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Place: Bapatla

(A. Hari Prasad)

Date: 
ABSTRACT

Name of the Author : SURESH T.V.
Title of the thesis : A study on participation of farmers in Sujala Kalinganahalli Halla Watershed of Tumkur district of Karnataka
Submitted for the Award of : MASTER OF SCIENCE
Faculty : Agriculture
Department : Extension Education
Major Advisor : Dr. CH. RAMESH BABU
University : Acharya N.G. Ranga Agricultural University
Year of Submission : 2007

The total geographical area of India is 329 m. ha. The total cropped area of India is 189.54 m. ha, and net irrigated area is 55.14 m. ha. The unscientific cultivation and misuse of land lead to degradation of 187 m. ha of land. The average soil loss in India is estimated to be 16.3 tonnes / ha / year.

Karnataka has a total geographical area of 19.05 m ha and net cultivated area is 10.41 m. ha. Per cent of net irrigated area to net cultivated area is found to be 25.40%.

The reclamation of degraded land has become an immediate need from the point of view of maintaining natural resources like soil and water so as to get good crop yields and economic profits. The World Bank assisted ‘Sujala’ watershed project was implemented in five districts of Karnataka during 2001-2007.

Participation of farmers is necessary for the watershed project to become successful, as farmers are the major stakeholders in management of natural
resources like soil and water. Hence, the research ‘A study on participation of farmers in Sujala Kalinganahalli Halla watershed of Tumkur district of Karnataka’ was taken with the main objectives to trace historical perspective emphasizing developmental priorities, to study profile characteristics, to assess extent of participation of farmers in watershed project and finally to identify constraints and suggestions as perceived by farmers in watershed project.

The study was conducted in Tumkur district of Karnataka with a total sample of 120 farmers. Data was collected through pre-tested well-structured interview schedule, which were subjected for statistical treatment and interpretation. The Participatory Rural Appraisal (PRA) technique like changes and trend analysis was used for collecting historical perspective emphasizing the developmental priorities of farmers in the study area.

Watershed project had a positive impact on the developmental priorities of farmers in crops and cropping systems, soil and water conservation practices; crops production practices and marketing; sources of irrigation and irrigation methods; farm implements and farm vehicles; food habits, sources of income, infrastructure and transport facilities.

Based on this information, the projections for next decade were also made which expected still more improvement in developmental priorities of farmers.

The findings indicated that majority of respondents studied up to primary school, were found medium in profile characteristics like decision making, empowerment, change proneness, communication behaviour, value orientation, self reliance and economic motivation.

Majority of the respondents had medium extent of participation in activities like motivational meetings, planning, implementation, maintenance and evaluation of watershed project.
All the eight independent variables namely education, decision making, empowerment, change proneness, communication behaviour, value orientation, self-reliance and economic motivation had shown highly significant relationship with the extent of participation of farmers in watershed project.

Contribution of independent variable viz; decision making was significant, whereas contribution of self reliance and economic motivation were highly significant to the variation in extent of participation of farmers in watershed project.

The most important constraints faced by farmers were uncertain and erratic rainfall, no remunerative price for farmers produce, poor water holding capacity of soil, lack of understanding and co-operation between farmers and field functionaries, inadequate draught power to carry out watershed practices and less productivity of soil. Small and fragmented land lead to difficulty in implementing watershed practices was also identified by farmers during participating in watershed project.

Most important suggestions as perceived by farmers to tackle the constraints were financial aid from banks viz., Nationalized, co-operatives for implementing watershed practices, co-operation between farmers, use of efficient mechanical devices for watershed activities, co-operation between farmers and field functionaries, minimum support price by Government and better price for their produce in the market.

A figurative strategy for watershed development was developed by considering the constraints and suggestions as perceived by farmers coupled with researcher’s vision, which helps in assisting the future watershed projects.
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>NRM</td>
<td>Natural Resource Management.</td>
</tr>
<tr>
<td>ICAR</td>
<td>Indian Council of Agricultural Research.</td>
</tr>
<tr>
<td>NWDP</td>
<td>National Watershed Development Project.</td>
</tr>
<tr>
<td>NWDPRA</td>
<td>National Watershed Development Programme for Rainfed Areas.</td>
</tr>
<tr>
<td>NABARD</td>
<td>National Bank for Agriculture and Rural Development.</td>
</tr>
<tr>
<td>NDDB</td>
<td>National Dairy Development Board.</td>
</tr>
<tr>
<td>HYV</td>
<td>High Yielding Variety.</td>
</tr>
<tr>
<td>DPAP</td>
<td>Draught Prone Area programme.</td>
</tr>
<tr>
<td>ITI</td>
<td>Industrial Training Institute.</td>
</tr>
<tr>
<td>BCM</td>
<td>Backward Communities and Minorities</td>
</tr>
<tr>
<td>LPG</td>
<td>Liquified petroleum Gas.</td>
</tr>
<tr>
<td>RCC</td>
<td>Reinforced cement concrete.</td>
</tr>
<tr>
<td>DDT</td>
<td>Dichloro Diphenyl Trichloroethane</td>
</tr>
<tr>
<td>BHC</td>
<td>Benzene Hexa Chloride.</td>
</tr>
<tr>
<td>APMC</td>
<td>Agricultural Produce Marketing Committee.</td>
</tr>
<tr>
<td>IPM</td>
<td>Integrated Pest Management.</td>
</tr>
<tr>
<td>DWCRA</td>
<td>Development of women and Children in Rural Areas.</td>
</tr>
<tr>
<td>KSDA</td>
<td>Karnataka State Department of Agriculture.</td>
</tr>
<tr>
<td>Ph.D</td>
<td>Doctor of philosophy</td>
</tr>
<tr>
<td>ADA</td>
<td>Assistant Director of Agriculture.</td>
</tr>
<tr>
<td>AO</td>
<td>Agricultural Officer.</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>-----------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>HRD</td>
<td>Human Resource Development</td>
</tr>
<tr>
<td>ANGRAU</td>
<td>Acharya N.G. Ranga Agricultural University.</td>
</tr>
<tr>
<td>PHT</td>
<td>Post Harvest Technologies.</td>
</tr>
<tr>
<td>GO</td>
<td>Governmental organization.</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>DANIDA</td>
<td>Danish International Development Agency.</td>
</tr>
</tbody>
</table>
CHAPTER - I

