# A STUDY ON KNOWLEDGE AND ADOPTION LEVEL OF SOIL AND WATER CONSERVATION PRACTICES BY FARMERS IN NORTHERN KARNATAKA

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**SEPTEMBER, 2004**

# A STUDY ON KNOWLEDGE AND ADOPTION LEVEL OF SOIL AND WATER CONSERVATION PRACTICES BY FARMERS IN NORTHERN KARNATAKA

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*By*
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## CERTIFICATE

This is to certify that the thesis entitled "A STUDY ON KNOWLEDGE AND ADOPTION LEVEL OF SOIL AND WATER CONSERVATION PRACTICES BY FARMERS IN NORTHERN KARNATAKA" submitted by **Mr. RAGHUNANDAN H. C.**, for the degree of **MASTER OF SCIENCE (AGRICULTURE)** in **AGRICULTURAL EXTENSION EDUCATION**, to the University of Agricultural Sciences, Dharwad is a record of research work done by him during the period of his study in this university under my guidance and the thesis has not previously formed the basis for the award of any degree, diploma, associateship, fellowship or other similar titles.

DHARWAD

September, 2004

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# *Introduction*

# I. INTRODUCTION

In ancient Hindu Purana, the Earth was treated as mother, who nourished the mankind by offering food and water. The other religions in the world have also treated land and water as important elements for human survival. Though, the man in ancient days had recognized the importance of earth, he has not taken much care to conserve its natural resources. The man only bowed before the earth as a goddess and was satisfied. This practice continued for years together and today we find that this natural treasure is being destroyed day by day. In the light of this fact, it is the responsibility of every one of us not only to treat the earth as goddess but also try to conserve the natural resources.

The future of mankind depends to a great extent on the capacity of the earth to produce adequate food, fibre, fuel and fodder and to absorb usefully the wastes of various kinds to keep the environment clean. This capacity of the mother earth will be materially influenced by the wisdom and foresight of the man to utilize basic life supporting systems of land and water resources. Since, agriculture and allied activities like forestry, animal husbandry, fisheries etc., are the largest users of land and water resources, developmental endeavours in these areas are bound to have profound impact on the primary survival system. In the developmental process, it is essential to integrate short-term production objectives to feed the growing human and livestock population with long term objectives of upgrading and conserving the land and water resource base (Shashikumar, 1994).

Land and water are the resources gifted by nature. The way in which we use these valuable resources determine the measure of progress.

The problem of conserving these resources are being tackled by the nation, since several decades and the efforts are getting accelerated year after year.

Soil and land constitute a natural resource vital for human sustenance. All forms of life derive their nutrition either directly from the soil or through life supporting systems controlled by the soil. The unique assemblage of soils together with water and other resources determine the development potential of a region, watershed or specific project area.

Soil is a nature's gift to mankind. Nature protected the soil with dense cover of trees and grasses. But, man and animal disturbed the balance between soil, water and plant which lead to the process of soil erosion. Nature takes 100 to 500 years to form one centimeter of a soil, whereas it can be lost in a single year by water and wind erosion. Top soil is the foundation of all agricultural and forestry production and any reduction in it causes permanent damage to our capital resources. The increased pressure of population on land has made to initiate serious measures to ensure the safety of the productive base, namely the soil.

The soil has been over exhausted by excessive cultivation, deforestation and natural calamities like flood etc. This soil loss has resulted in low agriculture production, fluctuating rainfalls and natural calamities like flood and famines. The soil losses cannot be restored because of heavy population growth and their increasing demands for the food, fibre and fuel. This alarming situation necessitates to protect the land losses immediately by adopting certain protective measures. It is also our social responsibility to protect the land for future generation and their survival on the earth.

Soil conservation in India, as in other countries of the world, has not been given much attention and it is only from last 20-30 years that measures to prevent erosion are being taken up. Prior to independence, in Punjab, Madras and Old Bombay states, the efforts were in the form of single practice schemes such as bunding and gully plugging. Soil conservation measures on an organized basis became the central government's policy following the recommendations of the Planning Commission in December, 1953. A Central Soil Conservation Board was set up. A notable progress has been made since then in organizing and co-ordinating of soil conservation research, training and action programmes at the national level. Technical and financial assistance to several states governments had been given in order to develop sound programmes in the states. The Central Soil Conservation Board has set in working concepts of soil conservation which include all soil and water management practices needed to achieve higher crop yield (Mishra, 2002).

Soil, water and plants are the important natural resources for the very survival of the mankind on the earth. The proper management of all these natural resources decides the wellbeing of mankind and prosperity of agriculture. Man, ever since his existence has learnt many things gradually. The urge for thinking and rethinking of technologies took new shape when his requirements increased. As a result, several soil and water conservation techniques were evolved to suit the requirements.

Though, the systematic and institutionalized study and research on soil and moisture conservation dates back as early as 1862-63, the instances of documenting the farmer's knowledge on soil and moisture conservation techniques for increasing the agricultural production are

made available in 1917 by Yagnya Narayana Iyer (Shashidhar *et al.*, 1990). In the initial stages of agricultural development, though the information generated was not backed by any experimental data and evidences, certain things were practiced just by experience to meet the requirements. Farmer's believed that for better germination and root establishment of any crop, a proper soil condition is required, for which ploughing, harrowing, clod crushing by local equipments were practiced. While, doing so, the practice of frequent hoeing for control of weeds in standing crop resulted in manifold advantages like checking the evaporation as well as proper earthing up to standing crop which resulted in a proper mechanical support against high velocity wind and thus increased crop yields.

These instances clearly indicated that our farmers had a very rich knowledge of soil and moisture conservation techniques, but unfortunately this knowledge was not properly documented and used while formulation of systematic research proposal. Had farmer's were involved in the process of formulating research proposals, the adoption of new technologies related to soil and moisture conservation techniques would have been better. This would also have helped in improving and modifying the existing implements used for soil and water conservation, which is still primitive. Use of already existing knowledge and its refinement helps in a long way to achieve higher efficiency of the system as a whole. It has been the experience of many extension workers and researchers that our farmers always accept any improvement in the existing system than the adoption of a completely new technique. It is a welcome gesture as it saves lot of time and resource.

Ever since the initiation of systematic research on soil and water conservation in India with the (establishment of a research stations at Manjiri of Maharashtra State) in 1923 and the recommendation of Royal Commission on Agriculture in 1928 to establish Dryland Agriculture Stations At Hagari, Raichur, Sholapur, Bijapur and Rothak, the technologies related to soil and water conservation got refined from time to time which ultimately led to the present day concept of watershed management.

India has achieved self-sufficiency in the production of food grains, but still we are not in a position to meet the standard dietary requirement of the increasing population. By the year 2020, the demand for food grains would be 250 million tonnes. Hence, the dependence on agriculture in the country would continue to increase posing a severe threat to the limited natural resources, particularly in the rainfed regions. Considering the present scenario of yield in irrigated areas, a major part of the additional requirement of production has to come from rainfed agriculture. This calls for up-scaling of productivity from the current 1 to 2 tonnes per ha in the rainfed agro ecosystem. In this context, soil and rainwater management on watershed basis constitutes the key to agricultural development of rainfed areas. Conservation of land and water not only controls land degradation but also can lead to sustained productivity. Rainfed areas are mostly characterized with high intensity, short duration and erratic rainfall causing unpredictable droughts and floods. Conservation of this scarce resource through improved in situ moisture conservation and runoff management therefore hardly needs emphasis. The benefit of green revolution has not been harnessed in rainfed areas because of undependable rainfall and costlier inputs.

**Table 1.1: Evolution of soil and water conservation (SWC)/watershed Development (WSD) Programmes in India**

| | |
|---|---|
| **Pre-independence period** | |
| 1928 | : Royal commission on agriculture recognition of soil erosion as a problem in ravine area |
| 1939 | : Scheme for dry farming development. Contour bunding was an integral part of the scheme |
| 1945 | : Famine commission. SWC recognized as an important relief measure which could be taken up on a large scale |
| Till 1948 | : SWC work was undertaken only in a scattered bases in Bombay presidency. This pattern continued for long even in the post-independence period |
| **Post-independence period** | |
| 1950-60 | : Enhancement of land development act by various state government. Land development banks were created in several states |
| 1960-70 | : Special scheme for drought/desert prone area undertook SWC work. Mainly a relief programme |
| 1967 | : National Scheme for ravinous WSD |
| 1974 | : Scheme for soil conservation in river valley projects |
| 1982 | : 46 model WSD projects were launched for the development of dryland agriculture |
| 1984 | : World bank initiated WSD project in four states |
| 1986 | : National watershed development programme for rainfed areas (NWDPRA) in 16 states (Ministry of Agriculture) |
| 1989 | : Integrated WSD project (IWDP) (National Waste Land Development Board) |
| 1991 | : IWDP (plains) by World Bank in three states |
| 1994 | : WSD by merging of various programmes under DPAP, PDP, TWDP, JRY (Ministry of Rural Development) |

*Source :* Economic and Political Weekly, June 27, 1998.

Amithashah (1998)

According to Central Soil and Water Conservation Research Training Institute, Dehradun 5334 million tonnes of soil is being eroded annually. Of this 29 percent is being permanently lost to sea, 10 percent is deposited in reservoirs as silt, 61 percent displaced from one location to another. This study warns that present annual acreage loss of top soil is approximately 16 tonnes per hectare; far above the permissible limit of 4 tonnes per hectare. Future generation of FARMERS is bound to be affected by this huge loss.

Agricultural land in the major part of the country suffers from erosion. Apart from reducing the yields through the loss of nutrients, erosion destroys the soil resources itself every year. For example, in Maharashtra over 70 per cent of the cultivated land has been affected by erosion in varying degrees and 32 per cent of the land having been highly eroded is no longer cultivable. In the Sholapur district, nearly 17 per cent of the land of medium depth (more than 45 cm) has deteriorated into shallow soils (less than 45 cm) in 75 years from 1870 to 1945. Similarly, in Akola, Buldana and Yeotmal districts, the number of fields with less than 37.5 cm soil depth increased during the same period by 54, 16 and 8 per cent respectively. As much as 2.3 million ha is already under ravines scattered all over India. The ravines apart from ruining the soil resources for ever are a constant threat to the adjoining fertile cultivated lands.

Soil erosion is the single largest factor responsible for degrading quality and productivity of land in India. It is estimated that 45 percent of forest, 56 percent of farm, 86 percent of cultivable wastes and 95 percent of pasture lands suffer from erosion related problems. Though 39 million hectares have since been treated in the last 30 years, but each year area

degraded far exceeds the area rehabilitated. Unless massive efforts are made to mobilise farming communities, the march of degradation cannot be contained. This would, how- ever, require the development of cost effective and easily adaptable packages linking conservation and production to motivate farmers. High cost and questionable performance of mechanical measures have also shifted emphasis on biological measures of land amelioration. It is planned that 40 mha of wastelands be developed with vegetation models designed for each agro-ecological region integrating multi purpose trees and sod-farming, conservation effective perennial grasses having inherent ability to thrive on degraded sites and provide usable biomass and economic returns.

Keeping the above points in view and meager research work in the area of soil and water conservation in Northern Karnataka, the present investigation was carried out with the following objectives.

**Objectives**

I. To study the knowledge level of the farmers on soil and water conservation practices

II. To study the extent of adoption of soil and water conservation practices by farmers

III. To study the socio-economic and personal characteristics of the respondents

IV. To study the problems faced by the farmers in adoption of soil and water conservation practices

V. To study the benefits derived from adopting soil and water conservation practices

VI. To know the suggestion made by the farmers.

## SIGNIFICANCE OF THE STUDY

There are meager studies with regard to the adoption of improved agricultural practices in Northern Karnataka.

Adoption of soil and water conservation practices in dry land is a must in modern agricultural technology for maximizing production and productivity. This requires adequate knowledge. The study would bring out the profile variations of knowledge among farmers, which could be made use of, by planners and administrators to develop appropriate strategy and impart knowledge to farmers in dry land farming.

The study is expected to bring to lime light, the benefits of adoption of soil and water conservation practices as well as the constraints faced by the farmers in the adoption. The suggestions given by the farmers are also made note of in this study. Thus, the study is useful to the extension workers, scientists, administrators, planners and various non-governmental organization functionaries.

## LIMITATIONS OF THE STUDY

The limitations of time and other resources in the present investigation have restricted the selection of locale, sample size and the variables. Hence, the findings have to be viewed in the specific context of the conditions prevailing in the study area and cannot be generalized for a wider geographical area. However, careful and rigorous procedures have been adopted in carrying out the research as objectively as possible. In spite of the individual bias made by the respondent farmers in eliciting the necessary responses, it is believed that the findings and conclusions drawn in the present study would be the focus of more rigorous field observations.

# *Review of Literature*

# II. REVIEW OF LITERATURE

A brief review of previous studies conducted on knowledge and adoption level of soil and water conservation practices by farmers in Northern Karnataka have been chronologically arranged here. Since limited review is available on soil and water conservation practices regarding knowledge and adoption aspects, review on other watershed aspects also included in this chapter. The review is presented below under various heads in accordance with the objectives of the study.

2.1 Knowledge on soil and water conservation practices and other related practices

2.2 Adoption level of various soil and water conservation practices by the dry land farmers

2.3 Socio-economic and personal characteristics

2.4 Problems faced by the farmers in adoption of soil and water conservation practices

2.5 Benefits of soil and water conservation practices

2.6 Suggestions made by the farmers

## 2.1 KNOWLEDGE LEVEL ON SOIL AND WATER CONSERVATION PRACTICES AND OTHER RELATED PRACTICES

Knowledge denotes the farmers' ability to have in mind, be able to recall and be aware or acquainted with his theoretical or practical understanding of the various soil and water conservation practices.

Rajkumar (1981) found that most of the beneficiaries of water management scheme possessed medium level of knowledge (76.77%) in soil and water management techniques followed by low (15%) and high (8.33%) level of knowledge. Pillai (1983) found that the technological gap in integrated soil conservation practices was negatively associated with knowledge about soil conservation practices. Jaiswal *et al.* (1985) reported that majority of the respondents (63%) from Vaghnadi and 94 per cent from Umaria watershed of Amreli district had fairly good knowledge about contour bunding, while 67 per cent of the Vaghnadi farmers and 42 per cent from Umaria watershed knew about the use of improved crop variety and cultural practices.

Jeyakrishnan (1984) found that majority of the farmers had medium level of knowledge *viz.*, marginal farmers (70%), small farmers (66.77%) and big farmers (66.33%) on low cost technology of paddy.

According to Krishnakumar (1987) majority (63.34%) of the respondents had medium level of knowledge, 23.33 per cent had high level of knowledge and 13.33 per cent had low level of knowledge in case of adopter categories of soil conservation practices. In the non-adopter category, 66.66 per cent of the respondents had medium level of knowledge, 10 per cent had high level of knowledge and 23.33 per cent of the respondents had low level of knowledge.

On the overall analysis of earlier studies, it could be concluded that there existed by and large medium to high degree of knowledge on soil and water conservation practices as possessed by the farmers involved in soil and water conservation schemes.

Since the studies concerned with the knowledge level on soil and water conservation was meagre the knowledge level on other related practices have also been reviewed.

Rao (1988) reported that majority of the contact farmers (45%) and high level of knowledge on contingency farming practices for rice, followed by 42.5 per cent and 12.5 per cent with low and medium level of knowledge.

Satyanarayanan (1991) reported that most of the farmer respondents possessed medium level of knowledge on selected technologies such as paddy Paiyur-I, potash top dressing, enriched FYM, *Azospirillium* and summer ploughing.

