REVIEW OF LITERATURE
II CHAPTER
REVIEW OF LITERATURE

Review of literature helps the researcher to see clearly the variables that should be measured. It produces a general framework, which can guide data analyses. In this chapter, the literature related to the several concepts of the objective statement is mainly examined.

2.1. CHARACTERISTICS OF DRYLAND FARMERS

The term dryland carries other nomenclatures like rainfed, and semi-arid area. The characteristics of dryland farmers are more or less the same.

Amtmann and Berrit (1975) inferred that there was an association between technical knowledge of farmers and some of their socio-economic characteristics.

According to Singh (1976) the profile of small farmers in general as compared to big farmers, indicated that the small farmers were low in their socio-personal characteristics like education, social participation, socio-economic status and adoption level.

Subramanian and Sripal (1978) reported that the dryland farmers were less educated, formed small farm size, had less social participation, mostly engaged in subsidiary occupations and were having low cropping intensity.

Dangi and Intodia (1990) stated that the
farmers having contact with extension personnel had more knowledge as compared to those of other farmers.

Grewal and Johl (1991) reported that rainfed areas have several unique characteristics. These includes small land holding, very low level of literacy, particularly among the women folk, who play a pivotal role in many farm operations, strong hold of some taboos, superstitions and orthodoxy. Common people are not quite aware of the new advances in technology.

2.2. PSYCHOLOGICAL CHARACTERS

2.2.1. Attitude

Attitude of an individual is one of the most important psychological factors which affects the adoption of an innovation. Reddy and Reddy (1972) observed that psychological factors influenced the farmer's behaviour in the adoption of new practices.

Singh and Singh (1970) statistically showed that there was a positive attitude of the farmers, who had large land holding and level of education.

Gupta (1976) observed that the favourable attitude towards dairy farming leads to higher adoption.

2.2.2. Achievement motivation

Achievement motivation is the orientation to strive for personal success by attaining personal goals.
David C. McClelland (1964) observed that individuals with high achievement tended to take moderate risk while subjects with low achievement preferred significantly more often either very safe or very speculative enterprises.

Siddaramaiah and Reddy (1990) reported that achievement motivation significantly contributed to the adoption of watershed management practices by farmers.

2.2.3. Risk taking behaviour

It is the degree to which a farmer is oriented towards risks or uncertainty in adoption of new idea. Hoffer and Stangland (1958) reported that risk taking willingness and adoption of improved agricultural practices were found positively related.

Subramanian (1981) reported positive and significant association between adoption of rice technology and risk orientation.

Natarajan and Ganesan (1981) observed that the mode of compliance increases with the increasing fear appeals over and above the general compli ciance level that is there just for suggesting it.

Pandey (1989) stated that risk orientation was positively and significantly associated with the adoption of agricultural innovations.
2.2.4. Scientific orientation

It is a characteristic which makes the farmer trust and rely on ideas and practices developed through scientific research. Satadal Dasgupta (1989) reported that adopters manifest higher level of rational, scientific and liberal orientation than non-adopters.

Siddaramaiah and Reddy (1990) observed that scientific orientation significantly influenced the farmers' attitude towards watershed management.

2.2.5. Alienation

The concept of alienation discussed by modern existential psychologists describes a similar condition in which the individual loses his sense of identification with and assimilation into his society (Ransford 1968). Feelings of helplessness and hopelessness as a reaction to aversive life event have been emphasised as basic depressive reaction. (Natarajan and Ganesan 1979).

Ganesan (1979) stated that the self and immediate environments like family climate and organisational climate were significantly related.

2.2.6. Level of aspiration

Atkinson (1964) stated that the relationship between achievement motivation and aspiration level are statistically significant.
Durganand Sinha (1969) reported lack of difference in the pattern of motivation and aspiration among the villagers from developed and under developed villages.

The high aspiration groups had a favourable personal-social and economic attributes compared with low and middle aspiration groups. (Muthayya, et. al. 1988).