INTRODUCTION

India has vast geographical area of 329 m ha. About 187 m ha of land in India has been degraded, out of this area 148 m ha has been affected by water erosion and 39 m ha by wind erosion, physical and chemical deterioration. The total cropped area is 189.54 m ha and net irrigated area is 55.14 m ha. The average soil loss is estimated to be 16.3 tonnes/ha/year. For every tonne of grain about 105 kg of nutrients has been removed from soil. The soil erosion is estimated to cause on yield decline of 0.14 tonne/ha/year of soil loss. (Krishnappa et. al. 2003 and Agricultural statistics at a glance, 2000)

The scenario of rainfed lands in Karnataka is similar to that of country. Karnataka has a total geographical area of 19.05 m ha, out of which net cultivated area is 10.41 m ha. The total cropped area is estimated to be 12.28 m ha. Percent of net irrigated area to net cultivated area is found to be 25.4%. There are 10 agro climatic zones with annual rainfall from 400 mm (part of central dry zone) to 4000 mm (coastal zone) (Source: Krishnappa et. al. 2003 and Agricultural statistics at a glance 2000)

There is an immediate need to conserve soil and water for sustainable agricultural development. The management of natural resources like soil and water through watershed approach has a strong bio-physical and economic logic. The watershed approach is holistic which included planners, managers and ecologists.

Watershed is a geographical entity having a common drainage point. The concept of watershed is development in an integrated approach. The
principle of watershed is usage of land according to its capability. Watershed area may vary from few hectares to several thousand hectares. Watersheds are broadly classified into three groups namely micro, sub and macro watersheds. A combination of micro watershed constitutes sub watershed which forms part of a macro watershed.

In India, National Watershed Development Project (NWDP) was launched during 7th five-year plan. The same project was renamed as National Watershed Development Programme for Rainfed Areas (NWDPRA) in 8th five-year plan to carryout watershed project in the country.

The watershed programmes in Karnataka were being implemented under different schemes such as Centrally Sponsored Scheme (CSS), State Sector Scheme (SSC), externally aided schemes, District Sector watershed Development Schemes, National Bank for Agriculture and Rural Development (NABARD) project and National Dairy Development Board (NDDB) project.

A Bird’s eye view of Sujala Watershed Development Programme in Karnataka.

In 2000, Karnataka established separate Watershed Development Department. Recently, World Bank assisted watershed project ‘Sujala’ was implemented in five districts namely Kolar, Tumkur, Chitradurga, Dharwad, Haveri in 6 year period. The project covered 77 sub watersheds and 747 micro watersheds. The Department of Space has undertaken monitoring and evaluation of watershed development project using data from Indian remote sensing. ‘Sujala’ covered 38 taluks, 1270 villages, 25 lakh beneficiaries 5,11,318 ha area spread in 3 phase of the project from 2001 – 2007.
Kalinganahalli Halla was the sub watershed taken for the study. It is located in Hagalawadi hobli of Gubbi. It consists of 10 micro watersheds with an average treatable area of 4,544.59 ha per micro watershed.

1.1 NEED FOR THE STUDY

The Watershed Development Programme can succeed only when it ensures the active participation of the farmers inhabiting the area who depend on resources like soil and water for their livelihood and hence are the major stakeholders in development, monitoring and maintenance of these resources. Involving farmers in watershed project and creating a sense of responsibility about their ecology and motivating them to adopt improved soil and water conservation practices and continued efficient use of natural resource calls for coordinated efforts from both state Watershed Development Department and Non Governmental Organizations.

Educating farmers on hazardous effect of biotic and abiotic stresses on natural resources and mitigating this effect by adopting improved soil and water conservation practices is the basic step in implementing watershed Development programme. Hence, this research was undertaken to study the extent of participation of farmers in watershed project.

