INTRODUCTION
I. INTRODUCTION

1. The Background

Indian economy is dependent mainly on agriculture. About 52 per cent of the India’s population is either fully or greatly dependent for their livelihoods on agriculture and allied activities but its contribution to Gross Domestic Product (GDP) is only 13 per cent (2013-14). In spite of increased area, production and productivity of food crops due to green revolution, raised rural per capita incomes and bettered food security, India still has a large poor population (According to the Planning Commission of India, 22 per cent of the India’s population is living below the poverty line in 2011-12). Recently the Planning Commission reported that, boosting of farm income is still a strong weapon for reducing the poverty in rural India.

“Though food grain production in India has touched a new peak of 259.32 million tonnes in 2011-12, growth in agriculture in the Eleventh Five Year Plan (2007-12) was about 4.1 per cent per year (DGCI & S; CSO\(^1\)). The Draft Approach Paper to the 12th Five Year Plan argues the need for ensuring a minimum of 1.4 per cent and 4.7 per cent growth in agriculture during the first two years of 12\(^{th}\) five Plan (20012-17). Indian agriculture is dominated by marginal and small farmers (80% of farming households) owning less than 1 ha of land. The proliferation of tiny and economically non-viable holdings is mainly due to slow growth of opportunities in the non-farm employment sector (NCF\(^2\), 2006). The shrinking of land and water resource base for an average farm holding over the last few decades is putting heavy pressure on natural resources like land and water. There are wide gaps between the yield potential and national average yields of most commodities. In addition to stressed natural resources and lower yields, there was clear evidence of technology fatigue, run-down delivery systems in credit, extension and marketing services and of insufficient agricultural planning at district and lower levels” (Planning Commission,2011).

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1 Directorate General of Commercial Intelligence and Statistics; Central Statistical Organization

2 National Commission on Farmers
The situation in Karnataka is no exception; as per the recent agriculture census the total number of operational holdings in Karnataka increased from 75.81 lakh during 2005-06 to 78.32 lakh in 2010-11, registering an increase of 3.3 per cent. Further, the average size of holding declined from 1.63 hectares to 1.55 hectares during the same period. About 75 per cent of the farmers are small and marginal farmers in Karnataka.

The income from farming alone in small and marginal farms is barely sufficient to meet the basic needs. With gradual decline in farm size due to explosion of population, it has become increasingly difficult to produce enough food and other farm products for the family. This situation has further worsened due to repeated failure of monsoons. Further, there is hardly any scope for horizontal expansion of land and only vertical expansion is possible by integrating various farm enterprises. National Commission on Farmers proposed the introduction of appropriate farming systems to achieve better growth in agriculture and livelihood. In recent years, farming systems approach gave a scientific touch to the existing practices and found ways and means to make them sustainable in changing the global scenario. In 2007 Behera suggested farming system approach as one of the best strategies to meet the multiple objectives of poverty reduction, nutrition and food security, competitiveness and sustainability.

1.1 Government Schemes

Rural developmental schemes play a greater role among developing nations like India, where a large part of the population lives in rural areas. Successive Governments chalk out programs devoting planned funds for the welfare of the people. Since independence there have been umpteen number of programs launched for the welfare of rural people. Considering the contemporary economic growth parameters and the perception of the development practitioners, different programs were shaped at different stages of economic development. Rural development programs in India primarily targeted on provision of basic necessities, poverty alleviation, better livelihood opportunities and infrastructure facilities through self-employment generation. However,

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3 Behera et al 2001
due to inefficient delivery systems, most of these programs do not reach the targeted poor.

The rural poor face a range of problems which disturb their survival and quality of life. These problems can be grouped into four categories. They are: 1) Livelihood: a. scarcity of food b. shelter and c. small holdings; 2) Health: which includes lack of access to primary health centres and issues related to nutritional security; 3) Education: which includes lack of access to schools and 4) Social development. Among all these, problems of livelihood are more stupendous and most of the programs are designed by the Central Government and implemented by the state Governments targeted to improve the livelihood of the rural poor.

