

**COMPARATIVE ANALYSIS OF INTEGRATED
FARMING SYSTEMS PRACTICED BY
FARMERS IN MANDYA DISTRICT**

SHWETHA, B. M.

PAL 0116

**DEPARTMENT OF AGRICULTURAL EXTENSION
UNIVERSITY OF AGRICULTURAL SCIENCES
GKVK, BENGALURU-65**

2012

COMPARATIVE ANALYSIS OF INTEGRATED
FARMING SYSTEMS PRACTICED BY
FARMERS IN MANDYA DISTRICT

SHWETHA, B. M.

PAL 0116

Thesis submitted to the
UNIVERSITY OF AGRICULTURAL SCIENCES, BENGALURU
in partial fulfillment of the requirements
for the award of the Degree of
MASTER OF SCIENCE (Agriculture)

IN
AGRICULTURAL EXTENSION

BENGALURU

JULY, 2012



Affectionately Dedicated to My

Beloved Parents

Lovely sister

AND

My Guide

**DEPARTMENT OF AGRICULTURAL EXTENSION
UNIVERSITY OF AGRICULTURAL SCIENCES
BENGALURU**

CERTIFICATE

This is to certify that the thesis entitled "**Comparative analysis of Integrated Farming Systems practiced by farmers in Mandya District**" submitted by **Ms. SHWETHA, B.M.**, ID No. **PAL 0116** for the award of the degree of **MASTER OF SCIENCE (AGRICULTURE) in AGRICULTURAL EXTENSION** to the University of Agricultural Sciences, Bengaluru, is a record of bonafide research work carried out by her during the period of her study in this University under my guidance and supervision and thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

**BENGALURU
JULY, 2012**

(S.V. SURESHA)
Chairperson, Advisory committee

APPROVED BY:

Chairperson : _____
(S.V. SURESHA)

Members : 1. _____
(D. NANJAPPA)

2. _____
(K. JAGADEESHWARA)

3. _____
(D.M. GOWDA)

AKNOWLEDGEMENT

With regardful memories

It is heart's turn to express my deepest sense of gratitude to all those who directly and indirectly helped me in this endeavour.

*I wish to record my profound sense of gratitude to **Dr. S.V. SURESHA**, Coordinator, Bakery Training Unit, Directorate of Extension, university of Agriculture sciences Bangalore and chairman of my Advisory Committee for his untiring and valuable guidance, constructive and critical review and constant encouragement and His innovative thinking and ideas made a deep impact on me throughout the period of my research. I had a great pleasure and precious opportunity to be associated with him and I feel no words to express my heartfelt respects for all his kindness.*

*I immensely thank **Dr. D. NANJAPPA** Professor and Head, Department of Agricultural Extension who served as member of my Advisory Committee, for his encouragement, valuable suggestions and cordial cooperation during the course of investigation.*

*I express my heartfelt thanks to **Dr. K. JAGADEESHWARA**, Professor and associate Director of Extension, Directorate of Extension for his constant encouragement during course of investigation.*

*My sincere thanks to **Dr. D.M GOWDA**, Professor and head Department of statistics, for helpful criticisms, cooperation, valuable suggestions during my course work and research work.*

I thank all the teachers of the Department of Agricultural Extension, UAS, GKVK, Bangalore for their valuable suggestions and support during the degree programme.

*I to express my heartfelt thanks **Rangaswamy, Naryanappa, Ranganna, Lakshamma and Rangawamaiah** (non-teaching staff) for their help and cooperation during my study.*

*I avail this opportunity to express my heartfelt sincere thanks to **Bakery Training Unit** staff and non teaching staff for their valuable support during my course work.*

*Words are inadequate to express my gratitude to my beloved parents **Mrs. Jaya, Mr. Mahadevappa** my sister **Smitha and** uncle **Mr.Raju** for their endurance, abundant love and affection, moral encouragement, constant support and personal sacrifice during the academic carrier.*

*My cordial thanks to my classmates **Manjula, Laxmi, Preethi, Sunitha, Vinay, Sujay, Naveen , Sameer, Sangappa and Nataraj** for their moral support and help they offered in time when I needed.*

*I sincerely and honestly confess thanks to my seniors **Shankaraiah and Mamatha Lakshmi** for their valuable suggestions, guidance, keen interest and affection with care were the great source of inspiration in successful completion of this research work and all my juniors for their help, support and great company.*

*Words could not help me when I need to thank my dear friends, **Yathish, Divya, Pushpa, Nagamma, Divyashree, Chandra prabha and sudha** for the great support they gave me.*

Finally, I wish to thank the farmers of mandya district who have cooperated in conduct of my research work. Above all, I must thank and express my inspiration for the blessings of the almighty, the eternal spirit.

*Bengaluru
July, 2012*

(Shwetha, B.M.)

Thesis abstract

COMPARATIVE ANALYSIS OF INTEGRATED FARMING SYSTEMS PRACTICED BY FARMERS IN MANDYA DISTRICT

Shwetha, B.M.

A research study was undertaken at Mandya and Nagamangala taluks of Mandya District of Karnataka during 2011-12. The selected 120 respondents were interviewed by using pretested structured schedule. The study revealed that majority of the farmers were under middle age group, nearly half of the farmers had medium extension participation, 40.00 per cent had favorable attitude towards farming system, 40.83 per cent falls under medium cropping intensity category, nearly two-fifth of the farmers belonged to medium market accessibility, one-third of farmers had medium land use efficiency. In irrigated condition 35.00 per cent of farmers practiced agriculture + sericulture +dairy and in dry land condition 35.00 per cent of farmers practiced agriculture + horticulture +dairy +forestry. In case of economic viability, in irrigated condition agriculture + sericulture + dairy + goat rearing + Vermicompost produced highest return and whereas in dry land condition horticulture + dairy+ goat rearing + forestry produced highest net return. Highest employment generation was found in agriculture + sericulture + dairy + poultry in irrigated condition, whereas crop production+ horticulture + dairy +forestry (201 man days/year) in dry land condition. In irrigated condition non availability of quality planting materials/breeds/species and in dry land lack of technical knowledge regarding crop harvest were the major constraints expressed by farmers.

Dept. of Agricultural Extension
UAS, GKVK, Bangalore
July 2012

(S.V. SURESHA)
Major Advisor

CONTENTS

CHAPTER	TITLE	PAGE No.
I	INTRODUCTION	1 - 8
II	REVIEW OF LITERATURE	9 - 36
III	MATERIAL AND METHODS	37 - 54
IV	EXPERIMENTAL RESULTS	55 - 112
V	DISCUSSION	113 - 145
VI	SUMMARY	146 - 158
VII	REFERENCE	159 - 172
	APPENDICES	173 - 187

LIST OF TABLES

Table No.	Title	Page No.
1	Distribution of respondents according to their age	57
2	Distribution of respondents according to their education	58
3	Distribution of respondents according to their Family size	60
4	Distribution of respondents according to their sources of irrigation	62
5	Distribution of respondents according to their Social participation	63
6	Distribution of respondents according to their Extension participation	65
7	Distribution of respondents according to their Mass media participation	67
8	Distribution of respondents according to their Level of aspiration	69
9	Distribution of respondents according to their Attitude towards farming system	71
10	Distribution of respondents according to their Crisis perception	73
11	Distribution of respondents according to their Entrepreneurial behavior	74
12	Distribution of respondents according to their Cropping intensity	76
13	Distribution of respondents according to their Family priorities	78
14	Distribution of respondents according to their Market accessibility	80

Table No.	Title	Page No.
15	Distribution of respondents according to their land use efficiency	82
16	Integrated Farming Systems practiced by different category of farmers under irrigated land	83
17	Integrated Farming Systems practiced by different category of farmers under dry land	85
18	Economic viability of Integrated Farming Systems practiced by farmers under irrigated land	87
19	Economic viability of Integrated Farming Systems practiced by farmers under dry land	88
20	Employment generation of farmers practicing Integrated Farming Systems under irrigated land	90
21	Employment generation of farmers practicing Integrated Farming Systems under dry land	92
22	Comparison of performance of farmers practicing Integrated Farming Systems under irrigated and dry land	94
23	Relationship between personal, socio-psychological characteristics of farmers with economic viability in irrigated land	95
24	Relationship between personal, socio-psychological characteristics of farmers with economic viability in dry land	97
25	Relationship between personal, socio-psychological characteristics of farmers with employment generation in irrigated land	98
26	Relationship between personal, socio-psychological characteristics of farmers with employment generation in dry land	100

Table No.	Title	Page No.
27	Contribution of personal, socio-psychological characteristics with Economic viability in irrigated land	101
28	Contribution of personal, socio-psychological characteristics with Economic viability in Dry land	103
29	Contribution of personal, socio-psychological characteristics with Employment generation in irrigated land	104
30	Contribution of personal, socio-psychological characteristics with Employment generation in dry land	106
31	Constraints faced by farmers practiced Integrated Farming Systems under dry land	107-108
32	Constraints faced by farmers practiced Integrated Farming Systems under dry land	110-111

LIST OF FIGURES

Fig. No.	Title	Between Pages
1	Map showing the study area	38-39
2	Conceptual model of the study	54-55
3	Integrated Farming Systems adopted by different category of farmers under irrigated land	83-84
4	Integrated Farming Systems adopted by different category of farmers under dry land	85-86
5	Economic viability of Integrated Farming Systems adopted by farmers under irrigated land	87-88
6	Economic viability of Integrated Farming Systems adopted by farmers under dry land	88-89
7	Employment generation of farmers adopted Integrated Farming Systems under irrigated land	90-91
8	Employment generation of farmers adopted Integrated Farming Systems under dry land	92-93
9	Comparison of performance Economic viability of farmers practiced Integrated Farming Systems under irrigated and dry land	94-95
10	Comparison of performance Employment generation of farmers practiced Integrated Farming Systems under irrigated and dry land	94-95
11	Empirical model showing the relationship between economic viability and independent variable	97-98
12	Empirical model showing the relationship between employment generation and independent variable	100-101



Introduction

INTRODUCTION

India with 2.2 per cent of global geographical area supports more than 15 per cent of the total world population, 60 per cent of whom depend on agriculture. It also supports nearly 15 per cent of the total livestock population of the world. One third of the gross national product comes from agricultural sector alone. Though there has been increase in food production from 51 million tons in 1950 and at present it is 250 million tons (2012) but nearly 40 per cent of the Indian rural population still lives below the poverty line who cannot afford two square meals a day. Nearly 84 per cent of farm families belong to small and marginal categories. The per capita availability of land has declined from 0.36ha and is projected to touch 0.2ha by the turn of the century.

Agriculture throughout the world is still single most important human activity. Despite all the advances of high technology, it is still the only source of food and fiber and other products, whose synthetic substitutes are often not good as the natural products or most costly to produce.

Hence, it is imperative to develop strategies and agricultural technologies that enable adequate employment, income generation and livelihood improvement. The crop and cropping system based on perspective of farming which need to make way for Integrated Farming Systems based farming in a holistic manner for the sound management of available resources by farmers (Jha, 2003). Under the gradual shrinking of land holding, it is necessary to integrate land based enterprises like dairy, fishery, poultry, sheep and goat rearing, duckery, apiary, forestry, field and horticultural crops, etc. within the bio-physical and socio-economic

environment of the farmers to make farming more profitable and dependable.

The integration of farm enterprises has been suggested as the means for economic development of farmers. Having achieved some success in rising crop production through various technological and institutional changes, the country is now said to be poised for white and blue revolutions involving substantial increase in livestock and fish output. In view of the population exposure shrinking recourses there is scope of increasing additional income through crop production, hence diversification is considered essential not only livelihood improvement but also for meeting the demands of milk products, meat, fish, eggs etc. which generally show rising trends with increasing levels of per capita income.

Conventional agriculture is known to cause soil and pasture degradation because it involves intensive tillage, in particular if practiced in areas of marginal productivity. Technologies and management schemes that can enhance productivity need to be promoted. At the same time, ways need to be found to preserve the natural resource base. Within this framework, an integrated crop-livestock farming system represents a key solution for enhancing livestock production and safeguarding the environment through prudent and efficient resource recycling.

Indian agriculture is characterized by mixed farming involving a system of combining crop production with one or more of the livestock enterprises like rearing of cattle, sheep, goat, pigs and poultry as well as fishery, bee-keeping, sericulture, etc. Although in India farming is not commercialized to a large extent, it remains that farmer has to make decisions regarding his business of farming, with a view to attaining maximum income. The income may not be maximization of net profit in the usual sense, but it can be assumed that he would like to maximize farm income by which he can maintain himself and his family. The decision of

enterprise mix on a farm will be conditioned by overall welfare of the family. In describing Farming Systems and their characteristics, we start therefore with the assumption that they did not come about by chance and that there is always a reason why farming in a specific case is carried out in one way rather than another.

Definitions of Integrated Farming Systems (IFS)

Itinal *et al.* (1999) stated that, Integrated farming system is a resource management strategy to achieve economic and sustained agricultural production to meet diverse requirement of the farm household while preserving the resource base and maintaining high environmental quality.

OR

Integration of two or more appropriate combination of enterprises like crop, dairy, piggery, fishery, poultry, bee keeping etc.,for each farm according to the availability of resources to sustain and satisfy the necessities of the farmer.

Concept of Integrated Farming Systems

IFS seems to be answer to the problems of increasing food production, increasing net farm income, improving nutritional status promoting natural resource management sustainable use of land, water and soil.

Farming system is a complex interrelated nature of soils, plants, animals, implements, power, labour, capital and other inputs controlled in part by farming family and influenced by social forces that operate at many levels.

Objectives of Integrated Farming System

1. To encourage farmers to take up improvement in all the crops grown by them by demonstrating new agricultural technologies
2. To assist farmers in introducing other subsidiary enterprise like dairy, poultry, fisheries, sericulture, piggery etc
3. To educate farmers to make them account conscious
4. To help farmers improve their standard of living by working with them over a period of time
5. To develop integrated farming system units as centres of agricultural development in the local areas

Components of IFS

- Agriculture, Horticulture, Fodder production, Kitchen gardening, Sericulture, Forestry, Vermiculture, Mushroom cultivation, Azolla farming, Dairy, Piggery, Poultry, Goat rearing, Sheep rearing, Fish farming and Duck rearing

The different Integrated Farming Systems are

- Crop –livestock-forest farming systems
- Crop-fish –poultry farming systems
- Crop- livestock-poultry-fish farming systems
- Crop –sericulture –dairy
- Crop –goat rearing –poultry –forest

Advantages of Integrated Farming System

- Higher food production to equate the demand of the exploding population of our nation

- Increased farm income through proper residue recycling and allied components
- Sustainable soil fertility and productivity through organic waste recycling
- Integration of allied activities will result in the availability of nutritious food enriched with protein, carbohydrate, fat, minerals and vitamins
- Integrated farming will help in environmental protection through effective recycling of waste from animal activities like piggery, poultry and pigeon rearing
- Reduced production cost of components through input recycling from the byproducts of allied enterprises
- Regular stable income through the products like egg, milk, mushroom, vegetables, honey and silkworm cocoons from the linked activities in integrated farming
- Inclusion of biogas & agro forestry in integrated farming system will solve the prognosticated energy crisis
- Cultivation of fodder crops as intercropping and as border cropping will result in the availability of adequate nutritious fodder for animal components like milch cow, goat / sheep, pig and rabbit
- Firewood and construction wood requirements could be met from the agro forestry system without affecting the natural forest
- Avoidance of soil loss through erosion by agro-forestry and proper cultivation of each part of land by integrated farming

Keeping the concept, features, objectives, advantages, and limitations of Integrated Farming Systems in mind the present study is designed to identify and compare the different integrated farming systems practiced by

Irrigated and Dry land farmers and to suggest a most suitable model of Integrated Farming System with the following objectives.

The specific objectives of the study

1. To document different Integrated Farming Systems adopted by farmers under irrigated and dry land farming situations
2. To compare the performance of different Integrated Farming Systems practiced by the farmers
3. To study the personal socio-psychological characteristics of the farmers practiced Integrated Farming Systems
4. To study the relationship between personal socio-psychological characteristics of the farmers with the economic viability and employment generation of the farmers practicing Integrated Farming Systems
5. To document constraints faced by farmers for better adoption of Integrated Farming Systems

Scope of the study

The present study will provide an insight into the economic viability accrued and employment generated among different categories of farmers under irrigated and dry land farming situations. This will also serve as guide line for the local extension workers to intensify their educational effort in promoting different successful combination of enterprise to generate additional income and to minimize the risk in monocropping and to generate increased employment opportunities to the family labours as well as to the farm labours of the area. The understanding of the profile of the farmers who are opting for different combination of enterprises would make the work of extension workers easy and effective to promote the integrated farming systems among different category of farmers in both irrigated and dry land situations.

Limitation of the study

As the study formed a part of the master degree programme of the researcher the concept used in the study could not be explored in depth due to limitation of time and other resources at the disposal of researcher. Due to these limitations, the investigator has restricted the study to limited combinations of integrated farming systems, research area and the sample size. Generalization made based on the findings of the study may have limited application in the non study areas. Again the investigation based on the expressed opinions of respondents i.e. recall and as such, personal and prejudice cannot be overruled in an ex-post-facto research design, even though every care has taken in the preparation of the questionnaire and in collecting data.

Presentation of the study

The thesis is divided into seven chapters. The first chapter deals with the introduction where in the importance, statement of the problem, specific objectives, the scope and limitations of the study are given. The second chapter review of literature deals with the review of related studies in light of present investigation. The third chapter devoted to the details of methodology used in the process of investigation, followed by presentation of results in fourth chapter. The findings of study have been discussed in fifth chapter and the sixth chapter summarizes the study followed by references in seventh chapter and appendices.

Operational definitions of the terms used:

Economic Viability:

Economic viability means that the real returns from farming operations, relative to the farm's asset value and labor inputs, are competitive with other small business, career, or investment alternatives. It includes following components

(a) Gross returns: The total monetary returns of the economic produce such as grain, tuber, bulb, fruit, etc. and bye- products viz., straw, fodder, fuel, etc. obtained from the crops and also from different enterprises like sericulture, dairy, poultry, vermicompost and goat rearing etc. The total return is expressed in terms of unit area, usually one hectare.

(b) Net returns: This is worked out by subtracting the total cost of cultivation from the gross returns. This value represents the actual profit obtained by the farmers.

(c) Rupees per rupee invested: this is also called profit- cost ratio or input-output ratio.

$$\text{Rupees per rupee invested} = \frac{\text{Gross returns}}{\text{cost of cultivation}}$$

Employment generation:

Combining crop enterprises with that of livestock to take advantage of complementary and supplementary relationships between them, would increase the labour requirements tremendously and can help in solving the problem of underemployment to a great extent. The employment generated out of mixing different enterprises in addition to crop husbandry with the available resources of the farmers is termed as Employment generation.



Review of
Literature

REVIEW OF LITERATURE

A brief review of literature is an integral part of any investigation as it not only gives an idea on the work done in the past, but also provides the basis for interpretation and discussion of the findings. In the light of the objectives of the study, the relevant literatures are reviewed and presented under the following sub headings.

- 2.1 Concepts of Integrated Farming Systems
- 2.2 Personal socio-psychological characteristics of the farmers practiced Integrated farming systems
- 2.3 Economic Viability of different Integrated Farming Systems
- 2.4 Employment Generation in different Integrated Farming Systems
- 2.5 Relationship between Personal socio-psychological characteristics of the farmers with economic viability and employment generation of the farmers practicing Integrated Farming Systems.
- 2.6 Constraints faced by farmers in practicing Integrated Farming Systems.

2.1 Concepts of Integrated Farming Systems

Hosmani (1999) stated that, farming system takes into account the interactions between the sub systems within a whole farm setting and thus designed to address farmers and society needs and goals. The whole farm is viewed as a system encompassing interacting subsystems. No potential enterprise is considered in isolation. It looks at the farm family household as a system of natural and human components.

Itnal *et al.* (1999) stated that, "farming system" is a resource management strategy to achieve economic and sustained agricultural production to meet diverse requirements of the farm household while preserving the resource base and maintaining high environmental quality.

Rangasamy (1999) viewed that, the concept of farming systems has got more relevance in the present day farming to reap better harvests in the long by maintaining a productive resource base on a holistic approach. The IFS approach introduces a change in the farming techniques for maximum of production in the cropping pattern and takes care of optimal utilization of resources. The farm wastes are better recycled for productive purposes. A Judicious mix of agricultural enterprises like dairying, poultry, mushroom, piggery, fishery etc. suited to the local agro-climatic situations and socio-economic status of farmer would bring in prosperity in the farming.

Behera *et al.* (2001) defined integrated farming systems as one of the potential approaches, which focuses on judicious combinations of any one or more of the such enterprises and effective recycling of the residues wastes for the better management of the available resources with small and marginal farmers for the generation of the more income and employment to the farming labourer during off season.

Nagaraja and Yellappa (2002) reported that farming demonstration is an innovative and unique approach to promote integrated land use and animal management technologies as well as resource management capabilities among the farmer, more particularly small and marginal farmers of rural population.

Chinmay and Singh (2003) opined that the integration of two or more enterprises like crop, livestock, fishery, poultry ,bee-keeping etc. for

each farm according to the availability of resources to sustain and satisfy as many necessities of the owner as possible and the systems thus developed will be termed as integrated farming systems.

Radhamani *et al.* (2003) explained that the integrated farming systems approach introduces a change in the farming techniques for maximum productivity in farming by optimal utilization of resources. Judicious mix of agricultural crops and other enterprises suited to the given agro climatic condition and socio-economic status of the farmer would improve the prosperity in the dry land farming.

Ramana Rao (2005) explained that mixed farming system of farming on a particular farm which includes crop production, raising lives stock, poultry, fisheries, bee keeping etc. to sustain and satisfy as many needs of the farmers as possible.

Behern and Yates (2008) viewed that in order to make farming profitable and improve resource use efficiency at the farm level, the synergy among components of farming systems should be exploited. In the process of technology generation, transfer and other developmental efforts at the farm level (contrary to the discipline and commodity-based approaches which have a tendency to be piece meal and in isolation), it is desirable to place a whole-farm scenario before the farmers to enhance their farm income, thereby motivating them towards more efficient and sustainable farming.

Sivamurugan (2008) reported that integration of cropping with components like dairy, biogas and mushroom or fish resulted in higher productivity, economic returns and employment generation than the cultivation of crops alone.

Sanjeev Kumar Singh and Shivani Dey (2011) reported that integrated farming system is the Integration of different agriculturally related enterprises with crop activity as base, provide ways to recycle the products and by-products of one component as input to another linked component and reduce the cost of production.

2.2 Personal socio-psychological characteristics of the farmers practiced Integrated farming systems

2.2.1 Age

Malathesh (2004) conducted study on An Analysis of selected farming system in eastern dry zone in Karnataka district. The result revealed that in case of crop + dairy farming system, 30 per cent of respondents are under young age group, followed by 40.0 per cent under middle age and 30.00 per cent were under old age group.

Vani (2005) conducted a study on farming system approach: socio-psychological and economic dimensions of farming system approach in Chitradurga district. The result indicated that farmers adopted agriculture + dairy + poultry farming system were belonged to middle age (61.54%), young (23.08%) and old age (15.38%).

The research carried out by Mangala (2008) on Impact of Integrated Farming system on Socio-economic status of BAIF beneficiary Farmers. The result stated that majority of the respondents practicing IFS (51.43%) were belonged to middle age group, while 27.14 per cent were old age group and 21.43 per cent were of young age group.

Chitra (2010) conducted study a study on knowledge and adoption of improved practices in selected farming systems of Mandya district. The results indicated that little more than (56.70%) per cent of the respondent were belonged to middle age group followed by 23.30 per cent

were belonged to old age group and 20.0 per cent were belonged to young age group who were practicing both paddy+ sugarcane +dairy and ragi +dairy.

2.2.2 Education

Malathesh (2004) conducted study on An Analysis of selected farming system in eastern dry zone in Karnataka district. The results revealed that in case of crop + dairy farming systems 46.60 per cent of the respondents were belonged to the low level of education , 30.07 per cent were under middle and 23.33 per cent were under the high level of education group.

Moulasab (2004) in his study on mango growers in North Karnataka indicated that, more than 23.00 per cent of the respondents were educated up to primary school followed by higher secondary school (19.16%) and 14.16 per cent of the respondents were illiterates.

Vani (2005) in her study on on farming system approach: socio-psychological and economic dimensions of farming system approach in chitradurga district revealed that the farmers adopted agriculture + dairy + poultry were belonged to middle education (46.15%) than low (30.77%) and high (23.08%) educated farmers.

Mangala (2008) reported in her study on Impact of integrated farming system on Socio-economic status of BAIF beneficiary Farmers observed that (34.30%) of the IFS beneficiaries were illiterates, followed by primary school (17.86%), can read only (15.70%), can read and write (11.43%), middle school (10.70%), high school (9.30%) and PUC (0.71%) level of education.

Pottappa (2008) in his study on knowledge and adoption of potato growers in Chikkaballapur district reported that majority (56.60%) of the

respondents belonged to low education category followed by 18.33 per cent with higher education category whereas, 25.00 per cent were in the medium education category.

Chitra (2010) conducted study on knowledge and adoption of improved practices in selected farming systems of Mandya district. The results indicated that 30 per cent of the respondents were educated up to high school. Whereas, 26.6 per cent of respondent were illiterates. Nearly one-fourth (23.4%) and 20 per cent of respondents were educated up to primary to middle school and college, respectively in Paddy + Sugarcane + Dairy farming system.

Ugwumba (2010) conducted a study on Integrated Farming System and its Effect on Farm Cash Income in Awka South Agricultural Zone of Anambra State. The results reported that farmers who were educated, had more years of experience and can combine many viable enterprises tend to be more efficient in production and consequently will realize more income.

2.2.3 Family size

Malathesh (2004) conducted study on Analysis of selected farming system in eastern dry zone in Karnataka district. The result revealed that in case of crop+ dairy farming system majority of the respondents i.e., 53.33 per cent belonged to big size of family, 20.00 per cent and 26.66 per cent of the respondent were belonged to the medium and small family size, respectively.

Chandrani Saha (2008) in her study on sustainability of farming systems and livelihood security among rural households in Tripura reported that majority (66.64%) of the respondents had medium family size, followed by large (24.16%) and small (9.16%) family size.

Pottappa (2008) in his study on knowledge and adoption of potato growers in Chikkaballapur district and indicated that majority (69.16%) of the respondents belonged to big family where as 30.84 per cent of the respondents belonged to small family.

Vishvanath Hiremath *et al.* (2009) in his study on knowledge and adoption behaviour of vegetable growers with respect to eco-friendly technologies showed that less than half (40.30%) of the farmers had medium family size followed by big (35.40%) and small (24.30%) family size.

Chitra (2010) conducted study on knowledge and adoption of improved practices in selected farming systems of Mandya district. The results indicated that in case of paddy + sugarcane +dairy system of farming fifty per cent of the respondents had medium family size followed by 26.6 per cent and 23.4 per cent with big and small size family.

Lavanya (2010) in her study on Assessment of Farming Systems Efficiency in Theni District of Tamil Nadu reported that 45.00 per cent the respondent belonged to big size family under paddy system of farming followed by 33.30 per cent in medium size category and 21.70 per cent had small family size.

2.2.4 Land holding

Malathesh (2004) conducted study on Analysis of selected farming system in eastern dry zone in Karnataka district. The results revealed that in case of crop + dairy farming system of production, 26.66 per cent of the respondents were under small group of land holding, followed by 40.01 per cent had medium size of land holding and 33.33 per cent of with big land holding.

Vani (2005) in here study indicated that farmers adopted agriculture+ poultry +dairy were belonged to medium (46.15%) and big (53.85%) farmers category.

Dolli (2006) in his study on sustainability of natural resources management in watershed development project revealed that, majority of respondents had large landholding (7.85 acres).

Mangala (2008) conducted a study on Impact of integrated farming system on Socio-economic status of BAIF beneficiary Farmers. The results highlighted that 50.72 per cent of the beneficiaries were small farmers, followed by marginal farmers (25.72%), medium farmers (22.14%) and large farmers (1.42%).

Chitra (2010) conducted study on knowledge and adoption of improved practices in selected farming systems of Mandya district. The results indicated that almost an equal per cent (43.4% and 40%) of the respondent were belonged to small and marginal size of land holding category, whereas, 16.60 per cent were having large size of land holdings in farming system of paddy +sugar cane +dairy.

2.2.5 Sources of irrigation

Theertha Prasad (2006) conducted study on analysis of different farming systems in Hassan district. The results reported that half of the respondents (51.71%) had medium sources of irrigation followed by 40.25 per cent had high irrigation sources and only 7.79 per cent of the respondents had low sources of irrigating facility under irrigated cultivation system.

Thippeswamy (2007) revealed in his study on knowledge and adoption of plant protection measures in coconut cultivation of farmers of chitradurga district that nearly half (48 percent) of the respondents

possessed bore wells to irrigate the crop and remaining respondents were dependent on lake water for irrigating fields.

Mallika meti (2009) in her study on Technology reach, perception, knowledge, adoption and attitude towards agriculture technology by small and marginal farmers in Tungabhadra command area, revealed that majority(63.33percent) of the farmers practicing contract farming had bore well as the source of irrigation and 73.33, 70.00,60.00 and 50.00 per cent of the farmers from Kolar, Koppal, Hassan and Tumkur had the bore well as source of irrigation, respectively.

2.2.6 Extension participation level

Vani (2005) in her study on farming systems indicated that in case of agriculture + dairy + poultry, 46.15 per cent of the respondents had low level of extension participation, followed by 38.46 per cent with medium level of extension participation and 15.38 per cent had high level of extension participation.

Mangala (2008) conducted a study on Impact of integrated farming system on Socio-economic status of BAIF beneficiary Farmers. The results reported that 27.14 per cent of respondents participated in demonstrations organized by BAIF. About 15.00 per cent of the respondents participated occasionally, followed by 12.14 per cent of them participated regularly and 72.86 per cent of them never participated.

Chitra (2010) conducted study on knowledge and adoption of improved practices in selected farming systems of Mandya district. The results indicated that in case of ragi +tomato + coconut +agro forestry, 43.4 per cent of the respondents had high level of extension participation followed by 36.6 per cent with low level of extension participation and 20 per cent of them had medium level of extension participation.

Lavanya (2010) in her study on Assessment of Farming Systems Efficiency in Theni District of Tamil Nadu revealed that majority (58.30%) of the farmers had medium level of extension participation, 26.70 per cent belonged to high category and 15.00 per cent with low level of extension participation.

2.2.7 Social participation

Malathesh (2004) conducted study on An Analysis of selected farming system in eastern dry zone in Karnataka district. The results revealed that in case of crop + dairy farming system 40.66 per cent of the respondents were under medium level of social participation and 43.44 per cent of respondents were under low level of social participation. Further, it was observed that only 16.66 per cent of the respondents were under high level of social participation.

Vani (2005) in her study on farming system approach indicated that in case of agriculture, dairy and poultry, 7.69 per cent respondents had low level of social participation followed by 53.85 per cent had medium level of social participation and 38.46 per cent respondents had high level of social participation.

Chandrani saha (2008) carried out a study on sustainability of farming systems and livelihood security among rural households in Tripura and indicated that more than half (59.16%) of the respondents had medium level of social participation, followed by low (22.50%) and high (18.33%) level of social participation.

Chitra (2010) conducted study on knowledge and adoption of improved practices in selected farming systems of Mandya district. The results indicated that about 43.00 per cent of farmers had medium social participation followed by 30.00 per cent and 26.60 per cent of

farmers had low and high level of social participation, respectively in paddy+ sugar cane + dairy farming system.

Lavanya (2010) in her study on Assessment of Farming Systems Efficiency in Theni District of Tamil Nadu revealed that 39.20 per cent of all the farmers had medium social participation. Further, 31.60 per cent and 29.20 per cent of farmers had high and low social participation, respectively.

2.2.8 Mass media participation

Vani (2005) reported that farmers adopted agriculture, dairy and poultry belonged to medium category of mass media participation (61.84%) followed by low category of mass media participation (15.38%) and 23.08 per cent of with high level of mass media participation.

Mangala (2008) reported in her study on Impact of integrated farming system on Socio-economic status that 47.80 per cent of the respondents participated in training programmes organized by BAIF. About 27.14 per cent of the respondents participated regularly in training programmes, while 20.72 per cent of respondents participated occasionally and 52.14 per cent of them never participated.

Chitra (2010) indicated that little more than two fifth (43.40%) of the respondents belonged to medium category of mass media participation, 36.70 per cent belonged to high category and remaining (20.00%) belonged to low mass media exposure category with respect to paddy +sugarcane +dairy. farming system practicing farmers.

2.2.9 Cropping intensity

Patil (1990) conducted a study on the extent of adoption of recommended cultivation practices of DCH-32 cotton by farmers and its economics in Malaprabha command area of Dharwad district. The results observed that majority (73.50%) of Paddy farmers belonged to medium category, followed by high (15.50%) and low (11.00%) cropping intensity category.

Kanavi (2000) conducted study on knowledge and adoption behavior of sugarcane growers in Belgaum district of Karnataka and reported that 58.00 per cent of sugarcane growers were under low category of cropping intensity and 42.00 per cent of farmers were under high category.

Nagaraja (2002) conducted study on knowledge of improved cultivation practices of sugarcane and their extent of adoption by farmers in Bhadra Command Area in Davanagere district. The results reported that 90.00 per cent of the sugarcane growers were found in low category of cropping intensity and (10.00%) were found in high category.

Malathesh (2004) conducted a study on Analysis of selected farming system in eastern dry zone in Karnataka district. The results revealed in case of crop and dairy nearly 40.00 per cent of respondents were under high level of cropping intensity, followed by 16.66 per cent with low cropping intensity and 43.33 per cent had medium level of cropping intensity.

Maraddi (2006) conducted a study on An analysis of sustainable cultivation practices followed by sugarcane growers in Karnataka. The results reported that medium cropping intensity was exhibited by 47.22 per cent of sugarcane growers, followed by low cropping intensity (27.22) per cent and high cropping intensity among 25.56 per cent of sugarcane growers.