On analysis, it could be concluded that the farmers possessed medium to high level of knowledge on various farm practices like low cost technology, nutrient recommendation, contingency farming practices and on certain selected technologies.

Sripal and Phillip (1991) inferred that majority of the millet growers (79.17%) possessed medium level of knowledge and followed by low and high levels (10.83) and 10 per cent, respectively under dry land technologies.

Savithri (1992) inferred that 50.67 per cent of farm women had medium level of knowledge on dry land technologies and 30 per cent respondents possessed high level followed by low level (19.33%).

Reddy and Iqbal (1993) revealed that a great majority 81.34 per cent of beneficiaries of watershed development programme possessed high

knowledge and 70.68 per cent of non-beneficiaries possessed low knowledge of soil and moisture conservation measures.

But, farm size, scientific orientation and risk preference had significant and positive relationship with knowledge of beneficiaries.

Jagdale and Nimbalkar (1993) role of socio personal, economic and psychological characteristics of farmers on knowledge level about the improved dryland technology.

Findings of the study are based on 168 farmers response from Karmala tahsil of Solapur district. On the basis of knowledge index farmers are grouped into three categories. The finding was, there was no significant difference between three categories of the farmers and their knowledge levels. This indicates that knowledge is not dependent on category of farmers, but with size of farm and social participation are positive and significant with level of knowledge.

Kadam *et al.* (2001) their study reported that majority of the beneficiaries had knowledge about the practices namely dividing the fields with small bunds (82.00%) and small earthen bunds (76.66%). More than two-fifth of the beneficiaries had knowledge about the practices namely stubble and agro waste plucking (46.00%), drains per trenches (43.33%) and intercropping (42.00%).

## 2.2 ADOPTION LEVEL OF VARIOUS SOIL AND WATER CONSERVATION PRACTICES BY THE DRY LAND FARMERS

Pillai (1978) reported that out of 60 respondents, only 20 were full adopters. They had adopted all the three items of soil conservation works *viz.*, Engineering, Agronomy and Agrostology. Pillai and Nair (1979a)

reported that only 33.33 per cent of the respondents had adopted all the required soil conservation practices recommended. The adoption of contour bunding work in completed scheme areas of Trivandrum district was 62.20 per cent.

Mariappan (1981) revealed that 15.80 and 24.20 per cent of the respondents were found to be low and high level adopters, respectively. The rest (60%) were medium level adopters.

According to Lingan (1981), 54.17 per cent felt the need for soil conservation measures for tea gardens. Among those who felt the need, three-fourth had taken up the measure while the rest did not take up the same. Bhaskaram and Praveena (1982) informed that over tow-third of dry land farmers adopted off season tillage, soil mulching and mid-term correction whereas only less than five per cent of them adopted minimal irrigation techniques.

Donovan (1982) in a survey of the task of soil and water conservation reported that 82 per cent of the farmers had taken action at one time or another to reduce erosion by some form of minimum tillage. Pillai (1983) reported that 49.92 per cent of the farmers were in the low gap category and adopted any two or more practices out of three major practices in integrated soil conservation. One-third belonged to the medium gap category indicating that they had adopted one or two major practices.

Reddy (1983) observed from his study that more small practices than marginal farmers. He added that 56 per cent of small farmers adopted deep ploughing and only 36 per cent of marginal farmers had adopted the above dry land practices.

Krishnamoorthy (1984) reported that adoption of dry land technologies by farmers was found to be medium, while adoption among big farmers was high, it was medium and low among marginal and small farmers, respectively.

Sinha *et al.* (1984) studied on the attitude of farmers of Chotanagapur towards soil conservation programme and reported the adoption behaviour of farmers towards terracing programme was 76 per cent in their lands an the rest did not go for it.

Balasubramanian (1985) reported that summer ploughing was adopted by majority of the farmers (92%). He further found that sorghum raised as mixed crop with lab-lab was practiced by 85 per cent of farmers.

According to Rajagopalan (1986) 62.7 per cent of the farmers were medium level adopters while 20 per cent and 17.3 per cent were high and low adopters of rice technologies.

Ramachandran (1988) reported that summer ploughing and intercropping were adopted by all the farmers while adoption level of other technologies varied due to varied reasons.

Out of the eight studies presented, most of the studies reported that there was 75 per cent of adoption of different soil conservation practices. A few studies showed that the adoption was to the order of one-third. The studies further showed that more than half of the farmers had adopted contour bunding, off season tillage and soil mulching. One of the study reported that ploughing and intercropping were also adopted.

The studies related with the adoption level of soil and water conservation practices being limited, the knowledge level on other related practices have also been included.

Rao (1988) reported that majority of 45 per cent of contact farmers were found to be high level adopters of contingency farming practices while a majority of 40 per cent of non-contact farmers were found to be in low adopter category.

Theodore (1988) found that nearly half (45%) of the contact farmers were high adopters while it was less than one-third (30%) in case of other farmers. Sathyanarayanan (1991) reported that in case of technology-wise adoption, medium level of adoption was observed among the respondents for all the selected technologies like Paiyur-I, paddy (66.66%), potash top dressing (66.67%), enriched FYM (80%), *Azospirillium* application (63.33%) and summer ploughing (83.33%).

Gurusamy (1987) found that majority of the small farm women (53%) were low level adopter of dry land technologies and a considerable proportion of the big farm women (43%) were high level adopters.

Balasubramanian (1988) reported that majority of farmers (72.50%) were medium in their level of adoption of dry land technologies followed by high (17.50%) and low adoption levels (10%).

Savithri (1992) reported that majority (56.66%) of dry land farm women found to be low adopters. Nearly one-third of respondents were in medium level and 10.67 per cent high level of adoption of dry land technologies.

Sekar (1992) reported that majority of the respondents (53.33%) fall in the medium category in their adoption of sugarcane technology and this was followed by high and low adopter categories. Karthikeyan (1994) reported that majority of the sugarcane growers were medium level adopters of recommended package of practices. Practice-wise distribution of respondents revealed that cent per cent of them cultivated the recommended variety, did land preparation thoroughly, gave recommended spacing, did gap filling in time.

Dakhore *et al.* (1993) conducted a study on adoption of dry land technology by the farmers revealed that 40 per cent of beneficiaries and 35 per cent of non-beneficiary farmers had medium level adoption, 35 per cent beneficiary and 10 per cent non-beneficiary farmers were high level of adoption group. The per cent of farmers in low adoption group was more in non-beneficiary farmers (54.98%) than beneficiary farmers (25%).

Khatik and Singh (1993) in their study on adoption behaviour towards soil and water conservation technologies in Gujarat found that majority of farmers (90%) have adopted contour farming practice, whereas 3 farmers were aware but not adopting and only 2 farmers were unaware of the practice. The second most popular soil and water conservation practice intercropping with 88 per cent of adoption level, 5 farmers were aware of it but not adopting and only one farmer was unaware of it. The third important soil and water conservation practice was contour bunding, in this practice out of the 50 farmers, 32 farmers were adopting the practice, 16 were aware but not adopting and only 2 were unaware about the practice. The fourth important soil and water conservation practice was marginal bunding in which out of total 50 farmers, 20 were unaware

about the practice, 6 farmers were aware but not adopting and 24 farmers unaware about the practice. The fifth important soil and water conservation practice considered by tribal farmers was agro-forestry in which out of the total 50 farmers, 17 farmers were adopting, 27 were aware but not adopting and 6 farmers were unaware of the practice. Strip cropping, peripheral bunding and gully head protection works were the other extremes as the respondents were not ever aware of them.

Omprakash *et al.* (1993) in their study found that 52 per cent of farmers had adequate knowledge of the recommended vegetative measures, which has ranked first, further, about 47 and 42 per cent farmers had knowledge of conservation, agronomical and mechanical measures. About 39 per cent of the farmers were adopting demonstrated agronomical measures; about 35 per cent were adopting vegetative measures and 31 per cent were adopting mechanical measures. The overall adoption of all recommended practices combining mechanical, agronomical and vegetative measures was 35 per cent which was quite low.

Ajore and Singh (1993) conducted a study in Sharanpur district of Uttar Pradesh. Adoption gap could only be ascertained only after computing extent of adoption. The adoption level of recommended land leveling technology in less progressive and progressive district was 78.00 and 91.50 per cent, respectively. Whereas, for bunding practice no adoption gap was observed in the progressive district as against 14.00 per cent in less progressive district.

An overview of the above studies revealed that in most of the studies the respondents were found to have medium level of adoption of different

practices. Two of the studies showed that most of the respondents had high level of adoption. The percentage in case of low level of adoption was reported to be comparatively less. The adoption level varied according to the technology, the practices and the situation.

Bagdi *et al.* (1997) in their study revealed that majority of the respondents (80%) adopted intercropping practice on their farmers, 64 per cent practiced summer ploughing, gully ploughing, mulching and leveled their field are the other soil and water conservation practices being adopted by the farmers.

Rao and Singh (1997) in their study reported that, in their project eight soil and water conservation technologies were promoted during the period under investigation. Extent of adoption of these soil and water conservation practices by individual as well as group farmers was calculated.

In the successful village all the respondents were in the category of medium and high extent of adoption, while corresponding figure was 71 per cent in case of less successful village. These were 29 per cent farmers belonging to the low adoption category.

Prakash *et al.* (1998) while analysing the constraints in the adoption of soil conservation measures by the farmers of Doon valley, found that the average knowledge of farmers was 46 per cent and adoption was 35.1 per cent of the recommended soil and water conservation measures (mechanical, agronomical and vegetative). The major constraints faced by the farmers in adoption of improved technologies were technological (26.7% farmers), source of irrigation (20.0% farmers) and marketing (18.3% farmers) in that order.

Kadam *et al.* (2001) their study reported that adoption brought forward that majority (68.00%) of the beneficiaries had adopted only one practice namely dividing fields with small bunds. The practices namely stubble and agro waste plucking (38.66%) and small earthen bunds 23.33%) were also adopted by a considerable number of the beneficiaries.

## 2.3 SOCIO-PERSONAL CHARACTERISTICS

### 2.3.1 Age

Rao and Raheja (1959) in their study entitled evaluation of extension methods for change in attitude towards improved farm practices found that age of cultivators had some influence and the age group, 31 to 45 years indicated higher response in influencing the cultivators than below 30 years or above 46 years of age in changing attitude towards improved farm practices.

Pillai and Nayer (1978) in their study entitled, a study of the factors influencing adoptation of soil conservation measures, observed that younger farmers showed more response in adopting soil conservation measures in the scheme area.

Santha (1984) reported that 44 per cent of farm women belonged to old aged group and others were found to distributed equally among young and middle aged groups (28%).

Sinha *et al.* (1984) in their study entitled, a study on attitude of farmers of Chhota Nagpur towards soil conservation programme observed that the old age group (above 50 years) farmers had given favourable attitude towards the soil conservation practices.

Waghmare *et al.* (1988) in their study entitled, A study of awareness of horticultural development programme amongst the fruit and vegetable growers observed that middle age farmers had good knowledge about the scheme and had also given more response to the adoption of the horticultural practices.

Viswanathan (1989) concluded that 31 per cent of the small farmers and 23 per cent of marginal farmers belonged to young aged group. Similarly, 41 per cent of the respondents of both categories were under middle aged group.

Nirmala (1990) observed that 45.83 per cent of the farmers belonged to middle aged group followed by 30.12 and 28.66 per cent in old and young aged groups, respectively.

Sugumar (1992) inferred that more than half (59.12%) of the respondents were found to belong middle aged group followed by 25.83 per cent in old aged group and 15 per cent in young aged group.

**2.3.2 Educational status**

Patel and Maddlla (1974) in their study entitled, adoption of improved farm practices in village Bijapur found that extent of adoption of improved farm practices in cultivation of paddy, jawar, cotton, groundnut and sugarcane was higher with higher educational background.

Sinha *et al.* (1984) observed that education had an impact on the farmers in changing their outlook.

Nirmala (1990) reported that majority (66%) of the farm women were educated upto primary level of education followed by secondary level

(22%). Ten per cent of farm women belonged to the category of can ready only and 8.33 per cent of respondents were illiterates.

### 2.3.3 Social participation

Linderstorm (1960) found that almost 70.00 per cent of the labour took no part in activities of the formal organizations, whereas, only 30.00 per cent of the tenant members and 24.00 per cent of the farm owner and part owner members failed to take part.

Pillai and Nayer (1978) stated that the high social participation contributed some influence on the adoption of soil conservation measures in the scheme areas.

Sinha *et al.* (1984) observed that 52.00 per cent of the participants and 48.00 per cent of non-participants had adopted the soil conservation practices.

Pitchai (1987) pointed out that only a few farmers (7%) had high level of social participation and the rest were with low (45.83%) and medium (46.67% level of participation.

Viswanathan (1989) found that majority of the small farmers (56%) and most of the marginal farmers (64%) were found with low level of social participation. About 44 per cent of small farmers and 36 per cent of marginal farmers had participated either a members or as office bearers in one or more organizations.

### 2.3.4 Size of land holding

Pillai and Nayar (1978) revealed that the adoption of soil conservation measures in the scheme area was more among the farmers who had higher size of the holding.

Savithiri (1992) revealed that half of the respondents (50.67%) were found to operate more than five acres of dry land followed by 30 per cent who owned 2.51 to 5 acres of dry land. The rest (19.335) possessed less than 2.50 acres of land.

## 2.4 PROBLEMS FACED BY THE FARMERS IN ADOPTION OF SOIL AND WATER CONSERVATION PRACTICES

Blosser (1951) indicated inadequacy of soil conservation practices on small farms of Ohio and found that depleting rotation were often followed until the operator could not make a satisfactory income. He observed that a few farmers in his study objected to the immediate adoption of recommended rotation and erosion control practices because they did not want to change their field arrangement.

North Central Land Tenure Research Committee, Ohio (1952) observed that tenure position was one of the major stumbling blocks to the adoption of soil conservation practices in the corn belt in the mid-west. Fischer and Timmons (1959) in a study of the progress and problems in the Iowa soil conservation district programme concluded that the progress was impeded significantly by small size of farms.

Singh (1961) in a study of the people's response to soil conservation in the Damodar valley villages reported that the main handicaps observed in the soil conservation programme were : difficulty in demonstrating the

content of the innovation, the innovation demanding group action, poverty of farmers, small fragmented and scattered holdings, prevalence of share cropping system, lack of suitable credit institutions, village factionalism, illiteracy and pessimistic outlook of farmers, single factor approach to the problem and personal problems of staff members.

Pillai and Nair (1979) concluded that the important reasons for the non-adoption of engineering measures of soil conservation were : lack of credit facilities, non-availability of stones in the locality, high cost of the technique and inadequate technical assistance. Lack of technical guidance, inadequate technical assistance, lack of knowledge and non-availability of materials were the important reasons for non-adoption of agronomic measures. Inadequate technical assistance, non-availability of planting materials and inadequate financial assistance were reported to be the important reasons for the non-adoption of agrostologic measures of soil conservation.

The reasons for non-adoption of recommended practices in the dryland agricultural technology in a dryland agricultural project in Andhra Pradesh as stated by Bhaskaram and Praveen (1982) were : lack of knowledge, lack of guidance, high cost, lack of time, lack of conviction, no felt need, lack of credit, not profitable and unsatisfactory experience. Donovon (1982) opined that farmers did not perceive soil erosion as a problem because fertilizers an other inputs had boosted crop yields and masked the effects of high rates of soil loss and so did not adopt conservation measures.

According to Lingan (1981) one-third of the tea growers reported that more number of plants were damaged during the soil conservation

work which reduced the yield. He further reported that 16.66 per cent reported non-supply of seedlings for the damaged ones as their constraints. One-tenth of tea growers opined that they were uncertain about the cost and hence they had not adopted the measures in full.