1.2 OBJECTIVES OF STUDY

To ensure the impact of watershed project, it was necessary to study the historical perspective of area, profile characteristics of farmers, their extent of participation and their constraints to adopt watershed practices. Keeping the above aspects, the study was designed with following specific objectives.
1. To trace the historical perspective emphasizing the developmental priorities of farmers in Sujala Kalinganahalli Halla watershed project.

2. To study the profile characteristics of farmers in watershed project.

3. To assess the participation of farmers in watershed project.

4. To unearth the relationship between participation and profile characteristics of watershed farmers.

5. To identify the constraints and suggestions as perceived by watershed farmers so as to develop a figurative strategy for watershed development.

1.3 SCOPE OF THE STUDY

The present study discussed on extent of participation of farmers expected to give proper guidelines to plan for future watershed projects. The profile characteristics of farmers analyzed in this study will be of great use for Developmental Departments and Non Governmental Organizations to develop figurative strategy for the improvement of farmers. The constraints of farmers and suggestions as perceived by them will help Watershed Development Department to design the projects according to the needs and wishes of farmer.

The investigation would encourage extension workers and policy makers to study deeply about watershed development and its implementation, which will be in turn useful for farmers.
Limitations of study

1. Being a postgraduate research, this investigation has limitation of time and resources.

2. The finding cannot be generalized over large areas as it is based on expressed opinions of the respondent in the limited area.

3. The collection of data was based on respondent’s own spoken words and observed behaviour. The study may not be free from usual bias involved with the respondents in social research

Presentation of Study

The research report of this study is in six chapters. The first chapter ‘Introduction’ deals with need and importance of study, objectives scope and limitation of the investigation

The second chapter ‘Review of Literature’ dealt with available and related studies in the light of present research. The third chapter described the ‘Materials and Methods’ followed for the study comprising of sampling procedure, selected characteristics and their measurement and also statistical tools used. The forth chapter ‘Results’ covered the findings of the study. The fifth chapter completely covers the detailed ‘Discussion’ with respect to objectives and findings of the study. Finally sixth chapter brought about out the ‘Summary’ with the implications of the study and suggestions for future research. At the end the most important items ‘Literature Cited’ and ‘Appendices’ are presented.
CHAPTER – II

REVIEW OF LITERATURE

A thorough review of literature is of paramount importance to research endeavour. It helps to have a general background in the given field of study as it gives an idea about work done in the past. It helps to extract available information in relation to objectives of proposed research and assists in delineation of problem area and also provides basis for theoretical framework, testing and interpretation of findings. The present study is concerned with the “A study on participation of farmers in Sujala Kalinganahalli Halla watershed of Tumkur District of Karnataka” Hence, an earnest effort was made to review the relevant and updated literature having direct or indirect bearing on the study. The review of literature was divided into two parts viz. part I and Part II.

2.1 PART - I

2.1.1 Historical perspective emphasizing the developmental priorities of farmers in Sujala Kalinganahalli Halla watershed project

2.1.2 Adoption practices of farmers

2.2 PART II

2.2.1 Profile characteristics of farmers participated in watershed project.

2.2.2 Extent of participation of farmers in watershed project.

2.2.3 Relationship between selected independent variables and extent of participation.

2.2.4 Constraints as perceived by farmers in watershed project.

2.2.5 Suggestions as perceived by watershed farmers to tackle the constraints.
2.1 PART – I

2.1.1 Historical perspective emphasizing developmental priorities of farmers in Sujala Kalinganahalli Halla watershed project

Historical perspective for the past 50 years in all selected villages was traced to emphasize the developmental priorities of farmers.

The researcher gathered information by reviewing old literature, consulting Watershed Development Department, Gubbi; Karnataka State Department of Agriculture Gubbi; Department of Forestry, Gubbi; Grampanchayat Manchaladore; Revenue Department Manchaladore; ‘Abhivrudi’, Non Governmental Organization in that area and information given by villagers by conducting participatory methods like changes and trend analysis.

For a rational and intelligible description, the historical perspective emphasizing the developmental priorities of farmers in Sujala Kalinganahalli Halla watershed project was divided into ten parts.

1. Population
2. Crops and cropping pattern
3. Soil and water conservation practice
4. Crop production practices and marketing
5. Sources of irrigation and irrigational methods
6. Farm implements and farm vehicles
7. Food habits
8. Source of income
9. House, fuel and miscellaneous
10. Infrastructure and transport facilities
2.1.1.1 Population

Table 1: Population data in the study area

According to the census data, the population of the study area is presented below.