Chandrani saha (2008) carried out a study on sustainability of farming systems and livelihood security among rural households in Tripura and indicated that farming system practiced by small farmers had 43.33 per cent of high level of aspiration, followed by 31.66 percent of medium level of aspiration and 25.00 per cent of low level participation.

Lavanya (2010) in her study on Assessment of Farming Systems Efficiency in Theni District of Tamil Nadu observed that among paddy farmers, 21.70, 18.30, and 60 per cent had low, medium and high level of cropping intensity, respectively. Further, among coffee growers 51.70 and 48.30 per cent of the farmers were in low and medium category, respectively. Whereas, none of the farmers had high level of cropping intensity.

2.2.10 land use efficiency

Singh and vivek kumar singh (2005) conducted study on Identification of Land use and Resource use efficiencies in Agriculture in Jhabua Tribal district in Madhya Pradesh. The results revealed that the agricultural land use efficiency indicates the instability of agriculture system indicated by the decline of coefficient values in most of the tahsils of the district and the district as a whole. The standard coefficient of 50.82 during 1990-91 to 46.46 during 2004-05 indicates reduced efficiency of agricultural land use.

Namdev Gajre and Omprakash shahapurkar (2011) conducted study on Spatio-temporal analysis of land use efficiency in Nanded district of Andhra Pradesh found that the land use efficiency in Nanded district is influenced by irrigation facilities, pattern of agricultural practices, physical environment, soil types and nature of rainfall distribution etc.

2.2.11 Family priorities

Saleh *et al.* (2010) in his study on priority families for health care according to family socio-demographic risk risks. The results revealed that majority of the families in the study area give more priorities to health care rather than other activity.

2.2.12 Attitude towards farming system

Sriram and Palaniswamy (2000) reported that the farmers had favourable attitude towards eco-friendly agricultural practices.

Naik *et al.* (2008) in his study on Attitude of mango growers towards sustainable farming practices the results revealed that a larger number of mango growers (48%) possessed favorable attitude towards sustainable farming practices.

Alam *et al.* (2010) conducted study on Perceptions, preferences and attitude of Bangladesh farmers towards home garden farming systems It was concluded that various perceptions, preferences and attitude of the farmers would provide a framework for future policy formulation, preparation of home garden management plans and development of home gardens in the study area and more generally in Bangladesh.

Kanwat *et al.* (2012) in his study on Measurement of attitude towards the adoption of back yard poultry farming in Arunachal Pradesh the results observed that majority belonged to 'favorable' category and among the independent variables 'family-type' had a negative value with attitude. Based on the findings, implications were drawn for the extension agencies to promote poultry farming as income generating venture in the tribal areas.

2.2.13 Entrepreneurial behavior

Narmatha *et al.* (2002) conducted a study on Entrepreneurship behaviour of livestock farm women. The results observed that more than half (53.00%) of the livestock farm women had high entrepreneurial behaviour.

Bhagyalaxmi *et al.* (2003) observed that nearly fifty per cent (46.67%) of women in vegetable production and 51.67 per cent in dairy had medium entrepreneurial experience.

Patel *et al.* (2003) revealed that majority (63.00%) of sugarcane growers had medium level of entrepreneurship, while 21.00 and 16.00 per cent of respondents had high and low level of entrepreneurship, respectively.

Rao and Dipak De (2003) revealed that majority (60.00%) of the respondents had medium entrepreneurial behaviour, while 16.00 and 23.30 per cent respondents had low and high entrepreneurial behaviour, respectively.

Subramanyeswari and Veeraraghava Reddy (2003) in a study on Entrepreneurial behaviour of rural dairy women noticed that operationalized entrepreneurial behaviour as the changes in the knowledge, skills and attitudes of women livestock farmers towards dairy enterprises.

Anitha (2004) carried out study on entrepreneurial behaviour and market participation of farm women in Bangalore rural district of Karnataka. The results explained that 47.50 per cent of farmwomen belonged to medium category of entrepreneurial behaviour. Further, 28.30 per cent were in high entrepreneurial behaviour category and around one-fourth (24.20%) had low entrepreneurial behaviour.

2.2.14 Crisis perception

Irvine and Anderson (2005) reports in his study on the effects of various crisis management strategies to alleviate the ensuing problems in both areas the results observed that tourist industry in peripheral regions is fragile and highly vulnerable to any external shocks. However, also noted is the ability of small rural firms to respond to such catastrophes and to avert the worst impacts of crisis.

Sadek and Oktarani (2009) in his study on crisis and emergencies worldwide on food safety and environmental issues in recent decade the results indicated that consumer's interest in organic food is influenced by their belief that organic food is better for health and the environment. This may provide a basis for worldwide education on the benefits of going organic.

2.2.15 Level of Aspiration

Neelavani *et al.* (2002) reported that the Participation of Farm Women in Post-Harvest Technologies of Tomato in Kolar District found that nearly three fourth of the respondents had medium level of aspirations.

Anitha (2004) reported that 30.80 per cent of respondents had high level of aspirations, while, one third of farm women (33.30%) had medium aspiration level and 35.80 per cent of them had low aspiration.

Vani (2005) observed that farmers adopted agriculture, dairy Poultry were belonged to high aspiration level (61.54%), followed by low aspiration level (23.08%) and medium aspiration (15.38%).

Ravi (2007) in his study on entrepreneurial behavioural characteristics of SC and ST farmers of Gulbarga District revealed that

46.25 per cent of the respondents had low level of aspirations, followed by 38.12 and 15.63 per cent of them had high and medium level of aspirations, respectively.

Chandrani saha (2008) carried out a study on sustainability of farming systems and livelihood security among rural households in Tripura and indicated that 43.33 per cent of small farmers had high level of aspiration, followed by 31.66 per cent of medium level of aspiration and 25 per cent with low level of aspiration.

2.2.16 Market accessibility

Shivamurthy (1991) conducted a study on areca nut and cardamom growers in Shimoga district of Karnataka state and report that the majority of the cardamom growers sold their sold their produce to the village traders (61.67%), followed by gardeners society (55.00%) and commission agents (32.50%). None of the respondents had given cardamom to contractors.

Chandran (1997) in a study conducted in Ernakulam district of Kerala state found that majority of the tapioca growers (70.70%) sold their produce to the consumers through the middlemen and 16.66 per cent marketed their produce through the channel of middleman → processing unit → trader → consumer, a meager 1.67 per cent sold their produce to the consumer through the processing unit and no respondents sold the produce directly to the consumer.

Chandrashekhar (2007) reported that majority of the (61.66%) respondents disposed their produce to the wholesalers through commission agents in the regular market yard. Fifteen per cent of the respondents sold their produce to the village level traders. Some (15.00%) of the respondents sold their produce to the Distant market like

Bangalore and the remaining (8.33%) of the respondents sent their produce to others like hotels, marriage parties etc.

2.3 Economic viability of different Integrated Farming Systems

Jayanthi *et al.* (1998) carried out a study on Economic efficiency of component linkage in lowland integrated farming system. The results indicated that crop + pigeon + fish + mushroom integration was economically superior, with the highest net return (Rs 90 252/ha/yr), per day return, and benefit cost ratio (2.44).

Behera and Mahapatra (1999) reported that the integrated farming system consisted of pisciculture, field and horticultural crop (agro forestry), poultry, mushroom, apiculture and biogas enterprises. Apiculture produced the highest returns (Rs 7.94 per rupee invested), followed by pisciculture (Rs. 5.46 per rupee invested). Among the crop enterprises, best returns were obtained with multistoried cropping involving pumpkin, ridge gourd, and poi as ground storey; pineapple, colocasia, ginger and turmeric as first storey; and coconut as second storey and generated a net income of Rs 58,360.

Pushpa and Netaji seetharaman (1999) carried out study on Impact on income and employment of farmers in various integrated farming system. The results reported that in case of crop +dairy+ poultry + sericulture, the income was Rs.33,162 and it was followed by crop+ dairy+ sericulture (Rs. 32,762), crop + sericulture(Rs.29,892) and the benefit cost ratio per dairy animal was 1.37, per 100 poultry birds it was the maximum at 2.28. The percentage increase of additional net income ranged from Rs.24.90 in case of crop +dairy system to as high as 81.76 per cent in case of crop +dairy + poultry+ sericulture systems.

Murugan and Kathiresan (2005) conducted a study on Income and economic efficiency under low land integrated farming systems. The

results reported that rice integrated with fish and poultry produced the highest per day returns of Rs.2137 and Rs.3544 and net returns of Rs.155 920 and Rs.228 090 in the Samba and Navarai crops, respectively, when compared to the rice and rabbit in the first and rice alone in the second cropping season.

Ramrao *et al.* (2005) carried out study on Crop-livestock integrated farming system for augmenting socio-economic status of smallholder tribal of Chhattisgarh in central India. The results reported that 2 bullocks + 1 cow + 1 buffaloes + 10 goats + 10 poultry + 10 ducks along with crop cultivation was the best with a net income of Rs 33076 per year against arable farming (crop farming) alone (7843 per year) with a cost returns of 1: 2.238.

Shekinah (2007) conducted a study on Productivity, profitability and employment generation in integrated farming systems for rainfed vertisols of western zone of Tamil Nadu. The result reported that all enterprise combinations tried were profitable compared with conventional practice of cropping alone. The integration of crop (0.80 ha) fertilized with buffalo manure produced on the farm, with pigeon (10 pairs on 0.01 ha), goat (5+1 female + male on 0.02 ha), buffalo (2 milking buffaloes+1 calf on 0.03 ha), agro forestry (0.10 ha) and farm pond (0.04 ha) was found to be the most profitable farming system on a holistic basis. Recycling of resources and residues led to higher productivity, employment and income generation with this enterprise combination.

Nowakcki (2008) in his study on Comparison of profitability of potato cultivation in organic and integrated farming systems reported that the concept of farming system shown that gross margin at organic system were at higher level than at integrated one but yield is lower by about 38%. It is possible that profitability of organic system is higher

than at integrated system only when the market price of organic potato is two times higher than the price of potato cultivated at integrated system.

Ram Suresh and Hubba Lal Singh (2008) in their study on Income and employment generation in mixed farming systems in gonda district of Andra Pradesh reported that the overall average net income obtained from crops of paddy, wheat and sugarcane was Rs.5516, Rs.6614 and Rs.24142 per hectare and family labour income generation from these crops Rs.7098, Rs.8012 and Rs.24142 per hectare per year and In case of cow milk production, the average net income was Rs.1559 and family labour income was Rs.4758 per hectare.

Rathore and Bhatt (2008) conducted a study on productivity improvement in jhum fields through integrated farming system. The results highlighted that cultivation of rice, vegetable pea and beans along with dairy cattle (free grazing), having a system productivity of 105.0 t/ha of rice-equivalent yield. However, least system productivity was recorded with cultivation of rice, vegetable pea, beans, hybrid Napier, winter maize and soybean together with dairy cattle, with rice-equivalent yield of 56.6 t/ha. Except the piggery, all livestock components (dairy, poultry, duckery and fishery) recorded better economic viability (B: C ratio >1).

Channabasavanna *et al.* (2009) conducted a study on Development of profitable integrated farming system model for small and medium farmers of Tungabhadra project area of Karnataka. The result reported that farmers adopted crop, poultry, fish and goat increased their net return was Rs. 22,887 and benefit cost ratio was also higher (1.97).

Dhaka (2009) in his study on Integrated farming system approach for natural resource management and the results showed that the basic farming system viz. arable farming, arable with dairy and arable farming

in integration with vegetables and dairy were analyzed. The result of study indicated that integrated farming system was an appropriate approach to minimize risk and increase the production and profit with better utilization of resources.

Toor (2009) conducted study on Integrated farming systems for income and employment increasing possibilities on small farms in Punjab State. The result revealed that involving crops (rice, wheat, and Aloe Vera) and livestock (dairy animals, pigs, poultry, fish, rabbits and honey bees), proved more profitable than crops alone (rice-wheat system) in terms of net returns.

Singh *et al.* (2009) conducted study on Livestock in irrigated farming systems of Uttar Pradesh. The result reported that sesame-gram+linseed+one 'Murrah' buffalo integrated farming system were tested on ravines affected farmers fields. Among the tested integrated farming systems, the maximum net income (Rs. 65819/ha) was obtained from sesame-lentil+mustard+one 'Murrah' buffalo and was closely, followed by sesame-lentil+linseed (Rs. 64004/ha) in ravines degraded soils of Bundelkhand.

Rai and Raj (2010) in his study on Economic analysis of milk production of district Fatehpur in Uttar Pradesh observed that the net return in case of buffalo was higher (Rs.9637.66 per lactation) as compared to cow (Rs.8234.04 per lactation) while, benefit cost ratio was higher in cow (1.49) than the buffalo(1.41).

Deepa Bisht (2011) conducted a study on integrated fish farming for food, nutritional security and economic efficiency in mid hills of Indian Central Himalaya. The result reported that an average net gain of Rs 36,823 was obtained annually from IFF with investment of Rs 11,925 by the farmer. Economic analysis of technology clearly showed advantage

over conventional system of cropping under rain fed conditions. A net profit of about 200 per cent of the total cost indicates the economic viability of the technology

2.4 Employment generation in different Integrated Farming Systems

Natarajan (1983) in his study on Possibilities of blackish water paddy cum fish farming in coastal saline soils revealed that employment generation to the tune of 16,800 man days was possible for 100 acre land area in one year through fish and prawn culture in the paddy fields.

Chandrasekaran *et al.* (1994) conducted study on Rice based IFS approach in Cauvery delta region and stated that integration of duck cum fish culture could generate 396 man days as against 252 man days with rice cropping alone.

Pushpa and seetharaman (1999) study conducted on Impact on income and employment of farmers in various integrated farming systems. The result reported that additional employment generated by poultry was 160 man days. Whereas, in dairy it was 170 man days.

Behera and Mahapatra (2001) conducted a study on Generation of income and employment- a success story. The results reported that the integrated farming system generated an employment of 573 man days on a small piece of land (1.25 ha), ensuring a high standard of living for small and marginal farmers.

Nagaraja and yellappa (2001) reported that there is need to establish and strengthen farming system demonstration in order to provide maximum family employment throughout the year and to improve the marginal farmers in particular to achieve stable net income.

Jayanthi *et al.* (2003) reported that integrated farming system experiments comprising enterprises like crop, fishery, poultry, pigeon and goat recorded highest level of employment of 575 man-days ha⁻¹ year⁻¹ with crop +fish+ goat generation.

Malathesh (2004) reported that employment generation was found high in crop +dairy + sericulture farming systems i.e., (75 man days) followed by crop +sericulture (59 man days) and crop +dairy it was found that only (32 man days) but very low employment generation was found in case crop production alone. (29 man days)

Ramrao *et al.* (2005) reported that mixed farming (crop-livestock) module of 1.5 acre small scale holders resulted in employment generation of 571 man days, net income of Rs. 58456 per year against crop farming alone with employment generation of 385 man days and net returns of Rs. 18300 per year.

Vani (2005) reported that employment generation was high in case of agriculture + horticulture (62 man days) followed by agriculture +dairy+poultry (58 man days) and very low employment generation was found in case of agriculture +dairy(32 man days)

Shekinah and Sankaran (2007) reported that integration of crop fertilized with buffaloes manure produced on the farm, pigeon, goat, buffalo, agro forestry and farm pond integration was found to be higher productive and resulted in ncreased employment generation.

Ram Suresh and Hubba Lal Singh (2008) conducted a study on Income and employment generation in mixed farming systems in gonda district of Uttar Pradesh reported that employment generation from crops of paddy, wheat and sugarcane was 235.60, 146.42 and 118.81 man-

days per annum, respectively and In case of cow milk production employment generation was 74.76 man-days per annum

Channabasavanna and *et al.* (2009) conducted study on Development of profitable integrated farming system model for small and medium farmers of Tungabhadra project area of Karnataka. The results reported that farmers adopted crop, poultry, fish and goat increased their employment generation to a tune of 275 Man days/ha/year

Namadeva Shinde (2009) conducted study on income and employment generation under sugarcane based intercropping systems. The results observed that generation of employment was high in CS-II. (213.2 man/days/ha) followed by CS-I (208.31 man/days/ha),CS-IV (207.92 man/days/ha) and CS-I (201.12 man/days/ha).

2.5 Relationship between Personal socio-psychological characteristics the farmers with economic viability and employment generation of the farmers practicing Integrated Farming Systems.

2.5.1 Relationship between Personal socio-psychological characteristics of the farmers with economic viability of the farmers practicing Integrated Farming Systems.

Sheriff and Hovland (2001) the proponents of social judgement theory reported that both internal factors (motivation, learning, attitude) and social factors (institution, demand characteristics) influence judgement studies point out the education, family size, cosmopolitaness, extension participation, mass media participation, extension organization support, size of land holding, deferred gratification, competition orientation, risk willingness were found to have significant relationship with economic performance.

Malathesh (2004) reported that in case of crop +dairy farming systems it was found that land holding, social participation, livestock possession were found positively significant with economic performance, where as cropping intensity and scientific orientation were found to had negatively significant relationship with economic performance.

Ugwumba (2010) reported that Farmer's age has no significant effect on farm cash income but it is positively correlated with it, implying that older farmers earn more cash income from IFS than younger ones.

2.5.2 Relationship between profile of the farmers with employment generation of the farmers practicing Integrated Farming System

Chinmay and Singh (2003) have opined that by adopting integrated farming system, farmer can get increased productivity per unit of land, better utilization of resources of farm wastes, sustainable employment generation and reduction of risk in farming.

Malathesh (2004) reported that in case of crop +dairy farming system, land holding, management orientation were found positive significant relationship, but social participation, cropping intensity and innovativeness exhibited negatively significant relationship with the employment generation.

Nagesh (2006) conducted a study on Entrepreneurial behavior of Pomegranate growers in Bagalkot district of Karnataka and revealed that characters such as education, landholding, annual income, mass media participation, extension participation and scientific orientation were positively and significantly correlated with entrepreneurial behavior.

Chandrani saha (2008) conducted a study in Tripura about sustainability of farming system and livelihood security. She identified

that age, risk orientation, and farming experience were significant and level of aspiration was highly significant with adoption of sustainability of farming system.

2.6 Constraints faced by farmers

Vivekananda (1999) in his study has opined that agricultural development in the state is hindered by the problems such as weak input research, weak extension net work, regional imbalance, stagnation in the area under HYV's etc. and has suggested the measures for development of agricultural in the state.

Kella lakshmana *et al.* (2002) suggested two field extension approaches for sustainability viz., integrated farming system and blending of indigenous farm technologies into modern technologies and opined that these two approaches have advantage as they are eco-friendly, economically feasible and the IFS gives more income per unit area by reducing the cost of production.

Krishnamurthy *et al.* (2004) identified the problems of rice growers in five district of Karnataka state. The major constraints faced by them were non availability of seeds and fertilizer (98.00%), lack of literature (93.00%), lack of knowledge (90.00%) and complex technology (87.00%).

Malathesh (2004) reported that crop +sericulture farming systems experienced the constraints like Cumbersome procedure to get credit from bank (91.66%), control of pests (88.33%) under crop production and sericulture enterprises respectively followed by lack of knowledge regarding pest and diseases of the field crops (86.33%), lack of technical guidance from extension personnel (85.00%), lack of knowledge/difficulty to maintain temperature and humidity in the rearing house (78.33%), lack of technical guidance from extension personnel (75.00%) and high cost of pp chemicals (73.0%).

Thejaswini *et al.* (2004) conducted a study on performance of farm women in agriculture and income generating activities in Mysore district of Karnataka and reported that majority of respondents indicated that lack of training (85.00%), financial constraints (82.00%), poor quality of raw materials (81.00%), high cost of production (77.00%), lack of quality aspects (73.00%), marketing problems (65.00%) and lack of storage and ware housing facilities were the major constraints to undertake income generating activities.

Nagesha (2005) reported that high incidence of pests and diseases followed by other problems such as high cost of fertilizers, chemicals and insecticides, high wages of labour, non-availability of skilled labour and lack of transportation and storage facilities were the major constraints faced by them.

Vani (2005) reported that a great majority of the farmers who were practicing agriculture expressed that lack of irrigation facilities (95%), erratic distribution of rainfall (94.16%), irregular supply of electricity (93.30%) and lack of soil testing facilities (90.80%) as the major constraints. Further, majority of them expressed that failure of rainfall at the critical stages of crop growth (), non-availability of drought resistant varieties (85%) and high incidence of pests and diseases for the crops as other important constraints.

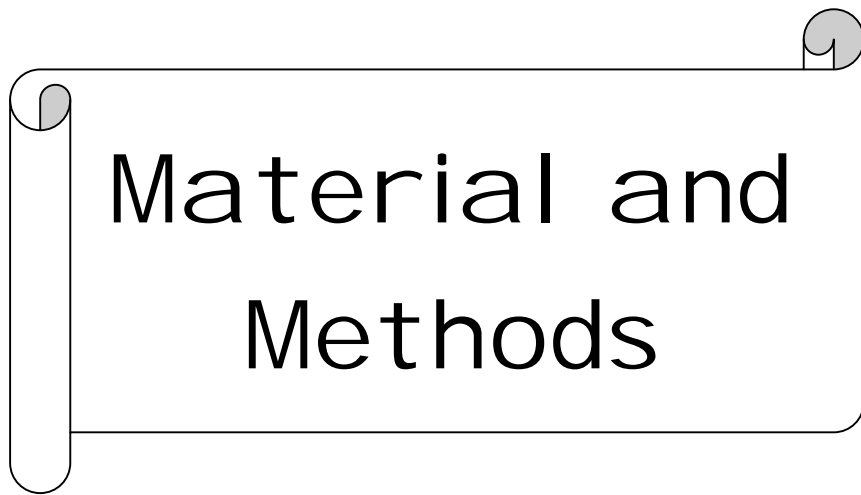
Ganesh Prasad (2006) reported that the important production constraints faced by the turmeric growers were: rotting of seed rhizome (98.83%), lack of technical know-how (71.67%), high labour wage (63.33%), scarcity of labour (60.00%) and high cost of inputs (54.17%). Very few respondents (10.83%) cited that the problem of non - availability of credit followed by delayed payment (26.67%) and non-remunerative prices (19.17%), respectively.

Nethravathi (2008) observed that the constraints faced by majority of farm women in various post-harvest technologies of tomato were change in climate (98.33%), loss of fruits while grading (97.50%), Far off market places (84.17%), lack of training (57.50%), non-availability of processing units (52.50%) and manual harvesting (55.00%) followed by lack of technical knowledge on tomato products making (20.00%).

Karthik (2009) reported that Lack of timely available credit, lack of required finance and non availability of sufficient credit were the most important financial constraints. Problem of timely supply of seeds, lack of market facilities at local level and problem in supply of quality seeds were the most important institutional constraints. Followed by lack of technical guidance, lack of proper resources and lack of knowledge were perceived as the most important.

Chitra (2010) reported that in case of paddy +sugar cane +dairy farming system less than 50 per cent of farmers were facing problems like non availability of good quality seeds (50.0%), lack of good marketing system (43.3%), lack of improved breeds (40.0%), lack of training and guidance by extension personnel (33.3%) and lack of transportation facility(30.0%)

Pushpa (2010) reported that in dairy farming non-availability of planting material (95.83%), lack of knowledge on fodder crop cultivation (93.33%), inadequate veterinary service (91.67%) were the major constraints. Fluctuations in the price of cocoons, lack of knowledge on identification of disease symptom, lack of training on silkworm reeling could be considered as the most important constraints in practicing Sericulture enterprise. Establishing model farms, high lighting the benefits of integrated farming system in one or two locations in each Panchayat union will enable the farmers of that locality to gain firsthand knowledge about various aspects of integrated farming system.



Material and
Methods

MATERIAL AND METHODS

The study was conducted in Mandya district of Karnataka state during 2012. The details of the methodology adopted for the present investigation is presented in this chapter under the following sub headings:

- 3.1 Locale of the study
- 3.2 Description of the study area
- 3.3 Research design
- 3.4 Selections of villages and the respondents
- 3.5 Methods used for measurement of dependent variables
- 3.6 Methods used for measurement of independent variables
- 3.7 Constraints faced by farmers
- 3.8 Instruments used for data collection
- 3.9 Statistical methods used for data analysis
- 3.10 Conceptual Model of the Study

3.1 Locale of the study.

The study was conducted during 2012 in Mandya district which comes under southern Dry zone (Zone -6) of Karnataka. Out of seven taluks of the district two taluk were selected purposively. The highest area and irrigation and the highest area under rain fed farming was the major criteria for selection of the taluks. Mandya taluk with highest area under irrigation and Nagamangala taluk with highest area under rain fed farming were selected. Three villages from each selected taluk were considered for the study by considering the background of major farming systems followed by the farmers in agriculture and other allied activities.

3.2 Description of the study area

Mandya is predominately agrarian district located in the south of the state between 76° 19' and 77° 20' E longitude and 11° 50' and 18° 27' N latitude with an altitude of 2500-3000 ft MSL. Mandya consists of seven taluks with geographical area of 3,26,383 ha. Based on the agro ecological parameters, three Agro- ecology situations (AES) have been identified in the district viz., AEX-I-Irrigated, AEX-II- Semi-Irrigated and AEX-III-Rainfed. The important taluks which comes under irrigated situation are Mandya, Paduvpura and Sri Ranga Patna. Whereas Krishna Raj Pet and Maddur taluks are fall in semi-irrigated situation. Nagamangala and Malavalli taluks comes under rain fed situations. The approximately cultivated area under the AES is 91,228 ha (28%), 72,058 ha (22%) and 1,63,097 ha (50%) respectively. The major crops grown are paddy, ragi, sugarcane, coconut, mango, tomato, green chilli, bhendi, cabbage, mulberry cultivation, flower production is also practiced along with other allied activities (dairy, poultry, sericulture, agro-forestry etc). Total average rainfall of the district is 725mm with bimodal distribution. The soils are predominately red sandy loams. The total area irrigated in the district is 1, 30,345 ha, which works out to 52% of cultivated area.

3.3 Research design

The research design adopted for this study was ex-post-facto technique, since the phenomenon has already occurred and is continuing. Ex-post-facto research is the most systematic empirical enquiry in which the researcher does not have control over independent variable as their manifestation has already occurred or they are inherent and not manipulatable. Thus, inference about relation among variables was made without direct intervention from concomitant variation of independent and dependent variable.

3.4 Selections of villages and the respondents

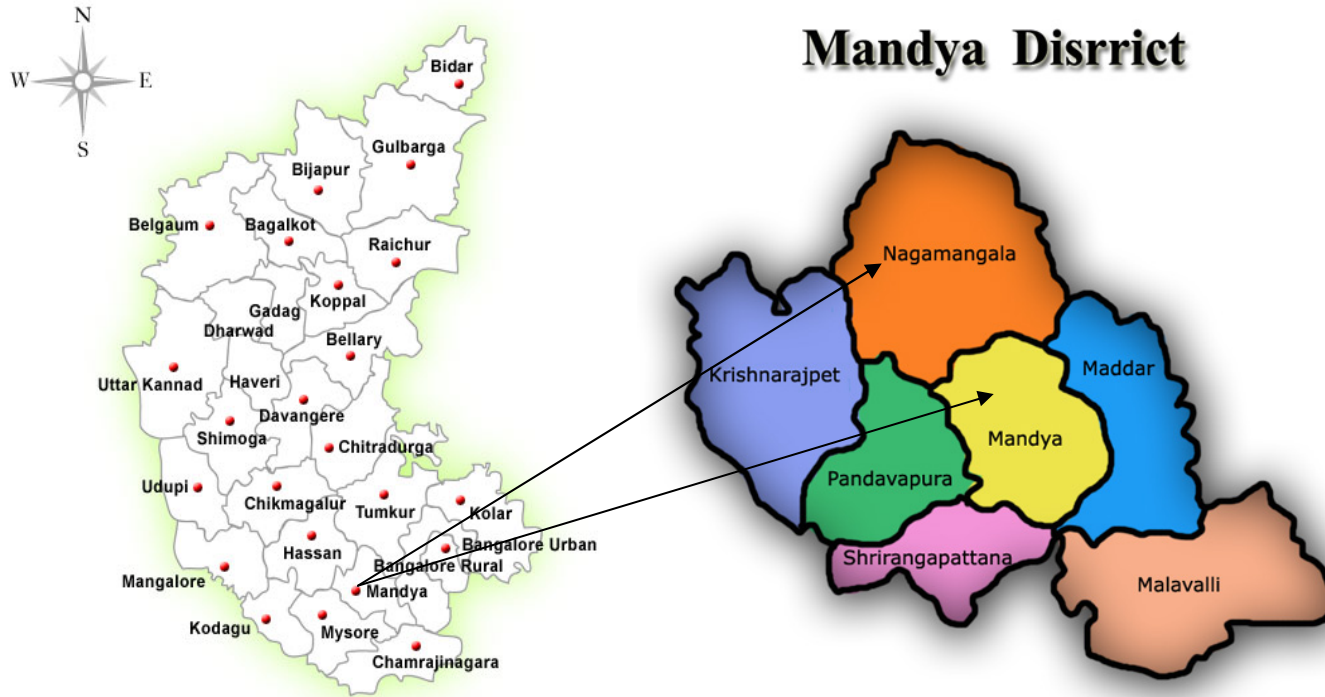
The study was carried out in Mandya district of Karnataka state. Out of seven taluks of the district two taluks were purposively selected based on highest area under irrigation (Mandya) and highest area under dry land situation (Nagamangala). 60 farmers comprising of 20 small, 20 medium and 20 big farmers from each taluks were selected and thus the sample size constituted for the study was 120.

District	Taluks	Hoblies	Villages	Respondents	Total respondents (120)
Mandya	Mandya	Kothathi	Hemmige	10	60
			Soongahalli	10	
		Keregodu	Keregodu	10	
			Keelara	10	
		Dudda	Shivalli	10	
			B .Hosalli	10	
	Nagamangala	Honakere	Honakere	10	60
			Kadiya	10	
		Devalapura	Sampanhalli	10	
			Tattahalli	10	
Bindiganavile		Lalanakere	10		
		Hadaganahalli	10		

3.5 Methods used for measurement of dependent variables.

3.5.1 Dependent Variables used in the study

Variables	Measurement
1. Economic viability <ul style="list-style-type: none"> a. Gross returns b. Net returns c. Rupees per rupee invested 	Schedule developed for the study
2. Employment generation	Schedule developed for the study



Karnataka State

Fig 1: Map indicating the study area

3.5.1.1 Economic viability

Here gross return, Net return and Rupees per rupee investment were calculated for all the selected enterprises

(a) Gross returns: The total monetary returns of the economic produce such as grain, tuber, bulb, fruit, etc. and bye- products viz., straw, fodder, fuel, etc. obtained from the crops and also from different enterprises like sericulture, dairy, poultry, vermicompost and goat rearing etc. The total return is expressed in terms of unit area, usually one hectare.

(b) Net returns: This is worked out by subtracting the total cost of cultivation from the gross returns. This value represents the actual profit obtained by the farmers.

(c) Rupees per rupee invested: This is also called profit- cost ratio or input-output ratio.

$$\text{Rupees per rupee invested} = \frac{\text{Gross returns}}{\text{cost of cultivation}}$$

3.5.1.2 Employment generation

It consists of calculating the differential employment generated in man days per year by taking into consideration employment status under different selected farming systems. One man days is equivalent to eight working hours. Women working days were converted into man days by using the following formula.

$$\text{i.e., } 3 \text{ women-days} = 2 \text{ man -days}$$

Labor generation in different farming systems on the basis of actual hours put in different operations and crop husbandry was recorded. The labour hours were converted into man-days on the basis of eight hours a day. The labour employment potential in different farming

systems was compared on the basis of agricultural year (July to June) during the study periods.

Integrated Farming Systems	Kharif (rainy season)				Rabi (winter season)						Summer Season			Grand total
	J	A	S	O	O	N	D	J	F	M	M	A	J	
Month														

*The agricultural year from July (J) to June (J); Months have been mentioned by first word of the month

3.6 Measurement of Independent Variables

Variables	Emphirical Measurement
Age	Chronological age of the respondents
Education	Procedure developed by Trivedi (1963)
Family size	Procedure developed by Trivedi (1963)
Land holding	Schedule developed for the study
Source of irrigation	Schedule developed for the study
Extension participation level	Procedure developed by Badagaonner (1983)
Social participation	Procedure developed by Hardikar (1998)
Mass media participation	Procedure developed by Patil (1990)
Cropping intensity	Formula developed by Sinha and Kolte (1974)
Land use efficiency	Schedule developed for the study
Attitude towards farming systems	scale developed by Ramegowda (1991) with slight modifications
Crisis perception	Scale developed by Ramegowda (1991) with slight modifications
Entrepreneurial behavior	Scale developed by Anitha (2004) with slight modifications

Level of aspiration	Schedule developed for the study
Family priorities	Schedule developed for the study
Market accessibility	Schedule developed for the study

3.6.1 Age:

The respondents were categorized into young, middle and old and it is calculated for the purpose of analyzing the socio-economic characters. Categorization of age is done as follows.

Category	Criteria
Young	<35 years
Middle	36-50 years
Old	>50 years

3.6.2 Education:

The respondents asked to state their formal educational level. The procedure followed by Trivedi (1963) used with slight modification. The respondents were categorized based on their education level attained as below.

Category	Score
Illiterate	0
Can read	1
Can read and write	2
Primary School	3
Middle School	4
High School	5
PUC	6
Graduation and above	7

Considering the above scoring pattern, the individual score for each respondent was arrived at and they were classified into three categories taking mean and standard deviation as a measure of check.

Category	Criteria
Low	< (Mean - ½ SD)
Medium	(Mean ± ½ SD)
High	> (Mean + ½ SD)

3.6.3 Family size

It refers to the number of members in the family living together under the same roof. The information was collected using simple questions and respondents were grouped into three categories, namely small, medium and big families based on the total members in the family as suggested by Trivedi (1963).

