2. REVIEW OF LITERATURE

In view of the fact that this study is on managerial efficiency under irrigated rice farming systems, an attempt has been made in this chapter to review work reported on the following aspects related to the study:

2.1. Concept of rice farming systems  
2.2. Irrigated farming  
2.3. Management, including farm management  
2.4. Managerial functions  
2.5. Managerial components  
2.6. Managerial efficiency  
2.7. Factors influencing farm management

2.1. CONCEPT OF RICE FARMING SYSTEMS

In a Balinese legend, Lord Vishnu, male God of fertility and water came to provide better food for the people who had only sugarcane juice as food. Vishnu made mother Earth give birth to rice and then fought Indra, Lord of the heavens to force him to teach man to grow rice. Thus, rice, as a source of life and wealth and a gift from the Gods was born from the union of the divine creative forces represented in earth and water. Therefore, rice was treated with
reverence and respect and its culture developed into an elaborate ritual.

Rice farming (cultivation) is important to a country like India, since about 65% of its population depend on the crop for their daily food. The country also has the world’s largest rice growing area of 39.6 million hectares (ha.), followed by China (36 million ha.).

Rice cultivation in Kerala may be considered to fit into what is termed as the Farming systems concept. Farmers typically view their farms, whether small subsistence units or large corporations as systems in their own right. The household, its resources, and resource flows and interactions at the individual farm level are together referred to as farm systems. Individual farm systems are organized to produce food and meet other household goals through management of available resources. Besides cultivation of different crops and livestock keeping, farming systems can encompass fishing, agro-forestry etc. Farming systems also denotes a concept of mixed farming where a mixture of various crops are grown along with maintenance of livestock on a piece of land owned by the farmer.

Salam and Sreekumar (1990)\(^2\) highlighted mixed farming as a harmonious assembly of crop husbandry and animal husbandry.

Homestead farming is a system being adopted by majority of the farmers in Kerala, wherein small sized landholdings predominate. It has been referred to in many terms such as homestead, home garden, household farm, homestead farming, mixed farm etc. A typical Kerala homestead consists of a dwelling house with small garden in front and a variety of annual and perennial crops grown in mixture on a small piece of land.\(^3\) Jose(1991)\(^4\) was of the opinion that wetlands(where rice is cultivated) adjoining to the homestead are also a part of homesteads. The term extended garden was employed to refer to such additional crop land operated by the homestead farmer. The extended garden influences the activities of the homestead farmer.

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in terms of planning, resource allocation, implementation strategies etc. The interaction of homestead and extended garden is usually of a high degree that these two units could be viewed as a single farming systems unit.

On a wide angle, farming in Kerala may be brought under the broad farming systems classification of homesteads with associated extended gardens where rice cultivation is undertaken. Usually, Kerala farmers have a small piece of land with a house along with coconut/arecanut/ banana/vegetables/livestock/poultry etc. Adjoining this will be the extended garden consisting of low-lying wetlands where rice is cultivated. This type of a rice-centered farming systems strategy is maintained to meet the fundamental requirements of the farmer and his family. This is especially significant, since more than 97% of holdings in the state have an area of less than two hectares. The income and resources generated from the homesteads are primarily useful for these small-scale farmers to undertake rice cultivation in a sustainable manner, particularly due to the high cost of cultivation and low profitability of the enterprise.

Substantial reduction in both area and production of rice which forms about 90% of food grains cultivated in Kerala have been
reported. Farmers in the state have also shifted away from rice farming to other more remunerative crops like coconut, banana, arecanut, etc. Geemoolunni(1983) reported shift in cultivation from paddy to coconut during the period 1960 to 1979. Increasing cost of rice farming and decline in profitability has been attributed as the major reason for the change in cropping pattern(George, 1980; Gemoolunni, 1983; Panikar, 1983). Another practice observed in Kerala due to low profitability from rice cultivation is that of leaving land fallow without cultivating it(Namboodiri, 1986).


of Kerala\textsuperscript{12} has reported an increase in fallow land from 24000 ha. during 1970-71 to 47605 ha. in 1987-88.