2.3. TECHNOLOGY

The ultimate objectives of research in agriculture and allied fields is to develop technologies that are suitable for users. The term technology has been defined in different ways by different authors.

While dealing with the concept of 'technology' Gomez (1978) stated that technology can play a significant role in destroying or subordinating unadvanced method of production, operate as an instrument for widening and or deepening capitalistic relations of production, play a leading role in the process of accumulation at the national urban and rural levels.

Bunting (1979) stated that technology has been increasingly recognised as a powerful influence on economic growth, but transfer has always been accompanied by new economic and social problems. The current changes in many developing countries necessitate the development of realistic technology and means of enabling it to work for a very different future.
Technology is a part of the universal heritage of mankind and all countries have a right to it at least to alleviate if not to eliminate that intolerable economic inequalities within the new international economy (Kabore, 1979)

In line with this Johny et. al. (1981) reported that technology can not be divorced for its social context and is unlikely to have an independent determinative role to play in the success of social change.

Singh (1989) suggested that technology should be low-cost and capable of being adopted by a large number of small farmers under most of existing conditions. It should be flexible so that if one component of the technology is not followed for any reasons, the overall effect is not considerably diminished. Besides being adoptable in stages, the technology should be appropriate and suit the resources available with small farmers. It should be location-specific and based on sound principles of crop management.

Technology must be economically viable, socially acceptable and biologically applicable. One of the important causes of failures in technology utilisation is that technology offered is inappropriate, irrelevant, unusable or ineffective, because it was designed to maximize yield rather than to resolve felt or real problems of real producers in real life system with real resources actually available.
From behavioural point of view, technological change and innovation occur as the result of complex sets of human interactions; information flows and transfers; individual and organisational creativity; and individual and organisational risk taking and decision making capabilities. Each of these factors involve human beings with their motivations, perceptions, attitudes, beliefs, abilities, ambitions, personalities and prior knowledge and experience.

The process of technological innovation, technical and scientific communication and technology transfer have been the subjects of considerable research in recent years. Thus the technology emerging out of concerted research and organised development efforts is expected to be appropriate and relevant from users' point of view.

2.4. AGRICULTURAL TECHNOLOGY

Gaur (1981) stated that technology in the field of agriculture has been developed to provide guidance to farmers. But progress in the real sense is possible only when majority of small farmers are able to make use of developed technology.

Sanghi and Vishnumurthy (1989) stated that the recommended technology has often been found to be suitable for one or two major soils of a given village. However, a number of soil conditions occur within a given village. Very often no special consideration is being made while recommending the technology for different soil conditions.
Technology has to be location specific and should be applicable for a given condition, a given area, and usually qualified by several factors. Technology is rarely of universal value and use. It is the duty of the scientists perfecting the technology to highlight the assumptions and conditions under which the technology is expected to functions satisfactorily and the duty of the extension worker is to highlight the requirements and limitations.

2.5. ATTRIBUTES OF TECHNOLOGY

Technologies are being emanated from various fields and so in agriculture and allied activities. Even in the same field, all technologies are not same in all dimensions. That is why some technologies could pick up at more faster rate than others.

Rogers and Shoemaker (1971) stated that all innovations were not equivalent units of analysis. The several characteristics of innovation as perceived by receivers contribute to their rate of adoption.

In line with this, Veerabhadraiah et. al. (1973) reported that characteristics of innovation like profitability and relative advantages of hybrid jowar had exerted considerable influence on its adoption.

Sharma and Nair (1974) reported that the perception of five attributes of the innovation viz.,
Adoption decisions tend to be made on balance and are reached by individuals through a pattern of mental gymnastics involving trade-offs on compromises among recognized influence - variables perceived to form two categories - reasons favourable for taking innovative action (incentives) and reasons favourable for non-action or maintaining the status quo (disincentives).

Variability of the adoption behaviour of farmers can be ultimately attributed to the differential force of cumulative valence perceived by respondents as incentives and disincentives to the proposed object of adoption behaviour.

