practices		
3	Somehow I believe that traditional ways of farming are best		
C 1	I am cautious about a new practice		
2	After all our forefathers were wise enough and I do not see any reason for changing the old methods		
3	Often new farm practices are not successful, however, if they are promising I would surely like to adopt them		

7. Fatalism/Scienticism		SA	A	UD	DA	DSA
I.	ôMantrasô have for reach effects. If one can chant and recite accurately. Right ôMantrasô on right occasion, can produce miraculous effects					
II.	Every event in a manôs life already been settled and determined by his fate					
III.	There canôt be any real relationship between massive changes and congregation of eight planets in the same year through some astrologers claim it to be so.					
IV.	A basic human tragedy is that man proposes but God disposes					
V.	It is better to disbelieve in what is not proved or tested, but when proved it is to be relied on					
VI.	Those who say that they have seen ghosts, either distort the truth or tell a lie					

SA= strongly agree; A=Agree; UD=Undecided; D=Disagree; SDA=strongly disagree

8.	**Mass media exposure:**	
A	Do you have radio/ transistor?	Yes / no (1) (0)
B	Do you listen to krishi jagat programme?	Yes / no (1) (0)
C	Do you subscribe to any farm magazine? If yes, mention the name of magazine (one mark for each) 1 2 3 4	yes / no (1) (0)
D	Have you visited any farmers fair / farm darshan / Agricultural exhibition? If yes mention the event 1 2 3 4	yes / no (1) (0)
E	Do you have T.V	YES/NO 1/0
F	Do you watch krishi darshan programme	yes/no 1/0

PART-II

1. Attitude of farmers

Sr. No	Statement	SA	A	DA
A	**Technical aspect**			
1.	In Drip Irrigation there is no effect of high wind velocity on equal distribution of water as in case of sprinkler irrigation.			
2.	Drip Irrigation is highly effective in sandy soil.			
3.	The drip system is not beneficial where hard soil crust formed after irrigation.			
4.	Clogging of dripper is frequent.			
5.	Suitable fertilizers are available for use with Drip Irrigation System.			
6.	Drip system is useful in minimizing soil erosion.			
7.	It is water efficient technology.			
8.	Drip system of irrigation is good for fruit orchards.			
9.	PVC pipes are damaged due to cultivation operation			
10.	Drip irrigation is equally effective in all types of soil.			
11.	Drip Irrigation System is a simple technology.			
12.	Pressure gauge is used by farmers to check the cleaning need for filters.			
13.	Drip system improving the quality of fruit crops.			
14.	Farmer regularly flushes the lateral line			
15.	Drip irrigation system does not interfere with the movement of farm machinery.			
16.	Post installation service is easily available			
17.	Drip irrigation hinders the development of root zone of the plants and ultimately reduces the fruit production.			
18.	Sub main line and cleaning of filters			
19.	Drip irrigation system is a useless technology.			
B	**Economical aspect**			
1.	In Drip Irrigation System there is no problem in farming operation.			
2.	There is no need to make irrigation cannels and check basin for drip system of irrigation.			
3.	There is minimum loss of fertilizer through drip irrigation method.			
4.	Land leveling is not essential for drip system of irrigation.			
5.	Drip irrigation achieves higher and better quality crop yield.			
6.	Drip irrigation system is only pump show of govt. department as it is not good than conventional irrigation system in Kinnow orchards.			
7.	Drip irrigation saves the crop from frost.			
8.	Parts are not easily available in market as in case of defect.			
9.	This technology improves economic condition of farmer.			
10.	Drip irrigation system is also beneficial for commercial crops like cotton, sugar cane etc.			
C	**Social aspect**			
1.	Drip irrigation system enhances the social status of farmer.			
2.	Drip irrigation system is socially acceptable technology			
3.	Drip irrigation system increases the working efficiency of farmer.			
4.	Drip irrigation system owning farmers have high social participation.			
5.	Social contact of farmer increases by adopting drip irrigation.			
6.	Farmers having drip irrigation system Purchase better Agriculture implements.			
7.	Drip irrigation system technology improves the living standard of the farmers.			
8.	This technology has no effect on the social sphere of the farmers.			
9.	Installation of drip irrigation system on farm increases the reputation of farmers among the fellow farmers.			
10.	Farmers having drip irrigation system Purchase more Agriculture land.			
11.	Farmers have no interest in drip irrigation system.			
D	**Input management**			
1.	Drip irrigation effectively introduces fertilizer in the root zone with the irrigation water.			