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Manchaladore</td>
<td>1320</td>
<td>1330</td>
<td>1348</td>
<td>1456</td>
</tr>
<tr>
<td>2</td>
<td>Nalluru</td>
<td>280</td>
<td>287</td>
<td>297</td>
<td>329</td>
</tr>
<tr>
<td>3</td>
<td>Jogihalli</td>
<td>397</td>
<td>405</td>
<td>422</td>
<td>459</td>
</tr>
<tr>
<td>4</td>
<td>Matha</td>
<td>796</td>
<td>803</td>
<td>822</td>
<td>877</td>
</tr>
<tr>
<td>5</td>
<td>Yaraballi</td>
<td>607</td>
<td>618</td>
<td>620</td>
<td>627</td>
</tr>
<tr>
<td>6</td>
<td>Kalinganahalli</td>
<td>92</td>
<td>101</td>
<td>127</td>
<td>168</td>
</tr>
</tbody>
</table>

2.1.1.2 Crops and cropping pattern

Between 1960 to 1970, farmers were raising mainly jowar, greengram, blackgram, ragi and redgram as kharif crops followed by ragi and horse gram as rabi crops. Some of the farmers cultivated perennial crop like coconut. The farmers were raising vegetables like tomato, chilli and onion mainly on sustainable basis. It was observed that they were cultivating local varieties. They were unaware of high yielding varieties. They were giving top priority for sustainable agriculture. Only a minute quantity of produce was sold in local shandy market or exchange of produce of each other.

In 1970–1980, farmers continued to grow the traditional varieties on sustainable basis. Only change observed was cultivation of commercial crops like sesameum and groundnut as kharif crops. The rice was grown only when there were enough rains. Groundnut and red gram were raised as intercrops.
The commercial cultivation of vegetables started from this period. Top priority had given to the large scale cultivation of tomato, onion, chilli and coriander.

Between 1980 and 1990, the traditional varieties of crops continued to grow on sustainable basis and change observed was growing of high yielding varieties of ragi namely Indaf 5 and Indaf 8. Rice cultivation was given top priority in Manchaladore village only as the village pond existed as main source of irrigation. Mandya Vijaya, Mandya Vani and Prakash were the varieties given top priority for raising in fields. The high priority was also given for increasing the cultivation of vegetables. Floriculture was started in this period in small scale along with Arecanut cultivation.

Between 1990 and 2000, for most of the crops, cropping pattern continued with a few changes. In this period, farmers had given top priority for growing commercial crops and usage of High Yielding Varieties (HYV’S).

The cultivation of commercial crops like sunflower as kharif crop was given top priority. The cultivation of HYV’S like Kadiri, T.G.-1 for groundnut, Indaf 9, Indaf 15 and MR-1 for Ragi were given top priority. The cultivation of arecanut increased considerably as it was fetching high economic profits.

In 2000-2007, most of the crops and cropping pattern continued with few changes. The HYV’S like Mangala, Hansa, Vani for rice crop, Badami for groundnut, HR 911and IR-64 for ragi were cultivated. The farmers in villages like Manchaladore, Jogihalli were growing horticulture crops and vegetables because of more sources of water for irrigation. The intercropping of maize / soyabeans, pigeon pea/ground nut were introduced in that period.
In Manchaladore and Kalinganahalli villages some of the farmers were raising gherkins on commercial basis. This gave a clear indication of the fact that farmers had given top priority for commercial cultivation of crops and cropping pattern.

**Source:** PRA Method ‘changes and trend analysis’ conducted by the researcher and Annual reports (1995 to 2005) at the office of Assistant Director of Agriculture, Gubbi.

### 2.1.1.3 Soil and water conservation practices

The Soil and water conservation practices followed in all the villages were almost identical with a few exceptions in Manchaladore village. The perusal of the study gave a clear indication of the fact that there was gradual change in soil and water conservation practices from last 50 years. Farmers had given top priority for conserving soil and water, as given below.

Between 1960 and 1970, the farmers were unaware of improved soil and water conservation practices. However, they were raising crops mainly on sustainable basis and yield was less. They were constructing small field bunds and growing grasses on bunds to conserve soil and water.

In 1970-1980, the farmers had given top priority for increasing the size of bunds, growing trees like rosewood on border of the fields. The growing of trees was not only to conserve soil, but also provided financial security for them.

In 1980-1990, the farmers had given top priority for construction of farm ponds. In Manchaladore village, Village Development Committee constructed a village pond through participation of farmers in village. This
pond was the main source of irrigation for crops and drinking water for cattle in village. In this period farmers had given top priority to avoid soil and water loss due to run off. As a result traditional check dams were constructed in Manchaladore and Kalinganahalli villages.

Between 1990 and 2000, the top priority was given by farmers to improve the technology involved in watershed practices. As a result, the watershed practices like nalabund, rubble checks, brushwood checks, contour bunds, contour furrows came into existence. The commercial crop like arecanut was given drip irrigation to conserve both soil and water. Priority was given for in-situ moisture conservation practices like covering rhizosphere by grasses and leaves.

Between 2001 and 2007, introduction of ‘Sujala’ and many watershed projects under NWDPRA created a considerable impact on soil and water conservation and subsequently on yield of crops. The farmers had given top priority for adopting automatically operated drip irrigation system, well structured check dams and farm ponds. Other practices like vegetative live hedge on contour, nalabund, rubblechecks, cactus checks, covering of bunds with *stylosanthes hamata* grass, *insitu* moisture grafting and khuss lines came into practice. This showed that farmers had given top priority for conserving soil and water.

**Source :** PRA method’ Changes and trend analysis’ conducted by the researcher. Weekly reviews (2005 to 2006) at Kalinganahalli Halla Sub-watershed, Sujala Watershed Project, Watershed Development Department, Gubbi.
2.1.1.4 Crop production practices and marketing

The crop production practices adopted and marketing of farm produce followed by farmers of study area is explained below.