Adams (1982) reported that the principal constraint in the water management extension among small farms in Central Java was the jack of qualified staff to foster the darmatirta approach at the village level.

Brewin (1982) in a study of the factors influencing farmers behaviour in soil conservation areas in Australia reported that the major areas of weakness were derived from methodological failings, a paternalistic attitude by the authority in limiting farmers involvement in direct experience of soil conservation practices and extension education activities.

Basavaraj (1982) reported that lack of technical know now, involvement of initial cost, non-suitability, were the reasons for non-adoption of contour bunding. In the same study lack of technical know how (61.00%), involvement of addition cost (38.00%) were cited as reasons for non-adoption of strip cropping.

Biote and Nikalje (1983) in their study reported that inadequate of capital (86.67%), lack of scientific knowledge (80.00%), non-availability of technical guidance (61.00%), lack of improved implements (58.00%), inadequacy of labour (6.00%) as reasons for non-adoption of dryland farming practices.

Pillai (1983) reported that the low gap of category of farmers perceived inadequate technical assistance and non-availability of stones

for construction of stone pitched bunds as the most important problem. Inadequate technical assistance, high initial cost of contour bunding and non-availability of stones for construction of stone pitched bunds were the most important perceived problems of medium gap category farmers.

Kunnal and Itnal (1984) reported impracticability of the practices as the main reason for non-adoption of soil and water conservation practices.

Sinha *et al.* (1984) reported that the reasons for non-adoption were : majority (76%) of the farmers lacked knowledge about the utility of terrace, 72 per cent id not believe that any benefit an be derived out of it, 67 per cent did not adopt to fear of fragmentation of their plots into unconventional shape and size, 51 per cent lacked money and 48 per cent thought that bunds would waste a part of their land. Krishnakumar (1987) revealed that the reasons for non-adoption were : lack of knowledge, lack of credit, small and uneven size of holding, loan facilities not offered by Agricultural Engineering Department, involvement of heavy initial expenditure.

Jaiswal *et al.* (1985) conducted case study on planning and management of watersheds under DPAP in Rampura-Bhatin watershed and reported that there was no co-ordination between different sectors. Krishnakumar (1987) reported that the problems putforth by personnel in implementing the practices were : the concept of mixed cropping and contour cultivation were not properly understood by the farmer because most of the farmers raised different types of crops irrespective of deep penetration of roots and slope.

He further stated that the important problems perceived by the respondents in adoption of soil conservation practices were uneven small

size and fragmented holdings, non-availability of infrastructural facilities in time, failure of crops because of removal of top soil, water stagnation in the field, lack of adequate credit and finance facilities, wastage of land due to formation of contour bunds, limited supply of tank silt, lack of infrastructure for collection of tank silt, lack of knowledge and high initial investment.

Chithis and Bhilegaonkar (1987) in their study on constraints causing technological gap in dry farming system, reported that high (22.34%), medium (41.55%) and small (91.11%) farmers had opined that soil conservation was highly technical work and strip cropping was a complicated process. Lack of credit, lack of knowledge, lack of implements were other reasons quoted by the farmers.

Dube *et al.* (1988) reported that lack of knowledge regarding use of mulch, use of improved implements, water harvesting had ultimately resulted in poor or incomplete adoption of dryland farming practices.

Prabhu (1988) reported that the perceived reasons for non-adoption of soil conservation practices were inadequate technical guidance, inadequate financial assistance, fear of fragmentation of holding, due to belief that it is the job of the government, non-availability of stores in the locality for the construction of contour store walls, lack of knowledge about its utility, lack of co-operation from the neighbour. Venkiataprabu (1988) pointed out that in the case of sugarcane water management practices, cent per cent of the farmers proclaimed that lack of adequate water supply, lack of adequate training and field demonstration were the major constraints in non-adoption of the practices.

Venkiataprabu (1988) reported that the constraints felt by sugarcane farmers in adoption of water management practices were lack of adequate knowledge, training and field demonstration. According to Jane brown (1994) of World Food Programme, the total lack of any participatory planning, the lack of integration of soil conservation into mainstream development, the limited positive perception on farmers of achievement; the poor capacity for collective management of common assets are the problems encountered.

It can be inferred from the preceding literature that farmers experienced various constraints in their acceptance of soil and water conservation practices. These constraints varied with the type of technology, type of farmer and also the locality. Some of the constraints encountered are lack of interest, tenure position, small farm size, lack of group action, damage to crops, lack of technical guidance and lack of resource.

Wasnick (1988) in his study identified the following reasons for non-adoption of dryland farming practices such as inadequacy of capital (90.00%), lack of improved implements (50.00%), non-availability of inputs (32.00%), un-economic holding (28.00%), inadequacy of rains (44.00%), lack of irrigation facilities (44.00%), lack of extension contact (80.00%), risk (52.00%) and high cost of technology (56.00%).

Dry farming calls for adoption of a series of related recommended dry farming practices by the farmers. Hence, it would be very necessary to know the reasons for non-adoption of improved dryland farming practices.

Omprakash *et al.* (1993) in their study found that about 27 per cent farmers were facing technological constraints followed by 20 per cent

source of irrigation, 18 per cent marketing, 13 per cent training, 12 per cent financial and 10 per cent communicational constraints. The above study revealed that major constraints in adoption of recommended soil and water conservation were technological which ranked first.

Nayak (2000) in his study reported that most of the constraints severely faced by the farmers leading them to non-adopter category, were related to financial factors. Such as heavy investment, credit not available, high interest rate and long gestation period but not technology relate problems.

Kadam *et al.* (2001) their study reported that lack of information/guidance was reported by almost all the non-adopters in respect of each practice as reason for non-adoption. The second important reason for non-adoption of the recommended soil and water conservation practices was non-availability of inputs, material/labour *etc.* In case of many of the practices, difficulty in crop cultivation, difficulty in maintenance and lack of skill were the important reasons for non-adoption.

## 2.5 BENEFITS OF SOIL AND WATER CONSERVATION PRACTICES

Pillai (1978) reported that 95 per cent of the farmers perceived that there was increase in yield in tapioca and coconut after 5 years of completion of soil conservation work. He further reported that 93.33 per cent of the farmers perceived that soil conservation works resulted in controlling of silting in paddy field and cent per cent perceived that soil conservation measures have effect on conserving soil moisture.

Pillai and Nair (1978) opined that the perception of simplicity of the practice had positive association with the adoption of soil conservation practices.

A report from the Tamil Nadu Agricultural University, Anonymous (1981) revealed that it was possible to take up two crops in a year after the implementation of soil and water conservation measures compared to three crops in two years before the implementation of the Run Ganga Project.

According to Krishnakumar (1987), majority (51.11%) of the respondents were satisfied with the working of soil conservation schemes. He further stated that most of the respondents had increase in knowledge about agriculture (82.2%), skill in cultivation (74.4%), income (70%) and cropping intensity (60%) in case of adoption of soil conservation. One-fourth of the respondents experienced heavy loss and difficulty in growing crops.

Krishnakumar (1987) found that the reasons for adoption of soil conservation practices were to get increased yield, to prevent runoff loss of water, to improve soil structure and texture, forced by Agricultural Engineering Department to adopt contour bunds and in order to avail loan facilities offered through Agricultural Engineering Department.

The impact of watershed programme on adoption and economics of technology conditions of rural people was studied by Reddy and Walker (1987). They reported 12 per cent area under sole crops in Mittemari watershed area in Karnataka as compared to 16 per cent in non-watershed villages. It was also observed that the area under improved

varieties was 92 per cent in watershed villages as against 69 per cent in non-watershed villages during *kharif* 1986.

According to Prabhu (1988) the reasons for adoption of soil conservation practices are compelled to adopt, neighbour is adopting, to avail subsidy, to get additional yield, to conserve top soil, to conserve moisture and to ease cultivation operations.

From the above studies, it can be concluded that some of the reasons why farmers go for the adoption of soil and water conservation practices are the perception on simplicity, the increased yield, to prevent runoff loss of water, to improve soil condition, influence from neighbours, subsidy involved, to conserve water and due to compulsion from the department of agricultural engineering.

Pagire (1989) in a study on the impact of watershed development observed that almost all the crops cultivated in the area showed an improvement in per ha yield compared to that of the base year (1984-85) at Kolhewaji watershed, Maharashtra. The increase in yield of *kharif* sorghum and wheat was 85 to 134 and 12 to 7 per cent, respectively.

Singh *et al.* (1989) from their study on the socio-economic impact of Kandi watershed and area development project in Punjab concluded that there were significant shifts in land use pattern from uncultivated to cultivated, uncultivable waste to cultivable area and from unirrigated to irrigated due to the project. The cropping pattern analysis also indicated a slight shift in favour of commercial crops.

Campbell (1990) reported that the production of mechanized tillage had an impact on three levels by affecting the social norms and patterns

in the rural family itself which inturn affected the social fabric of the community. Reddy (1987) reported that there was significant increase in the output of most crops; an improvement in their standard of living as a benefit from the watershed programme.

Hanxiong (1991) reported that five years of practicing integrated control in Ansai soil and water conservation experimental area resulted insubstantial economic and social benefits and marked improvement in production and environmental conditions.

Snhelatha (1991) studied on the impact of farm technologies on the socio-economic condition of farmers and concluded that majority of the respondents (73.5%) expressed better education and better family nutrition as the major consequence as a result of their adoption of TNAU technologies. The economic functional consequence such as renovation of their old houses, purchase of home and farm appliances and deepening of wells were also reported.

Rajput *et al.* (1996) in their study on economic evaluation of watershed programmes in Madhya Pradesh, reported that the crop yields were higher in watershed areas compared to non-watershed areas. The yields of soybean, sorghum, wheat and gram were 14.60, 19.60, 16.66 and 14.33 q per ha, respectively, within the watershed compared to 11.00, 14.00, 15.60 and 8.66 q per ha outside the watershed.

## 2.6 SUGGESTIONS MADE BY THE FARMERS

Granger (1984) suggested that the government should act to drastically reduce stock numbers, particularly of sheep and goats to reduce soil erosion since, the primary cause of soil erosion in Trauskei

was due to overstocking of grazing animals. Vishnumurthy 1986 made the following suggestions to minimize the problem of water way in adoption of bunding system in small holdings.

- Payment of compensation by government towards the land occupied under water ways.
- Shifting the waterway to the ownership boundaries as suggested by farmers of DRP at Hyderabad.

Krishnakumar (1987) pointed that the farmers made the following suggestions to overcome the constraints in adoption of soil conservation practices.

- Loan amount can be increased with subsidy facilities.
- Bunds should be formed with proper drainage facilities.

He further stated the suggestions made by implementing agency as follows :

- Agricultural Department should conduct demonstration and training to educate farmers on soil conservation practices.
- Government should offer more loan facilities to ryots.
- Training, publicity and propaganda should be carried out by technical staff.
- Through legislation soil conservation should be made compulsory.

Gopalkrishnan (1994) proposed that giving crop insurance and credit through RRB's co-operatives and nationalized banks, producing

adequate foundation seeds, improving water harvesting and drought resisting technologies need to be taken to overcome the problem of oilseed growers.

The suggestions offered to overcome the constraints faced differed based on the type of technology, the respondents and the situation and the type of problem. For soil erosion problem due to grazing the suggestion offered was to reduce the stock number. To overcome the problem of bunding in water ways the suggestion offered was payment of compensation by the government. A few other suggestions offered to overcome the constraints in adoption were increasing the subsidy amount, conducting demonstration, publicity and propagation.

# *Methodology*

# III. METHODOLOGY

The study was conducted during 2002-2003 in Bijapur and Bagalkot districts of Northern Karnataka.

The description of the methods and procedure followed in conducting the research is furnished under the following subheadings.

3.1 Research design

3.2 Locale of the study

3.3 Sampling procedure

3.4 Brief description of the study area

3.5 Selection of variables

3.6 Operationalization and measurement of variables

3.7 Development of interview schedule

3.8 Statistical methods used to analyse the data.

## 3.1 RESEARCH DESIGN

In the present investigation an Ex-post-facto research design was considered as appropriate because the phenomena has already occurred.

## 3.2 LOCALE OF THE STUDY

Bijapur and Bagalkot districts were sleeted purposively, based on area receiving low rainfall in Northern Karnataka (Table 3.1 and Fig. 3.1). Bijapur district consists on five taluks out of these Bijapur, Indi and Sindhagi were taken for the study (Fig. 2).