Category	Criteria
Small family	<4 members
Medium family	4-8 members
Large family	>8 members

3.6.4 Land holding

The extent of land actually possessed by the farmer was recorded and this was converted into standard acres based on Karnataka Land Reforms Act 38 of 1996. According to this act, one acre of wet or garden land was considered and equated to 2.50 acres of dry land.

It is taken as the total number of standard acres a farmer owned at the time of data collection including land leased. The conversion of different kinds of land holding into standard dry land acre was done. The extent of land owned by each category of farmers is given as under.

For wet land,

Category	Criteria
Small	< (2.5acres)
Medium	(2.5-10acres)
Big	>(10 acres)

For dry land,

Category	Criteria
Small	<(5.0 acres)
Medium	(5-10 acres)
Big	>(10 acres)

3.6.5 Sources of irrigation

The sources of irrigation considered for the study was tank, canal, open well and tube well. The scores were given as indicated below.

Sources	Scores
Canal	1
Bore well	2

3.6.6 Extension participation level

Extension participation is referred to the extent of participation of farmers in different extension activities during the preceding years of the investigation. The variable was quantified by using the procedure followed by Badagaonnar (1983). The frequency of extension participation was quantified with a three point continuum viz., regularly, occasionally and never with the scores of 2, 1 and 0, respectively. Further, the respondents were grouped in to three categories based on mean score and standard deviation as a measure of check.

Category	Criteria
Low	Less than (mean - ½ SD)
Medium	Between (mean ± ½ SD)
High	More than (mean + ½ SD)

3.6.7 Social participation

It refers to the participation of the respondents in the activities of organizations as a member or as an office bearer or it is the degree of involvement of the respondents from mere membership to organizational positions and his active participation in the activities of local organizations. Scoring for this variable was followed as per Procedure followed by Hardikar (1998).

Position of Respondents	Score
Office bearer of an organization	2
Member of an organization	1
Not a Member of an organization	0

Participation	Score
Regularly	2
Occasionally	1
Never	0

The information on both these aspects of social participation was obtained and scoring was done. The respondents were grouped into three categories using mean and standard deviation as a measure of check.

Category	Criteria
Low	Less than (mean- ½ SD)
Medium	Between (mean ± ½ SD)
High	More than (mean + ½SD)

3.6.8 Mass media participation

It refers to the participation of individuals in different mass communication media in the related activities such as listening to radio, viewing to television and reading news papers. The quantification of mass media exposure was done according to the procedure followed by Patil (1990).

The maximum and minimum score for each respondent were 18 and 0. Higher score reveals greater participation in mass media by the respondent. Further, respondents were categorized into three categories based on mean score and standard deviation as a measure of check.

Sl. No.	Mass media	Owner	Subscriber	Frequency of participation		
				Regular	Occasional	never
1	Listening to Radio (General programme)	1	1	2	1	0
2	Listening to Radio (Agril. programme)	1	1	2	1	0
3	Viewing the TV (General programme)	1	1	2	1	0
4	Viewing the TV (Agril. programmes)	1	1	2	1	0
5	Reading Newspaper	1	1	2	1	0
6	Reading Farm books/ Magazine/ Journals	1	1	2	1	0

Category	Criteria
Low	Less than (mean - ½ SD)
Medium	Between (mean ± ½ SD)
High	More than (mean + ½SD)

3.6.9 Cropping intensity:

It refers to the degree of intensity to which an individual put land into use by cultivating crops.

The variable was empirically measured by computing 'cropping intensity index' based on the formula suggested by Sinha and Kolte (1974).

$$\text{Cropping Intensity Index} = \frac{\text{Gross cropped area}}{\text{Size of landholding}} \times 100$$

The proportion of total annual cropped area to the size of operational holding expressed in percentage. The respondents were categorized into three groups based on the cropping intensity.

Category	Cropping intensity
Low	Up to 100%
Medium	101 to 150%
High	Above 150%

3.6.10. Land use efficiency

(a) **Multiple cropping index or multiple cropping intensity (MCI):** It was proposed by Dalrymple (1971). It is the ratio of total area cropped in a year to the total land area available for cultivation and expressed in percentage.

$$MCI = \frac{\sum_{i=1}^n a_i}{A} \times 100$$

Where, $i=1,2,3,\dots,n$, n =total number of crops, a_i =area occupied by i th crop and A =total land area available for cultivation.

(b) Cultivated land utilization index (CLUI): Cultivated land utilization index (chuang,1973) is calculated by summing the products of land area planted to each crop, multiplied by the actual duration of that crop, divided by the total cultivated land area, times 365 days.

$$CLUI = \frac{\sum_{i=1}^n a_i d_i}{A \times 365} \times 100$$

Where, $i=1,2,3,\dots,n$, n = total number of crops, a_i = area occupied by the i^{th} crop, d_i =days that the i^{th} crop occupies; and A =total cultivated land area available for 365 days.

With the above calculation, all the three components were pooled and classified into three categories taking mean and standard deviation as a measure of check.

Category	Criteria
Low	< (Mean - ½ SD)
Medium	(Mean ± ½ SD)
High	> (Mean + ½ SD)

3.6.11 Attitude towards farming system

In the context of farming system, it was defined as the degree of negative and positive feelings of a farmer towards farming system. Where farming system has been conceptualized as the existence of multi-farm enterprise, combined on their interrelationship, sustainability to physical and social environmental as well as economic capability of farmers in order to maximize the income from all the enterprises as a whole besides meeting food and fodder requirement of his family. The scores of 4,3,2,1,0 were given for response categories strongly agree, agree, undecided, disagree and strongly disagree respectively for favourable attitude. According to procedure followed by Ramegowda (1991) attitude

towards farming system score of the respondents was considered for categorizing the respondents into low, medium and high.

Category	Criteria
Low	< (Mean - ½ SD)
Medium	(Mean ± ½ SD)
High	> (Mean + ½SD)

3.6.12 Crisis perception

The perception of crisis by farmers was quantified in terms of relatively difficultness perceived by a farmer to meet his family need during a drought year when compared to normal year. The three point continuum of Agree completely, Agree partially and Disagree were provided to elicit the farmer response with the scoring of 2,1 and 0. Therefore the score obtained by a respondent on this variable ranged from 0 to 2 according to scale developed by Ramegowda (1991). Crisis perception score of the respondents was considered for categorizing the respondents into low, medium and high.

Category	Criteria
Low	< (Mean - ½ SD)
Medium	(Mean ± ½ SD)
High	> (Mean + ½SD)

3.6.13. Entrepreneurial behaviour

It is the behavioral pattern of an individual to take up other enterprises along with agriculture. This variable was measured by using scale developed by Anitha (2004). It consists of 4 point continuum of response, (most progressive, progressive, some what progressive and least progressive) was followed in this study. The scale consists of eighteen statements and scores of 4, 3,2and 1 was assigned. The mean and standard deviation of Entrepreneurial behaviour score of the

respondents was considered for categorizing the respondents into low, medium and high by keeping Standard Deviation as a measure of check.

Category	Criteria
Low	$< (\text{Mean} - \frac{1}{2} \text{SD})$
Medium	$(\text{Mean} \pm \frac{1}{2} \text{SD})$
High	$> (\text{Mean} + \frac{1}{2}\text{SD})$

3.6.14 level of Aspiration

This is defined as the possible goal an individual sets himself in his performance. Level of aspiration is quantified as the level of future performance in a familiar task, which an individual after knowing the level of past performance in his task, explicitly undertook to reach. Self-anchoring striving scale devised by cantrill (1965) was used in the study, consisting of desires, worries and fears in his own terms and assumptions. A figure of ladder with one to ten steps was shown to each respondent and asked to indicate the steps on the ladder he felt stood personally, (a) at the present time (b) five years ago and (c) five years from now onwards. Corresponding to the steps in the ladder for the present, past and future, scores were given and summed up. The total score would range from 0 to 30. The respondents were categorized into three categories by keeping mean and standard deviation as a measure of check.

Category	Criteria
Low	$< (\text{Mean} - \frac{1}{2} \text{SD})$
Medium	$(\text{Mean} \pm \frac{1}{2} \text{SD})$
High	$> (\text{Mean} + \frac{1}{2}\text{SD})$

3.6.15 Family priority

It refers to the extent of importance given by family members to their needs for the living together under the same roof. The multiple

responses were collected on this aspect using simple questions and respondents were grouped into different categories according to their priorities.

Category	Criteria
Food security	1
Family requirements	1
Nutritional security	1
Livelihood security	1
Social need	1
Financial security	1
Planned future savings	1

After computing the family priorities the respondents were grouped into low, medium and high categories by taking mean and standard deviation as a measure of check.

Category	Criteria
Low	$<(\text{Mean} - 1/2 \text{ SD})$
Medium	$(\text{Mean} \pm 1/2 \text{ SD})$
High	$>(\text{Mean} + 1/2 \text{ SD})$

3.6.16 Market accessibility

It refers to the extent of use of market and marketing information by the farmers. The multiple responses were collected on this aspect using simple questions and respondents were grouped into different categories according to their opinion.

Category	Criteria
a. Based on information obtained by middle man	1
b. By Daily news paper	1
c. By government	1

d.	By procuring agency	1
e.	By previous price	1
f.	Halting facility	1
g.	Drinking water facilities	1
h.	Storage facilities	1
i.	Transportation facilities	1
j.	Regulated procedures	1
k.	No middlemen	1
l.	security for the produce	1

With the above score after computing the respondents were grouped into low, medium and high categories by taking mean and standard deviation as a measure of check.

Category	Criteria
Low	$<(\text{Mean} - 1/2 \text{ SD})$
Medium	$(\text{Mean} \pm 1/2 \text{ SD})$
High	$>(\text{Mean} + 1/2 \text{ SD})$

3.7 Constraints Faced by Farmers practicing Integrated Farming Systems

Constraints are the restrictions or problems undergone by the farmers in the process of adoption of integrated farming system. It consists of production constraints, situational constraints, financial constraints, marketing constraints and extension constraints. Farmers were asked to indicate the constraints they faced which were noted down. The constraints were grouped and responses were pooled together. The scores were assigned based on the responses of the respondents. Based on the score, the constraints were grouped accordingly to the ranks.

3.8 Instruments used for data collection:

Keeping the objectives of the study in view, a structured schedule was prepared with the help of experts in the field of Agricultural Extension, which included all the variables to study farmers profile (Appendix-I) and village profile (Appendix-II). Data collection was done by personal interview method with the help of the schedule. The data collection was done during the month of February 2012.

3.8 Statistical tools employed for analysis of data:

Appropriate statistical tools were used for analyzing the data of investigation. The data collected from the respondents were scored, tabulated and analyzed using the following statistical tools and techniques.

3.8.1 Percentage

Percentage was used to make the simple comparison of different groups where ever needed.

3.8.2 Mean

Mean is the sum of the observed values of a set divided by the number of observations in the set is called a mean or an average. The calculated mean was used for grouping the respondents.

3.8.3 Standard Deviation

The positive square root of the variance is called standard deviation. It explains the average amount of variation on either side of the mean.

The mean and standard deviation were used to classify the farmers into three following categories.

Category	Criteria
Low	$<(\text{Mean} - 1/2 \text{ SD})$
Medium	$(\text{Mean} \pm 1/2 \text{ SD})$
High	$>(\text{Mean} + 1/2 \text{ SD})$

3.8.4 Frequencies

A frequency distribution was used to quantify the different personal, social, psychological and economic characteristics of the farmers. It was also used in the response analysis of knowledge and adoption statements.

3.8.5 Correlation Test

Correlation test was used to calculate r-value, which facilitated to know the relationship between dependent and independent variables.

3.8.6 Multiple Linear Regressions

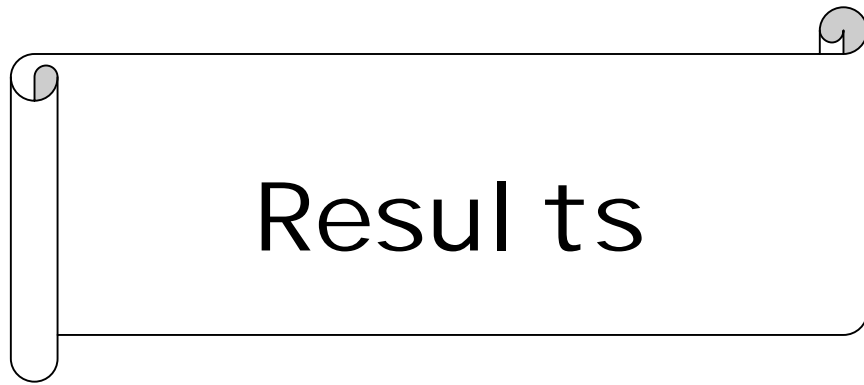
This test was employed to know the nature and extent of effect on the dependent variables, which is caused by the independent variables. Further, R^2 was used to assess the level of contribution between the variables under study.

3.9 Conceptual Model of the Study

Conceptually the variables under study were presented in Figure 2. It is conceived that the dependent variables - economic viability and employment generation were influenced by the independent variables like age, education family size, land holding, sources of irrigation, social participation, mass media participation, extension participation, attitude towards farming system, crisis perception, entrepreneurial behavior, cropping intensity, land use efficiency, family priorities and market opportunity.



Fig. 2. Conceptual model of the study

A horizontal scroll graphic with a black outline and rounded corners. The scroll is partially unrolled, with the top and bottom edges curving upwards at the right end and downwards at the left end. The word "Results" is written in a black, sans-serif font in the center of the scroll.

Results

Based on the objectives and methodology mentioned in the preceding chapters, a systematic study was made and the results obtained from the analysis of the data are presented under following headings:

- 4.1 Personal, socio-psychological characteristics of farmers practiced Integrated Farming systems
- 4.2 Integrated Farming Systems adopted by different category of farmers under irrigated and dry land
- 4.3 Economic viability of Integrated Farming Systems practiced by farmers under irrigated and dry land
- 4.4 Employment generation of farmers practiced Integrated Farming Systems under irrigated and dry land
- 4.5 Comparison of performance of farmers practiced Integrated Farming Systems under irrigated and dry land
- 4.6 Relationship between personal, socio-psychological characteristics of farmers with economic viability in irrigated and dry land
- 4.7 Relationship between personal, socio-psychological characteristics of farmers with employment generation in irrigated and dry land
- 4.8 Contribution of personal and socio-psychological characteristics with economic viability in irrigated and dry land
- 4.9 Contribution of personal and socio-psychological characteristics with employment generation in irrigated and dry land
- 4.10 Constraints faced by the farmers practicing Integrated Farming Systems

4.1 Personal, socio-psychological characteristics of farmers practicing Integrated Farming Systems.

4.1.1 Age

The data in table 1 gives the age grouping of the farmers practicing integrated farming system under irrigated and dry land.

It was observed that in irrigated land, in case of small farmers more than half (60.00%) of the farmers belonged to middle age followed by, young (25.00%) and old (15.00%) age categories. In case of medium farmers majorities (55.00%) of the farmers were under middle age category followed by young age (30.00%) and old age (15.00%) categories. Whereas, in case of big farmers majorities (55.00%) of the farmers were under old age category, followed by middle age (35.00%) and young age (10.00%) categories.

In dry land, in case of small farmers majority (60.00%) of the farmers belonged to middle age followed by old (25.00%) and young age category (10.00%). In case of medium farmers, 80.00 per cent of the farmers were under middle age followed by old age (15.00%) and young age (5.00%) categories. In case of big farmers 45.00 per cent of the farmers were under old age category, followed by young (30.00%) and old age (25.00%) categories.

The pooled data indicated that majority (68.33%) of the farmers were under middle age, followed by young (22.50%) and old age (9.17%) categories.

4.1.2 Education

The education level of farmers practicing integrated farming system under irrigated and dry land has been presented in Table 2.

Table 1. Distribution of respondents according to their age

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Young (<35 years)	5	25.00	6	30.00	2	10.00	3	10.00	1	5.00	6	30.00	27	22.50
Middle (36-50 years)	12	60.00	11	55.00	7	35.00	12	60.00	16	80.00	5	25.00	82	68.33
Old (>50 years)	3	15.00	3	15.00	11	55.00	5	25.00	3	15.00	9	45.00	11	9.17
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean=39.90
SD= 7.60

No. =Number, %= Percentage

Table 2. Distribution of respondents according to their education

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Illiterate	10	50.00	6	30.00	6	30.00	6	30.00	3	15.00	7	35.00	40	33.33
Can read	0	0.00	2	10.00	2	10.00	3	15.00	1	5.00	2	10.00	10	8.33
Can read and write	0	0.00	1	5.00	2	10.00	0	0.00	2	10.00	1	5.00	6	5.00
Primary school	2	10.00	0	0.00	0	0.00	1	5.00	3	15.00	0	0.00	6	5.00
Middle school	3	15.00	1	5.00	1	5.00	0	0.00	3	15.00	0	0.00	8	6.66
High school	4	20.00	5	25.00	5	25.00	8	40.00	7	35.00	4	20.00	32	26.66
Pre university/ Diploma	1	5.00	5	20.00	4	20.00	2	10.00	1	5.00	3	15.00	15	12.50
Graduates and above	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	3	15.00	3	2.50
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean= 3.37

SD=2.63

No. =Number, %= Percentage

It was observed that in irrigated land majority of small farmers were illiterate, (50.00%) followed by high school education (20.00%). In case of medium farmers 30.00 per cent of the respondents were belonged to illiterate followed by high school (25.00%) and Pre University (20.00%). Whereas in case of big farmers 30.00 per cent were illiterates, followed by high school (25.00%), and pre university/diploma (20.00%) level of education.

In dry land, majority of small farmers were high school education i.e. 40.00 per cent followed by illiterate, (30.00%), can read (15.00 %) and pre university/diploma (10.00%). In case of medium farmers about 35.00 per cent were studied up to high school followed by, primary school (15.00%), middle school (15.00%) and illiterate (15.00%). Whereas in case of big farmers, 35.00 per cent were under illiterates followed by, high school (20.00%), pre university/diploma (15.00%) and Graduates and above (15.00%).

The pooled data indicated that nearly 34.00 per cent of the farmers were under illiterate category, followed by high school (26.66%), pre university/diploma (12.50%) and only 2.50 per cent studied upto graduation and above.

4.1.3 Family size

The farmers practicing integrated farming system were classified into three groups depending on the family size and the results were tabulated and presented in Table 3.

In irrigated land a great majority (70.00%) of small farmers were under medium family size followed by, large (20.00%) and small (10.00%) family size. In case of medium farmers a great majority (80.00 per cent) were under medium family size followed by large (15.00%) and small (5.00%) family size. In case of big farmers majority (60.00 per cent) were

Table 3. Distribution of respondents according to their Family size

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	NO.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Small	2	10.00	1	5.00	2	10.00	6	30.00	6	30.00	5	25.00	56	46.67
Medium	14	70.00	16	80.00	12	60.00	6	30.00	9	45.00	10	50.00	34	28.33
Large	4	20.00	3	15.00	6	30.00	8	40.00	5	25.00	5	25.00	30	25.00
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean=7.23

SD=2.30

No. =Number, %= Percentage

medium family size, followed by large (30.00%) and small (10.00%) family size.

In dry land 40.00 per cent of small farmers were large family size followed by equal (30.00%) per cent farmers were small and medium size. In case of medium farmers about 45.00 per cent of farmers were under medium family size, followed by small (30.00%) and large (25.00%) family size. In case of big farmers half (50.00%) of farmers were medium family size, followed by small (25.00%) and large (25.00%) family size.

The results from the pooled data indicated nearly half (46.67%) of the respondents had small family size, followed by 28.33 per cent and 25.00 per cent had medium and large family size respectively.

4.1.4 Sources of irrigation

The farmers practicing integrated farming system were categorized into two group based on source of irrigation in both dry and irrigated area.

It is clear from the Table 4 that cent per cent of the farmers in the irrigated land were using canal water as the source of irrigation and cent per cent of farmers in the Nagamangala taluk region were using bore well as the source of irrigation.

4.1.5 Social participation

The keen observation of Table 5 revealed the extent of social participation of the farmers practicing integrated farming system.

In irrigated land it was noticed that a great majority (80.00%) of small farmers were low social participation followed by, high (15.00%) and medium (5.00%) level of participation. In case of medium farmers half of (50.00%) the farmers were under low participation level, followed

**Table 4. Distribution of respondents according to their sources of irrigation
(n=120)**

Category	Irrigated land		Dry land	
	No.	%	No.	%
Canal	60	100.00	0	0.00
Bore well	0	0.00	60	100.00
Total	60	100.00	60	100.00

No. =Number, %= Percentage

Table 5. Distribution of respondents according to their Social participation

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	16	80.00	10	50.00	5	25.00	16	80.00	8	40.00	2	10.00	54	45.00
Medium	1	5.00	7	35.00	5	25.00	2	10.00	10	50.00	6	30.00	25	20.83
High	3	15.00	3	15.00	10	50.00	2	10.00	2	10.00	12	60.00	41	34.17
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean=1.475
SD= 2.22

No. =Number, %= Percentage

by medium (35.00%) and high (15.00%) level of participation. Whereas in case of big farmers half (50.00%) of the farmers were under high participation level followed by equal per cent of (25.00%) farmers were under low and medium level of participation.

In dry land a great majority (80.00%) of small farmers were under low social participation followed by equal per cent of (10.00%) farmers were under medium and high social participation. In case of medium farmers half (50.00%) of the farmers were under medium social participation followed by low (40.00%) and high social participation. Majority of big farmers (60.00 %) were under high social participation, followed by medium (30.00%) and low (10.00%) social participation.

In total, majority of the respondents belonged to low (43.33%) followed by high (34.17%) and medium (22.50%) level of social participation.

4.1.6 Extension participation

The result in the Table 6 revealed at extension participation of the farmers practicing integrated farming system in various organizations and they were categorized into three groups.

In irrigated land it was observed that nearly half (45.00%) of small farmers were under low followed by medium (30.00%) and high (25.00%) level of extension participation. In case of medium farmers, 45.00 per cent of farmers were under high followed by medium (35.00%) and low (20.00%) level of extension participation. Exactly half (50.00%) of big farmers were under high extension participation, followed by medium (30.00%) and low (20.00%) level of extension participation.

In dry land it was observed that majority of small farmers were under low (45.00%) level of extension participation followed by medium

Table 6. Distribution of respondents according to their Extension Participation

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	NO.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	6	45.00	4	20.00	4	20.00	9	45.00	2	10.00	2	10.00	27	22.50
Medium	9	30.00	7	35.00	6	30.00	7	35.00	17	85.00	13	65.00	52	43.33
High	5	25.00	9	45.00	10	50.00	4	20.00	1	5.00	5	25.00	41	34.17
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean= 19.43
SD= 4.33

No. =Number, %= Percentage

(35.00%) and high (20.00%) extension participation. In case of medium farmers, 85.00 per cent of farmers were under medium followed by low (10.00%) and high (5.00%) extension participation. In case of big farmers 65.00 per cent of the farmers were under medium, followed by high (25.00%) and low (10.00%) level of extension participation.

Also the pooled data indicated that nearly half (43.33%) of the farmers were under medium extension participation followed by high (34.17%) and low (22.50%) level of extension participation.

4.1.7 Mass media participation

It is evident from the Table 7 that level of mass media participation of farmers practicing integrated farming system were categorized into three groups under different cropping conditions.

In irrigated land more than half (60.00%) of small farmers belonged to low mass media participation followed by equal per cent (20.00%) of farmers under medium and high level of mass media participation. Further, 50.00 per cent of medium farmers were under medium, followed by low (30.00%) and high (20.00%) level of mass media participation whereas 50.00 per cent of big farmers belonged to high level of mass media participation, followed by medium (30.00%) and low (20.00%) level of mass media participation.

In dry land situation, 50.00 per cent of small farmers belonged to low mass media participation followed by medium (30.00%) and high (20.00%) level of mass media participation. Exactly half (50.00%) of medium farmers belonged to medium mass media participation, followed by high (30.00%) and low (20.00%) level of mass media participation. Whereas, 80.00 per cent big farmers were under high, followed by medium (15.00%) and low (5.00%) level of mass media participation.

Table 7. Distribution of respondents according to their Mass media participation

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	NO.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	12	60.00	6	30.00	4	20.00	10	50.00	4	20.00	1	5.00	33	27.50
Medium	4	20.00	10	50.00	6	30.00	6	30.00	10	50.00	3	15.00	55	45.83
High	4	20.00	4	20.00	10	50.00	4	20.00	6	30.00	16	80.00	32	26.67
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean= 10.21
SD=2.77

No. =Number, %= Percentage

The results from the pooled data indicated that less than half of the respondents (45.83%) belonged to medium level of mass media participation category. However, 27.50 per cent and 26.67 per cent of farmers belonged to low and high level of mass media participation categories, respectively.

4.1.8 Level of aspiration

The farmers practicing integrated farming system were classified according to their level of aspiration and result has been presented in Table 8 under different condition.

In irrigated land majority (60.00%) of small farmers belonged to medium level of aspiration followed by equal per cent of (20.00%) farmers belonged to low and high level of aspiration. In case of medium farmers, 50.00 per cent were under medium level of aspiration followed by high (40.00%) and low (10.00%) level of aspiration. Whereas, in case of big farmers more than half (55.00%) of farmers were under high level of aspiration followed by medium (30.00%) and low (15.00%) level of aspiration.

In dry land 55.00 per cent of small farmers were under low level of aspiration followed by medium (40.00%) and low (5.00%) level of aspiration. In case of medium farmers half (50.00%) of the farmers were under medium level of aspiration followed by low (35.00%) and high (15.00%) level of aspiration. Whereas, 40.00 per cent of big farmers were under medium category, followed by equal per cent (30.00%) were under low and high level of aspiration.

A glance at the sample as a whole indicated that 41.67 per cent had medium level of aspiration, followed by high (34.17%) and low (24.17%) level of aspiration.

Table 8. Distribution of respondents according to their Level of aspiration

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	NO.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	4	20.00	2	10.00	3	15.00	11	55.00	7	35.00	6	30.00	29	24.17
Medium	12	60.00	10	50.00	6	30.00	8	40.00	10	50.00	8	40.00	50	41.67
High	4	20.00	8	40.00	11	55.00	1	5.00	3	15.00	6	30.00	41	34.17
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean=5.60
SD=1.79

No. =Number, %= Percentage

4.1.9 Attitude towards farming system

It is apparent from the Table 9 that the attitude towards farming system of farmers practicing integrated farming system under different condition.

In irrigated land majority (65.00%) small farmers had favorable attitude towards farming system followed by least favorable (20.00%) and more favorable (15.00%) attitude towards farming system. In case of medium farmers 40.00 per cent of farmers had favorable attitude towards farming system followed by most favorable (35.00%) and least favorable (25.00%) attitude towards farming system. Whereas in case of big farmers majority had favorable category, followed by least favorable (20.00%) and most favorable (15.00%) attitude towards farming system.

In dry land situation, 50.00 per cent of small farmers had favorable attitude towards farming system followed by least favorable (45.00%) and most favorable (5.00%) attitude towards farming system. In case of medium farmers equal per cent (35.00%) of farmers belonged to favorable and least favorable attitude towards farming systems, followed by most favorable (30.00%) attitude towards farming system. Whereas, big farmers 40.00 per cent had favorable attitude followed by equal per cent (30.00%) of farmers were least and most favorable attitude towards farming system.

The results from the pooled data indicated that about 40.00 per cent of the respondents had favorable whereas, 30.83 and 29.17 per cent of them had most and least favorable attitude towards farming system respectively.

Table 9. Distribution of respondents according to their Attitude towards farming system

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Least favorable	4	20.00	5	25.00	4	20.00	9	45.00	7	35.00	6	30.00	35	29.17
Favorable	13	65.00	8	40.00	13	65.00	10	50.00	7	35.00	8	40.00	48	40.00
Most favorable	3	15.00	7	35.00	3	15.00	1	5.00	6	30.00	6	30.00	37	30.83
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean= 22.2
SD=4.38

No. =Number, %= Percentage

4.1.10 Crisis perception

Crisis perception of farmers practicing integrated farming systems is present in Table 10 and it was categorized into three groups.

In irrigated land 45.00 per cent of small farmers belonged to high crisis perception followed by medium (35.00%) and low (20.00%) crisis perception. In case of medium farmers nearly half (45.00%) were under medium level of crisis perception followed by high (30.00%) and low (25.00%). Whereas in case of big farmers majority (65.00%) were under medium crisis perception level, followed by high (20.00%) and low (15.00%) crisis perception.

In dry land 40.00 per cent of farmers had high crisis perception followed by medium (35.00%) and low (25.00%) crisis perception. In case on medium farmers 50.00 per cent of farmers belonged to medium crisis perception followed by low (35.00%) and high (15.00%) crisis perception. Whereas in case of big farmers 40.00 per cent of farmers were grouped under medium crisis perception, followed by low (35.00%) and high (25.00%) crisis perception.

Also the pooled data indicated that about 40.000 per cent of the respondents belonged to medium crisis perception level, followed by low (35.00%) and high (25.00%) crisis perception.

4.1.11 Entrepreneurial behaviour

We can notice entrepreneurial behavior of farmers practicing integrated farming system in Table 11 and were categorized into three groups under different conditions.

In irrigated situation exactly two-fifth (40.00%) of small farmers exhibited low entrepreneurial behavior followed by high (35.00%) and medium (25.00%) entrepreneurial behaviour. In case of medium farmers

Table 10. Distribution of respondents according to their Crisis perception

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	4	20.00	5	25.00	3	15.00	5	25.00	3	15.00	7	35.00	42	35.00
Medium	7	35.00	9	45.00	13	65.00	7	35.00	10	50.00	8	40.00	48	40.00
High	9	45.00	6	30.00	4	20.00	8	40.00	7	35.00	5	25.00	30	25.00
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean= 10.81
SD=2.18

No. =Number, %= Percentage

Table 11. Distribution of respondents according to their Entrepreneurial behaviour

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	8	40.00	3	15.00	6	30.00	5	30.00	5	25.00	6	30.00	35	29.17
Medium	7	35.00	13	65.00	4	20.00	13	65.00	8	40.00	5	25.00	41	34.17
High	5	25.00	4	20.00	10	50.00	2	10.00	7	35.00	9	45.00	44	36.67
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean= 50.59
SD=8.57

No. =Number, %= Percentage

majority (65.00%) of farmers belonged to medium entrepreneurial behavior, followed by 20.00 and 15.00 per cent were under high and low entrepreneurial behaviour, respectively. Whereas in case of big farmers exactly half (50.00%) of the farmers had high entrepreneurial behavior followed by low (30.00%) and medium (20.00%) entrepreneurial behaviour.

In dry land more than half (65.00%) of small farmers belonged to medium entrepreneurial behavior, followed by low (30.00%) and high (10.00%) entrepreneurial behaviour. In case of medium farmers two-fifth (40.00%) farmers were under medium entrepreneurial behaviour followed by high (35.00%) and low (25.00%) entrepreneurial behaviour whereas 40.00 per cent of big farmers had high entrepreneurial behaviour followed by medium (25.00%) and low (30.00%) entrepreneurial behaviour.

The results from the pooled data indicated that more than one-third (36.67%) respondents belonged to high category. Whereas, 34.17 per cent and 29.17 per cent of farmers had medium and low entrepreneurial behaviour respectively.

4.1.12 Cropping intensity

The table 12 presents the cropping intensity of farmers practicing integrated farming system in three different groups under different conditions.

In irrigated area equal (45.00%) per cent of small farmers were under low and high category. In case of medium farmers 45.00 per cent were under medium category followed by low (30.00%) and high (25.00%) cropping intensity category whereas, 40.00 per cent of big farmers belonged to low category, followed by medium (35.00%) and high (25.00%) category of cropping intensity.

Table 12. Distribution of respondents according to their Cropping intensity

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	9	45.00	6	30.00	8	40.00	8	40.00	5	25.00	7	35.00	40	33.33
Medium	5	25.00	9	45.00	7	35.00	7	35.00	10	50.00	9	45.00	49	40.83
High	6	30.00	5	25.00	5	25.00	5	25.00	5	25.00	4	20.00	31	25.83
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean= 104.98
SD=34.97

No. =Number, %= Percentage

In dry land 40.00 per cent of small farmers were under low followed by medium (35.00%) and high (35.00%) category of cropping intensity further, 50.00 per cent of medium were medium cropping intensity followed by equal per cent (25.00%) of farmers were low and high cropping intensity. Whereas, in case of big farmers more than two-fifth (45.00%) were under medium category, followed by low (35.00%) and high (20.00%) category of cropping intensity.

A glance at the sample as a whole indicated that about 40.83 per cent falls under medium category followed by low (33.33%) and high (25.83%) cropping intensity category.

4.1.13 Family priorities

Table 13 revealed the order of family priorities of farmers practicing integrated farming system.

In irrigated land more than half of (55.00%) the small farmers were had medium family priorities followed by high (25.00%) and low (20.00%) family priorities. Further in case of medium farmers exactly half of the farmers had medium family priorities, followed by medium (30.00%) and low (20.00%) family priorities. Whereas in case of big farmers' 50.00 per cent of the farmers had high family priorities followed by medium (40.00%) and low (10.00%) family priorities.

In dry land 40.00 per cent of the small farmers were had medium family priorities category, followed by low (30.00%) and high (20.00%) and further in case of medium farmers 40.00 per cent of farmers were belonged to medium category followed by equal per cent (30.00%) of farmers with low and high family priorities. Whereas in case of big farmers, majority (75.00%) of farmers were belonged to high family priorities category followed by medium (15.00%) and low (10.00%) family priorities.

Table 13. Distribution of respondents according to their Family priorities

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	4	20.00	6	30.00	2	10.00	6	30.00	6	30.00	2	10.00	33	27.50
Medium	11	55.00	10	50.00	8	40.00	8	40.00	8	40.00	3	15.00	45	37.50
High	5	25.00	4	20.00	10	50.00	4	20.00	6	30.00	15	75.00	42	35.00
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean=4.54
SD=1.97

No. =Number, %= Percentage

Also the pooled data indicated that about 37.00 per cent of the respondents had medium family priorities, followed by high (35.00%) and low (27.00%) family priorities.