2.1.1.4.1 Sowing

From 1960 to 1970, farmers were unaware of scientific method of sowing. They were simply broadcasting the seeds on the field. This type of sowing fails to spread seeds uniformly and evenly. The plants were suffering due to competition for nutrients and water where seeds were sown heavily. As a result, decrease in yields was observed.

Between 1970 and 1980, farmers started knowing the disadvantages of broadcasting. To overcome this, farmers had given high priority for uniform sowing of seeds on field. They started putting seeds uniformly by hand immediately after tillage in furrows. This practice avoided wastage of seeds and also facilitated even distribution of seeds on the fields.

For more uniformity and to avoid wastage of seeds, farmers had given top priority for dibbling in that period. The fact observed from this was farmers had given top priority for uniform and even distribution of seeds on the field.

From 1980 to 1990, earlier practices continued. The only change observed was usage of hand seed drill. Farmers had given top priority for still more uniform and even distribution of seeds. As a result, hand seed drill came into practice. It facilitated fast and accurate sowing.

In 1990-2000, earlier practices were continued. Only change observed was farmer’s priority for transplanting techniques for crops like rice, onion, chilli first in Manchaladore and later spreading to all villages. The technique
involved was the initial nourishment of plants in nursery beds and later transplanted to main field. The yield of transplanted crops was more compared to direct sown crops on main field. This gave a clear an indication of the fact that farmers had given high priority to scientific method of sowing.

Between 2001 and 2007, the earlier practices were continued by majority of farmers but change observed was usage of seed cum fertilizer drill. This technique facilitated uniform sowing along with even distribution of fertilizer in the field.

2.1.1.4.2 Manures and fertilizers

The farmers in the study area were initially using Farm Yard Manure (FYM) as main plant nutrient. After some period, a few changes occurred which are explained below.

In 1960-1970, FYM and sheep manure were the major plant nutrients used in all villages. The farmers were unaware of chemical fertilizers.

Between 1970 and 1980, earlier practices of using FYM and sheep manure were continued but change observed was farmer’s priority for systematic preparation of FYM by storing cow dung, cow urine in well structured pits and preserving FYM for some period for decomposition.

In 1980-1990, earlier practices were continued but some of the farmers had given priority for use of chemical fertilizers. Farmers had given priority for urea as nitrogenous fertilizer and Single Super Phosphate (SSP), Double Super Phosphate (DSP) as phosphatic fertilizer, Muriate of Potash (MOP) as compound fertilizer.
Between 1990 and 2000, earlier practices of usage of chemical fertilizers, FYM, sheep manure continued but few changes were observed which are depicted below. Few farmers used the slurry obtained from gobar gas plant as manure. However, few learned farmers had given top priority for usage of vermi compost in their fields.

Between 2001 and 2007, earlier practices of usage of fertilizers were continued but few changes observed are given below.

Few farmers had given priority for application of bio fertilizers like rhizobium for crops like red gram, ground nut in which 20 per cent increase in yield was observed, while usage of Blue Green Algae (BGA) resulted in 15 per cent, Azatobacter resulted in 10 per cent raise in rice and vegetables crop yield and application of Azospirillum resulted in 15 per cent raise in crop yield of rice and sorghum.

2.1.1.4.3 Insect control

Between 1960 and 1970, farmers had given priority for indigenous methods of insect control such as hand picking, hand destruction, flooding and draining, which were used to kill insect that breed in soil. There was no much care taken for insect control in that period.

From 1970 to 1980, earlier practices of insect control were continued and change observed was use of trap crops. For example, marigold was used as trap crop for tomato. Crop rotation practice was also given high priority for insect control. This showed that farmers had given top priority for understanding the crop ecosystem and use of intelligence for control of insects.
In 1980–1990, earlier practices were continued. The change observed was introduction of mixed cropping system. In that system insect associated with one crop get hindrance in reaching its hosts since plants of other crops were present which was not the host of the insect. Later, farmers had given priority for clean seed and planting material to avoid insect infestation.

In 1990-2000, earlier practices of insect control continued but this period was dominated by usage of insecticides first started in Manchaladore and Matha villages and spread to all villages later. A few important insecticides used were discussed below. Dichloro Diphenyl Trichloro ethane (DDT), endosulfan, malathion were used to control pod borer in pulse crops.

Benzene Hexa Chloride (BHC) and malathion for control of grass hopper feeding millets and Carbaryl and phorate were used for controlling sorghum shoot fly.

Between 2001 and 2007, most of the earlier practices were continued. In that period farmers continued to give top priority for using chemical insecticides. Only few farmers had given priority for Integrated Pest Management (IPM) techniques specially in Manchaladore village.

### 2.1.1.4.4 Plant disease control

The study revealed that earlier in the villages under study farmers’ awareness about disease management was very less and later increased which is explained below.