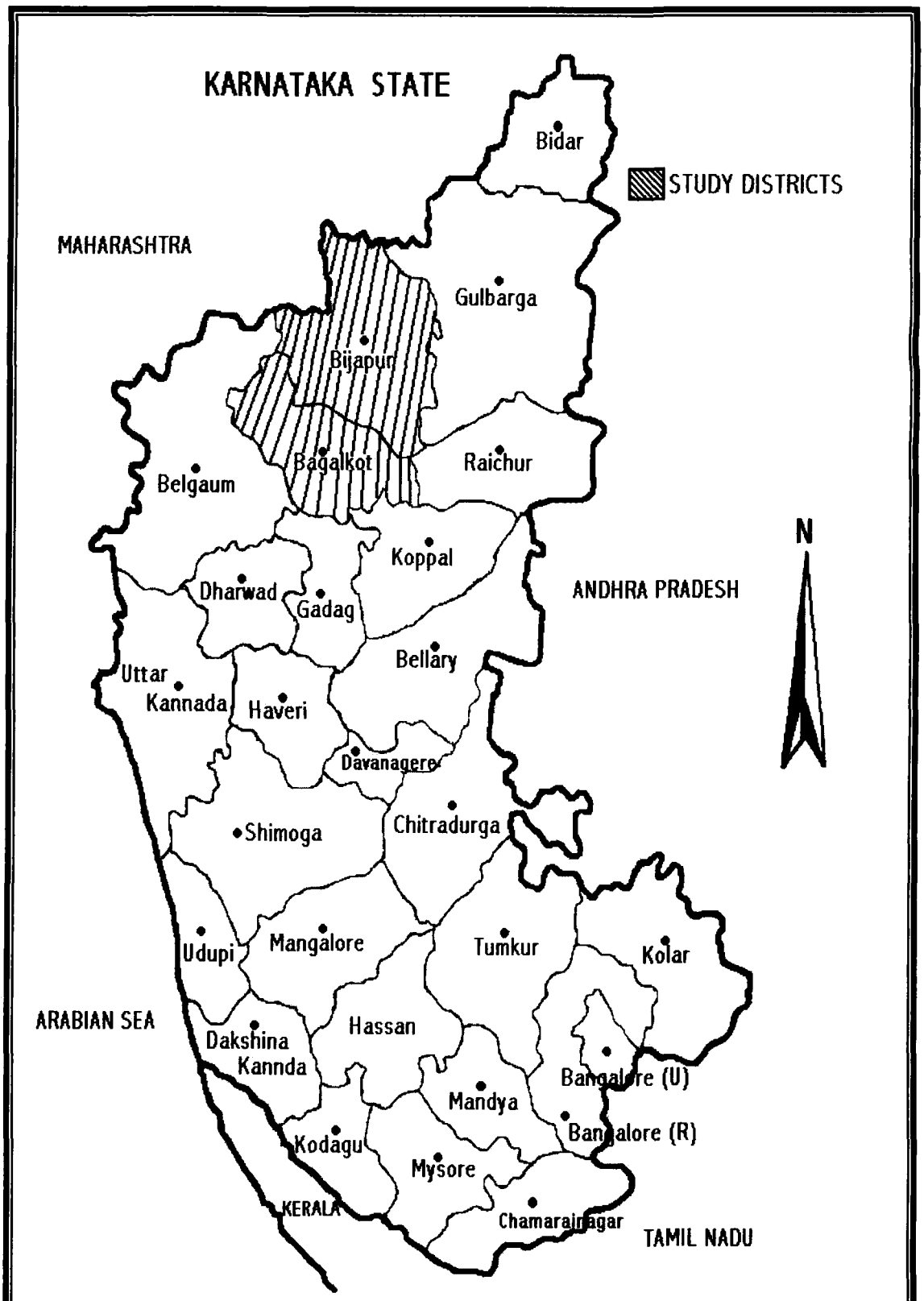


Fig. 3.1 MAP OF KARNATAKA STATE SHOWING STUDY AREA

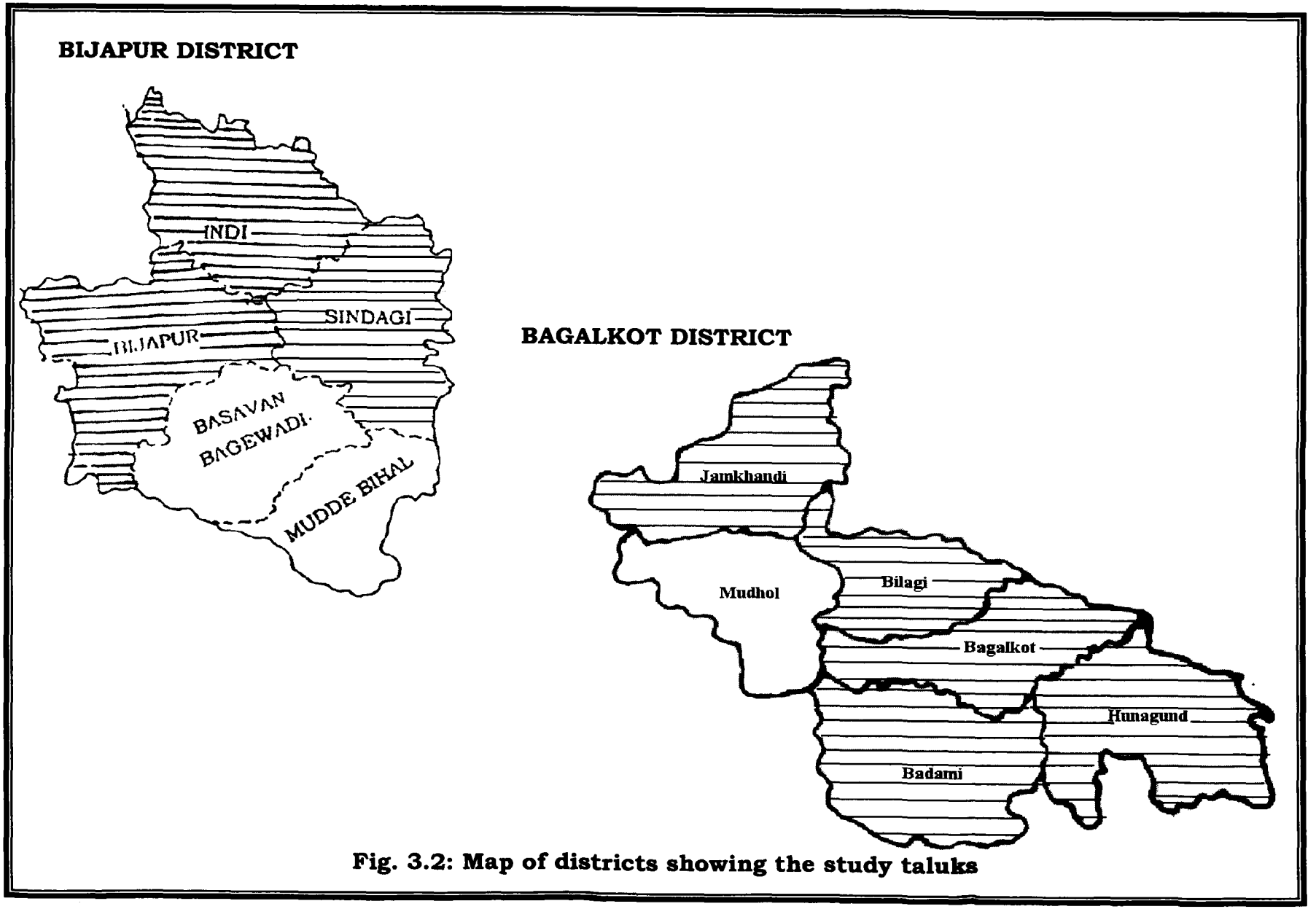


**Fig. 3.2: Map of districts showing the study taluks**

**Table 3.2: District, Taluka and village wise selection of farmers for the study**

| District | Taluka | Villages | Number of respondents selected |
|---|---|---|---|
| Bijapur | Bijapur | | |
| | | Shivanagi | 5 |
| | | Devaranimbaragi | 5 |
| | | Chabanoor | 4 |
| | Indi | | |
| | | Jagajeevanagi | 5 |
| | | Inchalagere | 5 |
| | | Dhevaratanda | 3 |
| | Sindagi | | |
| | | Devarahipparagi | 5 |
| | | Ingalagi | 5 |
| | | Koravara | 3 |
| Bagalkot | Bagalakot | | |
| | | Sutagunda | 3 |
| | | Shirura | 3 |
| | | Kiresur | 2 |
| | Badami | | |
| | | Endigere | 2 |
| | | Konkanakoppa | 2 |
| | | Badami (local) | 4 |
| | Bilagi | | |
| | | Balagandi | 3 |
| | | Nagarahal | 3 |
| | | Jevur | 2 |
| | Hunagund | | |
| | | Nagur | 2 |
| | | Gudur | 2 |
| | | Madahalli | 4 |
| | Jamakhandi | | |
| | | Savalagi | 3 |
| | | Tungala | 3 |
| | | K Jagandalli | 2 |
| **Total** | | | **80** |

**Table 3.1: Basic information of rainfall (mm) districts in Northern Karnataka**

| Districts | Normal rainfall (mm) 1901-1970 | Actual rainfall (mm) 2000 |
|---|---|---|
| Bagalkot | 562 | 593 |
| Bijapur | 578 | 607 |
| Bellay | 636 | 622 |
| Raichur | 631 | 640 |
| Koppal | 572 | 701 |
| Gulbarga | 777 | 805 |
| Bidar | 847 | 959 |

*Source :* Karnataka at a Glance, 2000-01

Bagalkot district consists of six taluks out of these Bagalkot, Bilagi, Badami, Jamkhandi and Hunagund were taken for the study (Fig. 2).

## 3.3 SAMPLING PROCEDURE

A purposive sampling procedure was adopted in which the two districts *viz.,* Bijapur and Bagalkot were selected from the Northern Karnataka based on the rainfall data. The taluks were selected purposively since the taluks were known for the dry land agriculture and villages and respondents were selected randomly (Table 3.2). The sample numbers followed was forty samples each from selected districts Bijapur and Bagalkot to form a sample size of eighty.

## 3.4 DESCRIPTION OF THE STUDY AREA

### Bijapur district

### Location

The Bijapur district is situated in northern part of Karnataka. The lies between 15.20 to 17.28 latitude and 74.50 to 76.28 longitude and at an altitude of about 593 meters above the mean sea level. The district is bound on the north by Solapur district, on the northeast by Gulburga districts on fourth surrounded by Bagalkot district. The Bijapur district consists of five taluks Bijapur, Indi, Sindhagi, Muddebihal and Basavana Bagewadi

### Demographical features

According to 2001 census, the total population of the district was 18.08 lakh persons with 51 per cent male and 49.00 per cent female (as per the 2001 census).

**Population of the district**

| | Number |
|---|---|
| Total | 18.08 lakh |
| Male | 9.28 |
| Female | 8.80 |
| Density per sq. km | 171 |
| Sex ratio | 948/1000 |

**Literacy rate**

According to 2001 census, the literacy rate of Bijapur district was 57.46 per cent with male literacy at 68.10 per cent and female literacy at 46.19 per cent.

**Climate**

Climate will be very hot in summer during the month of April to May with a temperature range of 40-40$^0$C. The temperature will be 20-15$^0$C during November to January.

**Soil type**

The district is made of two types of soil namely black cotton soil, which is suited for kharif crops and Deep mixed red and black soil.

**Major crops**

Major crops grown are jowar, wheat, sunflower, cotton, groundnut, redgram, grape and pomegranate.

**Source of irrigation**

The major source of irrigation are wells, borewell and tanks, with net irrigated area 143748 ha.

**Table 3.3: Land utilization pattern in Bijapur and Bagalkot districts during 2002-03**

(in hectares)

| Sl. No. | Particulars | Bijapur district | Bagalkot district |
|---|---|---|---|
| 1. | Total geographical area | 1053471 (100) | 658877 (100) |
| 2. | Net area irrigated | 143748 | 200241 |
| 3. | Cultivable area | 863395 (81.95) | 512748 (77.82) |
| 4. | Area under forest | 1977 (0.19) | 81126 (12.32) |
| 5. | Area not available for cultivation | 60343 (5.72) | 53637 (8.14) |
| 6. | Other uncultivated land excluding fallow land | 16383 (1.55) | 5676 (0.86) |
| 7. | Fallow land | 225636 (21.41) | 70555 (10.70) |
| 8. | Net sown area | 749132 (71.11) | 447883 (67.97) |

Note : Figures in the parenthesis indicate Per cent to the total geographical area
Source : District statistical office - Bijapur and Bagalkot

**Land utilization pattern**

With a total geographical area of 10541 square kilometer which accounts for 8.9 per cent of state geographical area. With a total cultivable area of 863395 ha (Table 3.3). The average annual rainfall of the district is 578 mm.

**Bagalkot district**

**Location**

The Bagalkot district is situated in northern part of the state, the district lies between 15.49 to 16.46 latitude and 74.59 to 76.20 longitude. The district is surrounded by Bijapur, Belgam, Gadag, Koppal and Raichur districts. Bagalkot district consists of six taluks *viz.,* Bagalkot, Bilagi, Badami, Jamkhandi, Mudhol and Hunagunda.

**Demographical features**

According to 2001 census, the total population of the district was 16.52 lakh persons with 51 per cent male and 49.00 per cent female (as per the 2001 census).

**Population of the district**

| | Number |
|---|---|
| Total | 16.52 lakh |
| Male | 8.36 |
| Female | 8.16 |
| Density per sq. km | 251 |
| Sex ratio | 977/1000 |

**Literacy rate**

According to 2001 census, the literacy rate of Bagalkot district was 57.81 per cent with male literacy at 71.31 per cent and female literacy at 44.10 per cent.

**Climate**

Climate will be very hot in summer during summer for April to May. The temperature will be 20-15$^0$C during November to January.

**Soil type**

The major soil types of the district are medium black soil, red and sandy soils.

**Major crops**

Major crops grown are jowar, maize, wheat, redgram, soybean, sunflower, groundnut, cotton and sugarcane.

**Source of irrigation**

The major source of irrigation are canals, borewells, wells and tanks with net irrigated area of 200241 ha.

**Land utilization pattern**

With a total geographical area of 6594 square kilometer. With cultivable area of 512748 ha and the average annual rainfall is 562 mm (Table 3.3).

## 3.5 SELECTION OF THE VARIABLES

### 3.5.1 Dependent variables

In the light of objectives set for the study the dependent variables considered were;

1. Knowledge of soil and water conservation practices
2. Adoption of soil and water conservation practices

### 3.5.2 Independent variables

Based on the review of literature and discussion with the scientists of UAS, Dharwad and Extension functionaries of Department of Agriculture, the following independent variables were selected for the study.

1. Age
2. Education
3. Family type
4. Family size
5. Land holding
6. Source of agricultural information
7. Social participation

## 3.6 OPERATIONALIZATION AND MEASUREMENT OF VARIABLES

### 3.6.1 Dependent variables

#### 3.6.1.1 Knowledge level of soil and water conservation

In the present study knowledge of soil and water conservation practices is operationalized, as the meaning and usefulness of the practices as factual information possessed by the farmers.

**Construction of the knowledge test**

A teacher made test procedure was followed to measure the knowledge level of the farmers about the selected soil and water conservation practices.

A list of practices relating to soil and water conservation were carefully framed in consultation with the soil and water conservation experts and state department of agriculture. The most appropriate response was given a score of three and appropriate response was given a score of two and less appropriate response was given a score one.

$$\text{Knowledge index} = \frac{\text{Number of correct response}}{\text{Total number of knowledge items}} \times 100$$

Thus after computing the knowledge scores the respondents were grouped into high, medium and low categories by considering the mean and standard deviation.

### 3.6.1.2 Adoption of soil and water conservation practices

This has been operationalized as the extent of adoption of selected recommended soil and water conservation practices. The adoption behaviour of the respondent was measured by using pre-tested list of practices, which have impact on soil and water conservation.

$$\text{Adoption quotient} = \frac{\text{Adoption score of the respondents}}{\text{Maximum adoption score one could get}} \times 100$$

The score of one for the adoption and zero for the non-adoption of the practice was followed.

Adoption quotient was converted into total adoption quotient depending on the total score obtained by each one of the respondents. They were grouped into high, medium and low adoption categories by taking mean and standard deviation as a measure of check.

### 3.6.2 Independent variables

It is referred to the chronological age of the respondents in completed years at the time of investigation. The respondents were further cauterized into three groups.

| Categories | Age (years) |
|---|---|
| Young | < 35 |
| Middle | 36-45 |
| Old age | > 45 |

**ii. Education**

It is operationalized as the number of years of formal education the beneficiaries has undergone. The respondents were grouped into different categories based on frequencies. The procedure followed by Shashidhar (2002) was used.

| Categories | Education |
|---|---|
| Illiterate | Cannot read and write |
| Primary school | 1-4$^{th}$ standard |
| Middle school | 5-7$^{th}$ standard |
| High school | 8-10$^{th}$ standard |
| Pre-university | 11$^{th}$ and 12$^{th}$ standard |
| Graduate | Above 12$^{th}$ standard |

**iii. Family type**

Family type refers to two-way classification of family as nuclear and joint. The basic grouping of mates and their children is called nuclear family and collection of more than one nuclear family on the basis of close blood ties and common residence is called joint family (Dahama and Bhatnagar, 1980).

| Family type |
|---|
| Joint family |
| Nuclear family |

**iv. Family size**

Family was taken as a group of closely related persons living together in a single household with a common kitchen. It was measured as the absolute number of members in the household sharing the same economic unit. Beneficiary families are classified into two categories. This procedure was followed by Usha Rani (1999).

| Size | Number |
|---|---|
| Small family | 5 and below |
| Large family | Above 5 |

**Land holding**

It referred to the number of acres of land possessed by the family of respondents. Land holding of the individual respondents was expressed in terms of standard dry land acres respondents were grouped into four categories using the criterion adopted by the small farmers development agency, Bangalore district (1971) as followed by (Sangram, 1997).

| Category | Land holding (acres) |
|---|---|
| Land less | No land |
| Marginal farmers | Less than 2.5 |
| Small farmers | 2.5 - 5.0 |
| Medium farmers | 5.01 – 10.0 |
| Big farmers | More than 10 |

**Source of agricultural information**

It refers to the source of information through which the respondents sought information about the agriculture and allied activities, their day to day problems and also about the development programmes. The extent of use of information sources was measured by taking into account to the respondents were listed in the schedule.

**Social participation**

It was conceptualized as the degree of involvement of an individual in various social organizations as a member or as an office bearer. It was empirically measured using the procedure followed by Hardikar (1998).

## 3.7 BENEFITS OF SOIL AND WATER CONSERVATION PRACTICES

The benefits of soil and water conservation practices were asked to the respondents in closed end question type and the respondents were asked to indicate them which their realize these benefits were framed the carefully reading the literature.