The present level of production of rice in the state is not sufficient enough to meet the domestic requirements. Hence, people are depending on rice produced in states like Tamilnadu, Andhra pradesh etc. All these factors highlight the importance of increasing production as well as reducing cost of cultivation of rice in Kerala in order to sustain the rice farming system within the existing limitations. This is especially relevant because the soil and climatic conditions in the state are conducive for rice cultivation and improved farming technology developed from agriculture research stations are available for farmers to adopt on their farms.

2.2. IRRIGATED FARMING

Provision of irrigation water is the most important factor controlling production of food crops in the tropics including India. In areas where dependable irrigation facilities are provided, a new type of community takes shape due to the resultant higher land productivity and better assurance of agricultural produce.\textsuperscript{13}


Recognizing the importance of irrigation, huge investments have been made in our country during the five-year plan periods to create and utilize additional irrigation potential. Accordingly, about three-fold increase in irrigation potential has been achieved, compared to the pre-plan periods. It has been possible to step up agricultural production in irrigated areas of the country through integrated use of high yielding varieties, water, fertilizers, plant protection measures etc. Due to the emphasis placed on irrigation development in India, irrigation potential created has risen to about 80 million hectares by 1990 from the figure of 22.6 million hectares during 1951. Food production has accordingly increased from 50 to 176 million tonnes during this period. This has been mainly achieved from improvement in per unit productivity of land through irrigation and other improved agricultural practices, since the total cropped are has increased only marginally by 30 per cent.14

Dantwala(1978)15 presented a brief review of the anatomy of agricultural growth in India and reported that the extent of irrigation is the main factor which explains growth rate in the country.


With regard to rice farming, about 77 million hectares (53%) of world rice area is irrigated. 70 to 75% of world rice production also comes from irrigated areas.  

As far as Kerala is concerned, area irrigated from all irrigation sources together (1999-2000) works out to 3.80 lakh hectares. Area under irrigation for rice (1999-2000), which includes irrigation for second crop (mundakan) and third crop (punja) comes to 2.08 lakh hectares.

2.3. MANAGEMENT

Webster’s International dictionary has defined management as the judicious use of means to accomplish ends. According to McGregor (1971), management is responsible for organizing money, materials, equipment and people in the interests of economic ends.


Johannsen and Page (1983)\(^1\) were of the opinion that management implies efficient use and co-ordination of resources for achieving defined objectives. Haynes (1981)\(^2\) has viewed good management as taking the right decisions at the proper time.

### 2.3.1. Farm management

Efferson (1953)\(^3\) has defined farm management as the organization and operation of the farm in the context of efficiency and profit. Harinath (1971)\(^4\) viewed farm management in terms of decision making and implementing the decisions by farmers. Castle et al (1972)\(^5\) considered farm management as decisions related to profitability of the farm.

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However, Bora (1989) defined farm management as the process by which farmer is able to enhance his return on a sustained basis for attaining family goals. Ray et al (1987) also stated that all farmers are concerned with management of a production system to get a return from it. Singh et al (1994) reported that management is an important component influencing yield levels of paddy.

Parker et al (1994) report that farm management is concerned with procedures that assist farmers in allocating limited physical, financial and human resources in order to achieve their personal and family objectives.

From the above discussion, it may be derived that management primarily denotes performing certain functions/activities to achieve goals. Hence, in the present study, management by farmer


is considered as a set of managerial activities undertaken by him/her to achieve the goal.

2.4. MANAGERIAL FUNCTIONS OF FARMERS

According to Heady et al (1962),\textsuperscript{28} managerial functions of farmers include decision on crop combinations, amount of resources, best production practices, profitable size of farm, utilization of hired labour and timing of crop production. Harinath (1971)\textsuperscript{29} included decision making, contact with extension officials, preparatory cultivation, seeds and sowing and plant protection as management functions of farmers.

According to Buckett (1981),\textsuperscript{30} planning and controlling of production, financial and staff management are important farm management functions. Eyre (1982)\textsuperscript{31} was of the opinion that the functions of farm managers include production, finance and personnel management.


\textsuperscript{29} Harinath, Op.cit.


management. Nandapurkar (1982)\textsuperscript{32} included planning, organizing, human relationship, supervision, communication and control as components of management for farmers.

Considering the applicability of managerial functions under farmer’s conditions, the specific functions may be summarized as follows: farmers need to plan, perform labor management, financial and information management and finally produce his crop. Hence, managerial functions in terms of components such as planning, labour management, financial management, information management and production management are considered essential for farmers. The work reported on different management components are reviewed in the following pages.