4.1.14 Market accessibility

Table 14 presents the market accessibility of farmers practicing integrated farming system.

In irrigated land 50.00 per cent of small farmers had low market accessibility followed by equal per cent (25.00%) of farmers with medium and high Market accessibility category. Further in case of medium farmers two- fifth (45.00%) of farmers had medium Market accessibility followed by high (35.00%) and low (20.00%) Market accessibility. Whereas in case of big farmers, exactly equal per cent (40.00%) of farmers were belonged to medium and high Market accessibility category, followed by low (20.00%) Market accessibility.

In dry land more than half (65.00%) of the small farmers had medium Market accessibility followed by low (20.00%) and high (15.00%) Market accessibility and further with medium farmers exactly half (50.00%) of the farmers were under medium Market accessibility followed by low (30.00%) and high (20.00%) Market accessibility. Whereas in case of big farmers 40.00 per cent of farmers belonged to medium category followed by 30.00 per cent of farmers were low and high Market accessibility.

The results from the pooled data indicated that nearly two- fifth (37.50%) of the farmers were belonged to medium Market accessibility followed by high (35.83%) and low (26.67%) Market accessibility.

Table 14. Distribution of respondents according to their Market accessibility

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	10	50.00	4	20.00	4	20.00	4	20.00	6	30.00	6	30.00	32	26.67
Medium	5	25.00	9	45.00	8	40.00	13	65.00	10	50.00	8	40.00	45	37.50
High	5	25.00	7	35.00	8	40.00	3	15.00	4	20.00	6	30.00	43	35.83
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean= 6.35
SD=2.22

No. =Number, %= Percentage

4.1.15 Land use efficiency

From the Table 15 we can observe the results of the land use efficiency of farmers practicing integrated farming system

In irrigated land, 45.00 per cent of small farmers had medium land use efficiency followed by low (35.00%) and high(30.00%) land use efficiency. whereas medium farmers 40.00 per cent of farmers were under low category followed by medium (35.00%) and high (25.00%) land use efficiency. Further, in case of big farmers exactly half (50.00%) were under high category, followed by medium (35.00%) and low (15.00%) land use efficiency.

In dry land 65.00 per cent of small farmers were under medium category followed by low (25.00%) and high (10.00%) land use efficiency. In case of medium farmers exactly equal per cent (35.00%) of farmers belonged to medium and high category, followed by 30.00 per cent of farmers were under low land use efficiency. Whereas, 45.00 per cent of big farmers were high category followed by medium (35.00%) and low (20.00%) land use efficiency.

The pooled data indicated that more than one-third (38.33%) per cent of farmers were medium category, followed by low (33.33%) and high (28.33%) land use efficiency.

4.2 Integrated Farming Systems practiced by different category of farmers under irrigated and dry land

Table 16 provides information on different integrated farming systems followed by different category of farmers in irrigated land. More than one third (35.00%) of small farmers practiced agriculture + sericulture followed by agriculture+ dairy (30.00%), agriculture+ sericulture+ dairy (15.00%) and exactly equal per cent (10.00%) of small

Table 15. Distribution of respondents according to their land use efficiency

Category	Irrigated land						Dry land						Total (n=120)	
	Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)		Small farmers (n ₁ =20)		Medium farmers (n ₂ =20)		Big farmers (n ₃ =20)			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low	5	25.00	8	40.00	3	15.00	5	25.00	6	30.00	4	20.00	40	33.33
Medium	9	45.00	7	35.00	7	35.00	13	65.00	8	40.00	7	35.00	46	38.33
High	6	30.00	5	25.00	10	50.00	2	10.00	6	30.00	9	45.00	34	28.33
Total	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	20	100.00	120	100.00

Mean=253.99

SD= 34.97

No. =Number, %= Percentage

Table 16. Integrated farming systems practiced by different category of farmers under irrigated land

Sl. No.	Integrated farming system	Category							
		Small farmers n ₁ =20		Medium Farmers n ₂ =20		Big farmers n ₃ =20		Total (n =60)	
		No.	%	No.	%	No.	%	No.	%
1	Agriculture+ Sericulture	7	35	3	15	1	5	11	18.34
2	Agriculture + Dairy	6	30	2	10	0	0	8	13.33
3	Agriculture +Dairy +Horticulture	2	10	3	15	1	5	6	10.00
4	Agriculture + Sericulture + Dairy	3	15	4	20	7	35	14	23.34
5	Agriculture+Sericulture+Goat rearing	2	10	3	15	2	10	7	11.66
6	Agriculture+Sericulture+Dairy+Poultry	0	0	5	25	4	20	9	15.00
7	Agriculture+Sericulture+Dairy+Goatrearing+Vermicompost	0	0	0	0	5	25	5	8.33
Total		20	100	20	100	20	100	60	100

No. =Number, %= Percentage

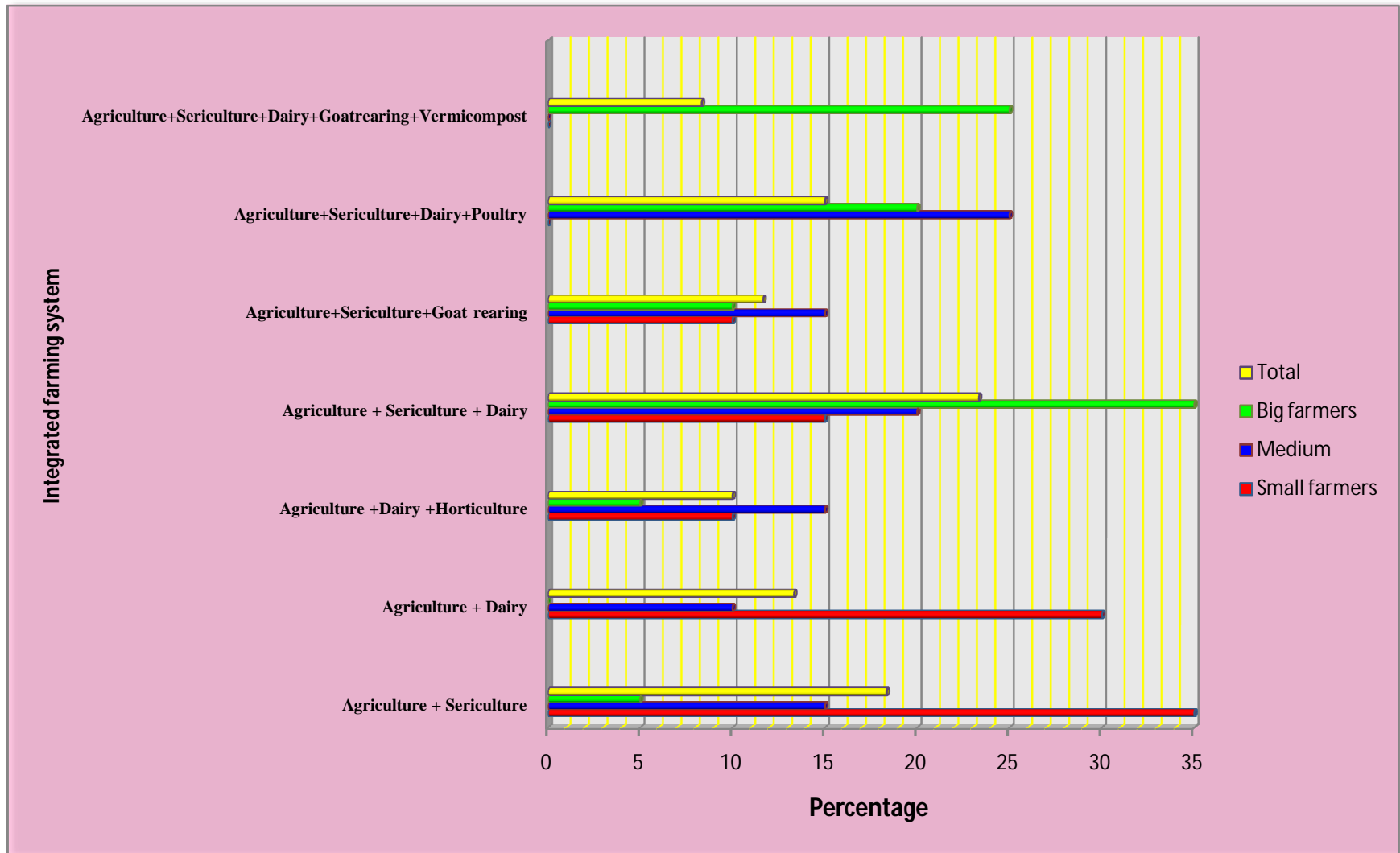


Fig. 3. Integrated Farming Systems adopted by different category of farmers under irrigated land

farmers practiced agriculture + dairy +horticulture and agriculture + sericulture +goat rearing respectively. Further, 25.00 per cent of medium farmers practiced agriculture + sericulture + dairy+ poultry followed by, agriculture+ sericulture+ dairy (20.00%) and equal per cent (15.00%) of medium farmers were followed agriculture+ sericulture, agriculture+ dairy +horticulture and agriculture + sericulture +goat rearing and 10.00 per cent of medium farmers practiced agriculture + dairy. Whereas 35.00 per cent of big farmers were practiced agriculture + sericulture +dairy followed by agriculture + sericulture +dairy +goat rearing + vermicompost (25.00%), agriculture+ sericulture+ dairy +poultry (20.00%) ,agriculture+ sericulture +goat rearing(10.00%) and exactly equal per cent (5.00%) of big farmers were practiced agriculture + sericulture and agriculture + dairy +horticulture respectively.

It is evident from Table 17 that dry land that about 30.00 per cent of small farmers practiced horticulture +dairy, followed by exactly equal per cent (20.00%) of small farmers adopted horticulture + dairy+ forestry and horticulture + dairy+ goat rearing and also equal per cent (15.00%) of small farmers were practiced agriculture+ horticulture and horticulture + dairy + sericulture respectively. Further, nearly one third (30.00%) of medium farmers adopted horticulture +dairy +forestry followed by, equal per cent (20.00%) of medium farmers with horticulture + dairy + goat rearing+ forestry and horticulture+ dairy enterprises. It could also be seen from the results that equal per cent (15.00%) of medium farmers were practiced horticulture + dairy + sericulture, agriculture + horticulture +dairy +forestry and 10.00 per cent of medium farmers practiced agriculture + horticulture. Whereas 35.00 per cent of big farmers practiced agriculture + horticulture +dairy +forestry followed by, horticulture +dairy +forestry (25.00%), horticulture + dairy+ goat rearing+ forestry (15.00%) and exactly equal (10.00%)per cent of big farmers adopted horticulture + dairy and horticulture + dairy

Table 17. Integrated farming systems practiced by different category of farmers under dry land

SI No	Integrated farming system	Category							
		Small farmers n ₁ =20		Medium Farmers n ₂ =20		Big farmers n ₃ =20		Total (n =60)	
		No.	%	No.	%	No.	%	No.	%
1	Agriculture +Horticoulture	3	15	2	10	0	0	5	8.34
2	Horticulture +Dairy	6	30	4	20	2	10	12	20.00
3	Horticulture +Dairy +Forestry	4	20	6	30	5	25	15	25.00
4	Horticulture +Dairy+Sericulture	3	15	3	15	1	5	7	11.66
5	Horticulture +Dairy+Goat rearing	4	20	0	0	2	10	6	10.00
6	Agriculture +Horticulture+Dairy+ Forestry	0	0	3	15	7	35	10	16.66
7	Horticulture +Dairy+Goat rearing +Forestry	0	0	2	20	3	15	5	8.34
Total		20	100	20	100	20	100	60	100

No. =Number, %= Percentage

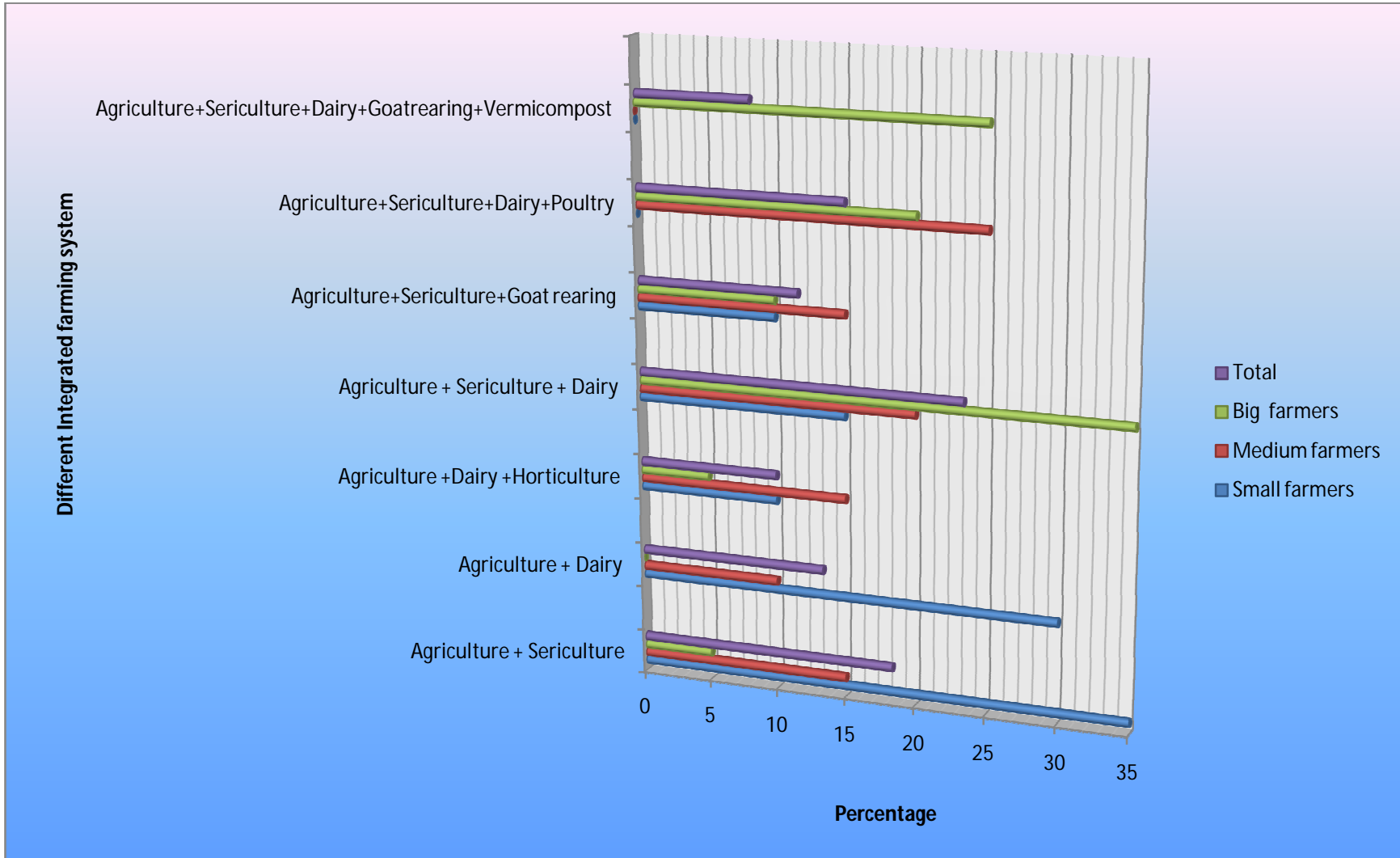


Fig. 4. Integrated Farming Systems adopted by different category of farmers under dry land

+ goat rearing and 5.00 per cent of big farmers were practiced horticulture + dairy + sericulture.

4.3 Economic viability of farmers practiced Integrated Farming Systems in irrigated and dry land.

It was noticed that in Table 18 the results of economic viability of farmers practicing different integrated farming systems in irrigated land were presented. In case of small farmers agriculture+ sericulture+ goat rearing produce highest net return (Rs.1.70 per rupee invested) followed by agriculture + sericulture + dairy (Rs.1.69 per rupee invested), crop production+ dairy + horticulture (Rs.1.66 per rupee invested), agriculture +dairy (Rs.1.64 per rupee invested) and agriculture + sericulture (Rs.1.45 per rupee invested). Further, in case medium farmers agriculture + sericulture +dairy + poultry produce highest return (Rs.1.76 per rupee invested) followed by agriculture+ sericulture + goat rearing (Rs.1.74 per rupee invested), agriculture + sericulture + dairy (Rs.1.74 per rupee invested), agriculture+ dairy + horticulture (Rs.1.73 per rupee invested), agriculture + dairy (Rs.1.73 per rupee invested) and agriculture + sericulture (Rs.1.72 per rupee invested). Whereas in case of big farmers agriculture + sericulture + dairy + goat rearing + vermicompost produce highest return (Rs.2.28 per rupee invested) followed by agriculture+ sericulture +dairy +poultry (Rs.1.91 per rupee invested), agriculture+ sericulture+ goat rearing (Rs.1.88 per rupee invested), agriculture +sericulture + dairy (Rs.1.81 per rupee invested), agriculture+ dairy+ horticulture (Rs.1.78 per rupee invested) and agriculture +sericulture (Rs.1.77 per rupee invested).

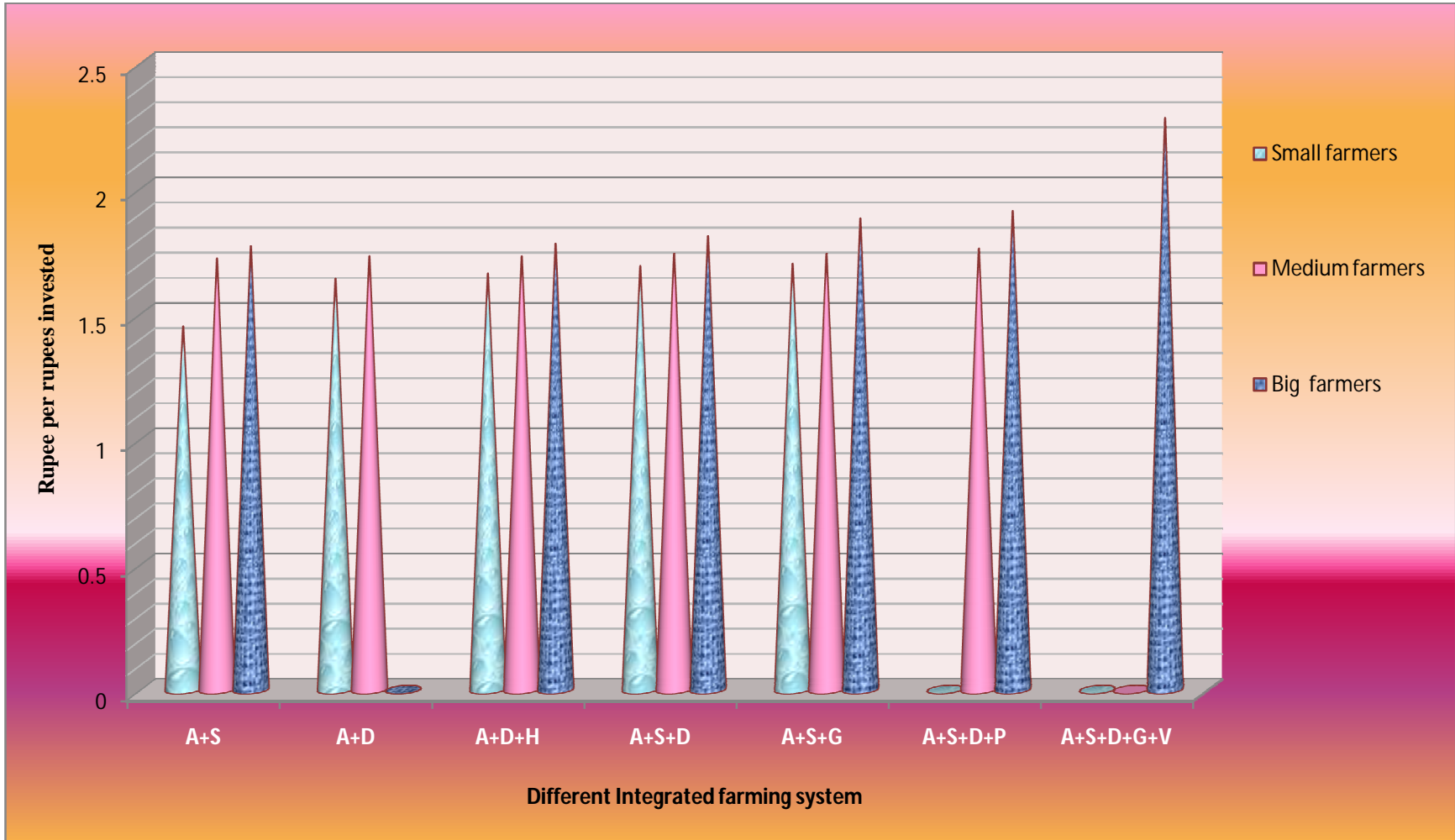
From the Table 19 reveals the economic viability of farmers adopted integrated farming system in dry land. In case of small farmers horticulture + dairy + goat rearing produced highest net return (Rs.1.55 per rupee invested) followed by, agriculture+ dairy + sericulture (Rs.1.54

Table 18. Economic viability of integrated farming systems practiced by farmers under irrigated land

(n =60)

SI No	Integrated farming system	Gross return	Total cost of production	Net return	Rupee per rupees invested
Small farmers					
1	A+S	115500	79500	36000	1.45
2	A+D	191600	117000	74600	1.64
3	A+D+H	242000	146000	96000	1.66
4	A+S+D	237000	140000	97000	1.69
5	A+S+G	245000	144000	101000	1.70
Medium farmers					
1	A+S	231000	134500	96500	1.72
2	A+D	383200	221900	161300	1.73
3	A+D+H	484000	280000	204000	1.73
4	A+S+D	474000	273000	201000	1.74
5	A+S+G	490000	281000	209000	1.74
6	A+S+D+P	615000	350000	265000	1.76
Big farmers					
1	A+S	462000	260000	202000	1.77
2	A+D+H	766400	431200	335200	1.78
3	A+S+D	968000	534000	434000	1.81
4	A+S+G	948000	505000	443000	1.88
5	A+S+D+P	980000	512000	468000	1.91
6	A+S+D+G+V	1230000	540000	690000	2.28

A=Agriculture, D=Dairy, H=Horticulture, S=Sericulture, P=poultry, G=goat rearing, V=vermicompost



**A=Agriculture, D=Dairy, H=Horticulture, S=Sericulture, P=poultry, G=goat rearing, V=vermicompost

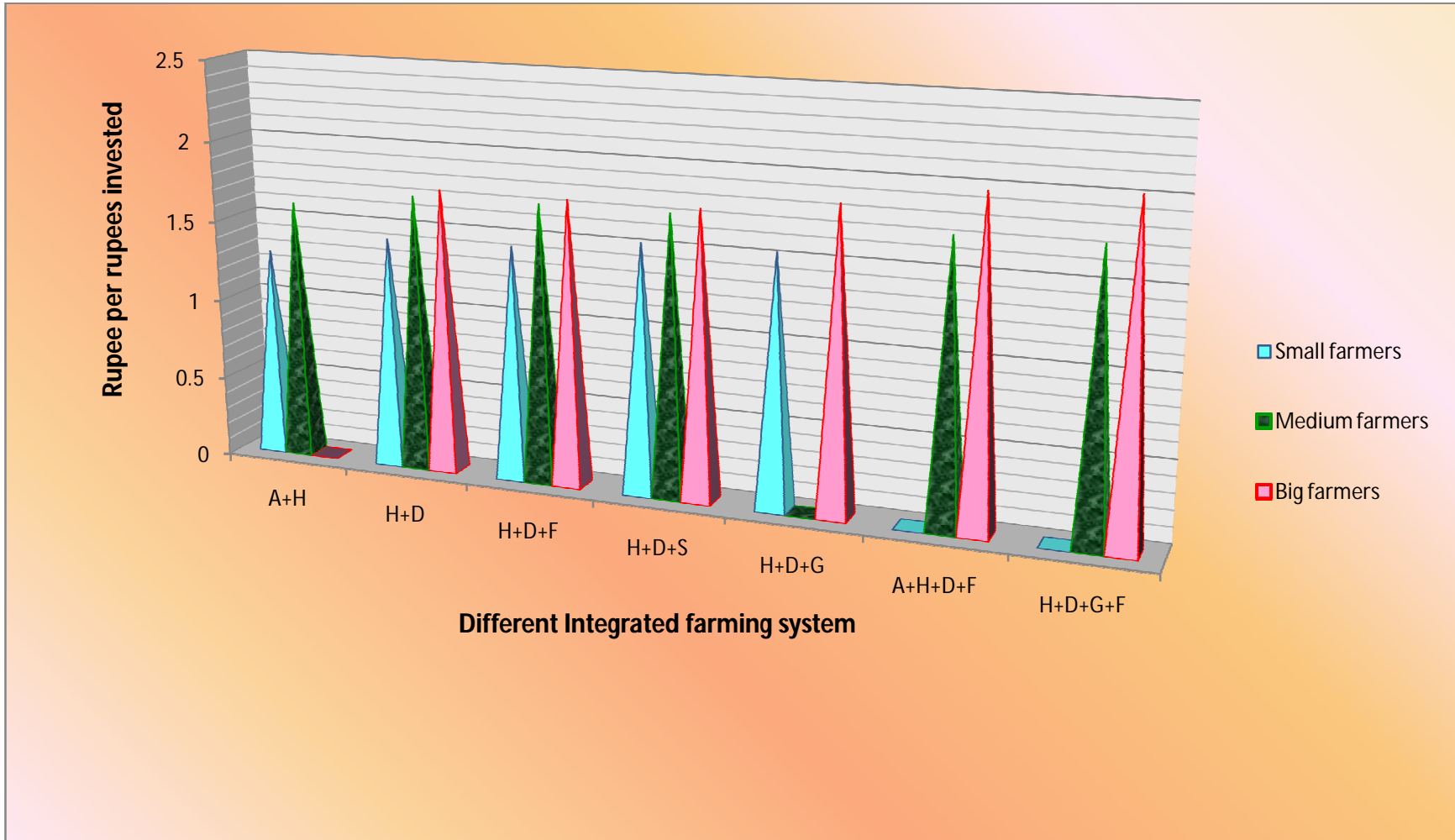
Fig. 5. Economic viability of Integrated Farming Systems adopted by farmers under irrigated Land

Table 19. Economic viability of integrated farming systems practiced by farmers under dry land

(n =60)

Sl. No.	Integrated farming system	Gross return	Total cost of production	Net return	Rupee per rupees invested
Small farmers					
1	A+H	130000	100900	29100	1.29
2	H+D	366400	255500	110900	1.43
3	H+D+F	421400	289500	131900	1.45
4	H+D+S	362900	235000	127900	1.54
5	H+D+G	403200	259000	144200	1.55
Medium farmers					
1	A+H	260000	161000	99000	1.61
2	H+D	732800	429000	303800	1.71
3	H+D+F	842800	490900	351900	1.72
4	H+D+S	725800	420500	305300	1.73
5	A+H+D+F	806400	466000	340400	1.73
6	H+D+G+F	865000	495000	370000	1.75
Big farmers					
1	H+D	520000	295000	225000	1.76
2	H+D+F	1465600	832000	633600	1.76
3	H+D+S	1685600	950000	735600	1.77
4	H+D+G	1451600	780000	671600	1.86
5	A+H+D+F	1612800	808000	804800	1.99
6	H+D+G+F	1730000	850000	880000	2.03

A=Agriculture, D=Dairy, H=Horticulture, S=Sericulture, P=poultry, G=goat rearing, F=forestry



**A=Agriculture, D=Dairy, H=Horticulture, S=Sericulture, P=poultry, G=goat rearing, F=forestry

Fig. 6. Economic viability of Integrated Farming Systems adopted by farmers under dry land

per rupee invested), horticulture + dairy+ forestry (Rs.1.45 per rupee invested), horticulture + dairy (Rs.1.43 per rupee invested) and agriculture+ horticulture (Rs.1.29 per rupee invested). Further, in case of medium farmers horticulture + dairy+ goat rearing + forestry produced highest net return (Rs.1.75 per rupee invested) followed by, agriculture+ horticulture + dairy +forestry (Rs.1.73 per rupee invested), horticulture +dairy +sericulture (Rs.1.73 per rupee invested), horticulture +dairy +forestry (Rs.1.72 per rupee invested), horticulture + dairy (Rs.1.71 per rupee invested) and agriculture + horticulture (Rs.1.61 per rupee invested). Whereas in case of big farmers horticulture + dairy+ goat rearing + forestry produce highest net return (Rs.2.03 per rupee invested) followed by agriculture+ horticulture + dairy +forestry (Rs.1.99 per rupee invested), horticulture +dairy + goat rearing (Rs.1.86 per rupee invested), horticulture + dairy + sericulture (Rs.1.77 per rupee invested), horticulture + dairy + forestry (Rs.1.76 per rupee invested) and horticulture + dairy (Rs.1.76 per rupee invested).

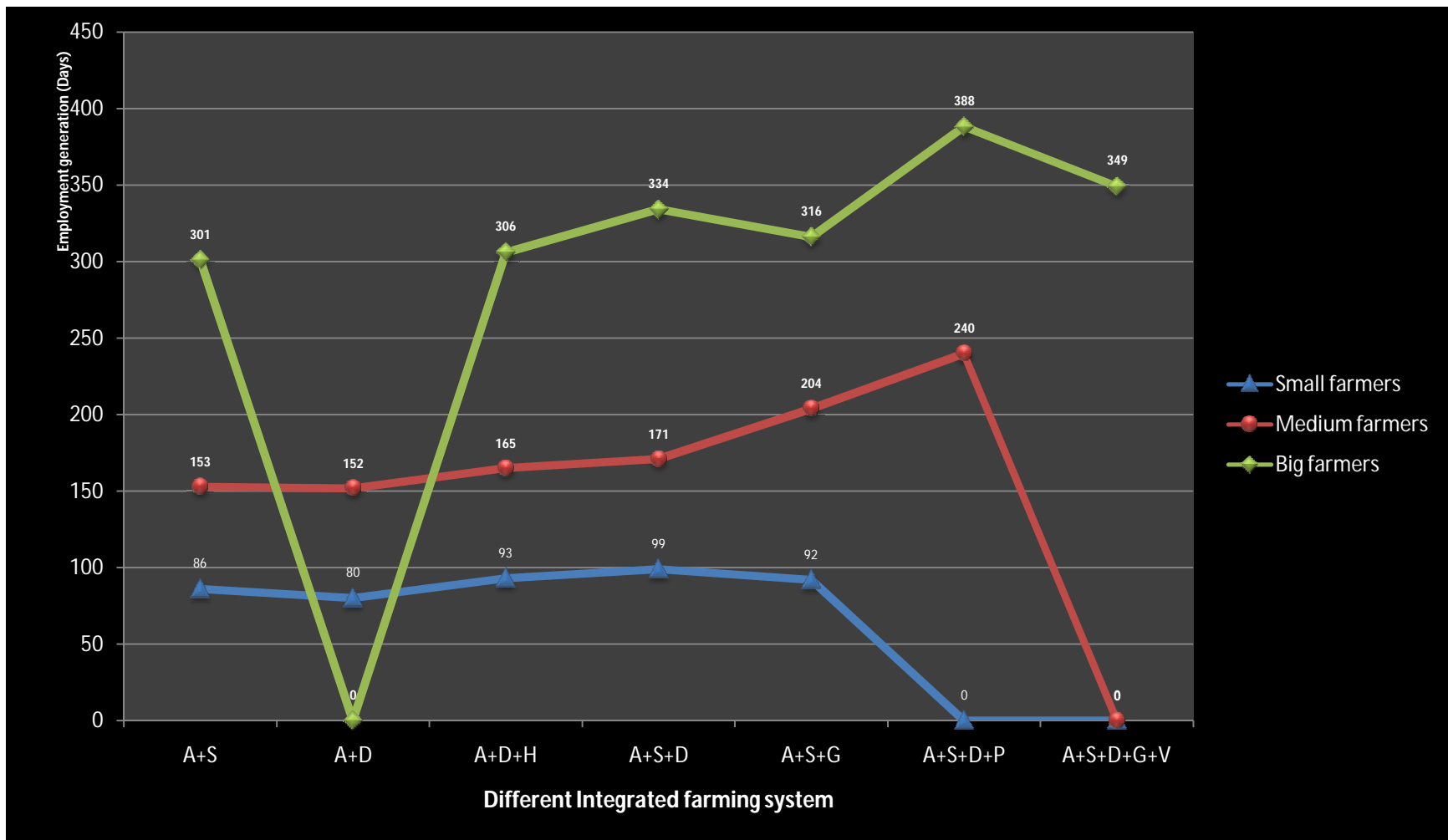
4.4 Employment generation of farmers practiced Integrated Farming Systems in irrigated and dry land

The data on employment generation under various Integrated Farming Systems were provided Table 20 under irrigated land. In case of small farmers highest employment generation was found in case of agriculture + sericulture + dairy (99 man days/year) followed by agriculture + dairy +horticulture (93 man days/year), agriculture + sericulture +goat rearing (92 man days/year), agriculture + sericulture (86 man days/year) and agriculture+ dairy (80 man days/year). Further, in case of medium farmers highest employment generation was found in agriculture + sericulture + dairy + poultry (240 man days/year) followed by, agriculture+ sericulture+ goat rearing (204 man days/year), agriculture+ sericulture + dairy (171 man days/year), agriculture + dairy + horticulture (165 man days/year), agriculture + dairy (152 man days/

Table 20. Employment generation of farmers practiced integrated farming systems under irrigated land (n=60)