### 3.7.1 Problems faced by the farmers in adoption of soil and water conservation practices

These are the difficulties faced by the farmers in implementing the practices. The respondents were asked to answer a multiple choice questions. The questions were framed by carefully reading the literature.

### 3.7.2. Suggestions made by the farmers

These are the idea put fourth by the respondents based on their experience. Suggestions of the farmers sought through a open and question.

## 3.8 DEVELOPMENT OF INTERVIEW SCHEDULE AND DATA COLLECTION

Keeping in view the objectives and variables under study, a structured interview schedule was prepared by consulting the previous research studies, discussing with experts and professional workers in the field of Agricultural Extension Education and Agronomy. The interview schedule was pre-tested with a sample of ten farmers who were not included in the final sample. The final schedule was prepared by necessary modifications, additions and deletions based on pre-tested result. The schedule was translated into Kannada and pre tested for the final use. The final format of the interview schedule is given in the Appendix I.

The data was collected from farmers practicing the soil and water conservation measures, in an informal atmosphere by personal interview method.

## 3.9 STATISTICAL TOOLS USED IN THE STUDY

The data collected from the respondents were scored, tabulated and analysed using suitable statistical methods. The statistical methods used in the present study are described below.

### 3.9.1 Frequencies and percentages

Frequencies, percentages, mean and standard deviation were used to interpret the categories of socio-economic and personnel characters, knowledge and adoption level of the respondents. They were also used for interpreting the findings pertaining to benefits, problems and suggestions of respondents.

# *Results*

# IV. RESULTS

Findings of the present investigation on A study on knowledge and adoption level of soil and water conservation practices by farmers in Northern Karnataka are presented under the following heads.

## 4.1 OVERALL KNOWLEDGE OF FARMERS ABOUT SOIL AND WATER CONSERVATION PRACTICES

The data in the Table 4.1 and Fig. 4.1 reveals that high knowledge of soil and water conservation practices was noticed with 22.50 per cent of the respondents, whereas, medium knowledge was exhibited by 56.25 per cent of the respondents, followed by low knowledge with 21.25 per cent of the respondents.

### 4.1.1 Knowledge level of farmers about individual soil and water conservation practices

The data regarding the knowledge of individual recommended soil and water conservation practices is presented in Table 4.2a.

#### 4.1.1.1 Contour cultivation means

A high per cent of respondents possessed the knowledge of, meaning, the crop cultivation across the slope (77.50%) and crop cultivation along the slope (16.25%). Whereas, knowledge of crop cultivation irrespective of slope was exhibited by (6.25%) of respondents.

#### 4.1.1.2 Contour cultivation purposes

It was found that only 17.50 per cent of respondents have the complete knowledge of contour cultivation purpose. It was observed that majority of respondents possessed the knowledge of reduces soil erosion

**Table 4.1: Overall knowledge level of respondents**

(n = 80)

| Category | Frequency | Per cent |
|---|---|---|
| Low (≤ 50) | 17 | 21.25 |
| Medium (51 – 75) | 45 | 56.25 |
| High (≥ 76) | 18 | 22.50 |

Mean = 62.60
SD = 13.39

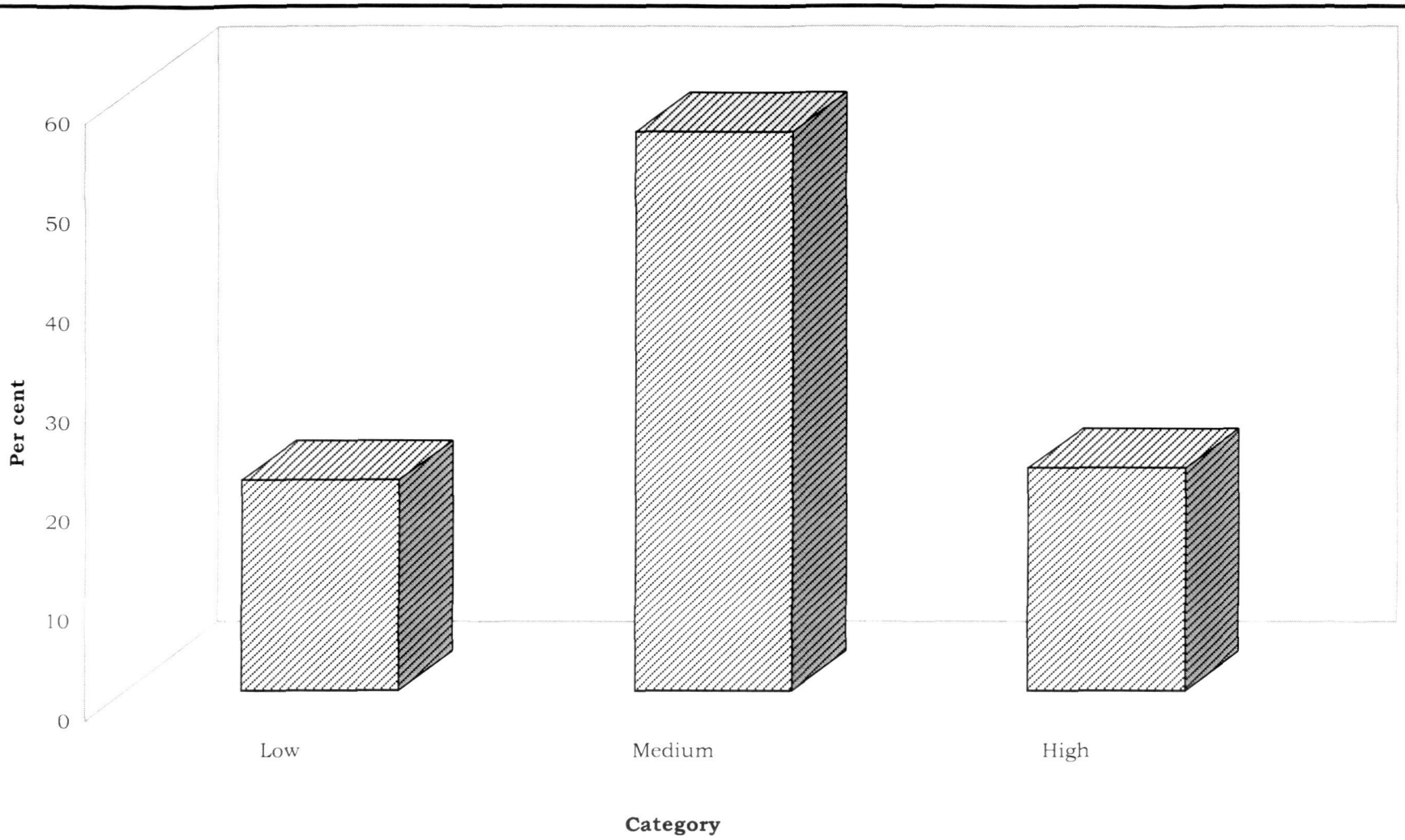


**Fig. 4.1: Overall knowledge level of respondents**

and conserves soil moisture (62.50%), followed by reduced cost of cultivation (50.00%) and directly improves soil fertility (26.25%).

#### 4.1.1.3 Crop rotation means

It was observed that a high per cent of respondents possessed the knowledge of regular recurrent succession of different crops on the same piece of land (85.0%), followed by growing more crops every year (10.0%) and growing different crops every year (5.0%).

#### 4.1.1.4 Purpose of crop rotation

It was noticed that only 11.25 per cent of the respondents had the complete knowledge of crop rotation purposes. It was observed that majority of the respondents (81.25%) expressed increases soil fertility, controls weed, pests and diseases. Whereas, 25.00 per cent of the respondents expressed, provide good opportunity for growth of succeeding crop and prevent soil from degrading 16.25 per cent.

#### 4.1.1.5 Deep ploughing practice

It was observed that high per cent of the respondents (40.0%) possessed the knowledge of deep ploughing, can be practiced, once in two years, followed by once in three years (32.5%) and regularly once a year (20.0%) whereas (7.5%) of the respondents felt that it should not be practiced.

#### 4.1.1.6 Deep ploughing purpose

It was found that only 28.78 per cent of respondents had the complete knowledge of deep ploughing purposes, whereas, 75.25 per cent of the respondents expressed increased infiltration rate, followed by

**Table 4.2a: Knowledge level of farmers about individual soil and water conservation practices**

(n=80)

| Sl. No. | Practices | Number | Percent |
|---|---|---|---|
| 1. | **Contour cultivation** | | |
| A | Contour cultivation means | | |
| | Crop cultivation along the slope | 13 | 16.25 |
| | Crop cultivation across the slope | 62 | 77.50 |
| | Crop cultivation irrespective of slope | 05 | 6.25 |
| B | Contour cultivation helps | | |
| | Reduces soil erosion and conserves soil moisture | 50 | 62.50 |
| | Directly improves soil fertility | 21 | 26.25 |
| | Reduces cost of cultivation | 40 | 50.00 |
| | Above all | 14 | 17.50 |
| 2. | **Crop rotation means** | | |
| | It is regular recurrent succession of different crops on the same piece of land | 68 | 85.00 |
| | Growing more crops every year | 08 | 10.00 |
| | Growing different crops every year | 04 | 5.00 |
| A | **Crop rotation helps** | | |
| | Increases soil fertility, controls weed, pest and disease | 65 | 81.25 |
| | Provide good opportunity for growth of succeeding crop | 20 | 25.0 |
| | Prevents soil from degrading | 13 | 16.25 |
| | Above all | 09 | 11.25 |
| 3. | **Deep ploughing** | | |
| A | Deep ploughing can be practiced (approximately) | | |
| | Regularly once a year | 16 | 20.00 |
| | Once in two years | 32 | 40.00 |
| | Once in three years | 26 | 32.50 |
| | Should not be practiced | 06 | 7.50 |
| B | Deep ploughing helps | | |
| | To control weed and pest incidence | 39 | 48.75 |
| | To increase infiltration rate | 61 | 76.25 |
| | Allows for natural withering to improve soil physical characters | 26 | 32.50 |
| | Above all | 23 | 28.78 |

*Contd....*

| | | | |
|---|---|---|---|
| **4.** | **Ridges and furrows** | | |
| | Ridges and furrows are formed..... | | |
| | Across the slope | 36 | 45.00 |
| | Along the slope | 12 | 15.00 |
| | Undulating land | 32 | 40.00 |
| **5.** | **Inter cropping** | | |
| A | Purpose of intercropping | | |
| | To improve soil fertility | 49 | 61.25 |
| | Increase crop yield | 58 | 72.50 |
| | Compensates incase of loss in one crop | 33 | 41.25 |
| | Above all | 30 | 37.50 |
| **6.** | **Bunding helps** | | |
| | To conserve soil and water | 67 | 83.75 |
| | To conserve soil only | 09 | 11.25 |
| | To conserve rainwater only | 04 | 5.00 |
| **7.** | **Farm pond** | | |
| A | Farm pond means | | |
| | Construction of small pond to conserve runoff water | 60 | 75.0 |
| | Construction of small pond in the field for better percolation | 25 | 31.25 |
| | Both | 05 | 6.25 |
| B | Farm pond helps | | |
| | To give protective irrigation | 47 | 58.75 |
| | To conserve runoff water and eroded soil | 61 | 76.25 |
| | To conserve eroded soil only | 32 | 40.00 |
| | Above all | 30 | 37.50 |
| **8.** | **Nala bunds** | | |
| A | Nala bund means | | |
| | Forming nalabund in nala to collect water | 59 | 73.75 |
| | Forming nalabunds to provide better way for flowing water | 02 | 2.50 |
| | Both | 19 | 23.75 |

*ontd....*

| | | | |
|---|---|---|---|
| B | *Nala bund helps* | | |
| | To reduce soil erosion and runoff | 42 | 52.50 |
| | To increase water table | 48 | 60.00 |
| | To increase crop yield | 12 | 15.00 |
| | Above all | 11 | 13.75 |
| **9.** | **Land levelling** | | |
| A | Land levelling means | | |
| | Reshaping agricultural land for better cultivation | 60 | 75.00 |
| | Levelling undulating land in the field | 35 | 43.75 |
| | Both | 15 | 18.75 |
| B | Land levelling helps | | |
| | Easy conduct of agricultural operation | 70 | 87.50 |
| | Control of rainwater flow and to check soil erosion | 11 | 13.75 |
| | Provides better surface drainage | 5 | 6.25 |
| | Above all | 03 | 3.75 |
| **10.** | **Vegetative barriers** | | |
| A | Vegetative barriers helps | | |
| | To conserve eroding soil | 26 | 32.50 |
| | Conserves soil moisture | 15 | 18.75 |
| | Cheap means of soil conservation and can be used as a fodder | 51 | 63.75 |
| | Above all | 6 | 7.50 |

**Table 4.2b: Knowledge level of farmers about individual soil and water conservation practices**

(n=80)

| Sl. No. | Practices | Frequency (Yes) | % | Frequency (No) | % |
|---|---|---|---|---|---|
| 1. | Live bund is permanent in nature | 45 | 56.25 | 35 | 43.75 |
| 2. | Deep ploughing helps in better penetration of rainwater | 69 | 86.25 | 11 | 13.75 |
| 3. | Farm pond helps for harvesting runoff and resupply | 76 | 95 | 04 | 5.00 |
| 4. | Fall ploughing practice is difficult to adopt in dryland | 27 | 33.75 | 53 | 66.25 |
| 5. | Intercropping helps in *in situ* rainwater harvesting | 63 | 78.75 | 17 | 21.25 |
| 6. | Waste weir helps in safe disposal of runoff and reduction in soil loss | 74 | 92.50 | 06 | 7.50 |
| 7. | Drop inlet spillway helps in avoiding breaching of bunds | 58 | 72.50 | 22 | 27.50 |
| 8. | Mulching helps in reducing evaporation losses | 65 | 81.25 | 15 | 18.75 |

control of weed and pest incidence 48.75 per cent and allows for natural withering to improve soil physical characters 32.50 per cent.

**4.1.1.7 Ridges of furrows formation**

It was noticed that high per cent of respondents have the knowledge of it can be formed across the slope 45.0 per cent, followed by undulating land (40.0%) and along the slope (15.0%).

**Purpose of intercropping**

It was observed that 37.5 per cent of respondents have complete knowledge intercropping, whereas increases the crop yield 72.50 per cent improves soil fertility (61.25%) and compensates in case of loss in one crop 41.25 per cent.

**4.1.1.8 Bunding purposes**

It was observed that high per cent of the respondents have the knowledge to conserve soil and water (83.75%) followed by to conserve soil only 11.25 per cent and it conserve rain water only 5.00 per cent.

**4.1.1.9 Farm pond means**

It was observed that high percent of respondents have the knowledge of construction of small pond to conserve run off water 75.50 per cent followed by construction of small pond in the field for better infiltration (31.25%) whereas 6.25 per cent of respondents had complete knowledge of it.

**4.1.1.10 Farm pond purposes**

It was found that 37.50 per cent of farmer have complete knowledge of farm pond purposes, followed by to conserve run off water and eroded

Waste weir in the field of Mallikarjuna Sangappa Angadi of Shirur village, Bagalkot taluk

Deep ploughing in the field of Naganagouda Desai Patil of Yendigere village, Badami taluk

Ploughing across the slope in the field of Eswarappa Duggi of Kiresura village, Bagalkot taluk

**Plate 1: Soil and water conservation practices**

*Contd.....*

Sand mulching in the field of Shivanagouda Mudigouda Patil of Ingalagi village, Sindhagi taluk

Crop residue mulching in the field of Mallappa Rudrappa Badiger of Tungala village, Jamkhandi taluk

Stone bunding in the field of Chandasaheb of Shivanagi village, Bijapur taluk

soil (76.25%) and to give protective irrigation (58.75%) and to conserve eroded soil only (40.00%).