\textbf{2.5. MANAGERIAL COMPONENTS}

\textbf{Planning}

According to Singh(1977),\textsuperscript{33} planning involves appraisal of existing farm resources, their use pattern and efficiency, appraisal of various production activities and preparing and evaluating plans for their feasibility and profitability.


Farm planning entails what is to be done, what are the resource requirements and how to accomplish the objectives (Kahlon and Singh, 1981).\textsuperscript{34} According to Kay (1981),\textsuperscript{35} farm planning represents particular ways of combining or organizing resources like land, labour and capital.

Johl and Kapur (1989)\textsuperscript{36} described planning as the deliberate and conscious effort of the farmer to think about farm programmes in advance and adjust them according to new knowledge on technical development, changes in physical and economic situations, price structure etc.

**Labour management**

Hardaker et al (1970)\textsuperscript{37} suggested hiring, directing and supervising workers as the major tasks in personnel management in farms.

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According to Harsh et al (1981), labour management deals with labour needs of individual enterprises, scheduling of available labour supply, allocation of work and aspects of human relations.

Kedia (1992) reported that labour management relates to human beings who are responsive, who feel, think and act. He also mentioned that in the absence of healthy relations between the labourers and management, even the latest technology fails to bring desired results.

Financial Management

Johnson (1971) stated that functions of financial management include financial planning, managing assets, raising funds and meeting special problems.

Kahlon and Singh (1981) were of the opinion that management of capital resources along with its efficient organization


with other farm resources is very important for farmers. Massie (1987)\textsuperscript{42} defined financial management as the operational activity of a business that is responsible for obtaining and effectively utilizing the funds necessary for efficient operation. The objective of financial management is to ensure that adequate cash is on hand to meet the required expenditure.

Johl and Kapur (1989)\textsuperscript{43} reported that judicious management of farm finances is very important for increasing the income of farmer, and financial management deals with the study of principles and practices of financing the farm business.

**Information Management**

According to Johnson and Haver (1953),\textsuperscript{44} farmers need information on changes in price structures, production methods, technological development behavior and capacity of people associated with farming, as well as economic, political and social situations.


\textsuperscript{44} Glenn L. Johnson and C.B. Haver, *Decision Making Principles in Farm Management*, Kentucky Experimental Station Bulletin, 593, 1953, pp. 8-24.
in which a farm operates. Mawby and Haver (1961) mentioned five types of information essential in farm decision making, namely, prices, production methods, technological changes, institutional arrangements and human relations.

Olsson (1988) was of the opinion that the farm manager seeks, receives, classifies and adjusts his activity on the basis of a lot of information concerning the developments in environment, market signals and production techniques.

Saikia (1994) said that technological developments brought about in agricultural production have been still out of reach of the small and marginal farmers due to problems of information availability.


Production Management

Hardaker et al (1970)\(^\text{48}\) included what to produce and how to produce as technical decisions of farm production. Wills (1973)\(^\text{49}\) stated that production refers to all those activities in which the firm is engaged in producing goods and services.

According to Osburn et al (1978),\(^\text{50}\) production know-how, production in time and adapting production process to changing economic and technical conditions are the technical activities in a farm.

Stoner (1982)\(^\text{51}\) mentioned that production management entails planning the production, establishing courses of action and procedures to achieve objectives, organizing human and capital resources to produce goods, directing and leading the personnel to be productive and monitoring and controlling production.


Having reviewed various managerial components, the next attempt is to analyse the theoretical orientation on managerial efficiency. The literature review given below outlines this concept.

2.6. MANAGERIAL EFFICIENCY

Marschak and Andrews (1944)\textsuperscript{52} defined managerial efficiency as the achievement of maximum output with given inputs or a given output with minimum inputs. Martin et al. (1960)\textsuperscript{53} were of the view that farm managerial ability consists of the ability to achieve favourable input-output results, ability to choose optimum combinations, ability to determine and obtain control at the lowest cost and ability to realize profit. According to Rao (1965),\textsuperscript{54} efficiency in farming in a region has wide connotation. The most efficient farm may be the one with the best cropping pattern, the one in which farmer obtains maximum yield or one giving maximum income or the highest return per labourer.