Sl. No.	Integrated farming system	Kharif(rainy season)					Rabi (winter season)								Summer season				Grand total
		J	A	S	O	Total	O	S	N	D	J	F	M	Total	M	A	J	Total	
Small farmers																			
1	A+S	11	9	6	8	34	7	4	7	6	2	4	4	34	6	5	7	18	86
2	A+D	12	4	6	7	29	6	5	5	4	5	4	5	35	6	5	5	16	80
3	A+D+H	14	6	5	6	31	6	7	7	9	5	4	3	41	6	7	8	21	93
4	A+S+D	15	5	5	10	35	13	3	2	5	7	5	6	41	7	7	9	23	99
5	A+S+G	16	3	4	9	32	14	6	2	8	5	5	3	43	6	5	6	17	92
Medium farmers																			
1	A+S	25	13	12	10	60	12	12	10	6	10	9	6	65	10	9	9	28	153
2	A+D	24	16	13	14	67	10	9	8	8	7	9	7	58	10	9	8	27	152
3	A+D+H	25	9	5	20	59	15	7	6	5	12	15	15	75	8	9	14	31	165
4	A+S+D	31	8	10	20	69	20	8	8	10	9	10	10	75	10	8	9	27	171
5	A+S+G	50	8	6	20	84	24	12	10	8	8	12	10	84	12	12	12	36	204
6	A+S+D+P	45	16	15	36	112	34	9	8	9	11	8	10	89	10	14	15	39	240
Big farmers																			
1	A+S	45	13	15	35	108	30	11	10	9	21	33	33	147	16	14	16	46	301
2	A+D+H	44	28	23	28	123	23	22	15	17	15	23	18	133	22	15	13	50	306
3	A+S+D	48	22	24	22	116	24	28	28	13	26	18	15	152	22	22	22	66	334
4	A+S+G	40	27	27	19	113	20	19	18	25	22	21	11	136	25	18	24	67	316
5	A+S+D+P	95	9	12	40	156	48	25	18	14	10	26	22	163	25	22	22	69	388
6	A+S+D+G+V	74	25	12	55	166	60	17	10	14	17	9	9	136	16	14	17	47	349

*The agricultural year from July (J) to June (J); Months have been mentioned by first word of the month and A=Agriculture, D=Dairy, H=Horticulture, S=Sericulture, P=poultry, G=goat rearing, V=vermicompost



**A=Agriculture, D=Dairy, H=Horticulture, S=Sericulture, P=poultry, G=goat rearing, V=vermicompost

Fig. 7. Employment generation of farmers adopted Integrated Farming Systems under irrigated land

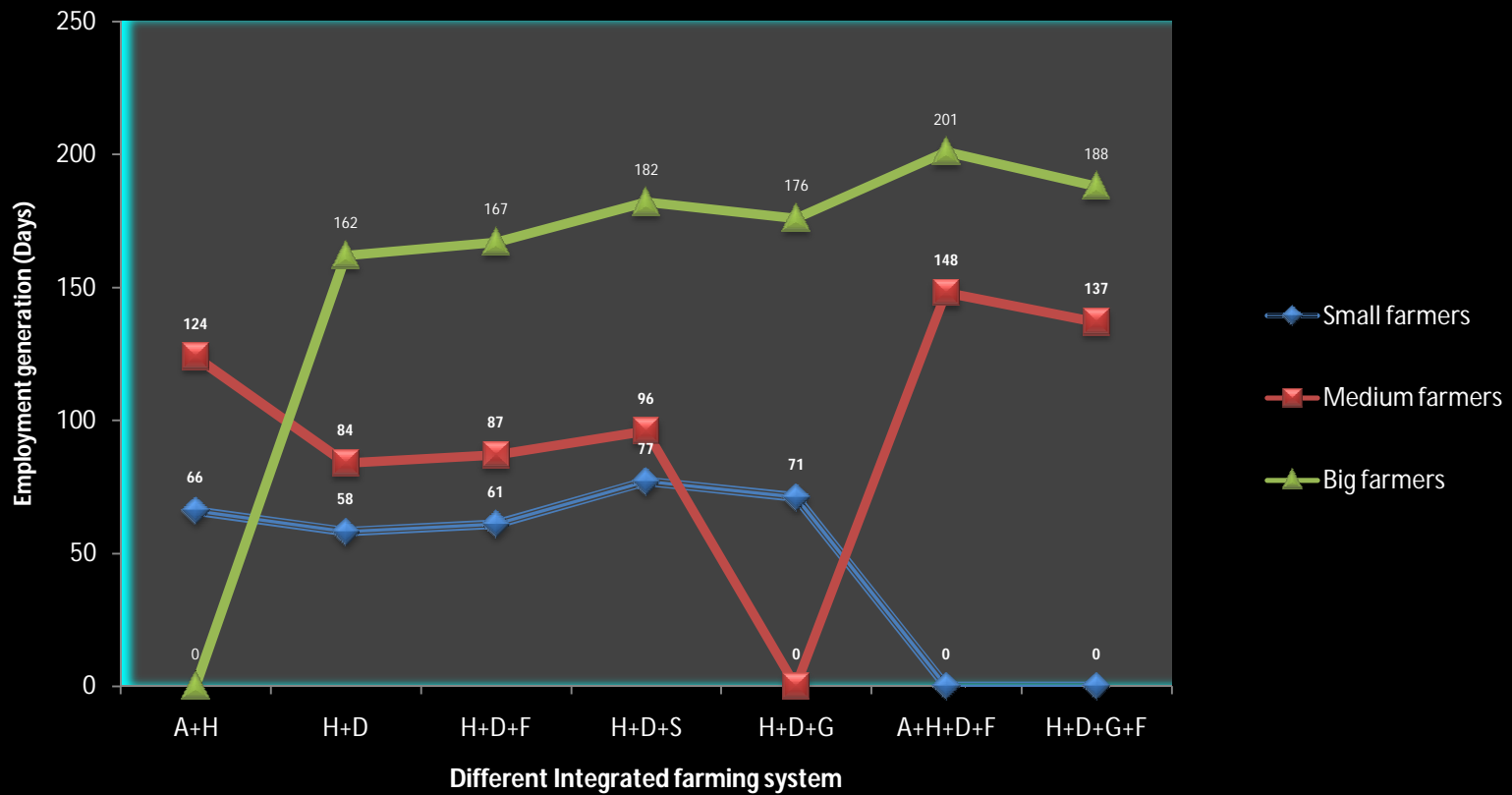
year) and crop production+ sericulture (153 man days/year). Whereas in case of big farmers highest employment generation was found in agriculture + sericulture + dairy + poultry (388 man days/year) followed by, agriculture+ sericulture + dairy+ goat rearing+ vermicompost (349 man days/year), agriculture+ sericulture+ dairy (334 man days/year), agriculture+ sericulture +goat rearing (316 man days/year), agriculture + dairy +horticulture (306 man days/year) and agriculture+ sericulture (301 man days/year).

The Table 21 indicated that employment generation of farmers practicing integrated farming system in dry land. In case small farmers highest employment generation was found in horticulture + dairy+ sericulture (77 man days/year) followed by, horticulture + dairy +goat rearing (71 man days/year), agriculture + horticulture (66 man days), horticulture + dairy + forestry (61 man days/year) and horticulture + dairy (58 man days/year). Further, in case of medium farmers highest employment generation was found agriculture + horticulture + dairy +forestry (148 man days/year) followed by, horticulture + dairy + goat rearing+ forestry (137 man days/year), crop production+ horticulture (124 man days/year), horticulture + dairy+ sericulture (96 man days/year), horticulture + dairy+ forestry (87 man days/year) and horticulture + dairy (84 man days/year). Whereas in case of big farmer highest employment generation was found in crop production+ horticulture + dairy +forestry (201 man days/year) followed by horticulture + dairy + goat rearing + forestry (188 man days/year), horticulture + dairy + sericulture (182 man days/year), horticulture + dairy + goat rearing (176 man days/year), horticulture + dairy + forestry (167 man days/year) and horticulture +dairy (162 man days/year).

Table 21. Employment generation of farmers practicing integrated farming systems under dry land
(n=60)

Sl. No.	Integrated farming system	Kharif(rainy season)					Rabi (winter season)								Summer season				Grand total
		J	A	S	O	Total	O	S	N	D	J	F	M	Total	M	A	J	Total	
Small farmers																			
1	C+H	9	7	3	7	26	6	3	2	3	2	2	5	23	6	5	6	17	66
2	C+D	10	4	2	10	26	6	2	2	3	3	4	2	22	6	2	2	10	58
3	C+D+F	8	2	3	7	20	8	2	4	2	4	3	3	26	7	4	4	15	61
4	C+D+S	8	7	7	8	30	5	5	4	4	4	5	4	31	5	5	6	16	77
5	C+D+G	8	5	6	6	25	5	3	6	4	5	4	3	30	6	4	6	16	71
Medium farmers																			
1	C+H	25	9	9	15	58	13	3	3	6	7	8	4	44	8	7	7	22	124
2	H+D	13	4	6	6	29	7	6	6	5	6	5	3	38	7	5	5	17	84
3	H+D+F	14	8	8	7	37	7	7	6	4	3	3	6	36	4	5	5	14	87
4	H+D+S	17	8	5	15	45	9	4	4	4	6	4	4	35	7	2	7	16	96
5	C+H+D+F	23	9	7	19	58	16	5	9	8	7	6	11	62	11	8	9	28	148
6	H+D+G+F	25	7	6	13	51	12	9	9	6	6	9	6	57	12	8	9	29	137
Big farmers																			
1	H+D	25	8	7	17	57	15	4	6	9	12	17	16	79	9	8	9	26	162
2	H+D+F	24	13	14	15	66	12	11	8	10	10	11	9	71	13	9	8	30	167
3	H+D+S	25	13	14	12	64	13	15	16	7	14	9	8	82	11	13	12	36	182
4	H+D+G	22	16	15	10	63	11	11	11	13	12	11	8	77	13	9	14	36	176
5	C+H+D+F	45	5	6	21	77	23	13	8	9	6	13	14	86	15	11	12	38	201
6	H+D+G+F	31	19	9	24	83	31	9	8	9	9	5	5	76	8	10	11	29	188

*The agricultural year from July (J) to June (J); Months have been mentioned by first word of the month and A=Agriculture, D=Dairy, H=Horticulture, S=Sericulture, P=poultry, G=goat rearing, F=forestry



**A=Agriculture, D=Dairy, H=Horticulture, S=Sericulture, P=poultry, G=goat rearing, F=forestry

Fig. 8. Employment generation of farmers adopted Integrated Farming Systems under dry land

4.5 Comparison of performance of farmers practicing integrated farming system under irrigated and dry land

One way ANOVA was used for compare the performance of farmers practiced integrated farming systems under irrigated and dry land

It could be seen in the Table 22 that farmers practicing integrated farming system entirely different both in irrigated and dry land. It was noticed that farmers under irrigated land were had more economic viability (1.80 per rupee investment) and generate more employment (209 man days/year) over the years compare to economic viability (1.65 rupees per rupee investment) and employment generation (114 man days/year) of farmers practicing integrated farming systems under dry land.

4.6 Relationship between personal, socio-psychological characteristics of farmers with economic viability in irrigated and dry land

In order to measure the relationship that exists between the independent variables with economic viability of farmers the correlation coefficients were worked out and tested for its statistical significance.

The Table 23 revealed that relationship between independent variables with economic viability of farmers in irrigated land. The variables such as family size, land holding, level of aspiration, mass media participation, extension participation, crisis perception and family priorities had positive and significant relationship with economic viability at one per cent level of significance and entrepreneurial behaviour, cropping intensity and land use efficiency had positive and significant relationship with economic viability at five per cent level. Other variables such as age, education, sources of irrigation, social participation,

Table 22. Comparison of performance of farmers practicing integrated farming system under irrigated and dry land (n=120)

Variable	Irrigated land		Dry land		Student 't' test
	Mean	Std dev	Mean	Std dev	
Economic viability	1.80	0.170	1.65	0.182	4.80*
Employment Generation	209	106.51	114	46.61	6.33*

	Irrigated land		Dry land		Student 't'test
	Mean	Std dev	Mean	Std dev	
Economic viability					
Small farmers	1.62	0.0939	1.45	0.0963	5.67**
Medium farmers	1.76	0.0128	1.70	0.0496	2.61**
Big farmers	1.89	0.1752	1.85	0.1124	3.4**
Employment generation					
Small farmers	89.70	6.69	66.60	7.01	2.17**
Medium farmers	178.00	31.97	111.80	25.25	7.26**
Big farmers	329.45	30.33	177.85	13.48	20.42**

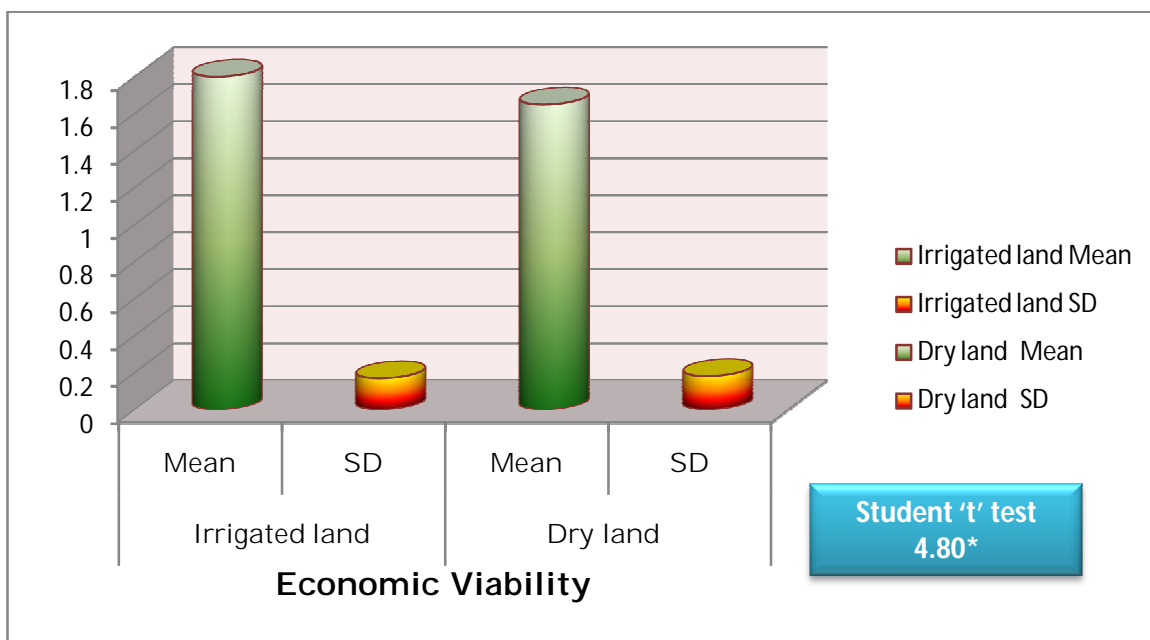


Fig. 9. Comparison of performance of Economic viability of farmers practiced Integrated Farming Systems under irrigated and dry land

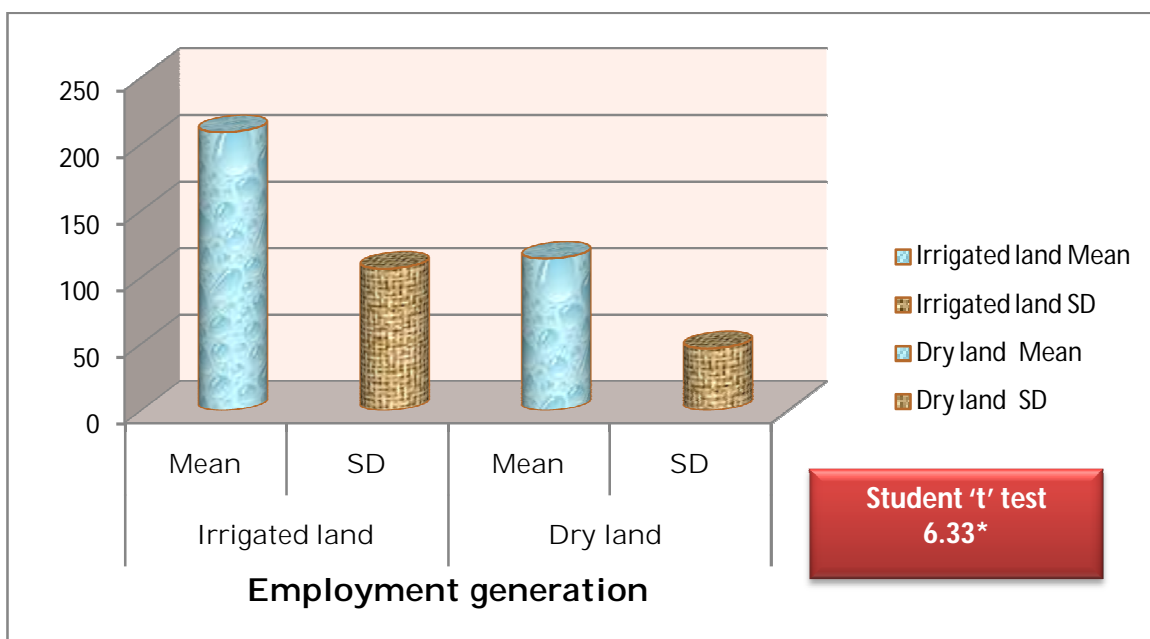


Fig. 10. Comparison of performance of Employment generation of farmers practiced integrated farming system under irrigated and dry land

Table 23. Relationship between personal, socio-psychological characteristics of farmers with economic viability in irrigated land (n=60)

Sl. No.	Independent variables	Correlation coefficient (r)
1	Age	0.224 ^{NS}
2	Education	0.156 ^{NS}
3	Family size	0.383 ^{**}
4	Land holding	0.525 ^{**}
5	Sources of irrigation	0.022 ^{NS}
6	Extension participation	0.633 ^{**}
7	Social participation	0.202 ^{NS}
8	Mass media participation	0.535 ^{**}
9	Level of aspiration	0.373 ^{**}
10	Attitude towards farming system	0.015 ^{NS}
11	Crisis perception	0.387 ^{**}
12	Entrepreneurial behavior	0.276 [*]
13	Cropping intensity	0.261 [*]
14	Market accessibility	0.153 ^{NS}
15	Land use efficiency	0.317 [*]
16	Family priorities	0.531 ^{**}

**correlation is significant at the 0.01 level

*correlation is significant at the 0.05 level

NS = Non-Significant

attitude towards farming system and market accessibility had non significant relationship with economic viability.

From the Table 24 it is evident that in dry land, the variables such as education, land holding, social participation, level of aspiration, crisis perception, entrepreneurial behaviour, land use efficiency and family priorities had positive and significant relationship with economic viability at one per cent level of the dry land farmers. Whereas, family size and cropping intensity had positively significant relationship with economic viability at five per cent.

Other variable such as age, sources of irrigation, extension participation, mass media participation, attitude towards farming system and market accessibility had non significant relationship with economic viability.

4.7 Relationship between personal, socio-psychological characteristics of farmers with employment generation in irrigated and dry land

In order to measure the relationship that exists between the independent variables with employment generation of farmers practicing integrated farming system the correlation coefficients were worked out and tested for its statistical significance.

It is apparent from Table 25 that in irrigated land, the variables such as education, family size, land holding, sources of irrigation, mass media participation, crisis perception, cropping intensity and market accessibility had positive and significant relationship with employment generation at one per cent level and social participation showed positive and significant relationship at five per cent level. Whereas, age, level of aspiration, attitude towards farming system, entrepreneurial behaviour, land use efficiency, extension participation and family priorities had

Table 24. Relationship between personal, socio-psychological characteristics of farmers with economic viability in dry land (n=60)

Sl. No.	Independent variables	Correlation coefficient (r)
1	Age	0.070 ^{NS}
2	Education	0.423 ^{**}
3	Family size	0.307 [*]
4	Land holding	0.657 ^{**}
5	Sources of irrigation	0.105 ^{NS}
6	Extension participation	0.008 ^{NS}
7	Social participation	0.362 ^{**}
8	Mass media participation	0.104 ^{NS}
9	Level of aspiration	0.770 ^{**}
10	Attitude towards farming system	0.035 ^{NS}
11	Crisis perception	0.510 ^{**}
12	Entrepreneurial behavior	0.391 ^{**}
13	Cropping intensity	0.294 [*]
14	Market accessibility	0.049 ^{NS}
15	Land use efficiency	0.404 ^{**}
16	Family priorities	0.558 ^{**}

**correlation is significance at the 0.01 level

*correlation is significant at the 0.05 level

NS = Non-Significant

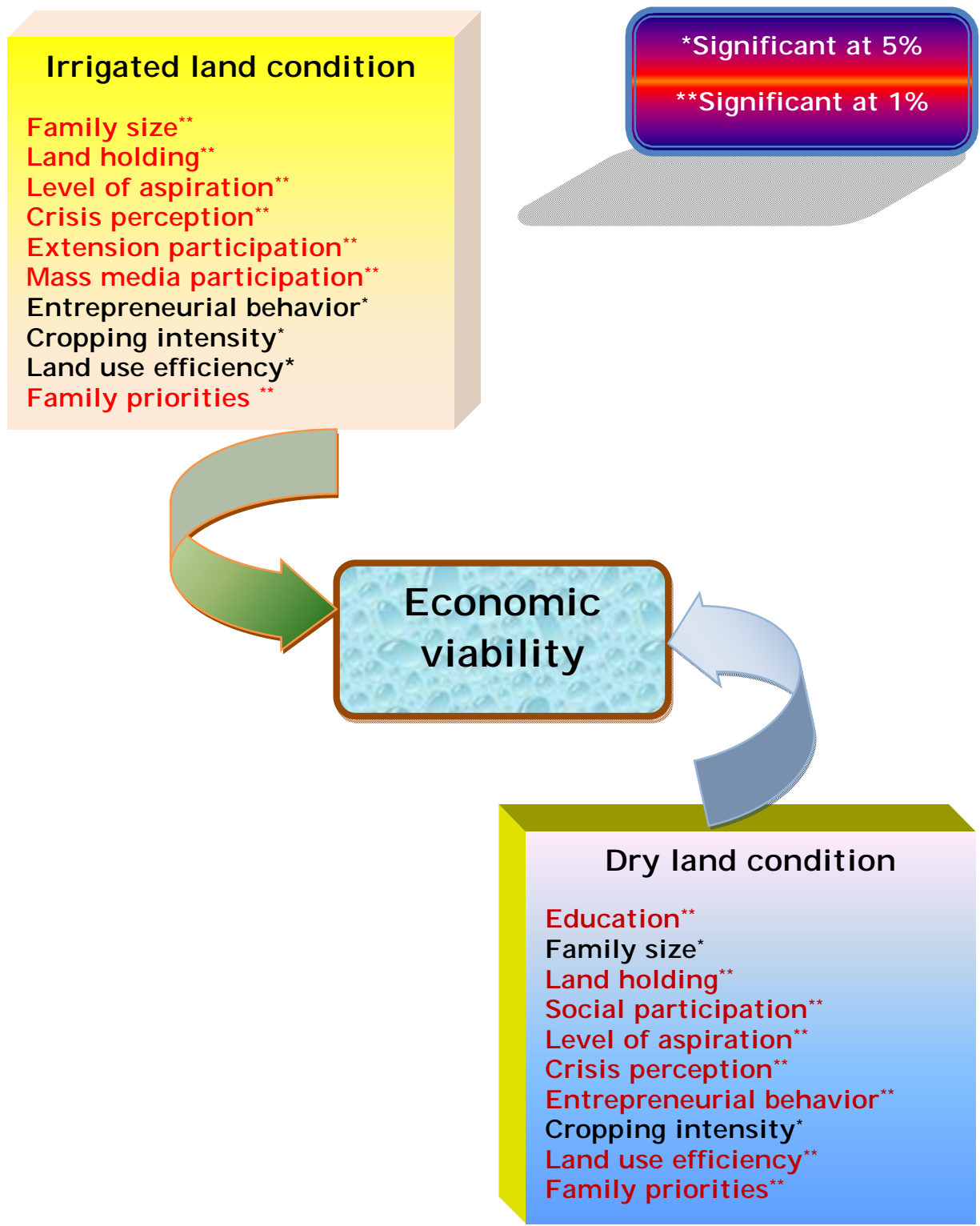


Fig. 11: Empirical model showing the relationship between economic viability and independent variable

Table 25. Relationship between personal, socio-psychological characteristics of farmers with employment generation in irrigated land (n =60)

Sl. No.	Independent variables	Correlation coefficient (r)
1	Age	0.020 ^{NS}
2	Education	0.339 ^{**}
3	Family size	0.582 ^{**}
4	Land holding	0.844 ^{**}
5	Sources of irrigation	0.370 ^{**}
6	Extension participation	0.210 ^{NS}
7	Social participation	0.319 [*]
8	Mass media participation	0.794 ^{**}
9	Level of aspiration	0.181 ^{NS}
10	Attitude towards farming system	0.089 ^{NS}
11	Crisis perception	0.687 ^{**}
12	Entrepreneurial behavior	0.091 ^{NS}
13	Cropping intensity	0.574 ^{**}
14	Market accessibility	0.852 ^{**}
15	Land use efficiency	0.013 ^{NS}
16	Family priorities	0.097 ^{NS}

**correlation is significance at the 0.01 level

*correlation is significant at the 0.05 level

NS = Non-Significant

positive and non significant relationship with employment generation of farmers in dry land situation.

The data from the Table 26 clearly indicated that the variables such as family size, land holding, mass media participation, entrepreneurial behaviour, land use efficiency and family priorities had positive and significant relationship with employment generation at one per cent level in dry land situation. Whereas, education, extension participation, social participation, level of aspiration had positively significant relationship with employment generation at five per cent level. Other variables like age, sources of irrigation, attitude towards farming system, crisis perception, cropping intensity and had positive and non significant relationship with employment generation.

4.8 Contribution of personal and socio-psychological variables with economic viability in irrigated and dry land

It is evident from the Table 27 that all the sixteen variables fitted together in the regression model explained 54.30 per cent of the variation in the economic viability of farmers with integrated farming system in irrigated land. The regression coefficients of four variables such as land holding, extension participation, cropping intensity, land use efficiency and family priorities were found to be positive and significant contribution with economic viability at five per cent level. Whereas family size, sources of irrigation, social participation, level of aspiration, mass media participation and crisis perception had positive and non significant contribution to economic viability. Other variables such as age, education, attitude towards farming system, entrepreneurial behaviour and market accessibility had negative and non significant contribution with economic viability.

Table 26. Relationship between personal, socio-psychological characteristics of farmers with employment generation in dry land (n=60)

Sl. No.	Independent variables	Correlation coefficient (r)
1	Age	0.125 ^{NS}
2	Education	0.307 [*]
3	Family size	0.373 ^{**}
4	Land holding	0.625 ^{**}
5	Sources of irrigation	0.015 ^{NS}
6	Extension participation	2.590 [*]
7	Social participation	0.294 [*]
8	Mass media participation	0.433 ^{**}
9	Level of aspiration	0.318 [*]
10	Attitude towards farming system	0.043 ^{NS}
11	Crisis perception	0.089 ^{NS}
12	Entrepreneurial behavior	0.391 ^{**}
13	Cropping intensity	0.006 ^{NS}
14	Market accessibility	0.173 ^{NS}
15	Land use efficiency	0.437 ^{**}
16	Family priorities	0.593 ^{**}

**Correlation is significance at the 0.01 level

* Correlation is significance at the 0.05 level

NS = Non-Significant

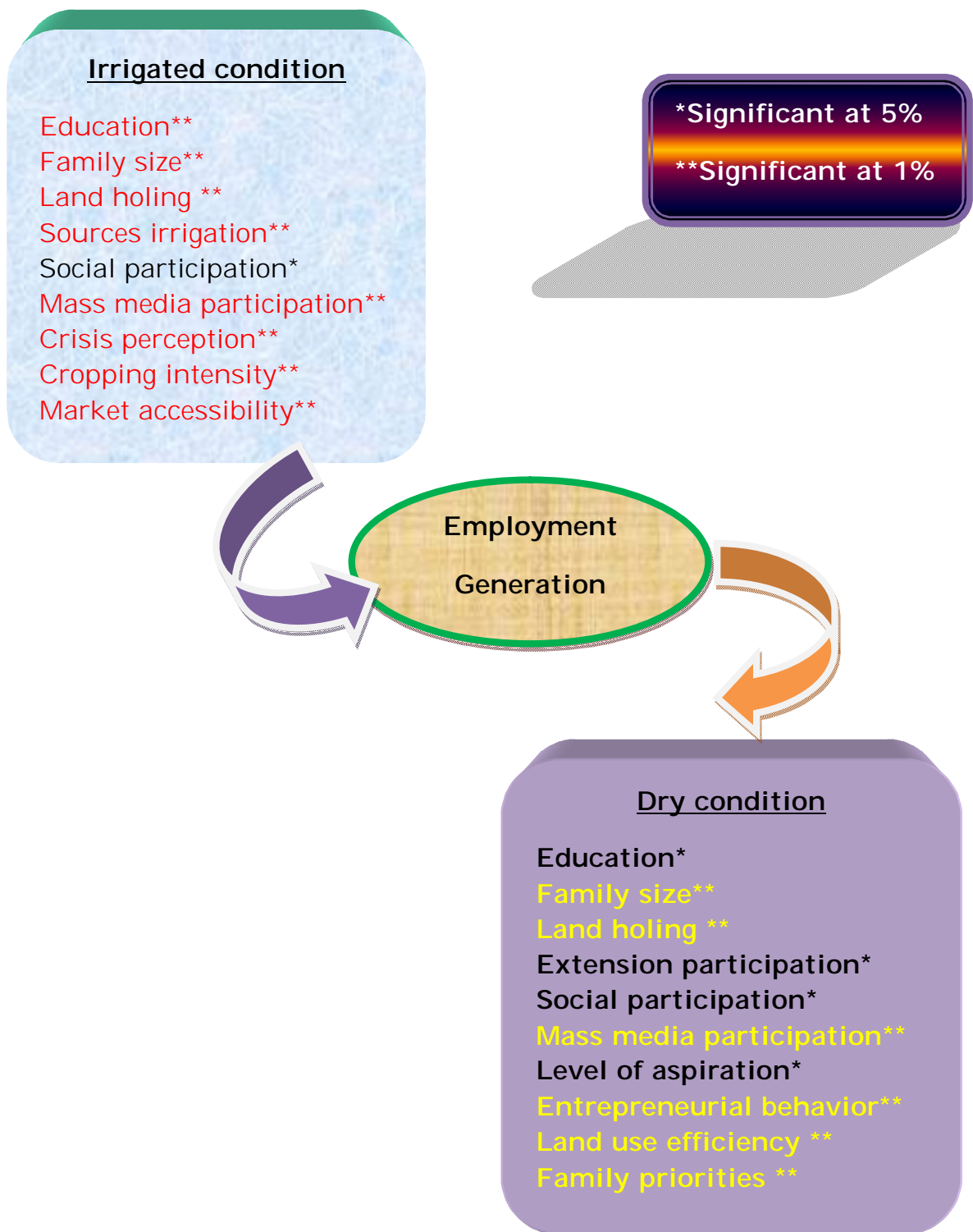


Fig. 12: Empirical model showing the relationship between employment generation and independent variable

Table 27. Contribution of personal, socio-psychological characteristics with economic viability in irrigated land (n=60)

SI. No.	Independent variables	Regression Co-efficient	SE of regression efficient	t-value
1	Age	-0.020	0.066	-0.303 NS
2	Education	-0.120	0.208	-0.578 NS
3	Family size	0.170	0.278	0.611 NS
4	Land holding	0.873	0.351	2.487*
5	Sources of irrigation	0.993	1.331	0.746 NS
6	Extension participation	1.134	0.229	4.952**
7	Social participation	0.036	0.264	0.136 NS
8	Mass media participation	0.222	0.266	0.837 NS
9	Level of aspiration	2.117	0.720	2.940*
10	Attitude towards farming system	-0.329	0.458	-0.718 NS
11	Crisis perception	1.269	1.014	1.252 NS
12	Entrepreneurial behavior	-0.107	0.089	-1.209 NS
13	Cropping intensity	1.064	0.411	2.590*
14	Market accessibility	-0.403	0.431	-0.935 NS
15	Land use efficiency	1.2787	0.640	1.998*
16	Family priorities	0.352	0.117	3.008*

NS = Non-Significant

* Significant at the 0.05 level

** Significant at the 0.01 level

R² =0.543, F= 3.195

It could be inferred from the Table 28 that all the sixteen variables fitted together in the regression model explained 72.20 per cent of the variation in the economic viability of farmers with integrated farming system in dry land. The regression co-efficient of five variable such as land holding, extension participation, level of aspiration, cropping intensity and land use efficiency had positive and significant contribution with economic viability at five per cent level. Whereas as, education, attitude towards farming system, crisis perception, entrepreneurial behaviour, market accessibility and family priorities had positive and non significant contribution with economic viability. Other variable such as age, family size, sources of irrigation, social participation, mass media participation exhibited negative but non significant contribution with economic viability.

4.9 Contribution of personal and socio-psychological variables with employment generation in irrigated and dry land

It was evident from Table 29 that all the sixteen variables fitted together in the regression model explained 85.80 per cent of the variation in the employment generation of farmers with integrated farming system in irrigated land. The regression coefficient of six variables such as age, land holding, extension participation, mass media participation, entrepreneurial behaviour and market accessibility was found to be positive and significant contribution with employment generation at five per cent level. Whereas education, social participation, attitude towards farming system, crisis perception, cropping intensity and land use efficiency had positive and non significant contribution with employment generation. Other variables such as family size, level of aspiration, sources of irrigation and family priorities had negative and non significant contribution with employment generation.