#### 4.1.1.11 Nalabund

It was found that high per cent of respondent have the knowledge of forming nalabund in nala to collect water (73.75%), followed by forming nalabunds in nala to provide better way for flowing water 2.50 per cent whereas, 23.75 per cent respondents have the complete knowledge.

#### 4.1.1.12 Nalabund purpose

It was noticed from the majority of the respondents felt, increases water Table (60.00%), followed by reduces soil erosion and runoff (52.50%), to increase crop yield (15.00%) and only 13.75 per cent of the respondents had complete knowledge of it.

#### 4.1.1.13 Meaning of land levelling

It was observed that 75.00 per cent of respondents have the knowledge of reshaping agricultural land for better cultivation, followed by levelling undulating land in the field (43.75%) whereas, (18.75%) of the respondents have complete knowledge.

#### 4.1.1.14 Purpose of land levelling

It was found that only 3.75 per cent of the respondents have the complete knowledge of land leveling purpose, whereas 87.50 per cent of respondents felt that easy conduct of agricultural operations, followed by control of rain water flow and to check soil erosion (13.75%) and provides better surface drainage (6.25%).

#### 4.1.1.15 Purpose of vegetative barriers

It was noted that only 7.50 per cent of the respondents have the complete knowledge of vegetative barrier purposes, whereas a high per cent of respondents have the knowledge of cheap means of soil conservation and can be used as a fodder 63.75 per cent followed by to conserve eroded soil 32.50 per cent and to conserve soil moisture 18.75 per cent.

#### 4.1.1.16 Live bund

It was noticed that 56.25 per cent of respondents have the knowledge of live bunds permanent nature whereas 43.75 per cent of the respondent expressed no knowledge of it.

Majority (86.25%) of the respondents had the knowledge of deep ploughing helps in better penetration of rain water, whereas 13.75 per cent have no knowledge of it.

Farm pond helps for harvesting runoff and resupply was expressed by 95 per cent of the respondents while 5.0 per cent of the respondents said no to it.

Fall ploughing practice difficult to adopt in dry land was expressed by 33.75 per cent of the respondents, whereas 66.25 per cent respondents said no to it.

More than three-fourth (78.75%) of the respondents expressed intercropping helps *in-situ* moisture conservation whereas 21.25 per cent respondents said no to it.

**Table 4.3: Overall adoption level of respondents**

(n = 80)

| Category | Frequency | Per cent |
|---|---|---|
| Low (≤ 6) | 24 | 30 |
| Medium (7- 8) | 41 | 51.25 |
| High (≥ 9) | 15 | 18.75 |

Mean = 7.17
SD = 1.36

Waste weir helps in safe disposal of runoff and reduction in soil loss was expressed by 92.50 per cent, whereas 7.50 per cent of the respondent said no to it.

Drop inlet spillway helps in avoiding breaching of bunds was expressed by 72.50 per cent of the respondents, whereas 27.50 per cent of the respondents said no to it.

Majority (81.25%) of the respondents expressed that mulching helps in reducing evaporation losses, whereas, 18.75 per cent said no to it.

## 4.2 OVERALL ADOPTION LEVEL OF SOIL AND WATER CONSERVATION PRACTICES

Distribution of the data in the Table 4.3 and Fig. 4.2 revealed that more than half (51.25%) of the respondents were under medium adoption category and 18.75 per cent of the respondents had fallen under high adoption category, whereas 30.00 per cent of the respondents were found in low adoption category.

### 4.2.1 Extent of adoption of individual soil and water conservation practices by the farmers

The data regarding adoption of individual soil and water conservation practices is presented in the Table 4.4.

Cent per cent of the respondents adopted the bunding. Mulching was adopted by 73.75 per cent of the respondents whereas 26.25 per cent of respondents have not adopted the practice.

Farm pond was adopted by 46.25 per cent of the respondents whereas, 53.75 per cent of the respondents not adopted.

**Table 4.4: Adoption of individual soil and water conservation practices by farmers**

| Sl. No. | Practices | Adoption | | Non-adoption | |
|---|---|---|---|---|---|
| | | Frequency | Per cent | Frequency | Per cent |
| 1. | Bunding | 80 | 100.00 | 0 | 0.00 |
| 2. | Mulching | 59 | 73.75 | 21 | 26.25 |
| 3. | Farm pond | 37 | 46.25 | 43 | 53.75 |
| 4. | Levelling | 76 | 95.00 | 04 | 5.00 |
| 5. | Live vegetative barrier | 23 | 28.75 | 57 | 71.25 |
| 6. | Deep ploughing | 67 | 83.75 | 13 | 16.25 |
| 7. | Crop rotation | 74 | 92.50 | 6 | 7.50 |
| 8. | Ridges and furrows | 26 | 32.5 | 54 | 67.50 |
| 9. | Zing terrace | 9 | 11.25 | 71 | 88.78 |
| 10. | Intercropping | 65 | 81.25 | 15 | 18.75 |
| 11. | Waste weir | 61 | 76.25 | 19 | 23.75 |
| 12. | Tank silt application | 18 | 22.50 | 62 | 77.50 |
| 13. | Drop inlet | 22 | 27.50 | 58 | 72.50 |

Land leveling was adopted by 95 per cent of the respondents, whereas it was not adopted by 5 per cent of the respondents.

Live vegetative barrier was not adopted by 82.50 pr cent of the respondents, whereas it was adopted by only 17.50 per cent of the respondents. 83.75 per cent of the respondents adopted the deep ploughing and 16.25 per cent of the respondents not adopted to practice.

Crop rotation was adopted by 92.50 per cent of the respondents whereas it was not adopted by 7.50 per cent of the respondents.

Ridges and furrows adopted 32.50 per cent of the respondents and not adopted by 67.50 per cent of the respondents.

High majority (88.75) per cent of the respondents not adopted the practice of zing terrace whereas it was adopted by 11.25 per cent of the respondents.

Intercropping was adopted by 81.25 per cent of the respondents and it was not adopted by 18.75 per cent of the respondents.

Waste weir was adopted by 76.25 per cent of the respondents and not adopted by 23.75 per cent.

Tank silt application was adopted by 22.50 per cent of the respondents and it was not adopted by 77.50 per cent.

Drop inlet spillway was adopted by 27.50 per cent of the respondents and it was not adopted by 72.50 per cent of the respondents.

## 4.3 SOCIO-ECONOMIC AND PERSONAL CHARACTERISTIC OF THE RESPONDENTS

The data on distribution of socio-economic and personal characteristics of the respondents is depicted in Table 4.5.

### 4.3.1 Age

It was found that comparatively more number of respondents (45%) belonged to the middle age group followed by old age (36.25%) and young age group (18.75%) category distribution.

### 4.3.2 Education

It was clear from the data the majority of the respondents are literate of which 22.50 per cent studied upto primary school. 20.00 per cent studied middle school, 15.0 per cent respondents up to high school, 11.25 per cent of respondents upto pre-university, whereas, 5 per cent respondents had graduation. Whereas, 25.26 per cent of the respondents were illiterate.

### 4.3.3 Family type

It was observed that 57.50 per cent respondents had nuclear family whereas, 42.50 per cent of respondents had joint family.

### 4.3.4 Family size

It was evident that a high per cent of the respondents were noticed in medium size (62.25%), followed big size 25 per cent and small size family (13.75%).

**Table 4.5: Socio-economic and personal characteristics of the respondents**

(n = 80)

| Sl. No. | Categories | Frequency | Per cent |
|---|---|---|---|
| 1. | *Age* | | |
| | Young < 35 years | 15 | 18.75 |
| | Medium 36-45 years | 36 | 45.00 |
| | Old > 45 years | 29 | 36.25 |
| 2. | *Education* | | |
| | Illiterate | 21 | 26.25 |
| | Primary school | 18 | 22.50 |
| | Middle school | 16 | 20.00 |
| | High school | 12 | 15.00 |
| | PUC | 9 | 11.25 |
| | Graduate | 4 | 5.00 |
| 3. | *Family type* | | |
| | Nuclear | 46 | 57.50 |
| | Joint | 34 | 42.50 |
| 4. | *Family size* | | |
| | Small upto 4 | 11 | 13.75 |
| | Medium 5 - 7 | 49 | 61.25 |
| | Big > 7 | 20 | 25.00 |
| 5. | *Land holding (acres)* | | |
| | Marginal farmers < 2.5 | 1 | 1.25 |
| | Small farmers 2.5 – 5.0 | 5 | 6.25 |
| | Medium farmers 5.01-10.0 | 43 | 53.75 |
| | Big farmers > 10.0 | 31 | 38.75 |

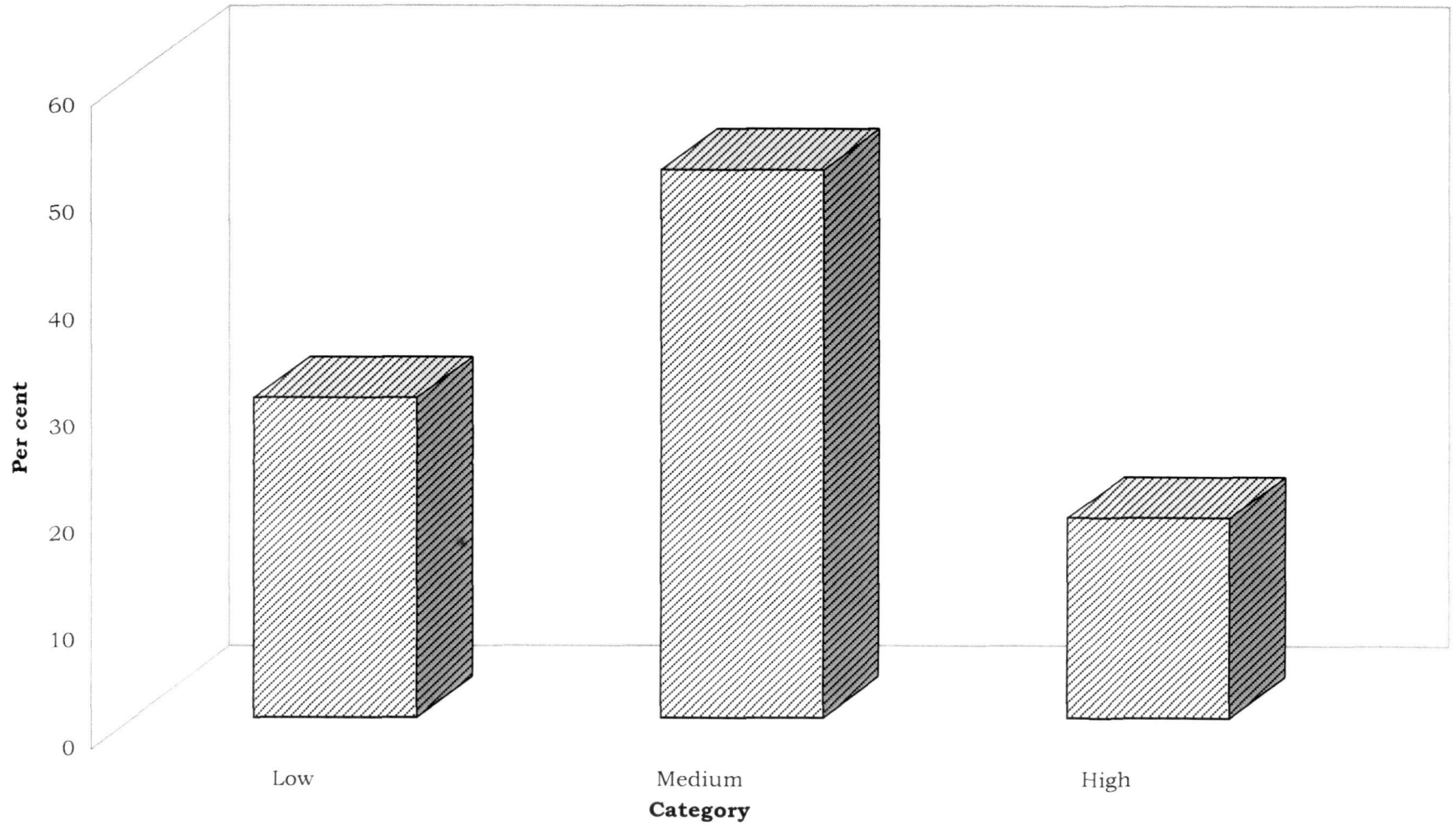


**Fig. 4.2: Overall adoption level of respondents**

**Table 4.6: Source of agricultural information**

n = 80

| Sl. No. | Category | Frequency | Per cent |
|---|---|---|---|
| 1. | *Family member* | 19 | 23.75 |
| 2. | Friends and relatives | 31 | 38.75 |
| 3. | Neighbours | 46 | 57.50 |
| 4. | Gram Sevak | 40 | 50.00 |
| 5. | Agriculture Department (AO, ADA) | 15 | 18.75 |
| 6. | Agricultural University (Extension guides, ATIC) | 09 | 11.25 |
| 7. | Mass media | | |
| a. | Newspaper | 16 | 20.00 |
| b. | Radio | 33 | 41.25 |
| c. | Television | 01 | 1.25 |
| | Note : *Multiple response is possible* | | |

**Table 4.7: Social participation of the respondents**

(n = 80)

| Sl. No. | Category | Frequency | Per cent |
|---|---|---|---|
| I. | *Social participation** | | |
| 1. | Non-participants | 33 | 41.25 |
| 2. | Participants | 47 | 58.75 |
| a. | Gram panchayat members | 04 | 8.51 |
| b. | Co-operatives | 31 | 65.95 |
| c. | Youth club | 12 | 25.53 |

### 4.3.5 Land holding (acre)

The distribution of respondents according to land holding revealed that comparatively more number of farmers (53.75%) belonged to medium category, whereas big category (38.75%), small farmer category (6.25%) and marginal category (1.25%) were found.

### 4.3.6 Sources of agricultural information

It was found from the Table 4.6 that maximum number of respondents seek information from neighbor (57.50%) followed by gram sevaka (50%), mass media, radio (41.25%), friends and relatives (38.75%), family members (23.75%), news papers (20%), Agriculture department (18.75%), agriculture university (11.25%) and only 1.25 per cent of the respondents seek information from television.

### 4.3.7 Social participation

It was noticed from the Table 4.7 that more than half (58.75%) of the respondents have social participation and (41.25%) were non-participants. Among the social participants (65.95%) were the members of co-operative societies, 25.55 per cent were in youth club and 8.51 per cent were gram panchayat members.

## 4.4 PROBLEMS FACED BY THE RESPONDENTS IN ADOPTION OF SOIL AND WATER CONSERVATION OF PRACTICES

The constraints experienced by the respondents in the adoption of soil and water conservation practices are presented in the Table 4.8.