The Government of Karnataka has implemented several rural development programs like Anna Bhagya scheme, ‘Bhagyalakshmi scheme-for girl child protection’, ‘Yashaswini-health insurance scheme’, and ‘Kaliyuva makkalige free cycle’ for students studying in high schools. The Government programs which are mainly focusing on women are; SHG loans and subsidies, Widow pension and Bhagyalakshmi Scheme. Efforts were made to quantify the benefits received the sample farmers in the study area.

1.2 The conceptual framework

1.2.1 Farming systems

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 for future generations and maintaining a high environmental quality. Thus, farming system is the result of interaction among several interdependent components. The farmer allocates certain quantities and qualities of the four factors of production, to which he has access, among three processes, i.e., crop, livestock and off-farming enterprises in a manner which given the knowledge they possess, helps in attaining the set goals⁴.

⁴ Norman 1978
A farming system is defined as a set of individual farm enterprises that have broadly similar resource bases, enterprise patterns, household livelihoods and constraints, and for which similar development strategies and interventions would be appropriate. Depending on the scale of the analysis, a farming system can encompass a few dozen or many millions of households⁵.

In the farming system approach, different enterprises compete for the scarce resources such as land, labour and capital on the farm and also they exhibit interdependence due to supplementary or complementary relationship. Thus, it is necessary to deal with whole farm approach to minimize risk and increase the production and profit. To put this concept effectively into practice it is necessary to understand the linkages and the mutual synergies of different enterprises in various farming system.

Farming System may be defined as the approach, which involves the allocation of available resources of a farm to the production enterprises in the manner that helps the attainment of the goals of maximization of farm income and employment. The ultimate goal of sustainable agriculture is to develop farming system that are productive and profitable, conserve the natural resource base, protect the environment and enhance health and safety.

Maji in 1991 referred farming system specifically to a crop combination or enterprise-mix in which the products and or the by-products of one enterprise serves as the input for the production of other enterprise(s). It takes into account the consumption needs of the family, the economic factors like relative profitability of the technically feasible enterprises, availability of farm resources, infrastructure and institutions such as irrigation, marketing facilities including storage and transportation and credit, besides the agro-biological considerations, namely, interdependence if any among the various enterprises and the preferences of the individual farmers.

In general farming system may be defined as an approach, which involves allocation of available resources of the farm to the production of different enterprises in the manner that helps the attainment of the goals of maximization of farm income and

⁵ FAO
employment. In the farming system as a whole, different enterprises compete for the scarce resources such as land, labour and capital on the farm. They also exhibit interdependence due to supplementary or complementary relationships.

Thus, it is necessary to deal with the whole farm approach to minimize risks and increase production and profits. To put this concept effectively into practice it is necessary to understand the linkages and complementarities of different enterprises in various farming system. The linkages and complementarities in farming system are shown in Fig. 1.1.

![Diagram of farming system](image)

**Fig. 1.1: Integration of subsystems in the farming system**

### 1.2.2 Livelihood Security

Drinkwater and McEwan in 1992 defined household livelihood security as adequate and sustainable access to income and resources to meet basic needs (including adequate access to food, potable water, health facilities, educational opportunities, housing, time for community participation and social integration).

“A livelihood comprises the assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household”. A livelihood intervention (livelihood promotion) is a conscious effort by an agency or an
organization to promote and support livelihood opportunities usually for a large number of people. A livelihood intervention is more than income enhancement. It is facilitating asset creation, capacity building and access to opportunities.

The concept of livelihoods (Davies et al. 1996) has gained wide acceptance as valuable means of understanding the factors that influence people’s lives and well being particularly those of the poor in the developing world, the risk of a livelihood failure determines the level of vulnerability of a household to income, food, health and nutritional insecurity. Therefore livelihood are secure when households have secure ownership of, or access to resources and income earning activities including reserves and assets, to offset risks, ease shocks and meet contingencies. Sustainable livelihood creation basically translates into the creation of livelihoods that empower individuals to earn enough money to provide for basic amenities such as food, clothing and shelter. It also enables people to lead a life of dignity in a sustainable manner. Livelihoods are way of keeping one self meaningfully occupied by using ones endowments (human and material) to generate adequate resources to meet the requirements of the household in a suitable manner.