2.	By adopting drip irrigation farmer are realizing the importance of Micro Irrigation Technology.			
3.	Training of technical knowledge is required for operating drip irrigation system.			
4.	Enhance the sense of economic use of water among the farmers.			
5.	Farmer is reluctant to repair drip system.			
E	**Water management**			
1.	Farmers are also adopting the idea of water harvesting and storage by using drip irrigation.			
2.	Surface runoff of irrigation water can be avoided by drip irrigation system.			
3.	Under limited water resources drip irrigation is economical then Conventional irrigation system.			
4.	In drip irrigation system, quantity of water can be controlled according to crop requirement.			
5.	Higher water application efficiency normally be obtained by drip irrigation			
6.	With judicious use of drip irrigation, evaporation losses and deep percolation of water is very low.			
7.	Drip irrigation applies water frequently at very low rate to achieve efficiency.			

SA= Strongly agree; A=Agree; SDA= Disagree

2. Problem of farmers

Sr. No.	**Statement**	**VS**	**S**	**NS**
A	**Financial problems**			
1.	Initial cost of Drip Irrigation System is very high.			
2.	Maintenance cost is high.			
3.	Subsidy is very less as compared to investment.			
4.	Lesser the area under Drip Irrigation System higher the initial cost /acre.			
B	**Technical problems**			
1.	Installation of Drip System is very cumbersome.			
2.	Drip lines choked due to salty water.			
3.	The parts are not easily and timely available in market for replacement.			
4.	Majority of farmers are not fully aware about of Drip Irrigation System.			
5.	High power motor required for proper maintenance of water pressure.			
6.	Not suitable in the areas of hard soil.			
7.	Its adoption requires high technical competence know how.			
8.	Lack of technical guidance.			
9.	Lack of knowledge of current advances for Kinnow production under Drip Irrigation System			
10.	Rodents damages pipes of the Drip System.			
11.	The performance of Drip Irrigation deteriorates over the time.			
C	**Production problems**			
1.	Drip set create problems in intercultural operation.			
2.	The plants grown with Drip Irrigation System easily get uprooted under high wind conditions.			
3.	The Drip Irrigation System is very good at the initial stage of plants but fails to supply sufficient irrigation to the fully grown plants.			
4.	Farmer and labour are not skilled in Kinnow production under Drip Irrigation System			
D	**Input management problems**			
1.	Algae growth in stored water.			
2.	No specific information is available on the frequency and duration the system should operate during different stages of crops.			
3.	No specific information is available on the amount &time of fertilizer application through Drip Irrigation System for different crops			
4.	Non availability of inputs on proper time at village level			

VS= Very Series ; S= Series; NS= Not Series

3. Prospects of Kinnow production under drip irrigation system

Sr. No.	Statement	More bright	Somewhat bright	Not at all bright
1.	Drip Irrigation System for Kinnow production sustain till the subsidy is provided for tank, plantation and Drip System under NHM			
2.	Better from conventional Kinnow production up to when the subsidy is provided			
3.	Better credit facilities are available at present			
4.	High water efficient technology			
5.	Better fruit quality			
6.	Labour efficient technology			
7.	Better economic returns			
8.	Demand is increasing			
9.	Better for water deficient area			
10.	High price of Kinnow produce.			
11.	Purchasing power of people is increasing			
12.	Better technical support is available			
13.	Fruit consumption of people is increasing			
14.	Better market facilities are available at present			
15.	Better input management facilities are available			
16.	Better for only those who residing near the city			
17.	Better fruit and juice quality			