Dangi and Intodia (1990) stated that the contact farmers had more knowledge as compared to those of Rogers (1983) has given five attributes of innovations viz., relative advantage, compatibility, complexity, trialability and observability.

Peterson (1985) stated that technology for the small farmers should carry as little risk as possible, and the level of risk should be defined in terms of not only of the profitability of gain versus loss but also in terms of the proportion the maximum possible losses bear to total farm income.
2.6 TECHNOLOGY TRANSFER

The term transfer of technology means movement of information from a research (source of technology) or an innovation system through an extension system (which acts as interpreter, disseminator and facilitator) to the client system (users of technology) i.e., the target group of farmers who are expected to adopt and integrate the new technology into the existing farming systems and practices. The effectiveness of technology transfer also depends on the support system as well as the socio-economic structures in which the other systems operate.

The systems in agriculture were identified as developing or innovative system, disseminating system and user system (Coughenour, 1968). Jain (1970) indicated the systems of research system; linking system and client system.

Ambasta (1974) stated that technology transfer is a communication problem both horizontal and vertical involving three systems viz., research, extension and client. Balasubramanian (1976) also considered these three systems.

Swindale (1979) while explaining problems and concepts of agro technology transfer stated that technology that was both transferable and appropriated might not be acceptable due to difficulty in understanding by the users.

Reddy (1981) while explaining the concept of transfer of technology stated that the effectiveness of
transfer of agricultural technology depend upon several interrelated factors, to understand a systems approach was necessary. Such an approach also helps to identify essential linkages within and among research system, extension system, client system, input system, economic system, psycho-socio-cultural system and administrative and organisation system.

Venugopalan and Perumal (1991) stated that the transfer of technology involves generation, dissemination and utilization of technology which are accomplished by three systems ie., agricultural research, agricultural extension and farmers. These systems could function effectively only when there is proper linkage among these systems.

In real life, the producers also have an initiating role. One of the many tasks of generalist extension is to determine the circumstances, purposes, and resources, to prescribe known technology suited to the client, where possible, and to refer their difficulties to specialists and research workers for which new knowledge is needed. Thus a two way process in which the extension worker has a central role not only as the intermediary for a new technology but also as the servant and adviser of the producers and their window into the knowledge system.

2.7. SYSTEMS APPROACH

In general, systems approach seeks to find the relatedness of methods of solution in order to extend the
realm of application and to facilitate understanding of new phenomena.

The systems approach according to Checkland (1972) was described as a new kind of scientific method embodied in the system's paradigm that could deal with the process of life. It was also reported to include the new ways of dealing with the soft variables such as value judgements, beliefs and sentiments.

Viramani (1979) suggested climatic approach to transfer of Farming Systems Technology, which includes systematic climatological steps like description of the rainfall regime in a particular area, calculation of potential evapotranspiration, evaluation of the soil water-holding capacity and other soil physical characteristics.

Rhodes and Booth (1982) recommended the farmer back-to-farmer model, in transferring farming system technology which assumes that effective applied agricultural research and transfer 'begins' and 'ends' with farmers; i.e., that research must come full circle from proper identification of the problem to acceptance or rejection of the solution.

Zaffaroni (1991) stated that farming systems research is an approach to agricultural research and development that focus on the farm as a system.
2.8. RESEARCH

Research is a process wherein the assistance of scientific method is enlisted in solving problems and resolving higher to unanswered questions.

According to Kilopsteg (1945), research was original and creative intellectual activity, carried out in the laboratory, the library or the field, which endeavours to discover new facts and to appraise and interpret them properly in the light of previous knowledge.

Madamba (1969) inferred, that agricultural research was a systematic method of efficiently integrating and applying knowledge to the biological, physical and social phases of production, processing and distribution of farm, forest and fishery products.

According to Graham (1971), agricultural research involves the application of basic principles of a wide range of scientific principles to the solution of problems of immediate, and prospective significance to agriculture. The agricultural research and the knowledge so generated serve as an important means of raising agricultural productivity.