Majority of the respondents (52.50%) expressed the problem of lack of long-term loans for land development activities followed by inadequate

**Table 4.8: Problems faced by the respondents in adoption of soil and water conservation practices**

(n = 80)

| Sl. No. | Types of problems | Frequency | Per cent |
|---|---|---|---|
| 1. | Lack of long-term loans for land development activities | 42 | 52.50 |
| 2. | Inadequate technical guidance by the concerned departments | 29 | 36.25 |
| 3. | High initial cost | 20 | 25.00 |
| 4. | Lack of group action | 19 | 23.75 |
| 5. | Long gestation period | 18 | 22.50 |
| 6. | Wastage of land | 14 | 17.50 |

Note : Multiple response is possible

**Table 4.9: Benefits derived out of soil and water conservation practices as perceived by farmers**

(n = 80)

| Sl. No. | Benefits | Frequency | Per cent |
|---|---|---|---|
| 1. | Checks soil and water erosion | 45 | 56.25 |
| 2. | Helps in groundwater recharge | 38 | 47.50 |
| 3. | Increases infiltration rate of water | 34 | 42.50 |
| 4. | Increased yield | 7 | 8.75 |
| 5. | Helps in increasing the cropping intensity | 6 | 7.5 |

*Note :* Multiple response is possible

**Table 4.10: Suggestions made by the respondents**

(n = 80)

| Suggestions | Frequency | Per cent |
|---|---|---|
| Need for more technical information/ guidance by concerned departments extension field functionaries | 46 | 57.50 |
| Financial assistance for maintenance of SWC work | 32 | 40.00 |
| Increase the subsidy amount | 20 | 25.00 |
| Bank loan should be made available for lesser interest rate | 18 | 22.50 |

technical guidance by the concerned departments (36.25%), high initial cost (25.00%), lack of group action (23.75%), long gestation period (22.50%) and wastage of land (17.50%).

## 4.5 BENEFITS DERIVED FROM ADOPTING SOIL AND WATER CONSERVATION PRACTICES

Advantages of soil and water conservation practices as perceived by the respondents. The advantages of soil and water conservation practices are presented in the Table 4.9. The table highlights that high per cent of the farmer had felt advantages like checks soil and water erosion (56.25%), helps in groundwater recharge (47.50%), increases infiltration rate of water (42.50%), increased yield (8.75%) and helps in increasing the cropping intensity (7.50%).

## 4.6 SUGGESTIONS MADE BY THE FARMERS

It was evident from the Table 4.10 that the respondents made the suggestions in this way. Need for more technical information/guidance by concerned department extension field functionaries (57.50%), financial assistance for maintenance of soil and water conservation work (40.00%), increase the subsidy amount (25.00%) and bank loan should be made available for lesser interest rate (22.50%).

# *Discussion*

# V. DISCUSSION

## 5.1 KNOWLEDGE LEVEL OF FARMERS ABOUT SOIL AND WATER CONSERVATION PRACTICES

### 5.1.1 Overall knowledge distribution of respondents about soil and water conservation practices

It is evident from the Table 4.1 that a high knowledge level about soil and water conservation practices was noticed in 22.50 per cent of the respondents, where as medium knowledge was possessed by 56.25 per cent of the respondents and low knowledge with 21.50 per cent of the respondents.

This situation highlights the knowledge of soil and water conservation practices was comparatively less than expected. This might be due to the fact that majority of the respondents were semi literate and lesser extension contact with developmental departments.

Likewise the studies of Rajkumar (1981), Jayakrishnan (1984) and Sathyanarayanan (1991), who highlighted the dominance of medium knowledge level of respondents in soil and water conservation practices.

### 5.1.2 Knowledge level of respondents about individual soil and water conservation practices

#### 5.1.2.1 Contour cultivation

It was observed that a higher per cent of the respondents had the knowledge of meaning and purpose of contour cultivation.

Regarding a purpose of contour cultivation 62.50 per cent of the respondents felt that it reduce the soil erosion and conserve soil moisture, whereas 17.50 per cent of the respondents had complete knowledge of it.

This may be due to the fact that less popular of the technology in the study area.

**5.1.2.2 Crop rotation**

It was clear that more than three fourth of the respondents had knowledge of crop rotation meaning, whereas 11.25 per cent of the respondents had complete knowledge of crop rotation purposes. This might be due to the reason of age old practice and also the practical usage.

**5.1.2.3 Deep ploughing**

About 40.00 per cent of the respondents felt that it can be practiced once in two years, whereas 28.78 per cent of the respondents had complete knowledge of purpose of deep ploughing. This might be due to their actual practice.

**5.1.2.4 Ridges and furrows formation**

Fourty five per cent majority of the respondents felt that it can be formed across the slope and undulating land (40.00%).

**5.1.2.5 Inter cropping**

About 37.50 per cent of the respondents had complete knowledge of purpose of intercropping, whereas 72.50 per cent of the respondents felt that it increases the crop yield. This might be due to fact that lesser

practice of the technology, since the research area known for sole cropping.

**5.1.2.6 Purpose of bunding**

More than three fourth of the respondents (83.75%) felt that to conserve soil and water.

This might be due to the fact that the advantages offered by practicing the bunding.

**5.1.2.7 Farm pond**

It was noticed that 75.00 per cent of the respondents felt the meaning of farm pond as construction of small pond to conserve runoff water, whereas 37.50 per cent of the respondents at complete knowledge of farm pond purposes. This might be due to the fact that majority of the research area is under dry land.

**5.1.2.8 Nalabund**

23.75 per cent of the respondents had complete knowledge of meaning of nalabund and 97.50 per cent of the respondents felt that forming, bund in nala to collect the water, whereas 13.75 per cent of the respondents had complete knowledge of nalabund purposes.

**5.1.2.9 Land levelling**

Majority of the respondents felt that reshaping of agricultural land for better cultivation and 18.75 per cent of the respondents had complete knowledge of land levelling meaning.

Majority (87.50%) of the respondents expressed easy conduct of agricultural operation, whereas only 3.75 per cent of the respondents had complete knowledge of land levelling purposes.

**5.1.2.10 Vegetative barriers**

More than half (63.75%) of the respondents felt that vegetative barrier has cheap means of soil conservation and can be used as a fodder and only 7.50 per cent of the respondents had complete knowledge of vegetative barrier purposes.

Live bund is permanent in nature is felt by 56.25 per cent of the respondents. This might be due to its perennial nature.

Deep ploughing helps in better penetration of rainwater was expressed by 86.25 per cent of the respondents. This might be due to the fact that it acts as a barrier for water flow and it gives ample time for rain water to infiltrate.

Farm pond helps for harvesting of runoff water and resupply was expressed by 95.00 per cent of the respondents, this might be due to avoiding runoff of water and use it as a protective irrigation.

Fall ploughing practice is difficulty to adopt in dry land was expressed by 33.75 per cent of the respondents, whereas 66.25 per cent of the respondents said no to it. This might be due that fact that majority of the research area is under dry land and *rabi* was their important crop season.

Intercropping helps in *in-situ* rainwater harvesting was expressed by 78.75 per cent of the respondents, this might be due to the fact that two crops can better utilize the moisture under varying root zone.

Waste weir helps in safe disposal of runoff and reduction in soil loss was felt by 92.50 per cent of the respondents this might be due to character of the technology.

Drop inlet spillway helps in avoiding breaching of bunds was expressed by 78.75 per cent of the respondents.

Mulching helps in reducing evaporation losses was expressed by 81.25 per cent of the respondents. Since, it acts as a barrier for direct sunrays fall on the soil surface.

## 5.2 OVERALL ADOPTION LEVEL OF SOIL AND WATER CONSERVATION PRACTICES

It could be seen from the Table 4.3 that 51.25 per cent of the respondents were noticed in medium adoption category and 30 per cent of the respondents belonged to low adoption category, whereas 18.75 per cent of the respondents belongs to high adoption category.

This clearly shows that there is much gap in adoption of recommended soil and water conservation practices, these results highlights planning effective extension activities in the concerned departments and agencies.

Similarly, the differential adoption of soil and water conservation practices was also reported from the studies of Mariappan (1981) and Krishnamoorthy (1994).

### 5.2.1 Extent of adoption of individual soil and water conservation practices by the respondents

It was significantly noted that cent per cent of the respondents adopted bunding this might be due to the fact that it is a easy practice, controls top soil erosion and also serves as a boundary lines.

#### 5.2.1.1 Mulching

It was noticed that 73.75 per cent of the respondents adopted the practice and 26.25 per cent of the respondents not adopted mulching. This might be due to the fact that mulching offers wide variety of advantages and reasons for non-adoption is weed infestation will be higher.

#### 5.2.1.2 Farm pond

It was adopted by 46.25 per cent of the respondents and not adopted by 53.75 per cent of the respondents this might be due to the fact that, storage of rain water, runoff control and silting were effectively managed. However, reasons for non-adoption were high cost and wastage of space.

#### 5.2.1.3 Levelling

High majority of the respondents adopted the practice (95.00%) this might be due to the fact that farmers felt advantage of it as their land proned to erosion, the frequent breaching and gully erosions were effectively controlled by the practice.

**5.2.1.4 Live vegetative barrier**

It was noted that 28.75 per cent of the respondents adopted the practice, whereas 71.25 per cent of the respondents not adopted the practice, because they plant the vegetation in the boundary lines and also the shade of the trees, plants, affect the crop production.

**5.2.1.5 Deep ploughing**

It was adopted by majority of the farmers 83.75 per cent this might be may be due to the fact that as it loosens the soil, ensures sub-soil process, also controls weed infestation increases the infiltration rate.

**5.2.1.6 Crop rotation**

It was observed that majority of respondents 92.5 per cent have adopted the practice, this might be due to the fact that it was one of the age old practice and also the practice gives better yield.

**5.2.1.7 Ridges and furrows**

It was noted that 32.50 per cent of the respondents adopted the practice. This is because, the ridges hinders the runoff and furrows and ensures the temporary storage of rainwater.

**5.2.1.8 Zing terrace**

It was adopted by only 11.25 per cent of the respondents, whereas 88.75 per cent of the respondents were not adopted. This is due to the reason that fields in which down hill slopes can be practiced.

#### 5.2.1.9 Inter cropping

It was practiced by 81.25 per cent of the respondents, this might be due to the fact that better utilization of the land, increased yield, compensation in case of failure of one crop.

#### 5.2.1.10 Waste weir

Nearly three fourth of the respondents (76.25%) adopted the practice, because of its usefulness of the practice and also which allows safe disposal of excess runoff from the field and checking soil and water erosion.

#### 5.2.1.11 Tank silt application

Only 22.50 per cent of the respondents adopted the practice and 77.50 per cent not adopted, mainly because of non-suitability of the silt to respective soil type and also due to non-availability.

#### 5.2.1.12 Drop inlet spillway

It was evident that 27.50 per cent of the respondents adopted the practice, because of its benefits, which prevents the breaching of bunds.

## 5.3 SOCIO-ECONOMIC AND PERSONAL CHARACTERISTICS OF RESPONDENTS

### 5.3.1 Age

The analysis of the results presented in Table 4.5 revealed that middle age group was dominating (45%) category, followed by old age (36.25%) and young age (18.75%) groups.

Similarly, the studies of Viswanathan (1989) delineated the dominance of middle age among the sample farmers were in agreement with the present findings similar observations were also obtained by Savithri (1992), Nirmala (1990) and Sugumar (1992).

### 5.3.2 Education

With regard to level of education, it is evident that majority of the respondents were literates, out of which 22.50 per cent studied upto primary school, 20.00 per cent upto middle school, 15.00 per cent upto high school, 11.25 per cent upto Pre-University and 5.00 per cent of the respondents had graduation.

### 5.3.3 Family type

It was noted that 57.50 per cent of the respondents had nuclear family and 42.50 per cent had joint family. This might be due to the fact that change of life style in the research area.

### 5.3.4 Family size

It was noticed that more than half of the respondents have medium size family (62.50), followed by big size (25.00%) and small size family (13.75%).

### 5.3.5 Land holding

It was evident that majority of the respondents belonged to medium level (53.75%), followed by big (38.75%) and small farmers (6.25%).

This might be due to the fact that increase in fragmentation of land due to population pressure.

### 5.3.6 Source of agricultural information

It was found that majority of the respondents seek the information in this way, neighbours (57.50%), gram sevak (50.00%) and radio (41.25%).

This might be due to the reason that mentality of the farmers to follow neighbours, easy accessibility of gram sevak, sharing of information among family members and relatives and also due to less extension contact with the developmental departments.

### 5.3.7 Social participation

It was evident from the Table 4.7 that majority of the respondents were the participants of social activity like members of co-operatives (65.95%) *viz.*, milk producers co-operative societies, agriculture co-operative societies, 8.51 per cent of the respondents were the members of Panchayat Raj Institutions viz., gram panchayat and 25.53 were the youth club members.

## 5.4 PROBLEMS FACED BY THE RESPONDENTS

The problems faced by the respondents in adoption of soil and water conservation practices have presented in Table 4.8.

Majority of the respondents felt that lack of long-term loans for land development activities, since now-a-days it is very difficult to get long-term loans for land development activities.

Thirty seven per cent of the respondents expressed the problem of inadequate technical guidance by the concerned departments like agriculture, watershed, forestry and horticulture. However, there was no more extension activities regarding the soil and water conservation practices.

One fourth of the respondents (25.00%) expressed the high initial cost for adoption of the soil and water conservation practices, because some of the practices like stone bunding, waste weir, farm pond, drop inlet spillway, which requires a high initial investments and also respondents expressed the long gestation period because it will take a long-time for realization of the investment made. About 25.00 per cent (23.75%) of the respondents felt that lack of group action especially for the adoption of community based soil and water conservation practices. About 17.50 per cent of the respondents felt that wastage of land for adoption of the practices like farm pond, check dam, nala bund.

Similarly the constraints of high initial cost, non-suitability, non-availability of technical guidance, inadequate financial assistance, long gestation period have been reported by Basavaraj (1982), Biote and Nikale (1983) and Nayak (2000).

## 5.5 BENEFITS DERIVED BY THE FARMERS

It was evident that (Table 4.9) majority of the respondents expressed advantages like, check soil and water erosion (56.25%), helps in groundwater recharge 47.50 per cent, increases infiltration rate of water (42.50%), increased yield (8.50%) and helps in increasing the cropping intensity.

Since, the soil and water conservation practices acts as a barrier for the runoff water and gives ample time for infiltration of water and prevents the erosion of soil and water, better infiltration of the rainwater, moisture availability in the soil increases, it helps the farmers to increase the cropping intensity and they can get two crops comfortable with increased yield, which were getting one crop earlier.

Some of the practices, which are community based like check dam, nala bund, helps in groundwater recharge, so the farmers adjacent to these structures will be benefited.

Similarly, the results of the increased yield, prevents runoff loss of water, to improve soil condition have been reported by Krishnakumar (1987), Prabhu (1988).

## 5.6 SUGGESTIONS MADE BY THE FARMER

It was evident from the Table 4.10 that majority of the respondents felt that they need more technical information on different aspects of soil and water conservation technologies by the concerned extension functionaries of agriculture, watershed, forestry and horticulture.

Financial assistance for maintenance of soil and water conservation work was expressed by 40.00 per cent of the respondents, because the practices like waste weir, drop inlet spillway, which were most popular in the study area need maintenance of the structure frequently.

Increase the subsidy amount was expressed by 25.00 per cent of the respondents, since the practices like farm pond, check dam, nala bund, waste weir, on which now the government departments and non-governmental organizations are funding to be made for encouraging the farmers for better adoption of the practices.

Bank loan should be made available for lesser interest rate was expressed by 22.50 per cent of the respondents because of higher interest rate prevailing. So, the farmers can get better benefits.

Similar suggestions like need more technical information increase the subsidy amount, financial assistance for maintenance of soil and water conservation work were expressed by Krishnakumar (1987) and Shashikumar (1994).

# *Summary*

# VI. SUMMARY

Soil, water and plants are the important natural resources for the very survival of the mankind on the earth. The proper management of all these natural resources decides the wellbeing of mankind and prosperity of agriculture. Man, ever since his existence has learnt many things gradually. The urge for thinking and rethinking of technologies took new shape when his requirements increased. As a result, several soil and water conservation techniques were evolved to suit the requirements.