Between 1960 and 1970, farmers were unaware of inorganic fungicides, but they were practicing field sanitation and removal of disease infected plants from field before they shed the spores.
From 1970 to 1980, earlier practices of removal of disease infected plants and field sanitation were continued. The only change occurred in that period was farmer’s top priority for crop rotation for controlling long smut of sorghum. Early sowing way practiced so that crop complete the life cycle before disease incidence. This gave an indication that farmers started understanding the crop ecosystem and started managing intelligently to avoid disease infestation.

In 1980-1990, earlier practices of disease control were continued. The only change occurred was use of resistant varieties. In Jogihalli village, farmers had given high priorities for cultivating CSH-9 for control of grain smut of sorghum and later this variety became popular in all villages under study.

Between 1990 and 2000, earlier disease control measures continued but the change occurred was farmers high priority given for usage of chemical fungicides. Bavistin and carboxin were used to control grain smut of sorghum. The farmers had given priority for fungicide ceresan for control of stinking smut of wheat.

From 2001 to 2007, farmers continued to give top priority for chemical fungicides for control of disease along with some cultural practices. The farmers of Manchaladore had given priority for seed treatment with thiram, brassicol to control die back of chillies and later it became popular in all villages under study.

To control anthracnose of mango, farmers had given priority for tree sanitation. Diseased twigs were pruned and burnt along with fallen leaves. Pruning was followed by spraying of recommended bordeaux mixture or
blitox-50. This gave a clear indication of the fact that farmers had given priorities for cultural practices along with use of fungicides.

2.1.1.4.5 Harvesting and processing

The harvesting and processing followed in last 50 years in villages under study is presented below.

Between 1960 and 1970, harvesting was done mainly through sickle and hand picking for horticultural crops and the beating of harvested crops with bamboo sticks to separate seeds. Sieves were used for separating the seeds. Crusher, made up of stone was used for powdering of produce. In this period farmers had given top priority for indigenous low cost technologies.

In 1970-1980, earlier practices continued and the change occurred was usage of bullock drawn stoneroller for threshing. The structures of sieves were improved in that period. Farmers had given top priority to avoid heavy manual work and started using implements for easy work.

In 1980-1990, earlier practices were continued and the change occurred was usage of tractor instead of bullock for drawing stoneroller, which was used for threshing. The flour mill was started first in Manchaladore village. The majority farmers had given high priority for visiting flourmill for powdering of farm produce.

From 1990 to 2000, earlier practices were continued. The only change observed was introduction of thresher which was used for separating seeds from crops. A number flourmills were started in Matha and Kalinganahalli villages. In this period, modern scientific farm machinery were introduced and farmers started giving top priority for them.
In 2001-2007, earlier implements continued to be used by farmers. The only change observed was usage of ground nut decorticator and areca nut dehusker operated manually were used first in Manchaladore village. New Improved flour mill was started in Manchaladore village.

2.1.4.6 Marketing

Marketing a farm produce since last 50 years in villages understudy is presented below. The marketing channels for each village were almost same.

In 1960-1970, less quantity of produce had been marketed in local shandy market. The farmers were carrying their produce by hand or through bullock cart. They had given less priority for marketing.

Between 1970 and 1980, the farmers continued to sell their produce in local shandy market but as production increased, they started carrying their produce upto nearby town or taluk to sell their produce. In this period marketing of farm produce increased.

In 1980-1990, earlier marketing channels continued but change occurred was farmer’s top priority for selling their produce in Agricultural Produce Marketing Committee (APMC). High priority was given to tractor and power tiller for carrying their produce. However, mini truck usage also started during that period.

From 2001 to 2007, earlier marketing channels continued but only change occurred was few farmer’s priority for going to district level market. Modes of transport used were truck and railways. In that period contract
farming for gherkins was considered to be the main priority item for achieving high economic profits.

**Source:** PRA Method ‘changes and trend analysis’ conducted by the researcher, Annual reports (1995 to 2005) at the office of Assistant Director of Agriculture, Gubbi.

### 2.1.1.5 Sources of irrigation and irrigation methods

The irrigation methods practiced by farmers in all villages were almost same. Some villages had little changes, which is discussed below.

Between 1960 and 1970, irrigation was mainly done through open well and monsoon rains. The farmers have adopted indigenous practices like flooding. The farmers were unaware of proper irrigation methods.

Between 1970 and 1980, the dependency on sources of irrigation namely open well and monsoon rains were continued. The farmers had given priority for conserving water by carrying water through pots and feeding into rhizosphere of horticultural crops. In some horticulture crops like coconut, the waterways connecting different trees were made so that water reached to every tree uniformly.

Between 1980 and 1990, the village pond had been constructed in Manchaladore village, which was main source of irrigation. Some of the farmers had given priority for construction of farm pond, which was considered, as main source of irrigation for their crops. Dependency on monsoon rains was continued. A few farmers used motor for lifting water from village pond and farm pond. It gave a clear indication of the fact that farmers
were slowly drifting towards water conservation practices and use it for irrigating crops.

Between 1990 and 2000, dependency on monsoon was continued by majority of farmers. Some of the farmers digged bore well for water source. Bore well from then onwards acted as main source of irrigation.