Table 28. Contribution of personal, socio-psychological characteristics with Economic viability in Dry land (n=60)

SI. No.	Independent variables	Regression Co-efficient	SE of regression efficient	t-value
1	Age	-0.040	0.186	-0.217 NS
2	Education	0.866	0.570	1.518 NS
3	Family size	-0.225	0.609	-0.370 NS
4	Land holding	0.682	0.327	2.085*
5	Sources of irrigation	-1.189	3.906	-0.304 NS
6	Extension participation	0.950	0.455	2.087*
7	Social participation	-1.168	0.790	-1.479 NS
8	Mass media participation	-0.071	0.870	-0.081 NS
9	Level of aspiration	3.292	1.059	3.107*
10	Attitude towards farming system	0.032	0.444	0.073 NS
11	Crisis perception	0.560	0.648	0.865 NS
12	Entrepreneurial behavior	0.076	0.199	0.382 NS
13	Cropping intensity	1.290	0.453	2.847*
14	Market accessibility	0.113	0.690	0.164 NS
15	Land use efficiency	-0.122	0.038	3.242*
16	Family priorities	1.621	1.065	1.522 NS

* Significant at the 0.05 level

NS = Non-Significant

R² =0.722, F= 8.367

Table 29. Contribution of personal, socio-psychological characteristics with Employment generation of farmers in irrigated land (n=60)

SI. No.	Independent variables	Regression Co-efficient	SE of regression efficient	t-value
1	Age	1.878	0.724	2.593*
2	Education	11.187	5.988	1.868 ^{NS}
3	Family size	-.749	8.129	-0.092 ^{NS}
4	Land holding	27.920	11.717	2.383*
5	Sources of irrigation	-2.472	4.774	-0.518 ^{NS}
6	Extension participation	-15.626	7.425	-2.105*
7	Social participation	5.208	7.182	0.725 ^{NS}
8	Mass media participation	36.924	18.780	1.966*
9	Level of aspiration	-8.105	13.436	-0.603 ^{NS}
10	Attitude towards farming system	13.306	29.500	0.451 ^{NS}
11	Crisis perception	4.128	2.414	1.710 ^{NS}
12	Entrepreneurial behavior	0.694	0.234	2.965*
13	Cropping intensity	19.235	12.048	1.596 ^{NS}
14	Market accessibility	31.906	14.683	2.173*
15	Land use efficiency	20.711	70.616	0.293 ^{NS}
16	Family priorities	-0.397	0.536	-0.742 ^{NS}

* Significant at the 0.05 level

NS = Non-Significant

$R^2 = 0.858$, $F = 19.372$

The results indicated in the Table 30 revealed that all the sixteen variables fitted together in the regression model explained 78.50 per cent of the variation in the employment generation of farmers with integrated farming system in dry land. The regression co-efficient of four variables such as extension participation, mass media participation, attitude towards farming system and family priorities was found to be highly significant with employment generation at one per cent level whereas land holding and market accessibility had positive and significant contribution with employment generation at five per cent level. Other variables such as education, family size, sources of irrigation, social participation, mass media participation, crisis perception, entrepreneurial behaviour, cropping intensity and land use efficiency had positive and non significant contribution with employment generation.

4.10 Constraints faced by the farmers practicing integrated farming system

Constraints faced by the farmers practicing integrated farming system were presented in the in the Tables 31 and 32.

4.10.1 Constraints faced by the farmers under irrigated land

An examination of the Table 31 shows that the major production constraints for effective adoption of Integrated Farming Systems in the order of severity were non availability of quality planting materials/ breeds/species (Rank I) followed by lack of resistant varieties /breeds for various pest and diseases (Rank II), lack of knowledge on balanced use of fertilizer (Rank III),lack of knowledge regarding identification of pest and diseases (Rank IV), lack of technical knowledge regarding crop harvest (Rank V), and lack of appropriate technologies for enhancing production (Rank VI).

Table 30. Contribution of personal, socio-psychological characteristics with Employment generation in dry land (n=60)

SI. No.	Independent variables	Regression Co-efficient	SE of regression efficient	t-value
1	Age	-0.817	1.045	-0.781 ^{NS}
2	Education	2.767	3.202	0.864 ^{NS}
3	Family size	1.035	3.418	0.303 ^{NS}
4	Land holding	0.873	0.351	2.487*
5	Sources of irrigation	4.274	2.555	1.672 ^{NS}
6	Extension participation	1.714	0.409	4.201**
7	Social participation	2.573	4.883	0.527 ^{NS}
8	Mass media participation	0.070	0.261	0.268 ^{NS}
9	Level of aspiration	24.824	5.949	4.173**
10	Attitude towards farming system	2.511	0.590	4.256**
11	Crisis perception	1.899	3.637	0.522 ^{NS}
12	Entrepreneurial behavior	0.422	1.120	0.377 ^{NS}
13	Cropping intensity	-4.314	3.874	-1.113 ^{NS}
14	Market accessibility	13.678	5.981	2.287*
15	Land use efficiency	3.295	28.048	0.117 ^{NS}
16	Family priorities	0.854	0.231	3.699**

* Significant at the 0.05 level

** Significant at the 0.01 level

NS = Non-Significant

R²=0.785, F= 11.759

Table 31. Constraints faced by farmers practiced Integrated Farming Systems under irrigated land (n=60)

Statements	Score	Rank
I Production constraints		
1. Non availability of quality planting materials/breeds/species	166	I
2. Lack of appropriate technologies for enhancing production	144	VI
3. Lack of knowledge regarding identification of pest and diseases	149	IV
4. Lack of the technical knowledge regarding crop harvest	148	V
5. Lack of resistant varieties / breeds for various pests and diseases	159	II
6. Lack of knowledge on balanced use of fertilizer	150	III
II Situational constraints		
1. Inadequate irrigation facilities	93	V
2. Uneven distribution of rainfall	154	II
3. Limited and irregular power supply	153	III
4. Non-availability of labour in peak seasons	157	I
5. Lack of custom hiring centers	121	IV
6. Lack of suitable farm implements	82	VII
III Financial constraints		
1. Lack of required finance	152	IV
2. Lack of timely availability of credit	155	III
3. High rate of interest on borrowings	137	VII
4. Non availability of subsidy credit in time.	146	VI
5. High cost of input	151	V
6. High cost of production	156	II
Loan disbursement procedure is cumbersome	163	I

IV Marketing constraints		
1. Lack of marketing facilities at local level	150	V
2. Fluctuations in the prices	155	I
3. Lack of storage facilities	154	II
4. Untimely payment for the produce	150	V
5. Lack of exclusive markets	145	VII
6. Problem of transportation	153	III
7. Exploitation by the middleman	152	IV
8. Low price for the produce	147	VI
V. Extension constraints		
1. Lack of extension services	148	III
2. Lack of capacity building programme	148	III
3. Non availability of clinical services for livestock	151	II
4. Lack of demonstrations to prove the worthiness of the technology	151	II
5. Lack of trained extension personnel	147	IV
6. Non availability of extension personnel	157	I

Multiple responses taken

In case of Situational constraints labour availability in peak seasons (Rank I), uneven distribution of rainfall (Rank II), limited and irregular power supply and inadequate irrigation facility (Rank III), Lack of custom hiring centers (Rank IV), inadequate irrigation facility (Rank V) and lack of suitable farm implements (Rank VI) were the constraints expressed by the farmers in the order of severity of problems.

Financial constraints the farmers expressed that cumbersome procedure of loan disbursement (Rank I), followed by high cost of production (Rank II), lack of timely availability of credit (Rank III), high rate of interest on borrowings (Rank IV), high cost of input (Rank V), non availability of subsidy in time (Rank VI) and lack of required finance (Rank VII) were the major constraints.

Fluctuation in the prices received as first rank followed by untimely payment for the produce (Rank II) , problem in transportation, exploitation by the middleman, lack of storage facilities, lack of marketing facilities at local level and lack of exclusive markets were the major constraints identified by the famers under marketing constraints which hinder them for adoption of effective Integrated Farming Systems.

In extension constraints non availability of extension personnel received rank first rank followed by, lack of demonstration to prove the worthiness of the technology, non availability of clinical services for livestock, lack of capacity building programme, lack of extension services and lack of trained extension personnel were the important constraints expressed by the farmers for effective use of different Integrated Farming Systems.

4.10.2 Constraints faced by the farmers under dry land

It was noticed from the results of the Table 32 that the production constraints like lack of technical knowledge regarding crop harvest

Table 32. Constraints faced by farmers practiced Integrated Farming Systems under dry land (n=60)

Statement	Score	Rank
I Production constraints		
1. Non availability of quality planting materials/breeds/species	142	V
2. Lack of appropriate technologies for enhancing production	153	II
3. Lack of knowledge regarding identification of pest and diseases	140	IV
4. Lack of the technical knowledge regarding crop harvest	154	I
5. Lack of resistant varieties / breeds for various pests and diseases	148	III
6. Lack of knowledge on balanced use of fertilizer	123	VI
II Situational constraints		
1. Inadequate irrigation facilities	148	II
2. Uneven distribution of rainfall	147	III
3. Limited and irregular power supply	144	IV
4. Non-availability of labour in peak seasons	154	I
5. Lack of custom hiring centers	134	V
6. Lack of suitable farm implements	94	VI
III Financial constraints		
1. Lack of required finance	157	II
2. Lack of timely availability of credit	140	V
3. High rate of interest on borrowings	221	I
4. Non availability of subsidy credit in time.	94	VI
5. High cost of input	149	IV
6. High cost of production	153	III
7. Loan disbursement procedure is cumbersome	149	IV

IV Marketing constraints		
1. Lack of marketing facilities at local level	152	III
2. Fluctuations in the prices	158	I
3. Lack of storage facilities	115	VIII
4. Untimely payment for the produce	157	II
5. Lack of exclusive markets	124	VII
6. Problem of transportation	134	VI
7. Exploitation by the middleman	141	V
8. Low price for the produce	147	IV
V. Extension constraints		
1. Lack of extension services	150	I
2. Lack of capacity building programme	149	II
3. Non availability of clinical services for livestock	146	III
4. Lack of demonstrations to prove the worthiness of the technology	145	IV
5. Lack of trained extension personnel	75	VI
6. Non availability of extension personnel	110	V

Multiple responses taken

received rank first followed by, lack of appropriate technologies for enhancing production, lack of resistant varieties /breeds for various pest and diseases, lack of knowledge regarding identification of pest and diseases, lack of knowledge on balanced use of fertilizer restricted the farmers for effective implementation of Integrated Farming Systems.

Labour availability in peak seasons, inadequate irrigation facility, uneven distribution of rainfall, limited and irregular power supply, non availability of quality inputs in required quantity and in required time, lack of custom hiring centers, and lack of suitable farm implement were the major situational constraints. .

In financial constraints high rate of interest on borrowings, lack of required finance (Rank II), high cost of production (Rank III), loan disbursement procedure is cumbersome (Rank IV), high cost of input (Rank IV), lack of timely availability of credit (Rank V) and non availability of subsidy in time with (Rank VI) were the major constraints expressed by the farmers.

The fluctuation in the prices, untimely payment for the produce, lack of marketing facilities, Low price for the produce, exploitation by the middleman with score, problem in transportation, lack of exclusive markets and lack of storage facilities were the important marketing constraints identified by the farmers.

In extension, lack of extension services, lack of capacity building programme, non availability of clinical services for livestock, lack of demonstration to prove the worthiness of the technology, non availability of extension personnel and lack of trained extension personnel were identified constraints.



Discussion

The finding of the study is discussed in this chapter under the following headings:

- 5.1 Personal, socio-psychological characteristics of farmers practiced Integrated Farming Systems
- 5.2 Integrated Farming Systems practiced by different category of farmers under irrigated and dry land
- 5.3 Economic viability of Integrated Farming Systems practiced by farmers under irrigated and dry land
- 5.4 Employment generation of farmers practiced Integrated Farming Systems under irrigated and dry land
- 5.5 Comparison of performance of farmers practiced Integrated Farming Systems under irrigated and dry land
- 5.6 Relationship between personal, socio-psychological characteristics of farmers with economic viability in irrigated and dry land
- 5.7 Relationship between personal, socio-psychological characteristics of farmers with employment generation in irrigated and dry land
- 5.8 Contribution of personal and socio-psychological characteristics with economic viability in irrigated and dry land
- 5.9 Contribution of personal and socio-psychological characteristics with employment generation in irrigated and dry land
- 5.10 Constraints faced by the farmers in practicing Integrated Farming Systems

5.1 Personal, socio-psychological characteristics of farmers practiced Integrated Farming Systems.

5.1.1 Age

It is apparent from Table 1 irrigated land majority of small (60.00%) and medium (55.00%) farmers were belonged to middle age category whereas; big farmers (55.00%) were old age category. Further, in dry land majority of small (60.00%) and medium (80.00%) farmers were belonged to middle age category whereas; big farmers (45.00%) were belonged to old age category. The pooled data indicated that majority (68.33%) of the farmers was under middle age.

The probable reason for majority of the small and medium farmers in both the region being under middle age category might be due to the fact that most of the young people are not interested in farming and are looking for better livelihood options in urban area. Another reason may be middle aged are enthusiastic and have more work efficiency than the older or younger ones. Individual may not be ready to accept the responsibility in the young age itself. Individuals in middle age group have physical vigor and also more responsibility towards family than the younger ones. As they become middle aged they will be taking more responsibility for the family. Further, due to increase in nuclear family system, it is natural to find more number of middle age groups to take up the responsibilities of head of the family. It is quite obvious to observe that majority of big farmers were old aged just because the big farmers normally have joint family approach where in the head of the family is older than the others.

This finding is supported by Satish Kumar and Sudershan Rao (2004) and Kale (2008).

5.1.2 Education

It is observed from Table 2 It was observed that in irrigated region 50.00 per cent of small and 30.00 per cent of medium farmers were illiterates whereas; in case of big farmers (30.00%) were illiterates. Further, in dry region 40.00 per cent of small and medium (35.00%) farmers were with high school education whereas; big farmers (35.00%) were illiterates category. The pooled data indicated that nearly 33.00 per cent of the farmers were under illiterate category, followed by high school (26.66%), pre university/diploma (12.50%) and only 2.50 per cent studied up to graduation and above.

This might be due to the fact that small farmers because of their low social strata and status they may not be able to find an opportunity of going in for formal education and also the farming being an important livelihood option, they might not have ventured for formal education. However, the medium and big farmers with relatively better off with their economic status and social exposure they might have fall into the medium education category. The results of the study are in line with the observations of Netravathi (2007) and Deepak (2003).

5.1.3 Family Size

The findings in Table 3 indicated that findings in irrigated land indicated that a majority of small (70.00%), medium (80.00%), and big farmers (60.00%) were medium family size, whereas in dry land small farmers (40.00%) were large family size. whereas medium (45.00%) and big farmers (50.00%) were medium family size. The results from the pooled data indicated that nearly half (46.67%) of the respondents had small family size.

The probable reasons for the findings could be that off late the social structure of the society is moving towards nuclear families because

of fragmentation and division of land holding. Further, the social values attached to the joint family system is slowly eroding may be because of the influence of urbanization and cosmopolitaness.

The findings are similar with the findings of Kale (2008).

5.1.4 Sources of irrigation

It was clearly noticed in the Table 4 that cent per cent of irrigated farmers use canal irrigation and cent per cent of the dry land farmers use bore well water as a source of irrigation.

It is quite obvious to find the above finding since, Mandya taluk falls under Cauvery command region and all the farmers were the beneficiaries of canal water and used for crop production. Whereas Nagamangala being a dry land and in the absence of any government implemented irrigation projects, the dependency of the farmers on bore wells which is treated as one of the easiest and relatively dependable source of irrigation. Hence, the cent per cent of dry land farmers use bore wells for irrigation purpose.

The result is in conformity with the findings of the study conducted by Thippeswamy (2007).

5.1.5 Social participation

Table 5 inferred that in irrigated land a great majority of small (80.00%) and medium farmers (50.00%) were under low participation. Whereas big farmers (50.00%) were high social participation. Further, in dry land a great majority of small (80.00%), medium (50.00%) and big farmers (60.00%) were under low, medium and high social participation category respectively. In total majority of the respondents belonged to low

(43.33%) followed by high (34.17%) and medium (22.50%) level of social participation.

The small farmers belonged to the lower strata of the socio-economic status will normally possess less financial resources. Always, these farmers aim for food security and practiced subsistence farming. Further, the opportunity in terms of time for them to participate in the social organizations activities may be curtailed because of the pre occupation with farming. The medium farmers with relatively better resources and capability to engage the hired labours for their farming and related activities may provide them an opportunity to participate in the social organizations activities. The big farmers possess very high socio economic status and it is needless to say that the big farmers with lot of resources may participate more in the activities of the social organizations. Further, the participation in the social organizations may provide them a status in the society and this might have forced them to participate more in the activities of the organizations. The result is in confirmation with the findings of the study conducted by Vani (2005)

5.1.6 Extension participation

Table 6 brought to notice that under irrigated land nearly half (45.00%) of small, medium and exactly half (50.00%) of big farmers were under low, high and high level of extension participation, respectively. Further, in dry land it was observed that majority of small (45.00%), medium (85.00%) and big farmers (65.00%) were under low, medium and medium level of extension participation respectively. Also the pooled data indicated that nearly half (43.33%) of the farmers were under medium extension participation followed by high (34.17%) and low (22.50%) level of extension participation.

The small farmers who will be satisfied with the technologies which are sufficient for subsistence farming may not look forward for different extension activities which are aimed for commercial and market led production systems. Further, as the modernization creeps into farming also in the advent of free market and globalization, the medium farmers are also tend to improve their participation in different extension activities. The medium farmers tend to be progressive and in transitional stage of change in order to come out of subsistence to commercial farming. Further, demands more technological information which may help them to practice farming on more scientific lines. Hence, the medium level of extension participation might have been observed with medium farmers practiced different integrated farming systems. It is needless to say that Big farmers are characterized with innovativeness, high extension contact and cosmopolitanism coupled with higher economic and social status and hence, the big farmers might have shown high level of extension participation. The findings of the present study are in conformity with the findings of Gowda (1997).

5.1.7 Mass media participation

It could be noted from the Table 7 that in irrigated land majority (60.00%) of small farmers, had low mass media participation. It is understandable that small farmers who concentrate more on livelihood activities because of their low land holding and this segment will be more interested in getting information directly from the individuals rather than mass media. 50.00 per cent of medium farmers belonged to medium level of mass media participation. This could be justified with the facts that the medium farmers who are interested in achieving higher yields to fulfill the requirements of their families need to go in for varied information sources out which mass media occupies an important place. However, 50.00 per cent of big farmers were belonged to high level of mass media participation and the probable reasons may be that the big

farmers by virtue of their higher social and economic status are capable of investing more on mass media including the electronic media. Hence, it is obvious that this segment of the farmers are more oriented towards all possible sources of information with an intention to expose themselves to the external world because of the social prestige attached to them in the society. Whereas in dry land situation, exactly half (50.00%) of small, medium and 80.00 per cent of big farmers were belonged to low, medium and high level of mass media participation respectively. The justifications provided for the small farmers of irrigated land holds good here also since the same kind of results were obtained in dry land situation also. The farmers are very much dependent on mass media not only as a source of news and information, but also as a source of entertainment and due to this they were grouped under medium to high mass media participation.

The observation made by Kumar (2005), Hiremath (2007) and Sunil Dutt and Chole (2002) is in line with the present study.

5.1.8 Level of aspiration

It was evident from Table 8 that in irrigated land that majority (60.00%) of small farmers and 55 per cent of medium farmers had medium level of aspiration. This could be explained with the facts that small and medium farmers always try to fulfill the basic needs because of less land holding coupled with low economic status. Resource crunch will make these two categories of farmers to always work for family needs rather than aspiring for higher things. It is interesting to note that 55.00 per cent of big farmers belonged to high level of aspiration and it needless to say that the big farmers because of their economic security are capable of affording and fulfilling the higher aspirations they may have for the family members as well as in farming. This will also help them to get respect among the members of the society. Whereas in dry

land majority 55.00 per cent of small farmers and half (50.00%) of medium farmers had low and medium level of aspiration. The same trend was observed even under irrigated land and hence the explanation provided above holds good for the dry land small, medium and big farmers also.

The observation made by Vani (2005) is in line with the present study

5.1.9 Attitude toward farming system

An examination of the Table 9 brought to the focus that Sixty five per cent of small farmers, 40.00 per cent medium farmers and 65.00 per cent of big farmers had favorable attitude towards farming system in case of irrigated situation. The probable reasons may be that irrespective of the category of farmers the attitude being a psychological variable the farmers were convinced about the advantages and usefulness of adopting farming systems. However, the mental acceptance of the technology does not demand any resources for its actual adoption. However, in dry land situation, 50.00 per cent of small farmers, 35.00 per cent medium farmers and 40.00 per cent of big farmers were had favorable attitude towards farming system. Further this trend can also be explained with the fact that the psychological variables are not affected by the farming region or condition.

The results of the present study is line with the observation of Ramegowda (1991)

5.1.10 Crisis perception

The findings of the Table 10 indicated that About 45.00 per cent of small and medium farmers belonged to high and medium level of crisis perception, It could be due to the facts that the small and medium

farmers always try to be safe in farming by foreseeing all possible crisis which may erupt during the farming time. The eventualities because of crisis may be overcome by perceiving them early and to take precaution in advance. Further in order to reduce the risk factor it may be essential for these two categories of farmers to perceive and to come out with suitable strategies. Whereas in case of big farmers majority (65.00%) were under medium crisis perception level in case of irrigated condition. The big farmers because of diversification in farming, and normally characterized with more land holding, high risk bearing ability and high social status may not bother them much to perceive the crisis. In dry land condition, 40.00 per cent of small farmers were under high crisis perception, whereas 50.00 per cent of medium farmers and 40.00 per cent of big farmers were grouped under medium crisis perception. The dry land situation the farmers normally may not to take risks because of uncertainty in rainfall. Further, the farmers prefer to be able to grow dry land crops which demand less water, less fertigation and incidence of pests and diseases are of lower order. Hence, the crisis perceptions of farmers were grouped from low to medium level.

The observations of the present study are in agreement with the study conducted by Ramegowda (1991)

5.1.11 Entrepreneurial behaviour

It was observed from the Table 11 that 40.00 per cent of small farmers were belonged to low level of Entrepreneurial behaviour. It is quite natural that the small farmers do not venture for any new enterprises and always look for safety in investment and returns. Under such circumstances the small farmers exercise utmost care in choosing and implementing the new ideas for better returns. Further, the characteristics of entrepreneurs like high mass media and extension participation, risk bearing ability, education level may not be noticed in

case of small farmers. Hence, the small farmers might have been found under low entrepreneurial behaviour category. It could also be observed that 50.00 per cent of the big farmers exhibited, high entrepreneurial behavior in irrigated condition. The probable reasons attributed for the above observed results may be that the big farmers are capable of invest and sustain for a longer gestation periods for expected returns because of their good economic status. Further, the big farmers can distribute the investments on different enterprises by hiring labours from outside for the maintenance. Under such circumstance, it is needless to say that the big farmers exhibit higher entrepreneurial behaviour compared to small and medium farmers. Whereas in dry land majority (65.00%) of small farmers, (40.00%) of medium farmers and 35.00 per cent of big farmers were under medium entrepreneurial behaviour respectively. Hence the explanation provided above holds good for the dry land small, medium and big farmers also. The results from the pooled data indicated that more than one-third (36.67%) of respondents belonged to high category whereas, 34.17 per cent and 29.17 per cent of farmers had medium and low entrepreneurial behaviour, respectively.

The studies conducted by Anitha (2004) and Savitha (2007) have reported similar findings.

5.1.12 Cropping intensity

The results of Table 12 indicated that 45.00 per cent of small farmers were belonged to low cropping intensity whereas, 45.00 per cent of medium and 40.00 per cent big farmers were belonged to low category of cropping intensity in irrigated condition. This could be explained with the facts that the small farmers under irrigated land have less scope for diversification and further the area is predominantly a Sugar cane growing belt which takes nearly 14 months to harvest. Even with medium and big farmers under irrigated situation, have less scope for

using the cultivable land for more than one crop in a year because of sugarcane cropping system which is widely adopted in the research area. Further, 40.00 per cent of small farmers were belonged to low cropping intensity and 35.00 per cent of medium farmers and 45.00 per cent of big farmers were under medium category of cropping intensity. The results observed under dry land situation is no way different from the irrigated area since the fact is that under dry land situation majority of the farmers have a definite cropping pattern with dry land orchards where in they are all perennial crops. Hence, the usage of the area for more than one crop is very much restricted. A glance at the sample as a whole indicated that about 40.83 per cent falls under medium category, followed by low (33.33%) and high (25.83%) cropping intensity category.

The findings are in agreement with the findings of Jambhale (2007).

5.1.13 Family priorities

The glance of Table 13 highlights that 55.00 per cent of small and medium farmers (50.00%) were belonged to medium level of family priorities. big farmers were belonged to high family priorities in case of irrigated condition. This could be attributed to the facts that the small and medium farmers normally will have to fulfill the basic needs of food, clothing and shelter and rest the commitments occupies the back seat. Whereas, in case of big farmers in addition to basic needs, esteem needs, social needs, self actualization needs also creep into the system as per Maslows need hierarchy because of their status in the community. Whereas, in dry land 40.00 per cent of the small and medium farmers were under medium level of family priorities further, majority (75.00%) of big farmers belonged to high family priorities. Also the pooled data indicated that about 37.00 per cent of the respondents had medium

family priorities followed by high (35.00%) and low (27.00%) family priorities.

The findings of the study fall in line with the results of Behera and Sharma (2007)

5.1.14 Market accessibility

The Table 14 that depicts that under irrigated land 50.00 per cent of small farmers had low level of market accessibility and 45.00 per cent of medium farmers and 40.00 per cent of big farmers were belonged to medium level of market accessibility. This may be due to the fact that under irrigated land only the commercial and high value crops like Sugar cane are cultivated and they are made to sell it to the nearby sugar factories because of contract with the farmers. Further, sugarcane requires does not find a place in other markets where it can be sold. Hence, all the categories of farmers under irrigated land falls under low to medium level of market opportunities. In dry land majority of the small and the medium farmers had medium level of market accessibility. Whereas, 40.00 per cent of the big farmers had high level of market accessibility. It is interesting to observe that majority of the farmers under dry land falls under medium to high level of market accessibility just because of the reasons that diversified of cropping system which can find market in any of the nearby places based on needs of the local communities. Further, the dry land farmers are growing horticultural crops like vegetables which are very much essential for the day to day consumption of all category of people in the society.

The observed results are in line with the findings of the study conducted by Chandrashekhar (2007)

5.1.15 Land use efficiency

Table 15 reveals the information on the land use efficiency by farmers. It could be observed that 35.00 per cent of small farmers and 40.00 per cent of medium farmers were under medium land use efficiency, whereas exactly half (50.00%) of farmers were under high land use efficiency in case of irrigated condition. It is quite justifiable that under irrigated land the farmers will have crops all through the year and hence the above trend might have been observed. Further, 65.00 per cent of small farmers and 35.00 per cent of medium farmers were under medium land use efficiency and 45.00 per cent of big farmers under high category of land use efficiency in case of dry land. Even under dry land situations the collected data reveals that cent per cent of the farmers are dependent on bore wells for irrigation purpose and through the year they are growing the short duration vegetable crops in addition to dry land orchard crops. This might have contributed for medium to high level of land efficiency by all the category of farmers irrespective of region. The pooled data indicated that more than one-third (38.33%) of farmers were under medium category followed by low (33.33%) and high (28.33%) land use efficiency.

The findings of the study fall in line with the results of Behera and Sharma (2007)

5.2 Integrated farming systems practiced by different category of farmers under dry and irrigated land

The data in Table 16 indicates that more than one third (35.00%) of small farmers practiced agriculture +sericulture and agriculture + dairy (30.00%), where as 25.00 per cent of medium farmers practiced agriculture +sericulture+ dairy+ poultry followed by, agriculture + sericulture+ dairy (20.00%), Whereas 35.00 per cent of big farmers were practiced agriculture + sericulture +dairy followed by agriculture

+sericulture +dairy +goat rearing + vermicompost (25.00%), in irrigated condition.

The combination of enterprises practiced by the farmers in any of the region is mainly depends on the agricultural situation exist in the area and the resources which are under the disposal of the farmer. Naturally, Mandya being a command area the farmers tend to go for the enterprises which are more water consuming. Hence, it is quite obvious that the farmers practiced Agriculture (mainly sugarcane based cropping system) + Sericulture (Mulberry production and worm rearing) + Dairy (including green fodder cultivation). Further, Sugar cane being a long duration crops the family need to have an enterprise which gives them regular income on day to day basis for family commitments. Under such circumstances it is needless to say that Dairy is an additional income generating activity especially for farm women. Hence, nearly one fourth of the respondents followed the above combination. Further, the other combinations followed by relatively less percentage of respondents also with the same logic and in principle the long duration enterprise combined with other enterprises which fetches them the income in regular periods. Further, small farmers land holding itself is less and they cannot divert their land for any other crops except field crops. It is also very much essential for them to cultivate food crops to meet family basic food consumption requirements. Hence the small farmers always look towards systems which do not demand land for production but the same time fetch regular income. Hence, agriculture + sericulture and agriculture + dairy is more popular farming systems among the small farmers.

Further, more popular integrated farming system among the medium farmers was agriculture+sericulture +dairy +poultry; agriculture +sericulture +dairy and agriculture +dairy+ horticulture. This may be

explained with the facts that medium farmers with relatively sufficient land holding, economically stable they are in a position to divert portion of their agricultural land to other enterprise like poultry, Horticulture and sericulture. In addition, agriculture crops returns fluctuate hence, they practiced sericulture +dairy +poultry as a component of their farming system which are sure to give them the sustainable income.

Whereas, majority of big farmers, practiced agriculture + sericulture + dairy, agriculture +sericulture +dairy +goat rearing + vermicompost and agriculture +sericulture +dairy +poultry. Again the justification drawn for the medium farmers in the above paragraph holds good for big farmers also. In addition, the big farmers are in a position to divert their land for different purposes looking into the infrastructure facility available to them like transport, irrigation, labour availability etc. Further, the economic resources of big farmers provide an opportunity to hire labour for practiced sericulture, dairy, poultry, goat rearing and Vermicompost as a component of integrated farming system.

These findings are in confirmation with the findings of Chinmay and Singh (2003) and Chitra (2010).

It was observed in the Table 17 that under dry land situation About 30.00 per cent of small farmers practiced horticulture +dairy followed 20.00 per cent adopted horticulture + dairy+ forestry. Further, nearly one third (30.00%) of medium farmers adopted horticulture +dairy +forestry followed by (20.00%) horticulture + dairy+ goat rearing+ forestry. Whereas 35.00 per cent of big farmers practiced agriculture +horticulture +dairy +forestry followed by, horticulture +dairy +forestry (25.00%).

The region selected for the study is a dry belt which is deprived of any natural sources of irrigation like canal and regular monsoon. Under

such circumstance, it is inevitable for the farmers to adopt the enterprises which can efficiently utilize the available underground water in the form of bore well. Hence, the farmers might have practiced Horticulture (Vegetables and dry land orchards) + Dairy (Cross bred and local cows) + forestry (uncultivable and low rainfall areas) which gives them an opportunity for obtaining income on staggered basis and making use of the available resources on a more judicious and scientific way. Further, the other combinations like horticulture +dairy +forestry and horticulture +dairy, Horticulture + dairy +goat rearing; horticulture +dairy +sericulture may also with the strategy of accumulating returns in a steady manner for their livelihood. The combination of agriculture +horticulture +dairy +forestry is easily understandable that agriculture being a mother occupation of the farmers which is a major source of food requirement is practiced along with other enterprises. Horticulture +dairy +goat rearing +forestry combination explains clearly that the combination of enterprises adopted should serve as supplementary and complementary for each other where in the product of one should serve as the raw material for the other. Likewise the forestry component along with Dairy and goat rearing provided very good fodder for grazing for both goats and dairy animals.

The small farmers possess less land holding and they are interested in taking up of horticulture crops because of less crop duration than agriculture crops and in addition, the study area is suitable for growing horticulture crops because of irrigation facility through bore well. Further they also had sericulture and dairy enterprises to meet the family financial commitments on daily basis.

Further, medium farmers were economically stable than small farmers and they are considerable percentage of land holding in addition, these farmers capacity to with stand crop loss hence they were

adopted different enterprises like dairy, poultry, sericulture and forestry as a components of their integrated farming systems.

The big farmers possess more land holding, have favorable attitude towards farming system, economically more stable, high mass media and social participation and in addition they have capacity to overcome the problems and this might be the reason for taking up more than one enterprise.

These findings are in line with Malathesh (2004) and Vani (2005)

5.3 Economic viability of integrated farming systems practiced by farmers under irrigated and dry land

It was evident from the Table 18 that in case of small farmers agriculture + sericulture +goat rearing produce highest net return (1.70 per rupee invested) followed by agriculture +sericulture +dairy (1.69 per rupee invested) and agriculture +dairy +horticulture (1.66 per rupee invested). Further, the medium farmers agriculture +sericulture+ dairy +poultry yielded highest net return (1.76 per rupee invested) followed by agriculture + sericulture +goat rearing (1.74 per rupee invested) and agriculture +sericulture +dairy (1.64 per rupee invested). Whereas big farmers with agriculture +sericulture + dairy + goat rearing + vermicompost produce highest return (Rs.2.28 per rupee invested) followed by, agriculture + sericulture +dairy +poultry (Rs.1.91 per rupee invested) and agriculture + sericulture+ goat rearing (Rs.1.88 per rupee invested).

It is not surprising that the farmers with more number of enterprises fetches highest rupee per rupee invested. The small farmers obtained highest value just because the land being a limiting factor they have adopted sericulture and goat rearing which demands less land but more profitable and steady income providing enterprises. Further, the

fluctuation in selling prices is less in Sericulture and goat unlike in other enterprises. The medium farmers with integration of agriculture with sericulture, poultry and dairy yielded highest returns may be because of the reasons that the medium farmers could able to divert small portion of their land to other enterprises also in addition to agriculture. Further, the integration with dairy and poultry have assured market because of their greater demand and also the concept of making use of complementary nature of enterprises might prompted them to adopt the enterprises. The big farmers could able to realize highest return of 2.19 (rupees per rupee investment) by integrating agriculture, sericulture, dairy, poultry and Vermicompost and it is quite obvious that the enterprises like poultry and dairy are more economically viable whenever they are adopted in large scale with scientific measures. The big farmers who are resource rich can invest for large scale production. Further, the Vermicompost production will naturally provide in impetus to the production system by adding good Vermicompost to the land based enterprises to improve soil fertility which in turn add for the production.