Apparao (1975) stated that in the research process it was very important not only to have excellence and meaningfulness but also to give more emphasis on the
relevance of the problem to the situation, ability and socio-economic conditions of the farmers.

Zollinger (1980) in his study on scientific discovery concluded that the fundamental basis of scientific discovery was logic, but that basic was distinguished by psychological factors.

Chambers and Jiggins (1986) stated that agricultural research had a good record with resource-rich farmers rather than resource-poor farmers.

Zaffaroni (1991) stated that the specific recommendation for farmers should include both the human being as well as the biological elements of the farm. Research planning should consider the goals of small farmers and the constraints that they have.

The quality of research, by and large depends on the intensity of sincerity and devotion on the part of the researchers. Number of factors which influence the ability of the scientists in bringing out a quality result in their research endeavour have been indentified by many eminent persons.

2.9. EXTENSION

The basic concept of extension is education. Agricultural Extension is a system of education through which rural families receive relevant information which might be accepted and adopted by them to their advantage. These
system of education is unique in the sense that it is imparted where people live and work, with the object that they would improve their method of work and life.

Skinner (1961) defined education as a process through which human behaviour is modified so as to be in closer agreement with some model or ideal determined by the value of society.

In Extension, the time bound management system - Training and Visit (T&V) - recommended by Dr. Danial Benor is being followed since April 1980 in Tamil Nadu. Some of the unique features of this system are a. single purpose extension worker without regulatory and administrative job, b. area jurisdiction of extension workers depending upon density of population, roads, intensity of cropping etc., c. extension service backed by an effective research programme and better training and d. supervision of extension staff through fixed programme of training and visit.

Johnson (1965) said that the rate of acceleration of agricultural production would be in direct ratio to the confidence the farmer had in the agricultural advisor or technical worker most closely associated with him. The Agricultural Officer as agricultural advisor or technical worker could win such confidence of the farmer only through his professional competency. The T & V system serves as an effective means of improving the professional competency of
the Agricultural Officer by having close and regular contact with the farmers.

Singh and Roy (1990) stated that under T & V system the field functionaries have to do only extension work. They are not involved in distribution of inputs and credits.

Dipak and Mathur (1991) reported that the information seeking behaviour of village Extension Workers can effectively be predicted by education, family background and training received by them.

In the present Training and Visit system, much is being concentrated on educational activities and the Agricultural Officers are freed from input supply and dual administration.

2.10. AWARENESS, KNOWLEDGE AND ADOPTION.

Individuals generally tend to expose themselves to ideas that are in accordance with their interest, needs, or existing attitudes.

Hassinger (1959) stated that individuals will seldom expose themselves to message about an innovation unless they first felt a need for the innovation, and even if such individuals are exposed to these innovation messages, such exposure will have little effect unless the individual perceives the innovation as relevant to his need and as consistant with his existing attitudes and beliefs.
Sundarasamy (1971) reported that due to lack of knowledge, all the dryland farmers did not follow proper spacing and removal of side tillers.

Krishnasamy and Patil (1973) observed that adoption status of dryland farmers were found to be related to the size of holding.

Sripal (1981) stated that 100 per cent of rainfed cotton cultivators were aware of high yielding varieties, 63 per cent were aware of seed treatment and 33 per cent were aware of plant protection.

Srinivasan (1981) found that contact of the marginal farmers and small farmers with extension agency maintained positive and significant relationship with overall adoption of dryland technology. In respect of big farmers increased education might affect the overall extent of adoption of dryland technology.

Bhaskaran and Praveena (1982) concluded that the recommended general dryland agricultural practices which were adopted by a large number of farmers were off-season tillage, soil mulching and mid-season correction.

Krishnamoorthy (1984) reported that there was significant difference in the knowledge level of small, medium and big dryland farmers. About 55 per cent of the dryland farmers had medium level of knowledge.
Krishnamoorthy (1984) reported that adoption of dryland technology by farmers were found to be mostly medium in nature. Adoption level among different categories of farmers were not uniform, while adoption among big farmers were high and it was medium and low among medium and small farmers respectively.