Radhakrishna (1969)\textsuperscript{55} defined efficient farmer as one who produces maximum yield per unit of input. Brittan and Hill (1975)\textsuperscript{56} mentioned that maximum agricultural efficiency exists when the greatest possible product is achieved from a given stock of resources.

Shanmugappa (1978)\textsuperscript{57} has defined managerial ability as those factors contributing to efficient estate maintenance with consistently higher productivity.

According to Hales (1986),\textsuperscript{58} managerial effectiveness means the extent to which what managers actually do matches with what they are supposed to do.

\begin{itemize}
\item \textsuperscript{57} S. Shanmugappa, A Study on Adoption Behavior and Value Orientation of Arecanut Growers of Shimoga District in Karnataka State, \textit{M.Sc (Ag.) Thesis} (Unpublished), University of Agricultural Sciences, Bangalore, 1978.
\end{itemize}
Ghosh et al (1988)\textsuperscript{59} denoted managerial effectiveness as the extent to which a manager achieves the productivity or output requirement of his or her position.

Luo (1992)\textsuperscript{60} stated that the focus of efficient management in Chinese agriculture is on guiding optimal combinations of various productive factors such as land, labour, capital and technology to produce maximum output.

Singh (1993)\textsuperscript{61} stated that efficiency in agricultural management implies a symbiotic relationship between administration of the support system and adoption of improved technology and farm management practices by the producer. He mentioned that given the same level of inputs and technology, efficient farm management can make two to three fold differences in crop yield.

Bose (1965)\textsuperscript{62} reported a positive relationship between farming efficiency and adoption of agricultural practices by farmers.


\textsuperscript{62} S.P. Bose, Socio-Cultural Factors in Farm Management Efficiency, 	extit{Indian Journal of Extension Education}, 1, 1965, pp.192-199.
From the literature reviewed, there seems to be some degree of elusiveness on the concept of managerial efficiency. Burgoyne (1976)\textsuperscript{63} stated that the vast amount of research carried out on managerial effectiveness had failed to come out with anything acceptable by definition or for measurement.

However, reviews on managerial efficiency reveal that the concept relates to performance of managerial functions by the individual (in this study, the farmer) in order to achieve the goal. Efficiency is conceived as performing the right managerial activities to achieve a determined goal.

Literature review on goal/objective of management by farmers is presented in the following pages.

2.6.1. Objective of management

Suresh (1983)\textsuperscript{64} and Chari and Nandapurkar (1987)\textsuperscript{65} were of the opinion that farmers should use basic business principles to

\begin{itemize}
\item \textsuperscript{63} J.G. Burgoyne, \textit{The Nature, Use and Acquisition of Managerial Skills and other Attributes}, Lanchester University, Lanchester, 1976.
\item \textsuperscript{64} K.A. Suresh, The Economics of Cardamom Plantations in Kerala, \textit{Ph.D Thesis} (Unpublished), University of Cochin, Cochin, 1983.
\end{itemize}
maximize profit from their farms. Bora (1986)\(^{66}\) related management attributes of farmers to profitability in farming. However, Kandker (1988)\(^{67}\) viewed that the goal of good management is to maximize returns.

Olsson (1988)\(^{68}\) opined that a farmer who is able to combine fulfillment of his own goals with basic economic goals can be considered successful. Sampath (1979)\(^{69}\) was of the opinion that all studies carried out have stressed on farmer’s objective as profit realization only. He claimed that it is not the right approach where profit-oriented as well as subsistence farmers exist.

Harsh et al (1981)\(^{70}\) mentioned that the goals of farm manager can be profit maximization, business survival, growth, leisure, social

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acceptance or maintenance of one’s health. Johnson (1990)\textsuperscript{71} indicated that good management will always obtain a better return than poor management using the same quantities of land, capital and labour.

Judging from the literature, there exists some difference of opinion on the goals/objectives of farmers. However, it is evident that the most important objective of a private enterprise such as farming is to realize profit or at least higher returns. The latter objective seems to be more relevant in the case of rice farming in a state like Kerala, where the trend seems to be that of transformation of rice cultivation into a subsistence venture for majority of the farmers. This is mainly due to the high cost of cultivation and low crop productivity, resulting in a condition of no profit. Hence, there is a decline in business orientation for rice farmers, with many of them sustaining rice cultivation to produce paddy for household consumption.