Livelihoods can be made up of a range of on-farm and off-farm activities which together provide a variety of procurement strategies for food and cash. Thus, each household can have several possible sources of entitlements which constitute its livelihood. These entitlements are based on the household's endowments and its position in the legal, political and social fabric of society.

The outcomes of livelihood security include economic security, food security, educational security, health security, habitat security and social network security.

a. Food Security

This definition implies three dimensions to food security, namely, availability, access and stability at various levels of aggregation i.e. global, national, household and

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6 http://www.fao.org/docrep/x0051t/x0051t05.htm
7 http://planningcommission.nic.in
the individual. FAO Committee on World Food Security, which, in a way, formalized the definition in 1983 incorporated following three specific goals for food security:

a. Ensuring adequacy of food supplies
b. Maximizing stability of supplies, and
c. Securing access to available supplies to all who need them.

Although national food security is important, in the ultimate analysis what is more important is food security at household level. To secure adequate food is a primary concern in any society. However, mere availability of food somewhere is not enough and it does not mean that everybody is having access to a fair share of it or that everyone has an adequate diet. Affordable food prices and adequate purchasing power with the people are equally important. Put differently, "at the household level, food security is defined as access to food that is adequate in terms of quality, quantity, safety and cultural acceptability for all household members."

From the point of individual, food security is physical and economic access to balanced diets, including the needed micro-nutrients, safe drinking water, primary health care and primary education to every member in a household. The emphasis on the individual is important because of growing feminization of poverty and a relatively greater under-nutrition of women and children.

b. Nutritional Security

One of the major pillars of food security is the achievement of nutrition security that is, adequate protein, energy, micronutrients and minerals. In vegetarian society, milk and milk products could be the major source for the supply of these components for nutrition security. Good nutrition depends not only on getting enough food grain and food materials but also on staying healthy.

A person is considered nutrition secure when she or he has a nutritionally adequate diet and the food consumed is biologically utilized such that adequate performance is
maintained in growth, resisting or recovering from disease, pregnancy, lactation and physical work\textsuperscript{12}.

Weingärtner (2010) defined food and nutrition security as a condition under which adequate food (quantity, quality, safety, socio-cultural acceptability) is available and accessible for and satisfactorily utilized by all individuals at all times to live a healthy and happy life.

c. Health security

There is growing acceptance of the concept of health security. However, there are various and incompatible definitions, incomplete elaboration of the concept of health security in public health operational terms, and insufficient reconciliation of the health security concept with community-based primary health care. More important, there are major differences in understanding and use of the concept in different settings\textsuperscript{13}. However, security of a household in terms of health is defined as the availability and accessibility of health services.

d. Habitat security

Habitat development in rural India has traditionally been viewed from consumption rather than from a production end. Households undertake habitat upgradation or construction as required based on affordability. “People build themselves”, therefore, the traditional self-build mechanisms and annual maintenance cycles as the accepted ways of life have never been questioned\textsuperscript{14}. Habitat of the farm households is also one of the factors which influence the livelihood of household. Type of the house, toilet facility, availability of cooking gas, drinking water and other households assets are the parameters which influence habitat security

e. Educational security

Education is the important necessity of life. Level of education at the individual as well as household level, availability and accessibility of educational institutes and

\textsuperscript{12} Frankenberger et al. 1997
\textsuperscript{13} William Aldis 2008
\textsuperscript{14} http://basinsa.net/Policy_Documents/redbook.pdf
monthly expenditure on education are the major determinants of educational security of households.

f. **Social security**

Social network is nothing but the level of participation by the households in organizations like Panchayat, Co-operatives, Self Help Groups and other organizations. Access to social network elements like phone and television is another factor which determines the social network status of households.

To understand the livelihood security of households under different farming systems in two distinct agricultural situations namely rainfed and irrigated, there is a need to study socio-economic characters like education level, family size, size of land holdings, organizational participation, asset structure of the farmers, market dependence, their standard of living, and income and expenditure pattern, consumption pattern, nutrient intake and benefits received from Government schemes.