Soil is a nature's gift to mankind. Nature protected the soil with dense cover of trees and grasses. But, man and animal disturbed the balance between soil, water and plant and the process of soil erosion started. Nature takes 100 to 500 years to form one centimeter of a soil, whereas it can be lost in a single year by water and wind erosion. Top soil is the foundation of all agricultural and forestry production and any reduction in it causes permanent damage to our capital resources. The increased pressure of population on land has made to initiate serious measures to ensure the safety of the productive base, namely the soil. Hence the present investigation was carried out with the following objectives.

**Objectives**

I. To study the knowledge level of the farmers on soil and water conservation practices

II. To study the extent of adoption of soil and water conservation practices by farmers

III. To study the socio-economic and personal characteristics of the respondents

IV. To study the problems faced by the farmers in adoption of soil and water conservation practices

V. To study the benefits derived from adopting soil and water conservation practices

VI. To know the suggestion made by the farmers

The study was conducted in Bagalkot and Bijapur districts during the year 2003-04. The Bagalkot and Bjapur districts were selected as they were low rainfall receiving districts in the Northern Karnataka as per the District Statistical Information. In Bagalkot, Bagalokot, Bilagi, Badami, Jamkhandi and Hunagund taluks were selected. From the Bijapur district, Bijapur, Shindagi and Indi were purposively selected for the present study, since these taluks were known for their dryland agriculture. From each district, 40 samples were selected.

The data was collected by using structured interview schedule developed for the study. The collected data was analysed by using frequency and percentage. The major findings of the study are as follows.

- High knowledge of soil and water conservation practices was noticed with 22.50 per cent of the respondents, whereas, medium knowledge was exhibited by 56.25 per cent of the respondents, followed by low knowledge with 21.25 per cent of the respondents.
- A high per cent of respondents possessed the knowledge of, meaning, the crop cultivation across the slope (77.50%) and crop cultivation along the slope (16.25%).

- About 17.50 per cent of respondents have the complete knowledge of contour cultivation purpose. Majority of respondents possessed the knowledge of reduces soil erosion and conserves soil moisture (62.50%), followed by reduced cost of cultivation (50.00%) and directly improves soil fertility (26.25%).

- High per cent of respondents possessed the knowledge of regular recurrent succession of different crops on the same piece of land (85.0%), followed by growing more crops every year (10.0%) and growing different crops every year (5.0%).

- Only 11.25 per cent of the respondents had the complete knowledge of crop rotation purposes. Majority of the respondents (81.25%) expressed increases soil fertility, controls weed, pests and diseases.

- High per cent of the respondents (40.0%) possessed the knowledge of deep ploughing, can be practiced, once in two years.

- About 28.78 per cent of respondents had the complete knowledge of deep ploughing purposes, whereas, 75.25 per cent of the respondents expressed increased infiltration rate.

- High per cent of respondents have the knowledge of it can be formed across the slope 45.0 per cent, followed by undulating land (40.0%) and along the slope (15.0%).

- About 37.5 per cent of respondents have complete knowledge intercropping, whereas increases the crop yield 72.50 per cent improves soil fertility (61.25%) and compensates in case of loss in one crop 41.25 per cent.

- Majority of the respondents had the knowledge of bunding purpose as to conserve soil and water (83.75%) followed by to conserve soil only 11.25 per cent and it conserve rain water only 5.00 per cent.
- High per cent of respondents have the knowledge of construction of small pond to conserve run off water 75.50 per cent.
- About 37.50 per cent of respondents have complete knowledge of farm pond purposes.
- Majority of the respondent have the knowledge of forming nalabund in nala to collect water (73.75%).
- Majority of the respondents felt, purpose of nala bund as increases water Table (60.00%), followed by reduces soil erosion and runoff (52.50%), to increase crop yield (15.00%) and only 13.75 per cent of the respondents had complete knowledge of it.
- One third of respondents have the knowledge meaning of land levelling as reshaping agricultural land for better cultivation, followed by levelling undulating land in the field (43.75%) whereas, (18.75%) of the respondents have complete knowledge.
- Majority of the respondents (87.50%) felt purpose of land levelling as easy conduct of agricultural operations, followed by control of rain water flow and to check soil erosion (13.75%) and provides better surface drainage (6.25%).
- Half of the respondents (56.25%) have the knowledge of live bund is permanent in nature, whereas 43.75 per cent of the respondent expressed no knowledge of it.

- High (86.25%) per cent of the of the respondents had the knowledge of deep ploughing helps in better penetration of rain water.
- About 51.25 per cent of the respondents were noticed in medium adoption category and 18.75 per cent of the respondents were observed in high adoption category.
- Cent per cent of the respondents adopted the bunding. Mulching was adopted by 73.75 per cent of the respondents
- More number of respondents (45%) belonged to the middle age group followed by age old (36.25%) and young age group (18.75%) category distribution.
- Majority of the respondents were literate of which 22.50 per cent studied upto primary school.
- About 57.50 per cent respondents had nuclear family whereas, 42.50 per cent of respondents had joint family.
- High per cent of the respondents were noticed in medium size (62.25%), followed big size 25 per cent and small size family (13.75%).
- More number of respondents (53.75%) belonged to medium category of land holding, whereas big category (38.75%) and marginal category (6.25%) were found.
- Maximum number of respondents seek information from neighbor (57.50%) followed by gram sevaka (50%), mass media, radio (41.25%), friends and relatives (38.75%), family members (23.75%), news papers (20%), Agriculture department (18.75%), agriculture university (11.25%) and only 1.25 per cent of the respondents seek information from television.

- About 58.75 per cent of the respondents have social participation and (41.25%) were non-participants. Among the social participants (65.95%) were the members of co-operative societies, 25.55 per cent were in youth club and 8.55 per cent were gram panchayat members.
- High per cent of the respondents farmer had felt advantages of soil and water conservation practices like checks soil and water erosion (56.25%), helps in groundwater recharge (47.50%), increases infiltration rate of water (42.50%), increased yield (8.75%) and helps in increasing the cropping intensity (7.50%).
- Majority of the respondents (52.50%) expressed the problem for adoption of soil and water conservation practices like lack of long-term loans for land development activities followed by inadequate technical guidance by the concerned departments (36.25%), high initial cost (25.00%), lack of group action (23.75%), long gestation period (22.50%) and wastage of land (16.00%).

**IMPLICATIONS AND RECOMMENDATIONS**

In the light of findings of the study and from the personal experiences of researcher at the time personally interviewing respondents, following implications are made for the effective implementing of soil and water conservation practices, to the concerned developmental departments.

- Nearly 80 per cent of the respondents belong to medium and low level of knowledge about soil and water conservation practices. Hence there is a need to conduct appropriate extension programms such as field visits, study tour, demonstrations, group meetings, to impart latest practical knowledge regarding soil and water conservation technology.

- Most of the respondents were under medium level adoption category, since soil and water conservation practices were very much important in dry land agriculture, there is need to intensify transfer of technology activity to increase extent of adoption in this direction the existing watershed training centers which are conducting training for a staff, should also plan for arraigning training for farmers

- More than 50 per cent of the farmers faced the problem of non-availability of long term loans for land development activities. Hence, there is need to take policy decision to provide long term loans to the needy farmers for land development

- It was observed during data collection visit to villages that there is cent per cent adoption bunding practice, but they lack proper drainage facilities. So, there is a need for concerned departments to plan for providing proper drainage facilities.

**SUGGESTIONS FOR FUTURE RESEARCH**

1. The present study was conducted with limited sample size. In order to derive wider generalization a study could be conducted with large sample size.

2. Comparative studies of indigenous technology knowledge and recommended soil and water conservation practices may be carried out.

3. Role of NGOs in implementing the soil and water conservation practices can be studied.

4. Case studies of successful soil and water conservation practicing farmers may be taken up.

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# *Appendices*

# A STUDY ON THE KNOWLEDGE AND ADOPTION LEVEL OF SOIL AND WATER CONSERVATION PRACTICES BY FARMERS IN NORTHERN KARNATAKA

## INTERVIEW SCHEDULE

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### I. GENERAL INFORMATION

a. Name of the farmer : _____ b. Age :_____

c. Name of the village : _____ d. Taluk : _____

e. Education level : _____ f. Family type : _____

g. Family size : _____ h. Land holding i. Dryland :_____

j. Crops grown : _____

_____

_____

### k. Source of agriculture information

| Sl. No. | Category | Frequency |
|---|---|---|
| 1. | *Source of agricultural information** | |
| | Family member | |
| | Friends and relatives | |
| | Neighbours | |
| | Gram Sevak | |
| | Agriculture Department (AO, ADA) | |
| | Agricultural University | |
| | *Mass media* | |
| | Newspaper | |
| | Radio | |
| | Television | |

### l. Social participation of the respondents

| Sl. No. | Category | Frequency |
|---|---|---|
| 1. | *Social participation** | |
| i. | Non-participants | |
| ii. | Participants | |
| | a. Gram panchayat members | |
| | b. Co-operatives | |
| | c. Youth club | |

## II. KNOWLEDGE LEVEL OF FARMERS ON SOIL AND WATER CONSERVATION PRACTICES

### A. Contour cultivation

**** Contour cultivation means***

i. Crop cultivation along the slope

ii. Crop cultivation across the slope

iii. Crop cultivation irrespective of slope

**** Contour cultivation helps***

a. Reduces soil erosion and conserves soil moisture

b. Directly improves soil fertility

c. Reduces cost of cultivation

d. Above all

### B. Crop rotation means

a. It is regular recurrent succession of different crops on the same piece of land

b. Growing more crops every year

c. Growing different crops every year

d. Above all

**** Crop rotation helps***

i. Increases soil fertility, controls weed, pest, disease

ii. Provide good opportunity for growth

iii. Prevents crop from drying

iv. Above all

**C. Deep ploughing**

Deep ploughing can be practiced (approximately)

a. Regularly once a year

b. Once in two years

c. Once in three years

d. Should not be practiced

**** Deep ploughing helps***

i. To control weed and pest incidence

ii. To increase infiltration rate

iii. Allows for natural withering to improve soil physical characters

iv. All the above

**D. Ridges and furrows**

Ridges and furrows are formed.....

a. Across the slope

b. Along the slope

c. Undulating land

**E. INTERCROPPING**

***Intercropping helps***

a. To improve soil fertility

b. Increases crop yield

c. Compensates in case of loss in a crop

d. Above all

**F. Bunding helps**

a. To conserve soil and moisture

b. To conserve soil only

c. To conserve rainwater only

**G. Farm pond**

**** Farm pond means***

a. Construction of small pond to conserve runoff water

b. Construction of small pond in the field for better percolation

c. Both

**** Farm pond helps***

a. To give protective irrigation

b. To conserve runoff water and eroded soil

c. To conserve eroded soil

d. All the above

**H. Nala bunds**

**** Nala bund means***

a. Forming nala bund in nala to collect water

b. Forming nala bunds to provide better way for flowing water

c. Both

**** Nala bund helps***

a. To reduce soil erosion and runoff

b. To increase water table

c. To increase crop yield

d. Above all

**I. Land levelling**

**** Land levelling means***

a. Reshaping agricultural land for better cultivation

b. Levelling undulating land in the field

c. Both

**** Land levelling helps***

a. Easy conduct of agricultural operation

b. Control of rainwater flow and to check soil erosion

c. Provides better surface drainage

d. Above all

**J. Vegetative barriers**

**** Vegetative barriers helps***

a. To conserve eroding soil

b. Conserves soil moisture

c. Cheap means of soil conservation and can be used as a fodder

d. Above all

1. Live bund is permanent in nature : Yes/No.
2. Deep ploughing helps in better penetration of rainwater : Yes/No.
3. Farm pond helps for harvesting runoff and resupply : Yes/No.
4. Fall ploughing practice is difficult to adopt in dryland : Yes/No.
5. Intercropping helps in *in-situ* rainwater harvesting : Yes/No
6. Waste weir helps in safe disposal of runoff of reduction in soil loss : Yes/No
7. Drop inlet helps in avoiding breaching of bund : Yes/No
8. Mulching helps in reducing evaporation losses : Yes/No
9. What is Zingg terrace and mention its uses?

10. What is the purpose of stone bund?

11. What do you mean by waste weir and its purpose?

12. What are mulching practices and why they are practiced?

13. What do you know about check dam?

## III. ADOPTION OF SOIL AND WATER CONSERVATION PRACTICES BY FARMERS

| Practices | Adopted | Not adopted | Reasons for non-adoption |
|---|---|---|---|
| Bunding | | | |
| Stubble mulching | | | |
| Farm pond | | | |
| Levelling | | | |
| Live vegetative barrier | | | |
| Deep ploughing | | | |
| Crop rotation | | | |
| Ridges and furrows | | | |
| Zing terrace | | | |
| Intercropping | | | |
| Waste weir | | | |
| Tank silt application | | | |
| Drop inlet | | | |

## IV. PROBLEMS FACED BY THE RESPONDENTS IN ADOPTION OF SOIL AND WATER CONSERVATION PRACTICES

| Sl. No. | Types of problems | Frequency |
|---|---|---|
| 1. | Lack of long-term loans for land development activities | |
| 2. | Inadequate technical guidance by the concerned departments | |
| 3. | High initial cost | |
| 4. | Lack of group action | |
| 5. | Long gestation period | |
| 6. | Wastage of land | |

## v. BENEFITS DERIVED OUT OF SOIL AND WATER CONSERVATION PRACTICES AS PERCEIVED BY FARMERS

| Sl. No. | Benefits | Frequency |
|---|---|---|
| 1. | Checks soil and water erosion | |
| 2. | Helps in groundwater recharge | |
| 3. | Increases infiltration rate of water | |
| 4. | Increased yield | |
| 5. | Helps in increasing the cropping intensity | |

## VI. SUGGESTIONS MADE BY THE RESPONDERS

1.

2.

3.

# A STUDY ON KNOWLEDGE AND ADOPTION LEVEL OF SOIL AND WATER CONSERVATION PRACTICES BY FARMERS IN NORTHERN KARNATAKA

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## ABSTRACT

The study was conducted in Bagalkot and Bijapur districts of North Karnataka during the year 2003-04. The districts were selected keeping rainfall as criterion. In Bagalkot district, Bagalkot, Bilagi, Badami, Jamkhandi and Hunagund taluks were selected, while Bijapur, Sindhagi and Indi were purposively selected from Bijapur district for the present study, as these taluks were known for their dryland agriculture. From each district, 40 samples were selected. In all these, over 80 samples were selected for the study on random basis.

High knowledge of soil and water conservation practices was observed with 22.50 per cent of the respondents, whereas, medium knowledge was exhibited by 56.25 per cent of the respondents. About 51.25 per cent of the respondents had fallen in medium adoption category and 18.75 per cent of the respondents were in high adoption category. More number of respondents (45%) belonged to the middle age group followed by old age groups (36.25%).

Majority of the respondents were literate, of which 22.50 per cent studied upto primary school. High per cent of the respondents had felt benefits of soil and water conservation practices like "*checks soil and water erosion*" (56.25%), "*helps in groundwater recharge*" (47.50%), "*increases infiltration rate of water*" (42.50%), "*increased yield*" (8.75%) and "*helps in increasing the cropping intensity*" (7.50%). The problems in adoption of soil and water conservation practices as expressed by majority of the respondents (52.50%) were *"lack of long-term loans for land development activities"* followed by "*inadequate technical guidance*" by the concerned departments (36.25%), *"high initial cost"* (25.00%), *"lack of group action"* (23.75%), *"long gestation period"* (22.50%) and *"wastage of land"* (16.00%). Majority (57.50%) of the respondents felt that they need more technical information on different aspects of soil and water conservation technologies, financial assistance (40.00%) for maintenance of soil and water conservation work.