This permits us to consider the objective of farm management by farmer to be that of realizing higher returns and not necessarily profit alone. This can be achieved through reduction in cost of cultivation and/or improvement in crop yield.

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Hence, farmers can be considered as managers who have to perform proper managerial functions to realize higher returns from farming. Farmers capable of undertaking such managerial functions can be considered to be managerially efficient.

Thus, the concept of managerial efficiency derived for this study refers to the farmer’s capability to perform managerial functions, which would contribute to higher returns from farming. Adoption of the managerial functions is considered to contribute to a reduction in cost of cultivation and/or increase in crop yield, thus helping the farmer to achieve his objective from farming. The managerial functions to be undertaken by the farmer have been included under five functional components of management, namely, Planning, Labour management, Financial management, Information management and Production management.

2.7. FACTORS INFLUENCING FARM MANAGEMENT

Under this section, studies on the relationship of various factors with management and adoption behavior of farmers are presented. Since studies dealing with management/managerial efficiency of farmers are few in number, factors related to adoption of agricultural technologies are also reviewed. Two things need to be mentioned here. In this study, adoption of agricultural technologies such as seed, fertilizer and irrigation recommendations by farmers
have been considered as indices of their managerial efficiency under the component, namely, Production management. Many studies have also reported a strong positive association between management and adoption behavior of farmers. (Bhaskaran, 1979; Sreekumar, 1985; Syamala, 1988). The second aspect is that according to Rogers (1983), technology (innovation) includes a 'software' component composed of information such as a conservative political philosophy, a religious idea, management by objectives etc. Rogers has included this component also in his studies on adoption of innovations.


In view of the above, in the present study, the concept of adoption may be considered applicable to managerial functions of farmers.

Review of literature on the factors related to management/adoption by farmers is presented below under the heads namely, a) Socio-economic factors b) Situational factors (those which depict the situation in which the farmer cultivates his crop).

2.7.1. Socio-economic factors

Education

Formal education can help in acquiring relevant information/knowledge, which will contribute to an individual’s decision-making process.

Reddy (1983)\(^{76}\) reported a positive association between education and management orientation of farmers. Jamison et al (1984)\(^{77}\) were able to establish a positive relationship between

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education and efficiency of farmers. Bora (1989)\textsuperscript{78} found positive relationship between returns to management and education level of farmers. Parikh and Shah (1994)\textsuperscript{79} observed that technical efficiency of farmers was dependant upon education of farmers, in addition to other factors. Pathak (1992)\textsuperscript{80} reported significant correlation between education and management behaviour index of marginal farmers.

Income

Income is the most important indicator of the economic status of farmer. Many studies have found income and economic status to be positively related to adoption of agricultural practices (Sanoria, 1970;\textsuperscript{81} Rajendra, 1973;\textsuperscript{82} Shukla, 1975\textsuperscript{83}). Reddy (1983)\textsuperscript{84} observed

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  \item[80.] S.Pathak, Op. cit.
\end{itemize}
significant relationship between material possession of farmers and their management orientation.

Social participation

It refers to the process of involvement of farmers in social organizations. Such participation would help them to interact with other farmers and gain knowledge on agricultural management practices. It would also help in developing a feeling of oneness/co-operation among farmers. This is very significant in view of the fact that rice cultivation is a farming system, which requires group/participatory approach in various agricultural management practices, particularly irrigation.

Reddy (1983)\textsuperscript{85} reported a significant relationship between management orientation of farmers and their social participation. However, Saraf (1983)\textsuperscript{86} observed no relationship between the two.

\textsuperscript{85} Ibid.

\textsuperscript{86} M.S. Saraf, A Study on Adoption Behaviour, Management Orientation and Economic Performance of Farmers in Malaprabha Command areas in Karnataka, \textit{M.sc (Ag.) Thesis} (Unpublished), University of Agricultural Sciences, Bangalore, 1983.
Thimmappa (1981)\textsuperscript{87} has reported a positive relationship between social participation and adoption behaviour of farmers with respect to coconut cultivation. However, Raju (1984)\textsuperscript{88} observed a negative relationship between social participation and adoption behaviour of summer paddy cultivators.

Farming Experience

Experience in cultivation will be helpful to develop the farmer's potential in farm management. It will help him to develop the required managerial skills including decisions to adopt sound agricultural practices for improving crop productivity.