1.3 **Research Gap:**

A review of past research studies helps in identifying the gaps in conceptual and methodological issues relevant to the proposed study. The earlier studies related to the farming systems indicated that agriculture in general and farming systems in particular are supporting rural population by providing larger amount of employment opportunity and food security; in turn agriculture are supported by various kinds of subsidies and development programs of the Government. Although there are ample number of studies focusing on livelihood security of farmers in rainfed agriculture, such studies failed to throw light on the relative features and economics of irrigated and rainfed farming systems being pursued by farmers in a geographically contiguous area. Hence, this study makes a modest attempt in analyzing different measures of livelihood security namely food and nutritional security, economic security, educational security and, above all, social security across two different agro climatic situations namely irrigated and rainfed situations. This study also attempts to evaluate the benefits received by the farmers from Government programs in rainfed and irrigated areas. In addition to this, present study
documents the major problems faced by the farmers under two distinct agriculture situations.

1.4 Statement of the problem

In rainfed agriculture majority of the farmers are deriving low income from farming due to poor integration of enterprises. As a result their livelihood security is affected to a greater extent leading to migrations in search of better opportunities in urban areas. Therefore, identification of best farming systems for enhancing income and employment is vital for strengthening their livelihood security.

Similarly, in irrigated agriculture majority of the farmers are facing problems like high cost of inputs, pests, low yield and marketing problems in respect of existing crops. Farmers are willing to shift from existing crops to new crops which provide higher net returns. Therefore, identifying and suggesting suitable farming systems is essential for irrigated agriculture also. With this background in view, a research problem was identified to indicate better utilization of resources, farm products as well as its by-products. Hence, Chikkaballapur and Dharwad districts were purposively selected for the study so that they represent the major farming systems in Karnataka.

1.5 The specific objectives of the study are:

1) To estimate the economics of different farming systems under rainfed and irrigated conditions and its impact on income and employment

2) To analyse food and nutrient intake at the farm level in rainfed and irrigated situations

3) To compare the status of health, habitat, educational security and social network security of the farm households in two agriculture situations

4) To measure the impact of Government rural development schemes on livelihood security across different types of farmers

5) To document the constraints faced by the farmers and strategies adopted by them for their livelihood.
1.6 Hypotheses developed for the above objectives

1. Farming systems adopted by the rainfed farmers are more viable compared to irrigated farmers

2. a) Farmers who have economic security also have food security

   b) Farmers who have adopted Integrated Farming Systems (IFS) possess higher nutritional security compared to non-IFS farmers

3. Farm households with more economic returns have highly secured in terms of health, habitat, education and social security

4. Utilization of benefits from Government programs by rainfed farmers is greater compared to irrigated farmers

1.7 Limitations of the Study

The present study mainly relied on the data collected through interview using a pre-tested schedule. Therefore, some amount of recall bias is bound to be associated with the collected data since the farmers did not maintain any record on the cultivation expenses, application of inputs, returns especially from subsidiary enterprises and the pattern of food consumption, expenditure on education and health. However, efforts were made to minimize them through cross checks at the time of data collection. The transaction costs in terms of availing benefits from Government programs and getting identified as a beneficiary household have not been estimated in the study and hence is a limitation of this study. In Karnataka state the policy makers have been launching different types of programs for the benefit of farmers and other citizens. The details of all programs are not available at any particular source. Hence efforts have been made to collect the details of the programs, in the process it is likely that all the Government programs may not have been listed. The transaction costs arise also because the resources for each program are scarce and all the beneficiaries in a given area cannot be covered in any reasonable time frame. Hence those farmers who are in constant touch with politicians and Government officials will have a greater probability of being chosen as beneficiaries. This is also a transaction cost but which is difficult to measure.
1.8 Presentation of the study

This study is undertaken in Chikkaballapur and Dharwad districts. This thesis is organized into six chapters. The first Chapter provides a brief introduction along with the specific objectives. In chapter two, some pertinent reviews of the available literature are presented in consonance with the study objectives. Chapter Three presents the methodology of the study including main feature of the study area, sampling framework, database and analytical tools employed in the analysis of the data. The empirical results pertaining to the study and critical discussion of results are presented in Chapter Four. Finally, Chapter Five summarizes the major findings of the study and draws some policy implications.