In Manchaladore village, drip irrigation was firstly adopted for areca nut crop and later spread to all villages. Village pond and farm pond continued to be utilized as source of irrigation. In Kalinganahalli few farmers had given top priority for adopting sprinkler system of irrigation for vegetables. It was observed that between 1990 to 2000, farmers had given top priority for improved watershed practices.

Between 2001 and 2007, farmers continued to use earlier practices of irrigation but with few exceptions like self-starting improved bore well and lifting system. Few farmers adopted drip irrigation and sprinkler irrigation with improved technology. From the above information, it could be easily concluded that farmers were drifting towards modern and scientific methods of irrigation.

Source: PRA Method ‘changes and trend analysis’ conducted by the researcher and annual reports (1995 to 2005) at the office of Assistant Director of Agriculture, Gubbi.

2.1.1.6 Farm implements and farm vehicles

Farm implements used by farmers were almost same in all villages. However, little variations were observed in some villages. The brief explanations of farm implements used by farmers are discussed below.

Between 1960 and 1970, farmer had given high priority for usage of implements like wooden plough for ploughing and sickle for harvesting, spade
for making water ways and lifting of soil and bamboo basket for carrying farm produce.

Hand operated crusher made up of stone was used for powdering the pulses and cereals; sieves for separation of grains from straw dust and soil particles were used in that period. In that period farmers had given top priority for local indigenous technologies.

From 1970 to 1980, farmers continued to use most of the earlier types of farm implements. The change observed was sickle modified into slightly bigger in size, which became more comfortable for harvesting. The farmers in that period had given priority for adopting the technology which was more practically feasible and economically viable.

From 1980 to 1990, farmers continued to use most of the implements practiced earlier. The change observed was farmer's top priority given for uniform sowing which avoided wastage of seeds. As a result, sowing with the help of hand seed drill came into practice. This showed that farmers had given high priority for improved technologies. Iron baskets were used for carrying produce, and for other farm works.

Between 1990 and 2000, the type of implements used earlier for farm works were continued. The change observed was use of improved hand seed drill used for sowing in two lines. Farmers had given top priority for using implements like hand sprayers for spraying insecticides, cultivators, levelers, and mould board plough for farm operations. Usage of thresher for seed separation was introduced at this period.
It was observed that farmers had given top priority for modern cost effective and improved technologies which were saving time and cost for hiring labour in farm operations.

From 2001 to 2007, the usage of earlier type of implements was continued with slight modifications such as motor operated sprayer. The new implements used were bund former, clod breaker, seed cum fertilizer drill. Usage of implements like groundnut decorticator and areca nut dehusker were started in this period. It was observed in that period that farmers had given top priority for usage of implements, which perform timely operations with higher coverage per unit time and less drudgery.

**Source:** PRA Method ‘changes and trend analysis’ conducted by the researcher and annual reports (1995 to 2005) at the office of Assistant Director of Agriculture, Gubbi.

### 2.1.1.7 Food habits

Food habits of people in all villages were almost same with few exceptions in some villages. The brief description is given below.

Between 1960 and 1970, majority of farmers had given priority for consumption of ragi, jowar, milk from local bred cows; pulses like red gram, greengram and black gram. Consumption of vegetables like chilli, tomato and bhendi was continued in this period. Rotti (local term) made from ragi and jowar, mudde (local term) made from ragi, anna (local term) made from rice and Saru (local term) made from pulses and vegetables were given high priority for consumption. Coffee made from jaggery was consumed in this period. In
Non-vegetarian food, sheep meat was given high priority than chicken for consumption by a few families.

Between 1970 and 1980, cereals like ragi, jowar, pulses, vegetables and milk continued as major vegetarian food habits with slight increase in consumption of wheat and rice. A few families had given top priority for more consumption of anna and chapati and usage of sugar in coffee was started by few families. In non-vegetarian food, consumption of chicken was given equal priority with sheep meat.

In 1980 - 1990, new hybrid varieties of ragi, wheat, jowar and rice were consumed and consumption of pulses, vegetables also increased in this period. Sugar coffee and tea were the main beverages preferred in that period. In non-vegetarian food, new breeds of broiler chicken were used for consumption.

In 1990-2000, earlier food habits were continued with a few changes like introduction of Sona mashuri, a high quality rice. In this area it was first introduced in Manchaladore and later spread to other villages. In non-vegetarian food, ‘Giriraja’ broiler consumption given top priority. However, sheep meat consumption also increased by a few families.

In 2001 – 2007, earlier food habits continued with few exceptions like use of different high yielding varieties in crops and milk from cross bred Holstein Friesian cows and nutritional beverages like Bournvita specially for kids. In non-vegetarian food, ‘Giriraja’ broiler consumption increased and sheep meat consumption was also increased in that period.
**Source:** PRA Method ‘changes and trend analysis’ conducted by the researcher and annual reports (1995 to 2005) at the office of Assistant Director of Agriculture, Gubbi.

### 2.1.1.8 Sources of income

Source of income represents all possible ways of earning livelihood. The sources of income since last 50 years were mainly from agriculture for all villages under study. The subsidiary sources of income also appeared to be identical with few exceptions in some villages from time to time. The brief description of sources of income is explained below.