Sethy et.al. (1984) found the only variable which has been constantly and uniformly affecting the adoption of rice technology in all the three groups of farmers in a big way is knowledge of the technology. It, is therefore evident that knowledge of technology among the farmers irrespective of their economic standing and resourcefulness, is influencing adoption.

Leagans (1985) summarised his findings as follows.

Optimum adoption of agricultural production innovations is advanced only when a farmer is persuaded to accept a technical innovation as being for him technically sound, economically feasible, physically possible, and physically and socially compatible.

The problem of increasing adoption rates especially by farmers operating small holdings, must be approached from the stand point of the farm, the farmer, the institutional and service circumstances as well as the agricultural research centre.
Adoption behaviour requires a favourable mental set up and a successful physical act: the first is internal and symbolic and is achieved through technical knowledge and conviction of its value; the second is external and physical and is achieved through related services such as seed, fertilizer, credit, market and education functions of the system.

Adoption behaviour at optimum levels depends on the presence of a complex infrastructure that establishes and maintains a macro and micro environment conducive to the translation by adopter - farmers of their internal and external behaviour influences into particular overt action.

Adoption decisions tend to be made on balance and are reached by individuals through a pattern of mental gymnastics involving trade-offs on compromises among recognised influence - variables perceived to form two categories - reasons favourable for taking innovative action (incentives) and reasons favourable for non-action or maintaining the status quo (dissincentives).

Variability of the adoption behaviour of farmers can be ultimately attributed to the differential force of cumulative valence perceived by respondents as incentives and disincentives to the proposed object of adoption behaviour.

Dangi and Intodia (1990) stated that the contact farmers had more knowledge as compared to those of
follower farmers. There was significant difference between the practices recommended and the existing technological knowledge of contact and follower farmers.

Bavalatti and Sundarasamy (1991) reported that knowledge of respondents was found to be significantly related with land holding and extension participation.

2.11. CONSTRAINTS IN ADOPTION.

Constraints which come in the way of the rainfed farmers in adoption of recommended rainfed cultivation practices on their farm are many. Farmers are facing various problems in adoption of improved practices of rainfed cultivation. Hence they have not adopted some of the improved rainfed farming practices. The research findings will throw some light on the constraints in adoption of new technology by farmers.

Bhilegankar (1979) stated that the most important constraints working against the normal use of fertilizer were its high prices, inadequate credit facilities and inadequate supply of fertilizer.

Ram (1980) found that the constraints in pulses cultivation were non-availability of high yielding varieties resistant to pest and disease.

Satapathy (1991) concluded in his study on the adoption of pulses technology that the main factors responsible for non-adoption of seed treatment in pulses were
ignorance, non availability of chemicals, lack of guidance, unwillingness of farmers and ineffectiveness of available chemicals in checking seed borne diseases. The reasons for non-adoption of plant protection measures were ignorance of the farmers about the recommendations, non-availability of plant protection equipments, high cost of chemicals and ineffectiveness of the available chemicals.

Araheri (1982) reported that the risk factors of climate and others, non-availability of inputs and lack of credit facilities were the major constraints in drylands.

Baskaran and Praveena (1982) reported that the most commonly cited reasons for non-adoption of dryland farming practices were lack of knowledge about practices, technologies have not been practical and lack of proper guidance.

FAO (1982) pointed out that low yield, lack of credit facilities, less price for the crop produce and lack of marketing facilities and infra-structural facilities were found to be major constraints in dryfarming.

Krishnamoorthy (1984) reported that about 46 per cent of the dryland farmers had sown their seed in advance for the better utilization of rainfall and to prevent water loss. Roughly three-fourths of the farmers did not adopt this practices because of the frequent failure of monsoon.
Kunnal et al. (1984) observed that impracticability of soil and water conservation practices was the main reason for non-adoption. Lack of knowledge was the main reason for not using improved varieties.

Sinha et al. (1984) stated that the reasons like lack of knowledge was also not less important for non-adoption of improved methods of cultivation.