From the Table 19 it was evident that in dry land situation, small farmers adopted horticulture + dairy + goat rearing produced highest net return (Rs.1.55 per rupee invested), followed by agriculture + dairy + sericulture (Rs.1.54 per rupee invested). This can be explained with the fact that farming in dry land is always a gambling with monsoon and hence horticulture component might have replaced the field crops. Further, dairy and goat rearing are always profitable to farmers because of the regular income and easy availability of fodder with horticulture orchards. Further, they are also the source of income on regular basis for family commitments to farm women and provide additional employment to family labors. Further, in case of medium farmers horticulture + dairy+ goat rearing + forestry produce highest net return (Rs.1.75 per rupee invested) followed by, agriculture + horticulture + dairy +forestry

(Rs.1.73 per rupee invested). It is curious to observe that medium farmers with relatively more land holding compared to small farmers can go in agriculture also but the net returns increased was negligible when compared the earlier combination. In addition, the inclusion of forestry into the system might have provided them an opportunity to get fodder for goat and dairy animals. Whereas in case of big farmers horticulture + dairy+ goat rearing + forestry produce highest net return (Rs.2.03 per rupee invested) followed by, agriculture + horticulture + dairy +forestry (Rs.1.99 per rupee invested). The net returns in case of big farmers are relatively more when compared with small and medium farmers. It could be explained with the reasons that the big farmers are capable of investing on large scale in enterprises like dairy, poultry which are more economical when they are adopted on a large scale for obtaining economic returns. Forestry component in the system might have increased the returns from dairy and poultry because of easy availability of fodder which is treated as an important feed for the increased the yield.

The findings of the study fall in line with the results of Behera and Sharma (2007)

5.4 Employment generation of farmers practiced integrated farming systems under irrigated and dry land

It was noticed in Table 20 that in irrigated condition, small farmers high employment generation was found in case of agriculture + sericulture+ dairy (99 man days/year) followed by, agriculture +dairy +horticulture (93 man days/year) and very least in case of agriculture+ dairy (80 man days/year). The small farmers normally will take three crops of sericulture because of resource crunch and rearing of one or two dairy animals will tend to provide them an additional employment. Further, in case of medium farmers highest employment generation was

found in agriculture +sericulture + dairy + poultry (240 man days/year) followed by, agriculture + sericulture+ goat rearing (204 man days/year) and very least in case of agriculture+ dairy(152 man days/year).Whereas in case of big farmers highest employment generation was found in agriculture +sericulture + dairy + poultry (388 man days/year) followed by, agriculture + sericulture + dairy+ goat rearing+ vermicompost (349 man days/year) and very least in case of agriculture+ sericulture(301 man days/year).

The results are very interesting that there is drastic increase of employment with big farmers when compared to small and medium farmers. It is needless to say that the big farmers have the capacity to adopt the enterprises on a large scale and also in more intensive manner because of the resources available with them. Further, they are in a position to harvest five crops in sericulture which contribute for additional employment. Dairy is other enterprises if adopted on a large scale definitely require more labour for its maintenance and add for additional employment. It is also true that the more number of enterprises in any of the farming system definitely add for creating additional employment.

The similar results were also reported by Kulkarni (1982) and Aiyaswamy (1980).

It was evident in Table 21 that in dry land condition, small farmers highest employment generation was found in case of horticulture + dairy+ sericulture (77 man days/year) followed by, horticulture + dairy+ goat rearing (71 man days/year) and least employment generation in case of horticulture +dairy (58 man days/ year). The probable reasons may be that under dry land conditions, the labour requirement will be less because of less no. of crops and also the requirement of labour is restricted only to monsoon season. Further, maintenance of one or two

dairy animals may not require additional labour except the family labour which is not productively utilized in the system. Even Though Sericulture demands more labor, they can take only two or three crops in year because of scarcity of water. Further, medium framers highest employment generation was found in case of agriculture + horticulture+ dairy +forestry (148 man days/year) followed by, horticulture + dairy +goat rearing+ forestry (137 man days/year) and least employment generation in case of horticulture + dairy (84 man days /year). This trend may be explained with the facts that medium farmers will have field crops addition to horticulture where in the labour requirement will increase to carry out seasonal operations. Further, cultivation of vegetables with bore well irrigation might have contributed for further generation of employment opportunities. Whereas, big farmers highest employment generation was found in agriculture+ horticulture + dairy +forestry (201 man days/year) followed by, horticulture + dairy + goat rearing + forestry (188 man days/year) and least employment generation found in case of horticulture +dairy (162 man days/year). The probable reasons may be that the big farmers by virtue of their large land holding, high socio economic status the capability of these farmers to adopt the enterprise on large scale is quite possible. Further, intensive cultivation may require more number of labours compared with other category of farmers who normally look forward for providing gainful employment to the family labours.

This findings of the study is supported by the findings of Malathesh (2004)

5.5 Comparison of performance of farmers practiced integrated farming system under irrigated and dry land

It could be seen in the Table 22 that farmers practiced integrated farming system entirely differ both in irrigated and dry land. It was

noticed that under irrigated land the economic viability (1.80 rupees per rupee investment) and the employment generated among the farmers practiced Integrated Farming System was (209 man days/year). Whereas under dry land situation the economic viability (1.66 rupees per rupee investment) and employment generated was (114 man days/year) among the farmers practiced Integrated Farming System.

The economic viability and employment generation was more in irrigated land compare to the dry land condition and the probable reason may be that in irrigated land farmers are growing agriculture crops like paddy, sugarcane, ragi and also horticulture crops like tomato and coconut in addition to sericulture enterprise, which is possible to take four to five crops in a year. Further, the more no. of crops naturally adds for increased income in turn contributed for the economic viability of the combination of enterprises. In addition it is possible under irrigation to go in for intensive production techniques in case of dairy, goat rearing, poultry and vermicompost which provide them income throughout the year. Under the above circumstances in irrigated land combination of agriculture crops with other enterprises like dairy, poultry, sericulture and Vermicompost provide high returns and this might have contributed for higher economic viability.

It could also be inferred that the employment generated is more in irrigated land because most of the farmers are practiced field crops like paddy, sugarcane and ragi required which will have employment throughout the cropping season and in addition the combination of enterprises like dairy and poultry also adds for the additional employment. It is quite natural that the Sericulture as a combination of IFS with five crops a year naturally contributed for higher employment generation. The marketing of products of these enterprises will also generate additional employment. The results in the earlier table indicate

that the cropping intensity under irrigated land is more and subsequently it adds for the employment generation.

It is not surprising to observe that economic viability and employment generation was low in case of dry land condition because the farmers are dependent more on dry land orchards due to lack of assured irrigation facility in the region. Further, the cultivation of field crops faces uncertainty due to vagaries of monsoon including the uneven distribution. Normally under such conditions, the return from field crops decreases and automatically reduces the employment opportunities when compared with irrigated condition.

The results of the study are conformity with the findings of Malathesh (2004)

5.6 Relationship between personal, socio-psychological characteristics of farmers with economic viability under irrigated and dry land

The Table 23 depicts the relationship between independent variables with economic viability of farmers practiced integrated farming system in irrigated condition.

It is very interesting to note that the variables such as family size, land holding, level of aspiration, crisis perception and family priorities had positive and significant relationship with economic viability at one per cent level of significance and entrepreneurial behaviour had positive and significant relationship at five per cent level and Entrepreneurial behaviour, cropping intensity and land use efficiency had positive and significant relationship with economic viability at five per cent level in irrigated land.

The above trend may be explained with the facts that family size and family priorities will always increase the pressure on the farmers to achieve excellence in farming and related activities to obtain higher yield or returns per unit area. This would enable them to meet family priorities as well as to meet the demands of more no. of people in a family. In addition, the requirements of family members will be diversified whenever the no. of people in a family are more. Further, more land holding provide the choice for the individuals to diversify their farm related activities and also help them to take up the enterprises on an economically viable mode. Thus the land holding might have contributed for a positive significant relationship with the economic viability. The crisis perception helps the farmers to understand the uncertainty they may face during the production activities due to uncertainty of monsoon and keep them vigilant for various problems they may encounter. Thus it will facilitate them to take up contingent planning to increase the production per unit area and to make the farming economically viable. This might have contributed for the positive and significant relationship.

Similar results were obtained by, Desai (1981), Reddy (1983) and Malathesh (2004)

It was noticed in the Table 24 that the variables such as education, land holding, social participation, level of aspiration, crisis perception, entrepreneurial behaviour, land use efficiency and family priorities had a positive and significant relationship with economic viability at one per cent level under dry land situation. The probable reasons may be that the education makes the individuals knowledgeable about different combinations of enterprises, production and productivity, economics of the enterprises, book keeping and other aspects related to the enterprise. Size of land holding always plays a vital role in deciding the diversification of farming into different appropriate enterprises and also provides the

economic base for the farmers to practice new farm and farm related technologies for achieving maximum profit. Further, the farmers having higher land holding status would also possess better socio-economic status which enable them to invest for different specialized farm operations of modern farming. The findings are in accordance with the findings of Ramegowda (1991) and Surya Prakasa Rao Gedela (2008).

Social participation helps to bring the farmers into an atmosphere of broader perspective where there is a better scope for them to exchange ideas, facts, and feelings etc. among group of farmers within the local setting. This helps the farmers to practice different integrated farming systems. The findings are similar with the findings of Ramegowda (1991).

Level of aspiration indicates farmers willingness to take up different farming systems for the betterment of future life. Further, the people who aspire for excellence in living standards naturally tend to put efforts to get maximum dividends out of different combination of enterprises. Thus, the level of aspiration might have contributed for the economic viability of the farmers. The finding is similar with the findings of Vani (2005).

Entrepreneurial behaviour of the farmers especially in dry lands motivate the farmers to adopt technologies which reduces the amount of uncertainty in any one of the enterprise. Further, the entrepreneurial behaviour makes the farmers to run the enterprises on more professional way and to make it economically profitable. Hence, it is needless to say that the entrepreneurial behaviour might have influenced the economic viability of the enterprises.

The results are in consonance with the finding of Parthasarathy Rao *et al.* (2004).

Further, in case of dry lands the farmers family priorities varies with their living styles which include the food consumption pattern also. Under such cases whatever the combination of enterprises they adopt should also contribute for the family requirements and need to make them economically viable for marketing the surplus products also. Normally the dry land farmers who depend more on monsoon and bore wells for irrigating the farm lands tend to grow the crops throughout the year without leaving land fallow for a small period. Further, due to the commitments they always include mixed cropping system in dry land orchards for better utilization of the land and also to grow short duration vegetables with bore well irrigation. Thus, the land efficiency of dry land farmers might have contributed for the economic viability of the enterprises.

5.7 Relationship between personal, socio-psychological characteristics of farmers with employment generation in irrigated and dry land

It was evident from the Table 25 that the variables such as education, family size, land holding, sources of irrigation, mass media participation, crisis perception, cropping intensity and market accessibility had relationship between independent variable with employment generation in irrigated land had positive and significant relationship with employment generation at one per cent level.

It is quite obvious that education will make the people aware and knowledgeable about the opportunities and prospects exist in different enterprises for additional employment. Family size will exert pressure for creation of additional employment in order to use the family labour available gainfully and profitably. It is needless to say that as the land holding increases the diversification of land for different combination of enterprises will also increase and this may lead to creation of additional

employment for both family as well as for hired labours. Mass media being important source of information for the farmers to go in for more than one enterprise to make the farm economically profitable and it also contribute for understanding and learning successful cases in other places also. This might motivated the farmers to get ideas and to implement it on the farm which may lead to creation of additional employment

Sources of irrigation play an important role in deciding the combination of enterprises and if the source of irrigation is perennial naturally the creation of additional employment would also increase. Cropping intensity is one of the best methods to increase the employment opportunities since in a same piece of land more no. of crops and other enterprises will be adopted with a intention to make it more viable.

Further, the crisis perception leads to overcome uncertainty, risk and other problem related to new enterprises and to overcome them by taking precautionary measures. Thus crisis perception would lead to generation of additional employment. Whereas, market being one of the important aspect in farming and better market opportunities for the products will naturally absorb more no. of labours for its economic activity.

Similar result were obtained by, Nagaraja (2002) and Malathesh (2004)

It was noticed in the Table 26 that the variable such as education, family size, land holding, extension participation, social participation, mass media participation, level of aspiration, crisis perception, entrepreneurial behaviour, land use efficiency and family priorities had

positive and significant relationship with employment generation at one per cent level in dry land situation.

It is needless to say that as the land holding increases the no. of enterprises adopted and also the area of cultivation will also increase. This provides an opportunity to engage more no. of labours for the farming operations and activities and it facilitates for creation of additional employment. Further, as the family size is more naturally they need to find gain full employment either on the farm or in any other enterprise to gainfully employ them. Hence, this may be the probable reason for finding the positive and significant relationship with the employment generation. The farmers participation in extension and social activities will make them aware about the opportunities and motivate them for practiced scientific and innovative farming which may contribute for creating more employment opportunities for family and hired labours.

Crisis perception, entrepreneurial behaviour, land use efficiency and family priorities also had positive and significant relation with employment generation. The justifications and the probable reasons drawn in the earlier irrigated land holds good for the present situation since the farming conditions may not affect the personal, situational and psychological variables which may have influence on the employment generation.

The findings are in line with the study conducted by Vani (2004) and Chitra (2010)

5.8 Contribution of personal and socio-psychological variables with economic viability in irrigated and dry land

The results of multiple linear regression analysis in Table 27 indicated that variables such as land holding, level of aspiration,

cropping intensity, land use efficiency, extension participation and family priorities had significantly contributed to the economic viability of integrated farming system in irrigated situation. The R^2 value of 0.543 indicated that all 16 variables had contributed to the tune of 54.30 per cent of variation in economic viability of integrated farming systems. The possible reasons might be that economic and social variables are the deciding factors of the economic viability of integrating farming systems.

The results of multiple linear regression analysis in Table 28 indicated that variables such as land holding, level of aspiration, cropping intensity, land use efficiency and extension participation had significantly contributed to the economic viability of integrated farming system under dry land situation. The R^2 value of 0.722 indicated that all 16 variables had contributed to the tune of 72.20 per cent of variation in economic viability. The possible reasons might be that economic and social variables play an important role in making the farming system viable as they are the deciding factors of the economic viability of integrating farming systems.

5.9 Contribution of personal and socio-psychological variables with employment generation in irrigated and dry land

The results of multiple linear regression analysis in Table 29 indicated that variables such as land holding, mass media participation, entrepreneurial behaviour and market opportunity had significantly contributed to the employment generation under irrigated situation. The R^2 value of 0.858 indicated that all 16 variables had contributed to the tune of 85.80 per cent of variation in employment generation. In addition to socio economic variables the situational variable like market opportunities and personal variable like entrepreneurial behaviour of the farmers might have contributed heavily for employment generation under irrigated situation.

The results of multiple linear regression analysis in Table 30 indicated that variables such as land holding, level of aspiration, attitude towards farming system, market accessibility, extension participation and family priorities had significantly contributed to the employment generation in dry land situation. The R^2 value of 0.785 indicated that all 16 variables had contributed to the tune of 78.50 per cent of variation in employment generation. It is curious that personal, socio-psychological, economic and situational variables are all responsible for the overall contribution to employment generation in different integrated farming situations.

5.10 Constraints faced by the farmers practiced integrated farming systems

5.10.1 Constraints faced by the farmers in irrigated condition

An examination of the Table 31 shows the production, situation, financial, marketing and extension constraints of farmers practiced Integrated Farming Situation under irrigated land.

In case of production constraints non availability of quality planting materials/breeds/species received first rank followed by non availability of adequate inputs in time (Rank II) were the major constraints faced by farmers. Any production system will survive only when it is supplemented with basic quality input like seed/ breed or species. Hence, this might have been rated as top most constraint. Further, many government schemes were fail to reach the farmers to supplement the inputs at right time, at right place and at right quantity.

Situational constraints like labour availability in peak seasons received first rank followed by, uneven distribution of rainfall (Rank II), limited and irregular power supply (Rank III) were the major situation constraints faced by farmers. It is quite obvious that the lack of labour

especially for farming is global phenomenon and hence the need of farm mechanization is realized by all. Over a period of time the uneven distribution of rainfall is commonly observed and in the absence of assured irrigation facilities the farmers might have burnt their fingers in gambling with the rainfall. Further, the availability of power is again depends on many factors like rainfall to generate hydro electricity and the respective governments might have failed to make use of the renewable sources of energy to reduce the pressure on hydro power projects. Hence, these things might have prompted them to rank these things on top priority.

With respect to financial constraints, loan disbursement procedure is cumbersome received first rank followed by, high cost of production (Rank II) and lack of timely availability of credit (Rank III). It is understandable that any financial institute for advancing loan follow stringent procedures regarding land records and repayment capacity of the borrowers. The social structure of the Indian communities is such that the land records sometimes are not updated regularly by the families and that may lead to confusion during sanction. Further, in the absence of single window system, it may create more problems for disbursement. The production cost is escalating day by day including the labour costs and bringing efficiency into the production system may reduce the cost of production.

Marketing constraints of fluctuation in the prices received first rank followed by, lack of storage facilities (Rank II), problem in transportation, exploitation by the middleman (Rank IV). This may be due to lack of market intelligence reports. The farmers find it difficult to sell their produce profitably due to lack of good market and marketing facilities. The absence of linking roads with the nearby markets may be the reason for the observation.

Extension constraints like non availability of extension personnel received first rank followed by, lack of demonstration to prove the worthiness of the technology and non availability of clinical services for livestock. This may be due to the government policies on ban on new recruitments and unwillingness of the extension personnel to stay in the villages and to conduct the demonstrations.

5.10.2 Constraints faced by the farmers in dry land.

It was noticed from the Table 32 that the production constraints like lack of technical knowledge regarding crop harvest received first rank followed by, lack of appropriate technologies for enhancing production and non availability of adequate inputs in time were the constraints faced by farmers of dry land. This may be due to the fact that lack of appropriate harvesting practices especially for field and fruit crops resulted in heavy loss of produce and less market price for inferior quality of produce. Again, the dry land cultivation is largely dependent on rain fall and hence, the technologies suitable for dry land production are the necessity of the farming community.

In case of situational constraints labour availability in peak seasons received first rank followed by, inadequate irrigation facility, uneven distribution of rainfall and limited and irregular power supply. This may be due to the dry land nature of agriculture where farmers face the vagaries of monsoon, droughts along with lack of irrigation facilities which leads to more distress condition among farmers. Further, the labour problem increases the production cost which affects the financial position of farmers.

In financial constraints high rate of interest on borrowings received first rank followed by, lack of required finance (Rank II), high cost of production (Rank III) and loan disbursement procedure is cumbersome.

This can be understood with the reasons that the dry land production majority of the times is not remunerative and hence they may feel that the interest rates charged may be very high.

In marketing constraints fluctuation in the prices received first rank followed by, untimely payment for the produce, lack of marketing facilities at local level and Low price for the produce. These constraints are inter-related. Because of non-availability of storage facilities there is scope for distress selling. Further, farmers find it difficult to sell produce profitably due to lack of good market and marketing facilities.

In extension constraints lack of extension services received first rank followed by, lack of capacity building programme (Rank II), non availability of clinical services for livestock (Rank III), and lack of demonstration to prove the worthiness of the technology were the constraints faced by the farmers.



SUMMARY

In an agricultural country like India, the average land holding is very small. The population is steadily increasing without any possibility of increase in land area. The income from cropping for an average farmer is hardly sufficient to sustain his family. The farmer has to be assured of a regular income for a reasonable standard of living by including other enterprises.

India with 2.2 per cent of global geographical area supports more than 15 per cent of the total world population, 60 per cent of whom depend on crop production. It also supports nearly 15 per cent of the total livestock population of the world. One third of the Gross National Product comes from agricultural sector alone. Though there has been increase in food production from 51 million tons in 1950 and at present it is 250 million tons (2012) but nearly 40 per cent of the Indian rural population still lives below the poverty line who cannot afford two square meals a day. Nearly 84 per cent of farm families belong to small and marginal categories. The per capita availability of land has declined from 0.36ha and is projected to touch 0.2ha by the turn of the century.

Mandya is one of the agrarian district in Karnataka and it has cultivated area of 3,26,383 ha comprises 65 per cent of total geographical area with varied farming systems practiced by the farmers. Farming system include the cultivation of paddy, ragi, sugarcane and other field crops along with other enterprises like dairy, poultry, goat rearing, vermicomposting and sericulture etc. With this background the study has been conceptualized with the following objectives.

1. To document different Integrated Farming Systems adopted by farmers under irrigated and dry land farming situations
2. To compare the performance of different Integrated Farming Systems practiced by the farmers
3. To study the Personal, socio-psychological characteristics of the farmers practicing Integrated Farming Systems
4. To study the relationship between socio-economic characteristics of the farmers with the economic viability and employment generation of the farmers practicing Integrated Farming Systems
5. To document constraints faced by farmers for better adoption of Integrated Farming Systems

The study was carried out in Mandya district of Karnataka state. Out of seven taluks of the district two taluks were purposively selected based on highest area under irrigation (Mandya) and highest area under dry land situation (Nagamangala). Sixty farmers comprising of 20 small, 20 medium and 20 big farmers from each taluks were selected and thus the sample size constituted for the study was 120. Ex-post facto research design was employed for conducting the study. The responses were scored, quantified, categorized and tabulated using statistical methods like percentage, mean and standard deviation, frequencies, correlation coefficient, regression and one way ANOVAs used for the study.

Major findings of the study

1. It was observed that in irrigated land majority of small (60.00%) and medium (55.00%) farmers were belonged to middle age category whereas; big farmers (55.00%) were old age category. Further, in dry land majority of small (60.00%) and medium (80.00%) farmers were belonged to middle age category whereas; big farmers (45.00%) were

belonged to old age category. The pooled data indicated that majority (68.33%) of the farmers was under middle age.

2. It was observed that in irrigated land 50.00 per cent of small and 30.00 per cent of medium farmers were illiterates whereas; in case of big farmers 30.00 per cent were illiterates. Further, in dry land 40.00 per cent of small and medium (35.00%) farmers were with high school education whereas; big farmers (35.00%) were illiterates. The pooled data indicated that nearly 33.00 per cent of the farmers were under illiterate category followed by, high school (26.66%), pre university/diploma (12.50%) and only 2.50 per cent studied up to graduation and above.
3. The findings in irrigated land indicated that a majority of small (70.00%), medium (80.00%), and big farmers (60.00%) belonged medium family size, whereas in dry land small farmers (40.00%) were under large family size. whereas medium (45.00%) and big farmers (50.00%) were medium family size. The results from the pooled data indicated that nearly half (46.67%) of the respondents had small family size.
4. It is clearly indicated that cent per cent of both irrigated and dry land farmers (100.00%) used canal water and bore well water as a source of irrigation respectively.
5. It was indicated that in irrigated land a great majority of small (80.00%) and medium farmers (50.00%) had low social participation. Whereas big farmers (50.00%) were had high participation. Further, in dry land a great majority of small (80.00%), medium (50.00%) and big farmers (60.00%) were under low, medium and high social participation category respectively. In total 43.33 per cent with low

social participation, followed by high (34.17%) and medium (22.50%) level of social participation.

6. It was noted that in irrigated land nearly half (45.00%) of small, medium and exactly half (50.00%) of big farmers were under low, high and high level of extension participation respectively. Further, in dry majority of small (45.00%), medium (85.00%) and big farmers (65.00%) were under low, medium and medium level of extension participation, category respectively. Also the pooled data indicated that nearly half (43.33%) of the farmers were under medium extension participation category.
7. It was observed that in irrigated land more than half (60.00%) of small farmers, 50.00 per cent of medium and big farmers were belonged to low, medium and high level of mass media participation respectively. Whereas in dry land situation, exactly half (50.00%) of small, medium and 80.00 of per cent big farmers were belonged to low, medium and high level of mass media participation respectively. The pooled data indicated that less than half of the respondents (45.83%) belonged to medium level of mass media participation category.
8. In irrigated land more than half (60.00%) of small farmers, 50.00 per cent of medium farmers and 55.00 per cent of big farmers belonged to medium, medium and high level of aspiration respectively. whereas in dry land majority (55.00%) of small farmers, half (50.00%) of medium farmers and 40.00 per cent of big farmers were under low, medium and medium level of aspiration, respectively. A glance at the sample as a whole indicated that 41.67 per cent had medium level of aspiration followed by high (34.17%) and low (24.17%) level of aspiration.

9. Sixty five per cent of small farmers, 40.00 per cent medium farmers and 65.00 per cent of big farmers were had favorable attitude towards farming system in case of irrigated situation. Whereas in dry land situation, 50.00 per cent of small farmers, 35.00 of per cent of medium farmers and 40.00 per cent of big farmers had favorable level of attitude followed towards farming system. The pooled data indicated that about 40.00 per cent of the respondents had favorable whereas, 30.83 per cent and 29.17 per cent had more favorable and least favorable attitude towards farming system, respectively.
10. About 45.00 per cent of small and medium farmers belonged to high and medium level of crisis perception, whereas in case of big farmers majority (65.00%) were under medium crisis perception level in case of irrigated land. In dry land 40.00 per cent of small farmers were under high crisis perception, whereas 50.00 per cent of medium farmers and 40.00 per cent of big farmers were grouped under medium crisis perception category. Also the pooled data indicated that about 40.00 per cent of the respondents belonged to medium crisis perception level.
11. Exactly two-fifth (40.00%) of small farmers, 65.00 per cent of medium farmers and half of the big farmers exhibited low, medium and high entrepreneurial behavior respectively in irrigated land. In dry land condition more than half (65.00%) of small farmers, two-fifth (40.00%) of medium farmers and 45.00 per cent of big farmers were under medium entrepreneurial behaviour respectively. The results from the pooled data indicated that more than one-third (36.67%) of respondents belonged to high, 34.17 per cent medium and 29.17 per cent had low entrepreneurial behavior, respectively.
12. Nearly 45.00 per cent of small farmers and medium farmers were belonged to low and medium category of cropping intensity whereas,

in case of big farmers 40.00 per cent belonged to low category of cropping intensity in irrigated land. Further, 40.00 per cent of small farmers, 50.00 per cent of medium farmers and two-fifth (45.00%) of big farmers were under low, medium and medium category of cropping intensity in dry land condition. A glance at the sample as a whole indicated that about 40.83 per cent falls under medium category followed by low (33.33%) and high (25.83%) cropping intensity category.

13. More than half of (55.00%) of small farmers, exactly half of the medium (50.00%) and big farmers were had medium, medium and high family priorities respectively in irrigated land. Whereas in dry land 40.00 per cent of the small and medium farmers had medium family priorities. Whereas in case of big farmers majority (75.00%) were belonged to high family priorities category. Also the pooled data indicated that about 37.00 per cent of the respondents had medium followed by high (35.00%) and low (27.00%) family priorities.
14. In irrigated land 50.00 per cent of small farmers, two- fifth (45.00%) of medium farmers and 40.00 per cent of big farmers had medium market opportunity. Whereas in dry land majority (65.00%) of the small farmers, exactly half (50.00%) of the medium farmers and 40.00 per cent of big farmers had medium level of market accessibility. The results from the pooled data showed that nearly two- fifth (37.50%) of the farmers were had medium, followed by high (35.83%) and low (26.67%) market accessibility.
15. Nearly 45.00 per cent of small farmers and 40.00 per cent of medium farmers were under medium and low land use efficiency, whereas in case of big farmers exactly half (50.00%) of farmers were under high land use efficiency in case of irrigated land. Further, 65.00 per cent of small farmers and 40.00 per cent of medium farmers were under

medium land use efficiency and 45.00 per cent of big farmers under high category of land use efficiency in case of dry land condition. The pooled data indicated that more than one-third (38.33%) of farmers were under medium category, followed by low (33.33%) and high (28.33%) land use efficiency.

16. Nearly one fourth (23.34%) of the farmers practiced agriculture+ sericulture + dairy followed by agriculture + sericulture (18.34%), agriculture + sericulture +dairy + poultry (15.00%), agriculture +dairy(13.33%), agriculture + sericulture +goat rearing (11.66%), agriculture + dairy+ horticulture (10.00%) and agriculture+ sericulture+ dairy+ goat rearing + vermicompost (8.33%) in irrigated land.
17. About 25.00 per cent of farmers practiced horticulture +dairy +forestry followed by horticulture + dairy (20%), agriculture + horticulture + dairy + forestry (16.66%), horticulture + dairy + sericulture (11.66%), horticulture + dairy + goat rearing (10%), whereas exactly equal per cent (8.34%) of the farmers practicing agriculture+ horticulture and horticulture + dairy + goat rearing + forestry respectively in dry land.
18. More than one third (35.00%) of small farmers practiced agriculture +sericulture followed by agriculture+ dairy (30.00%), 25.00 per cent of medium farmers practiced agriculture + sericulture + dairy+ poultry followed by, agriculture+ sericulture+ dairy (20.00%), Whereas 35.00 per cent of big farmers were practiced agriculture+ sericulture +dairy followed by agriculture + sericulture +dairy +goat rearing + vermicompost (25.00%), in irrigated land.
19. About 30.00 per cent of small farmers practiced horticulture +dairy followed 20.00 per cent adopted horticulture + dairy+ forestry.

Further, nearly one third of medium farmers adopted horticulture +dairy +forestry followed by horticulture + dairy+ goat rearing+ forestry (20.00%). Whereas 35.00 per cent of big farmers practiced agriculture + horticulture +dairy +forestry followed by, horticulture +dairy +forestry (25.00%) in dry land.

20. It was observed that economic viability of farmers of irrigated land practiced agriculture+ sericulture+ goat rearing produced highest net return (Rs.1.70 per rupee invested) in case of small farmers. Further, agriculture + sericulture +dairy + poultry produced highest return (Rs.1.76 per rupee invested) in case of medium farmers. Whereas agriculture + sericulture + dairy + goat rearing + vermicompost produced highest return (Rs.2.28 per rupee invested) in case of big farmers.
21. It was revealed that the economic viability of small farmers practiced horticulture + dairy + goat rearing yielded highest net return (Rs.1.55 per rupee invested). Further, in case of medium farmers horticulture + dairy+ goat rearing + forestry produced highest net return (Rs.1.75 per rupee invested). Whereas in case of big farmers horticulture + dairy+ goat rearing + forestry fetched highest net return (Rs.2.03 per rupee invested).
22. Employment generation in irrigated land showed that in case of small farmers high employment generation was found in agriculture+ sericulture+ dairy (99 man days/year). Further, in case of medium farmers highest employment generation was found in agriculture +sericulture + dairy + poultry (240 man days/year). Whereas in case of big farmers the highest employment generation was found in agriculture +sericulture + dairy + poultry (388 man days/year).

23. Employment generation of farmers in dry land showed that in case small farmers' highest generation was found in horticulture + dairy+ sericulture (77 man days/year). In medium farmers highest employment generation was found in agriculture+ horticulture+ dairy +forestry (148man days/year). Whereas in case of big farmers highest employment generation was recorded in crop production + horticulture + dairy +forestry (201 man days/year).
24. It was noticed that farmers in irrigated land practiced were had more economic viability (1.80 rupees per rupee investment) and generate more employment (209man days/year) over the years compare to economic viability (1.65 rupees per rupee investment) and employment generation (114 man days/year) of farmers practicing integrated farming systems under dry land.
25. It was found that in case of irrigated land the variables such as family size, land holding, level of aspiration, mass media participation, extension participation, crisis perception and family priorities had positive and significant relationship with economic viability at one per cent level of significance and entrepreneurial behaviour, cropping intensity and land use efficiency had positive and significant relationship with economic viability at five per cent level
26. It was found that in case of dry land the variables such as education, land holding, social participation, level of aspiration, crisis perception, entrepreneurial behaviour, land use efficiency and family priorities had positive and significant relationship with economic viability at one per cent level. Whereas, family size and cropping intensity had positively significant relationship with economic viability at five per cent level.

27. It was observed in irrigated land that the variables such as education, family size, land holding, sources of irrigation, mass media participation, crisis perception, cropping intensity and market accessibility had positive and significant relationship with employment generation at one per cent level and social participation showed positive and significant relationship at five per cent level.
28. It was observed in dry land that the variables such as family size, land holding, mass media participation, entrepreneurial behaviour, land use efficiency and family priorities had positive and significant relationship with employment generation at one per cent level in dry land situation. Whereas, education, extension participation, social participation, level of aspiration had positively significant relationship with employment generation at five per cent level.
29. With respect to extent of contribution of independent variables with economic viability in irrigated land, it is evident that all the sixteen variables fitted together in the regression model explained 54.30 per cent of the variation in the economic viability of farmers with integrated farming system.
30. With respect to extent of contribution of independent variables with economic viability in dry land, it is observed that all the sixteen variables fitted together in the regression model explained 72.20 per cent of the variation in the economic viability of farmers with integrated farming system.
31. All the sixteen variables fitted together in the regression model explained 85.80 per cent of the variation in the employment generation of farmers with integrated farming system in irrigated land. The regression coefficient of six variables such as age, land holding, extension participation, mass media participation,

entrepreneurial behaviour and market accessibility was found to be positive and had significant relationship with employment generation at five per cent level.

32. All the sixteen variables fitted together in the regression model explained 78.50 per cent of the variation in the employment generation of farmers with integrated farming system in dry land. The regression co-efficient of four variables such as extension participation, mass media participation, attitude towards farming system and family priorities were found to be highly significant with employment generation at one per cent level whereas land holding and market accessibility had positive and significant relationship with employment generation at five per cent level.
33. It was indicated that in irrigated land, the production constraints like non availability of quality planting materials/breeds/species (Rank I) followed by non availability of adequate inputs in time, Situational constraints like labour availability in peak seasons (Rank I) followed by, uneven distribution of rainfall (Rank II), financial constraints like loan disbursement procedure is cumbersome (Rank I) followed by, high cost of production (Rank II), marketing constraints like fluctuation in the prices (Rank I) followed by, lack of storage facilities (Rank II), extension constraints like non availability of extension personnel (Rank I) followed by, lack of demonstration to prove the worthiness of the technology (Rank II) were the major constraints faced by the farmers.
34. It was noticed that in dry land, the production constraints like lack of technical knowledge regarding crop harvest (Rank I) followed by, lack of appropriate technologies for enhancing production (Rank II), situational constraints like labour availability in peak seasons (Rank I) followed by, inadequate irrigation facility (Rank II), financial

constraints like high rate of interest on borrowings (Rank I) followed by, lack of required finance (Rank II), marketing constraints like fluctuation in the prices (Rank I) followed by, untimely payment for the produce (Rank II), extension constraints like lack of extension services (Rank I) followed by, lack of capacity building programme (Rank II) were the major constraints faced by the farmers.