Hamilton and Byrant (1963)\textsuperscript{89} reported that many farmers have listed farm experience as one of the most important requirements for success in profitable farming.

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\item \textsuperscript{87} H. Thimmappa, A Study on Adoption Behaviour, Motivation Pattern of Coconut Cultivators in Tumkur District of Karnataka State, \textit{M.sc (Ag.) Thesis} (Unpublished), University of Agricultural Sciences, Bangalore, 1981.
\item \textsuperscript{88} H. Raju, A Study on Extent of Extension Guidance Received by Contact Farmers in Adoption of Selected Practices of Summer Paddy Cultivation in Mandya District, Karnataka State, \textit{M.sc(Ag.) Thesis} (Unpublished), University of Agricultural Sciences, Bangalore, 1984.
\end{itemize}
Orkisz (1969) observed that the number of years of work on a given farm could influence the efficiency of farm operations.

Mass Media Participation

Nowadays, there is considerable coverage of agriculture-related topics in various mass media channels like newspapers, radio, TV etc. This will enable farmers to have adequate awareness, which will be helpful in his decision-making process. Hence, this can be expected to influence the management behaviour of farmers.


90. T. Orkisz, Premise for Investigating the Qualities of a Farm Manager by the Results of his Farm, *International Journal of Agrarian Affairs*, 5(4), 1969, pp. 131-139.


Pathak (1992)\textsuperscript{94} reported significant and positive influence of mass media exposure on management behavior index of marginal and small farmers.

2.7.2. Situational Factors

Cultivated area

This has a direct bearing on the farmer’s economic status, reflecting his capacity to buy and use required agricultural inputs and also other managerial decisions.

Walker et al (1983)\textsuperscript{95} found a negative association between land holding size and returns to management.

Reddy (1983)\textsuperscript{96} found a positive relationship between farm size and management orientation. However, Sreekumar (1985)\textsuperscript{97} observed no relationship between these two variables. Nagaraja (1989)\textsuperscript{98} reported significant relation between land holding size and management efficiency.

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\textsuperscript{94} S. Pathak, \textit{Op. cit.}
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\textsuperscript{96} G.Kullayi Reddy, \textit{Op cit.}
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\textsuperscript{97} N. Sreekumar, \textit{Op. cit.}
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\textsuperscript{98} N. Nagaraja, \textit{Op. cit.}
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Irrigation potential/water availability

Under irrigated farming, availability of irrigation water is a very important element, which contributes to the farmer’s managerial decisions.

Bora (1989)\textsuperscript{99} reported that irrigation potential was positively related to returns from farm management. However, Nagaraja (1989)\textsuperscript{100} observed a negative relationship between irrigation potential and management efficiency of farmers. Pathak (1992)\textsuperscript{101} opined that irrigation potential was significantly correlated with the management behaviour index of small farmers.

Location of water source

Location or reach of farmer’s landholding on irrigation canals in terms of head, middle and tail reaches implies differences in water availability. Farmers at the head reach usually receive adequate water in a timely manner. However, tail reach farmers generally face problems of adequacy and timeliness of water availability. Middle reach farmers face a condition which is neither too favourable nor unfavourable with respect to water availability.

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Hence, the significance of location is with respect to water availability for management of irrigated rice cultivation. Studies showing the relationship between this variable and management or adoption by farmers are not available. However, literature review on irrigation potential/water availability is expected to take care of this.

Madhava Chandran et al (1998)\textsuperscript{102} observed a statistically significant difference in farmer’s participation (which also encompasses management aspects of farming) between head and tail reaches of canals under Malampuzha irrigation project in Kerala. This has been attributed to water availability problems of tail reach farmers.

Land fragmentation

Fragmentation refers to the extent to which one’s cultivated holding is situated in a discontinuous pattern. It is hypothesized that the degree of land fragmentation would influence farm management and managerial efficiency of farmers.

Binns (1966)\textsuperscript{103} was of the opinion that all improved changes in agricultural methods and organizations will be greatly impeded by irrational fragmentation. Jabarin and Epplin (1994)\textsuperscript{104} mentioned that land fragmentation increases production costs and decreases efficiency in the farming sector.

Parikh and Shah (1994)\textsuperscript{105} found that technical inefficiency at the farm level is caused due to fragmented nature of landholdings.