Balasubramanian (1985) observed that non-availability of water in summer for taking up the foliar application, corching of leaves, consuming more labour and time and ignorance about the practice were the four major constraints.

Chauhan (1985) reported that lack of improved farm implements, low cost technology for control of pest and diseases, appropriate post-harvest technology to prevent post-harvest losses and deterioration in quality are some of the technical constraints.

Tripathi (1985) identified the following constraints in dryland farming. Production and productivity are low, scanty, uncertain and insufficient rainfall, frequent crop failure, soil erosion in some areas and livestock is underfed.

Srivastava et al. (1985) expressed the following four major areas of constraints in adoption of dryland technology.
1. Environmental constraints: About 85 per cent of the area under oilseed crops is rainfed, comprising of marginal and submarginal lands with soils of poor fertility.

2. Technology constraints: Lack of improved farm implements, low cost technology for control of pest and diseases.

3. Socio-economic constraints: Oilseed crops are grown mostly under poor crop management resulting in low yields. The non-realisation of the benefits of improved crop production technology is therefore more due to poor economic conditions of the farmers.

4. Organisational and infrastructural constraints: Inadequate arrangements for production and distribution of quality seed, timely supply of various inputs, credit, transfer of improved technology from research to farmer.

Ram Ajore (1986) reported that the main constraints in adoption of improved variety of wheat are lack of knowledge and technical guidance.

Selvanayagam (1986) expressed that more than three-fourths of the respondents agreed low amount of rainfall and untimely rainfall as the major constraint.

Ramachandran (1988) reported that non-availability of a specific implement for broadbed and deep furrow system, "gorru" for line sowing, lack of detailed
information about technology, non-availability of seed-treating chemicals and risk involvement are some of the constraints in adoption of dryland technology by the farmers.

Subramanian and Subramanian (1988) reported that the major constraints are the ill-distribution and insufficient rainfall in certain years. Increase in wages of labour, labour scarcity during peak season, increase in cost of inputs, non-availability of quality seeds in time and spurious sub-standard seeds are being marketed are other constraints in adoption.

Subhashchander et al. (1990) reported that ignorance on some components of potato technology, high cost of inputs and their non-availability at proper time were perceived to be the constraints coming in the way of exploiting full production potential.

Bhople et al. (1991) stated that nearly 50 percent of respondent farmers opined that recommended dryland practices were not practicable. He further reported that the lack of knowledge and skill, non-availability of regular guidance and non-availability of improved implements were infrastructural constraints in adoption of dryland practices.

Girase and Kamble (1991) found that the lack of sufficient knowledge about which, when and how much fertilizer to use?, use of fertilizer in dryland farming is not profitable and use of fertilizer requires assured
rainfall which is lacking, are some of the constraints in adoption of fertilizer in dryland cultivation.

Kulkarni and Nandapuka (1991) reported that the common reason for non-adoption or partial adoption of dryland technology are lack of knowledge, non-availability of inputs in time lack of credit facilities and fear of failure of crops.

Prasad and Mahipal (1991) observed that lack of credit, lack of knowledge and low market value of grain emerged as the major constraints in the adoption of dryland technology in black soils, while almost the same constraints were identified for cultivation of sorghum in red soil.

Subramanian (1991) reported that the economical cause of non-adoption of improved dryland technology by low-socio-economic status farmers was more (68%) than medium (58%) and high (31%) socio-economic status farmers.

Vijayaraghavan (1991) stated that high cost and untimely availability of inputs, high labour cost, untimely credit and inability to repay the loan, unsuitability of some practices and non-remunerative prices for the produce are the major constraints in adoption of improved practices by dryland farmers.

It is clear from the above research findings that the dryland farmers had several constraints that
generally worked against their adoption of dryland technology. These constraints experienced by them may be mainly due to their lack of knowledge about dryland technology and their low level of risk taking behaviour and achievement motivation. The practicability and utility of dryland technology therefore needs to be reinforced by demonstrations to the farmers at the research stations and project areas.