Implication and suggestions:

In the light of findings of the study and from the personal experiences of researcher at the time of personally interviewing respondents, following implications were made about different Integrated Farming Systems adopted by farmers under irrigated and dry land farming situations.

- The present study is an attempt to understand the different integrated farming systems followed by farmers of two distinct region i.e. irrigated and dry land of Mandya district. The economic viability and employment generation by different integrated farming systems help us to understand different viable combinations which in turn provide an insight to the extension personnel to create awareness and to motivate the farmers to go in for best combination of enterprises.
- The respective developmental department may concentrate on promoting such enterprise among the different categories of farmers and in addition the policy makers may look into the possibilities of overcoming the extension, situational and economic constraints of farmers practicing these enterprises.
- Case studies of successful farmers adopting different Integrated Farming Systems under irrigated and dry land farming situations may be taken up.

- Similar studies may be conducted in different agro-climatic zones with clear distinctions among irrigated, semi irrigated, dry land situations. Further study may also be conducted for farmers by keeping land holding as a basis.
- This study also revealed that irrigation found to be the major constraint in dry farming situation. Hence there is a need to bring more land under irrigation by completing ongoing irrigation projects and plan about the new irrigation projects, increasing network of canals, tanks; wells and micro irrigation systems. This will definitely help in increasing crop production, productivity, and change in cropping pattern, cropping intensity, and increase in the allied occupations in study area. These things are necessary not only for uphold the farmers economically but also for sustaining them socio-psychologically.

A decorative scroll graphic with the word "References" written inside. The scroll is horizontal and has a light gray background. The word "References" is written in a black, serif font, centered within the scroll. The scroll has a vertical strip on the left side and a small circular detail at the top right corner.

References

REFERENCES

- ALAM, M., FURUKAWA, Y. AND MIKA, M., 2010, Perceptions, preferences and attitude of Bangladesh farmers towards home garden farming systems. *Small-scale Forestry*; **9**(2): 213-226.
- ANITHA, B., 2004, A study on entrepreneurial behaviour and market participation of farm women in Bangalore rural district of Karnataka. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- AIYASWAMY, M.T., 1980, Knowledge of farmers on dry farming practice. *J. Extn. Educ.*, **5**(4):1291-1293.
- BADAGAONNER, S. S., 1983, Measurement of farmer's knowledge and factors affecting the adoption behaviour of groundnut cultivators of Uttar Kannada district of Karnataka state. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- BEHERA, U.K. AND MAHAPATRA, I. C., 1999, Income and employment generation of small and marginal farmers through integrated farming systems. *Indian J. Agron.*, **44**(3):431-439.
- BEHERA, U.K. AND SHARMA, A.R., 2007, Modern concept of agriculture farming systems. Advanced publishing IARI, New delhi pp.1-36.
- BEHERAN, U.K. AND YATES, C. M., 2008, Farming systems methodology for efficient resource management at the farm level: A review from an Indian perspective. *J. Agric. Sci.*, **146**(5): 493-505.

- BEHERA, U.K., JHA, K.P. AND MAHAPATHRA, I.C., 2001, Generation of income and employment-A success story. *Intensive Agric.*, **39**(7-8):9-13.
- BHAGYALAXMI, K., GOPALAKRISHNA RAO, V. AND SUDARSHAN REDDY, M., 2003, Profile of the rural women micro-entrepreneurs. *Journal of Research*, Acharya N. G. Ranga Agricultural University, Hyderabad, **31**(4): 51-54.
- CHANDRAN, B., 1997, A study on knowledge and adoption of farmers cultivating tapioca in Ernakulam district of Kerala State. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- CHANDRANI SAHA, 2008, A study on sustainability of farming system and livelihood security among rural house hold in Tripura. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- CHANDRASEKARAN, B., RAMANATHAN, S.P. AND GOVINDA SWAMY, K.W., 1994, Rice based IFS approach in Cauvery delta region report on IFSR and management for sustainable agriculture. Tamil Nadu Agri. Univ., Coimbatore.
- CHANDRASHEKHAR, S. K., 2007, Analysis of onion production and marketing behaviour of farmers in Gadag district, Karnataka. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- CHANNABASAVANNA, A. S., BIRADAR D. P., PRABHUDEV, K. N. AND MAHABHALESWAR HEGDE, 2009, Development of profitable integrated farming system model for small and medium farmers of Tungabhadra project area of Karnataka. *Karnataka J. Agric. Sci.*, **22**(1): 25-27.

- CHINMAY, B. AND SINGH, R., 2003, integrated farming system: An intensive approach. *Intensive Agric.*, **41**(7-8):22-23.
- CHITRA, B.M., 2010, A study on knowledge and adoption of improved practices in selected farming systems of Mandya district. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- CHUANG, F.T., 1973, An analysis of change of Taiwan's cultivated land utilization for recent years. Rural economic division JCRR REP. Taiwan, 21pp.
- DALRYMPLE, D.F., 1971, Survey of multiple cropping in less developed nations. USDFA, Washington, D.C. FEDS, 108 pp.
- DEEPA BISHT, 2011, Integrated fish farming for food, nutritional security and economic efficiency in mid hills of Indian Central Himalaya. *Research Journal of Fisheries and Hydrobiology*, 1-6.
- DEEPAK, M. P., 2003, A study on perception on beneficiaries and non-beneficiaries towards WYTEP programme in Dharwad district. *M.Sc. (Agri.) Thesis (Unpub.)*, Uni. Agri. Sci., Dharwad.
- DESAI, G.B., 1981, A critical analysis of the contribution of education and extension guidance of economic performance of cotton farmers of Karnataka state. *M.Sc (Agri.) Thesis (Unpub.)*, Uni. Agri. Sci., Dharwad.
- DHAKA, B.L. AND POONIA, M.K., 2009, Integrated farming system approach for natural resource management. *Indian Journal of Fertilizers*, **5**(11): 31-34.

- DOLLI, S. S., 2006, Sustainability of natural resources management in watershed development project. *Ph. D. Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- GANESH PRASAD, T.S., 2006, An analysis of adoption, marketing and constraints of turmeric growers in Chamarajanagar district. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- GOWDA CHANDRE, K. N., 1997, A study on extent of adoption of improved cultivation practices of chrysanthemum. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- HARDIKAR, D. P., 1998, Perception of development programme and benefits derived by women beneficiaries of Ratnagiri district Maharashtra, *Ph. D. Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- HIREMATH VISHVANATH, 2007, Knowledge and adoption behaviour of vegetable growers with respect to eco-friendly technologies. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- HOSAMANI, M. M., 1999, Research extension linkage in IFS development. *Lecture Notes of Summer Short Course on Farming Systems for Sustainable Production*, Univ. Agric. Sci. Dharwad. 266-269.
- IRVINE, W. AND ANDERSON, A. R., 2005, The impacts of foot and mouth disease on a peripheral tourism area: the role and effect of crisis management, *Journal of Travel & Tourism Marketing*. **19**(2&3):47-60.

- ITNAL, C. J., HUNDEKAR, S. T., WARAD, S. M. AND ITNAL, M. C., 1999, Farming system-A rational approach for sustainable agriculture. *Lecture notes of summer short course on Farming System for sustainable production*, Univ. Agric. Sci., Dharwad. 53-73.
- JAMBHALE, N. N., 2007, Technology gap in gram cultivation. *M.Sc. (Agri.) Thesis (Unpub.)*, Akola.
- JAYANTH, C., MYTHRILI, S., BALUSAMY, M., SHAKTHIVEL, N. AND SHANKARAN, N., 2003, Integrated nutrient management through residue recycling in low land integrated farming system. *Madras Agri. J.*, **90**(1-3):103-107.
- JAYANTHI, C., RANGASAMY, A. AND CHINNUSAMY, C., 1998, Economic efficiency of component linkage in lowland integrated farming system: *Madras-Agricultural Journal*, **84**(8): 498-504.
- JHA, D., 2003, An overview of farming systems research in India. *Annals of Agricultural Research*, **24**(4):695-706.
- JOGINDER SINGH AND MALIK, R.S., 2003, Diversified farming in Sonpet district of Haryana. *Indian J. Extn. Educ.*, **38**(5&4):173-177.
- KALE, N.M., 2008, Socio-economic, psychological and situational causes of suicides of farmers in Vidarbha region. *Ph.D. Thesis (Unpub.)*, Akola.
- KANAVI, V. P., 2000, Study on the knowledge and adoption behaviour of sugarcane growers in Belgaum district of Karnataka. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.

- KANWAT, M., MEENA, M. S., KUMAR, P. S., CHOUDHARY, V. K. AND BHAGAWATI, R., 2012, Measurement of attitude towards the adoption of back yard poultry farming in Arunachal Pradesh. *J. Agric. Sci.*, **4**(3): 131-136.
- KARTHIK, K.B., 2009, A study on diffusion of hybrid paddy seed PRODUCTION technologies in Mandya district. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- KELLA LAKSHMANA, IQBAL, I. M., NETAJI SEETHARAMAN, R. AND REANGASWAMY, R., 2002, Research in field extension- An approach for sustainability. *MANAGE Extn. Res. Rev.* **111**(2):109-112.
- KRISHNAMURTHY, B., RANGANATH, A.D. AND VANITHA, C., 2004, Constraints in adoption of integrated pest management practices by rice farmers. *Indian J. Extn. Educ.*, **40**:101-102.
- KUMAR VINAY, R., 2005, A study on knowledge and adoption of rose growing farmers in Karnataka. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- KULKARNI, A., 1982, Economics of poultry manure in and around Hydrabad. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Hydrabad.
- LAVANYA, S., 2010, Assessment of farming systems efficiency in Theni district of Tamil Nadu. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- MALATHESH, G.B., 2004, An Analysis of selected farming system in eastern dry zone of Karnataka, *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.

- MALLIKA METI, 2009, Impact of contract farming on economic status of farmers in selected district of Karnataka. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- MANGALA, B., 2008, Impact of integrated farming system on socio-economic status of BAIF beneficiary Farmers *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- MARADDI, 2006, An analysis of sustainable cultivation practices followed by sugarcane growers in Karnataka, *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- MATHEWOS BELLISA TEREFE, 2002, A study on extension activities of private sector to farm production and marketing in Karnataka state, India, *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. of Agri. Sci., Dharwad.
- MOULASAB, I., 2004, A study on knowledge and adoption of improved cultivation practices by mango growers of North Karnataka, *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- MURUGAN, G. AND KATHIRESAN, R.M., 2005, Income and economic efficiency under low land integrated farming systems. *Research-on-Crops*. **6**(2): 234-236.
- NAGARAJA, G. N. AND YELLAPPA, E., 2002, Economic impact of integrated farming system demonstrations on participating farmers, Univ. Agri. Sci., Bangalore, pp.32-34.
- NAGARAJA, M. V., 2002, A study on knowledge of improved cultivation practices of sugarcane and their extent of adoption by farmers in Bhadra command area in Davanagere district, Karnataka State. *Ph.D. Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.

- NAGESH, 2006, Study on entrepreneurial behavior of pomegranate growers in Bagalkot district of Karnataka. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- NAGESHA, 2005, Study on entrepreneurial behaviour of vegetable seed producing farmers in Haveri district of Karnataka. *M. Sc. (Agri.) Thesis, (Unpub.)*, Univ. Agri. Sci., Dharwad.
- NAIK, R. G., LAKSHMINARAYANA, M. T., ANAND, M. G. AND REDDY, R. N., 2008, Attitude of mango growers towards sustainable farming practices, *Crop Research (Hisar)*, **35**(1&2): 155-156.
- NAMADEV A. SHINDE, PATIL, B. L., MURTHY N, C. AND MAMLE DESAI, R., 2009, A study on income and employment generation under sugarcane based intercropping systems, *Karnataka J. Agric. Sci.*, **22** (4) :929-930.
- NAMDEV GAJRE, N. AND OMPRAKASHA SHAHAPURKAR, V., 2011, Spatio temporal analysis of land use efficiency in Nanded district: a geographical review. *Half yearly research journal*, **2**(2):62-63.
- NARMATHA, N., KRISHNARAJ, R. AND MOHMED SAFIULLAH, A., 2002, Entrepreneurship behaviour of livestock farm women. *J. Extn. Edu.*, **13**(4): 3431-3438.
- NATARAJAN, A. V., 1983, Possibilities of blackish water paddy cum fish farming in coastal saline soils. *J. Indian Soc. Coastal Agri. Res.*, **1**:113-115.
- NEELAVENI, S., RAMBABU AND PUNNA RAO, 2002, Developmental priorities of farm women in agribusiness management – A case of an adopted village K.B. Palm. *MANAGE Extn. Res. Rev.*, **6**(3): 74-83.

- NETHRAVATHI, R.V., 2008, Participation of farm women in post-harvest technologies of tomato in Kolar district. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- NETRAVATHI, G., 2007, A Comparative analysis of the preference and performance of marketing organizations of fruits and vegetables in Bangalore rural and urban district. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- NOWACKI, W., 2008, Comparison of profitability of potato cultivation in organic and integrated farming systems. *Progress in Plant Protection.*, **48**(4): 1526-1534.
- PARTHASARATHY RAO, P., BIRTHAL, P.S., JOSHI, P.K. AND KAR, D., 2004, Agricultural diversification in India and role of urbanization, international food policy research institute. *MTID discussion*, pp.77.
- PATIL, S. L., 1990, A study on the extent of adoption of recommended cultivation practices of DCH-32 cotton by farmers and its economics in Malaprabha command area of Dharwad district. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- PATIL, V. G., MAHADIK, R. P. AND PATIL, A. S., 2003, Entrepreneurial behavior of sugar cane growers. *Maharashtra J. Extn. Edu.*, **18**: 240-243.
- POTTAPPA, K., 2008, Knowledge and adoption of potato growers in Chikkaballapur district – A study, *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- PUSHPA J., 2010, Constraints in various integrated farming systems. *Agriculture-update*. **5**(3&4):370-372.

- PUSHPA, J. AND NETAJI SEETHARAMAN, R., 1999, Impact on income and employment of farmers in various integrated farming system. *J. Extn. Edu.*, **10**(4): 2628-2630.
- RADHAMANI, S., BALASUBRAMANIAN, A., RAMAMOORTHY, K. AND GEETHALAKSHMI, V., 2003, Sustainable integrated farming systems for dry land. *A Agricultural Reviews*, **24**(3): 204-210.
- RAI, R. AND RAJ, K., 2010, Economic analysis of milk production of district Fatehpur in Uttar Pradesh. *Agriculture Update*. **5**(3&4): 446-449.
- RAM SURESH AND HUBBA LAL SINGH, 2008, Income and employment generation in mixed farming systems in Gonda district of Uttar Pradesh, *Agric. Sci. Digest.*, **28**(2):121 - 123.
- RAMANA RAO, 2005, General studies for agricultural research services and other competitive examination. *Jain Brothers New Delhi*, **4** (9).
- RAMEGOWDA, B. L., 1991, Crisis management by farmers: An analysis. *Ph.D. Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- RAMRAO, W. Y., TIWARI, S. P. AND SINGH, P., 2005, Crop-livestock integrated farming system for augmenting socio-economic status of small holder tribal of Chhattisgarh in Central India. *Livestock Research for Rural development*. vol.17
- RANGASAMY, A., 1999, In lecture notes of summer short course on farming systems for sustainable production. Univ. Agric. Sci., Dharwad.

- RAO, M. S. AND DIPAK DE, 2003, Entrepreneurial behaviour of vegetable growers, department of extension education. Institute of Agricultural Sciences, Banaras Hindu University, Varanasi.
- RATHORE, S.S AND BHATT, B. P., 2008, Productivity improvement in jhum fields through integrated farming system. *Indian j. Agric. Sci.*, **53**(3):167-171.
- RAVI, G. K., 2007, A study on entrepreneurial behavioural characteristics of SC and ST farmers of Gulbarga district. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Darwad.
- REDDY , G.K.,1983, A study of management orientation farming efficiency and consultancy of rainfed ground nut growers in Kolar district of Karnataka state. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- SADEK, N. F. AND OKTARANI, Y. P., 2009, Consumer knowledge and perception about organic food: A challenge for consumer education on the benefits of going organic. *Asian Journal of Food and Agro-Industry*, **2**(1): 5363-5367.
- SALEH, D. A., YASSIN, S., SABRY, H. A. AND ABDELRAZIK, M. S., 2010, Priority families for health care according to family socio-demographic risks, *Journal of Public Health and Epidemiology*, **2**(6): 138-146.
- SANJEEV KUMAR SINGH, S. S. AND SHIVANI DEY, A., 2011, Integrated farming systems for Eastern India. *Indian J. Agron.*, **56**(4):297-304.
- SATISH KUMAR, G.D. AND SUDERSHAN RAO, B.V., 2004, Motives for cultivation of cotton. *Indian J. Extn. Edu.*, **40**(3 & 4): 91-93.

- SHEKINAH, D.E., AND SANKARAN, N., 2007, Productivity, profitability and employment generation in integrated farming systems for rained vertisols of western zone of Tamil Nadu. *Indian J. Agron.*, **52**(4): 275-278.
- SHERIF AND HOVLAND C.L., 2001, Social judgement: Administration and contrast effects in communication and attitude change. Yale University Press, New Haven.
- SHIVAMURTHY, G. R., 1991, A study on the knowledge and adoption behaviour of arecanut and cardamom growers in Shimoga district of Karnataka state. *M. Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Dharwad.
- SINGH, R.D AND VIVEK KUMAR SINGH, 2005, Pattern identification of land use and resource use efficiencies in agriculture in jhabua tribal district in Madhya Pradesh. *Indian journal of regional sciences*, **33**(2):111-114.
- SINHA, P. R. R. AND KOLTE, N. V., 1974, Adult education in relation to agricultural development - An evaluation study of development blocks in Andhra Pradesh, National Institute of Rural Development and UNESCO Press.
- SIVAMURUGA, A. P. AND SARAVANANE, P., 2008, Integrated farming systems for sustaining productivity in irrigated uplands. *International J. Agric. Sci.*, **4**(2):506-509.
- SRIRAM, N. AND PALANISWAMY, A., 2000, Cotton growers extent of awareness about the eco-friendly agriculture practices in cotton. *J. Extn. Edu.*, **11**(2): 27-90.

- SUBRAMANYESWARI, B. AND VEERARAGHAVA REDDY, K., 2003, Enterpreneurial behaviour of rural dairy women. *Madras Agri. J.*, **30**(1&3): 173-175.
- SUNIL DUTT, J. AND CHOLE, R. A., 2002, A study on adoption of sericultural practices by sericulturists. *Indian J. Seric.* **41** (1):1 -6.
- SURYA PRAKASA RAO GEDELA, 2008, Factors Responsible for Agrarian Crisis in Andhra Pradesh. *World Applied Sciences Journal*, **4** (5): 707-713.
- THEERTHA PRASAD, A.R., 2006, An analysis of different farming systems in Hassan district. *M.Sc. (Agri.) Thesis (Unpub.)*. Univ. Agri. Sci., Bangalore.
- THEJASWINI, C.N., CHANDRASHEKAR, V. AND NARAYANA GOWDA, K., 2004, Performance of farm women in agriculture and income generating activities. *MANAGE Extension Research Review*, 68-73.
- THIPPESWAMY, R., 2007, A study on knowledge and adoption of plant protection measures in coconut cultivation of farmers of Chitradurga district. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- TOOR, M.S., SIDHU, A. S. AND SUKHPREET SINGH, 2009, Integrated farming systems for income and employment increasing possibilities on small farms in Punjab State. *Agricultural Situation in India*. **66**(9): 519-524.
- TRIVEDI, G., 1963, Measurement and analysis of socioeconomic status of rural families. *Ph.D. Thesis (Unpub.)*, Div. Agril. Extn. IARI, NEW Delhi.

- UGWUMBA, C. O. A., OKOH, R.N., IKE, P.C., NNABUIFE, E.L.C. AND ORJI, E.C., 2010, Integrated farming system and its effect on farm cash income in awka south agricultural zone of Anambra State, Nigeria. *American-Eurasian J. Agric. & Environ. Sci*, **8** (1): 01-06.
- VANI, M., 2005, A study on farming system approach: Socio-psychological and economic dimensions of farming system approach in Chitradurga district of Karnataka state. *M.Sc. (Agri.) Thesis (Unpub.)*, Univ. Agri. Sci., Bangalore.
- VISHVANATH HIREMATH, SHIVAMURTHY, M., LAKAHMAN REDDY, B.S., KATTEPA, Y., 2009, Adoption behavior of vegetable growers regarding eco-friendly technologies in Kolar district of Karnataka, Mysore. *J . Agric. Sci.*, **43** (3):352-356.
- VIVEKANANADA, 1999, Problems and prospects of agricultural development in Karnataka occational paper-9 NABARD.



Appendices

INTERVIEW SCHEDULE

TITTLE OF THE RESEARCH: COMPARATIVE ANALYSIS OF INTEGRATED FARMING SYSTEMS PRACTICED BY FARMERS IN MANDYA DISTRICT

PART I

Respondent No.

Date:

1. General Information

- a) Name of the Respondent:.....
- b) Father's Name:.....
- c) Name of the Village:.....
- d) Name of the Taluk:.....
- e) Name of the District:.....

2. Personal information:

1) Age of the Respondent (in years):

2) Education:

- a) Illiterate ()
- b) Can read ()
- c) Can read and write ()
- d) Primary school ()
- e) Middle school ()
- f) High school ()
- g) Pre university/ Diploma ()
- h) Graduates ()
- i) Post Graduate ()

3. Family size

a.Men :
b.Women :
c.Children :
Total :

4. Land holding (in acres): please indicate your land holding under the following classification

Type of land	Dry land	Wet land	Garden land	Total
Area (acres)				

5. Sources of irrigation

Sl. No	Source	Maximum area can be irrigated	Actual area irrigated
1.			
2.			
3.			
4.			
5.			
Total area irrigated			

6. Social participation:

Are you a member or office bearer of any social organizations? Yes/ No
If yes, how often you attend the activities?

Sl. No.	Name of the organization	Membership		Extent of participation		
		Member	Office bearer	Regular	Occasional	Never
1.	Grama Panchayat					
2.	Taluk Panchayat					
3.	Zilla Panchayat					
4.	Co-operative society					
5.	Self Help Group					
6.	Youth club					
7.	Any other(specify)					

7. Extension participation:

Please indicate your participation in extension activities conducted by Extension agencies.

Sl. No.	Extension Activities	Conducted by		Extent of participation			
		Private	Public	Regular	Often	Occasional	Never
1.	Krishimela						
2.	Farmers trainings						
3.	Demonstrations						
4.	Field trips/ Study tour						
5.	Exhibitions						
6.	Campaigns						
7.	Meetings						

8. Mass media participation:

Please indicate how often you participate in mass media.

Sl. No	Mass media	Owner	Subscriber	Frequency of participation		
				Regular	Occasional	Never
1.	Listening to Radio(General programme)					
2.	Listening to Radio (Argil. programme)					
3.	Viewing the TV (General programme)					
4.	Viewing the TV (Argil. programme)					
5.	Reading Newspaper					
6.	Reading Farm books/Magazine/journals					
7.	Any other (Specify)					

9. Cropping intensity

Please indicate the different cropping systems under different season.

Season	Crops grown	Area in acres
Kharif	1.	
	2.	
	3.	
	4.	
Rabi	1.	
	2.	
	3.	
	4.	
Summer	1.	
	2.	
	3.	
	4.	
Perennial	a.	
	b.	
Horticulture	a.	
	b.	
Forestry	a.	
	b.	
Fodder crops	a.	
	b.	

10. Level of Aspiration

Here is the picture of ladder with 10 steps. Suppose we say that the top of ladder represents "best possible life" and the Bottom represents "worst possible life";

a) Where on the ladder do you feel personally stand at present?

Step no.:

b) Where on the ladder do you personally stood two years ago?

Step no.:

c) Where do you think you will be two years from now?

Step no.:

Best possible

10
9
8
7
6
5
4
3
2
1
0

11. Attitude towards farming system

Please indicate your response for a set of statements given below representing attitude towards farming system.

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

Sl. No.	Statements	Responses				
		SA	A	UD	DA	SDA
1.	There is no need to combine different farm enterprises to stabilize ones farm income					
2.	Farming involving different enterprises has no influence on farm productivity but rather increased complexity.					
3.	A farmer can be ensured of safety when he prefers a single profitable enterprise instead of too many					
4.	Before introducing the enterprises a farmer should visualize the harmful influences of new enterprises on existing farm enterprises					
5.	A farm with several enterprises provide adequate protection against yield uncertainties of the entire farm					
6.	By adopting several enterprises farmer can make up the loss incurred in any of the enterprises					
7.	A farm with several crops is no way better than monocarp farm in providing insurance against crop failure					
8.	Diversified farming ensures employment to family members round the year					

12. Crisis perception

Sl. No.	Statement	Agree completely	Agree partially	Dis agree
1.	A farmer while selecting a new crop variety, should first analyze farm situation and identify the problems related to his present cropping pattern in terms of the grain yield, cost, income, fodder quality duration			

2.	A farmer should list all the alternative crops suitable to substitute the present crop variety on his farm			
3.	The negativity and positive consequences of each alternative crop under consideration should be identified in terms of cost, returns, and effects on soil fertility.			
4.	A farmer takes the stock of his financial resources availability of land, labor and materials for crops under consideration.			
5.	A farmer foresees weather uncertainties and develops a contingency crop plan to adjust to adversities.			
6.	A farmer should assess the performance of crop selected after he has grown it, with respect to its cost, return, drought tolerance etc			

13. Entrepreneurial Behaviour

MP- Most progressive

P-Progressive.

SWP- Some What Progressive.

LP-Least Progressive

Sl. No.	Statement	Responses			
		MP	P	SWP	LP
1.	Get involved in preparing cropping pattern well in advance				
2.	Always keep ready to optimally combine the resources to suits agro climate conditions of the region				
3.	Always update the changes in technology				
4.	Attended to selection of right enterprise				
5.	Ensure timely application of quality inputs				
6.	Practice principle of the double /multiple cropping systems				
7.	Decide on the subsidiary enterprises for achieving higher profit				

8.	Decide on increasing or decreasing the area under different crops				
9.	Get involved in selection of appropriate livestock enterprises considering risk involved				
10.	Personally inspect crop stand, livestock and other enterprises periodically				
11.	Adhere to maintenance of records regarding expenditure and income				
12.	Adopt timely appropriate pest and disease control measures				
13.	Actively participate in harvesting of the crops at the right stage of maturity				
14.	Keep in mind the benefits of the multiple cropping systems and practice accordingly				
15.	Update knowledge regarding market prices of different commodities				
16.	Prefer to procure inputs from the nearest market				
17.	Keep vigilant to identify and use quality inputs (fertilizer , seeds , pesticides , chemicals) and use on the farm				

14. Market accessibility:

Please give your response on the following questions.

1). Location of the market: List the nearby markets available to your produce

Produce Market Price facilities available.

- a.
- b.

2). Where do you sell your produce?

Produce Market Reason for selling in that market

- a.
- b.
- c.

3). How do you decide the price for your produce?

- a. Based on the information obtained by the middlemen
- b. Based on the information obtained by Daily news papers
- c. Based on the support price fixed by the government
- d. Based on the policy decision of the procuring agency
- e. Based on the information available on previous price

4). Please mention facilities available in the market (if it is sold outside the village)

- a. Halting facilities
- b. Drinking water facilities
- c. Storage facilities
- d. Transportation facilities
- e. Regulated procedures
- f. No middlemen
- g. Security for the produce
- h. Loading and Unloading facilities at nominal charges / fixed charges
- i. Easily transportable

5). Distance from the village to market

- a).5 km b).5 - 10 km c).10-20km d).20-30 km e).30-40 km

6). Condition of the linking road from the village to the market

- a).Very Good b).Fairly Good c).Good d).Katcha Road

15. Land use efficiency:

a). Multiple cropping index

	Total Area	Cultivable area	Net cropped area
Dry land			
Irrigated			
Garden			

b). Cultivated Land Utilization Index

Total no of Crops	Total land area	Duration of the crops	Total area cultivated

16. Family priorities (indicate the order of priority)

- i. Food security
- ii. Family requirements
- iii. Nutritional Security
- iv. Livelihood security
- v. Social Needs
- vi. Financial Security
- vii. Planned future Savings
- viii. Organizational recognition
- ix. Political recognition

PART-II

I. Economic viability

1. Agriculture

Season	Crops	Area	Grain yield	Straw yield	Gross income	Total expenditure	Net income	Rupees/ Rupee investment
kharif								
Rabi								
Summer								

2. Horticulture

SI no	Crop	No of Plants	Total Yield		Price/ Qt.	Gross income	Total expenditure	Net income	Rupees / rupee Investment
			yield	Age					
1.									
2.									
3.									
4.									

3. Forestry

SI no	No of seedlings Planted	Age of the tree	Total yield	Total income	Total expenditure	Net income	Rupees/ rupee Investment

4. Dairy

Sl no	Type of animal	No.	No. of milking Days	Total Milk production		Price /unit	Total income	Total expenditure	Rupees/ rupee Investment
				Per day	Per month				
1.	Cows								
2.	Buffalows								
3.									
4.									

5. Vermicompost

Vermicompost production/ year in tonnes	Price /unit	Total income	Total expenditure	Net income	Rupees / rupee Investment

6. Forage crops

Forage types	Season	Variety	Price/unit	Total income	Total expenditure	Net income	Rupees / rupee Investment

7. Sericulture

Sl no	No. of eggs reared	Total cocoon yield	Gross income	Cost of production	Net income	Rupees /rupee investment
1.						
2.						
3.						
4.						

8. Poultry

Sl no	No. of birds	Eggs	Old hen weight in kg	Production cost	Net income	Rupees /rupee investment
1.						
2.						
3.						
4.						

9. Goat and sheep rearing

Sl no	Numbers	Age	Weight	Selling price	Production cost	Net income	Rupees /rupee investment
1.							
2.							
3.							

10. Any other enterprises

Sl no	Enterprise	Total yield	Gross income	Total expenditure	Net income	Rupees /rupee investment
1.	Apiculture					
2.	Mushroom cultivation					
3.	Petty Business					
4.	others					

II. Employment generation

Integrated Farming System	Kharif (rainy season)				Rabi (winter season)						Summer Season		Grand total	
	J	A	S	O	O	N	D	J	F	M	M	A		J
Month														

*The agricultural year from July (J) to June (J); Months have been mentioned by first word of the month

Part-III

1. Different Integrated Farming Systems adopted by farmers under irrigated and dry land

SI No	Farming systems	Farming situation	
		Irrigated	Dry land
1.	Agri + Poultry+ Dairy		
2.	Agri +Sericulture+ Dairy		
3.	Agri +Poultry+ Sheep rearing		
4.	Others		

2. Problems faced by farmers for better adoption

SI no	Constraints	Responses		
		Not problem	Problem to Some Extent	Very Problematic
Production constraints				
1.	Non availability of quality planting materials/breeds/species			
2.	Lack of appropriate technologies for enhancing production			
3.	Lack of knowledge regarding identification of pest and diseases			
4.	Lack of the technical knowledge regarding crop harvest			
5.	Lack of resistant varieties / breeds for various pests and diseases			
6.	Lack of knowledge on balanced use of fertilizer			

Situational constraints				
1.	Inadequate irrigation facilities			
2.	Uneven distribution of rainfall			
3.	Limited and irregular power supply			
4.	Non-availability of labour in peak seasons			
6.	Lack of custom hiring centers			
7.	Lack of suitable farm implements			
Financial constraints				
1.	Lack of required finance			
2.	Lack of timely availability of credit			
3.	High rate of interest on borrowings			
4.	High initial cost			
5.	Non availability of subsidy / credit in time.			
6.				
7.	High cost of production			
8.	Loan disbursement procedure is cumbersome			
Marketing constraints				
1.	Lack of marketing facilities at local level			
2.	Fluctuations in the prices			
3.	Lack of storage facilities			
4.	Untimely payment for the produce			
5.	Lack of exclusive markets			
6.	Problem of transportation			
7.	Exploitation by the middleman			
	Low price for the produce			
Extension constraints				
1.	Lack of extension services			
2.	Lack of capacity building programmes			
3.	Non availability of clinical services for livestock			
4.	Lack of demonstrations to prove the worthiness of the technology			

5.	Lack of trained extension personnel			
6.	Non availability of extension personnel .			

3. General information

Enterprise	Year of starting	Reasons for starting
<ul style="list-style-type: none"> ➤ Agriculture <ul style="list-style-type: none"> Traditional crops – Ragi Paddy Maize Groundnut ➤ Cash crops <ul style="list-style-type: none"> Sugarcane Cotton ➤ New crops – Hybrid paddy, 		
<ul style="list-style-type: none"> ➤ Horticulture <ul style="list-style-type: none"> Vegetables Fruits Dry land orchard Plantation crops Medicinal crops 		
<ul style="list-style-type: none"> ➤ Animal Husbandry <ul style="list-style-type: none"> Dairy Local cows Cross breed cows Sheep rearing Goat rearing Piggery Poultry 		
<ul style="list-style-type: none"> Other enterprises <ul style="list-style-type: none"> Mushroom Vermicomposting Value addition 		
<ul style="list-style-type: none"> ➤ Sericulture 		
<ul style="list-style-type: none"> ➤ Silviculture 		
<ul style="list-style-type: none"> ➤ Fisheries 		
<ul style="list-style-type: none"> ➤ Apiculture 		
<ul style="list-style-type: none"> ➤ Duck rearing 		