4. Prospects of Kinnow production under Drip Irrigation System as perceived by experts.

Sr. No.	Statement	More bright	Somewhat bright	Not at all bright
1.	High water efficient technology			
2.	Better for water deficient area			
3.	Purchasing power of people is increasing			
4.	Better technical support is available			
5.	Drip Irrigation System for Kinnow production sustain till the subsidy is provided for tank, plantation and system under NHM			
6.	Labour efficient technology			
7.	Better economic returns			
8.	Demand is increasing			
9.	Fruit consumption of people is increasing			
10.	High price of Kinnow produce.			
11.	Better credit facilities are available at present			
12.	Better from conventional Kinnow production up to when the subsidy is provided			
13.	Better market facilities are available at present			
14.	Better input management facilities are available			
15.	Better fruit quality			
16.	Better for only those who residing near the city			
17.	Better fruit and juice quality			

ABSTRACT

Title of Dissertation	:	Problems and prospects of Kinnow production under Drip Irrigation System in Haryana.
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Year of award of degree	:	2011
Major Subject	:	Extension Education
Total number of pages in dissertation	:	55 +viii + VII
Number of words in abstract	:	450 Approx.

India is the second largest producer of fruits after China, with a production of 71516000 MT of fruits from an area of 6329000 hectares. Haryana ranks 13th in citrus production. Drip Irrigation is basically precise, slow and artificial application of water in the form of discrete continuous drops, hence, is economic method of irrigation. In Haryana 3112 ha. has been covered under Drip Irrigation System and sprinkler irrigation form essential input for improving productivity and quality of horticultural produce. The present study entitled ñProblems and prospects of Kinnow production under Drip Irrigation System in Haryanaò was undertaken in the Sirsa and Hisar districts of Haryana state with the following specific objectives:- To measure the attitude of Kinnow growers towards Drip Irrigation System; To study the prospects of Kinnow production under Drip Irrigation System; To identify problems encountered by the Kinnow growers under Drip Irrigation System; To establish association between attitude and personality traits of Kinnow growers. From each districts two blocks were selected purposively, twenty respondents using Drip Irrigation System technology were selected from each of the four selected blocks thus making total sample size of 80 respondents. A sample of 20 Kinnow experts was also taken randomly from scientists working under KVK of selected districts, department of horticulture, college of Agriculture, Hisar, extension functionaries working in district Horticulture office as respondents for the study. The study highlighted that majority of the respondents were in middle to old age groups, belonged to high to medium education status, social participation and extension contact, with high mass-media exposure, risk orientation, irrigation facilities, change proneness and fatalism/ scienticism, having medium socio-economic status. The majority of Kinnow growers had most favourable attitude towards Drip Irrigation System. The remaining were having favourable attitude towards Drip Irrigation System. It is further highlighted that risk orientation, fatalism scienticism and change proneness were found highly significant and positively associated with the attitude. Whereas education were found significantly and positively associated with the attitude of farmers toward Drip Irrigation System. The problems such as initial cost of Drip Irrigation System and its maintenance cost is very high. The problems related to technical aspects were installation of drip system is very cumbersome, the drip lines chocked due to salt in water. The present study shows that more than half of Kinnow growers perceived high level of prospects towards Drip Irrigation System. However, the few of them were having medium and low level prospects. Whereas, a great majority of the Kinnow experts perceived medium level of prospects of Kinnow production under Drip Irrigation System followed by one third Kinnow experts perceived high level of prospects. None of the Kinnow experts perceived low level of prospects of Kinnow production under Drip Irrigation System.

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I also undertake the patent if any, arising out of the research work conducted during the programme shall be filed by only with due permission of the competent authority of CCS Haryana Agricultural University, Hisar.

SIGNATURE OF THE STUDENT