Between 1960 and 1970, the agriculture was main source of income for most of villages. Hence, it is appropriate to conclude that agriculture profession was given top priority. Sheep, goat, cattle and buffalo rearing were giving subsidiary sources of income other than agriculture. Agricultural labourers were considered as poor and demanded meals two times a day.

From 1970 to 1980, the agriculture continued as main source of livelihood with subsidiary sources of income like sheep, goat, cattle and buffalo rearing. Few farmers started profession of brokering of produce in Manchaladore village and later it spread to other villages. Basket making in commercial scale started during this period was on part time basis. This gave indication that farmers had given top priority for commercial ways of earning livelihood.

In 1980-1990, cultivation of commercial crops and high yielding varieties to earn more economic profits were given top priority. Rearing of cattle, buffalo, sheep and goat were started on commercial basis i.e., sale of animals for earning economic profits. A few farmers had given priority for
earning livelihood by transporting farm produce of other farmers through luggage auto. Some of the farmers and their family had given priority for beedi making on contract basis.

In 1990 – 2000, cultivation of commercial crops like High Yielding Varieties (HYV’s) and short duration varieties were given top priority to earn more economic profits. Some of the farmers started earning their livelihood by transporting the farm produce of other farmers through luggage auto and power tiller.

In Manchaladore village some people had given priority for owning of vehicles like luggage auto and power tillers. From this, it could be easily concluded that a few farmers had given priority for part time business along with agriculture.

From 2001 to 2007, in agriculture addition to HYV’s, short duration varieties and medicinal crops like gherkin cultivation was given top priority by a few farmers. Most of the farmers had given top priority for cultivation of horticulture crops like areca nut and banana for achieving more economic profits.

The cross bred cows like Holstein friesian were introduced. Some of the farmers in Manchaladore Jogihalli, Nalluru were rearing these cattle as it was giving more milk yield 10-15 litres per day. The main source of livelihood was by sale of milk in nearby town.

Source : PRA method ‘changes and trend analysis conducted by researcher, SWAP reports (2007) of Matha, Manchaladore, Kalinganahalli, Yaraballi, micro watersheds from ‘abhivruddi’ NGO, Gubbi, besides annual reports
(1995 to 2005) of Revenue Department, Manchaladore, Hagalawadi Hobli, Gubbi Taluk.

2.1.1.9 House, fuel and miscellaneous

In 1960-1970, the structure of house was simple and small in size with walls made of bamboo sticks with grass over roof. Some of the houses built with mud wall and bamboo roof. The dried farm produce and tree parts, were used as fuel. In this period, farmers had given top priority for constructing houses from easily available low cost materials. The houses were attached to one another in a row.

In 1970-1980, the farmers had given top priority for improving structure of the houses. The attachment between houses was removed. The houses were bigger in size and mudwalled with black tiles on roof. The usage of stones was practiced for construction of walls. Construction of chimneys was practiced in that period.

Between 1980 and 1990, the farmers had given top priority to construct walls of houses with bricks plastered with mud. Red coloured improved roof tiles were used because of non-durability of black tiles. The house with well structured chimneys and traditional cattle shed were seen in this period. Dried farm produce and tree parts were continued to be used as fuel. In some villages like Manchaladore, kerosene stove and pump stove were used by few farmers. Radio was used in this period. This information gave a clear indication of the fact that farmers had given top priority for easy, comfortable and entertaining life style.
From 1990 to 2000, the few farmers had given top priority for construction of walls of houses with bricks plastered with concrete, as it was durable and attractive red tiles continued to be used as roof tiles. Some of the houses contained compound and improved cattle shed. Radio and TV were used for entertainment and as information sources as well.

Majority of the farmers had given top priority for using kerosene stove, pump stove and a few rich farmers had given priority for using LPG stove and gobargas stove. Few farmers still continued to use dried farm produce as fuel for cooking. Telephone facility started in this period. Bike was used by a few farmers for transportation.

In 2001 – 2007, the past ways of constructing houses were continued by farmers a few exceptions. Some farmers who were economically strong had given top priority for constructing RCC houses. The houses were well structured with separate cattle shed.

The radio and TV continued to be used as entertainment and information sources. The young farmers had given top priority for using mobile phones for communication. However, telephone usage also continued. LPG stove usage continued but as far as gobar gas was concerned, farmers had given top priority for constructing new improved structure, which was cost effective, durable and easy for maintenance.

Source: ‘PRA method’, ‘changes and trend analysis’ conducted by researcher

2.1.1.10 Infrastructure and transport facilities

Infrastructural facilities of villages for the last 50 years were discussed below.
In 1960-1970, anganwadi, higher primary school started in all selected villages. It was evident that high priority had been given to lower education. The narrow mud road existed in that period. Grampanchayat started in Manchaladore village.

Between 1970 and 1980, anganwadi the higher primary school attracted many children for learning in all villages. The farmers had given top priority for opening of co-operative society which was first opened in Manchaladore village. The quality of mud road was improved. Bullock cart was the chief mode of transport.

From 1980 to 1990, more facilities existed. Anganwadi and higher primary school were started in all selected villages. A high school and a college were started in that period in Manchaladore village. The quality of mud road again improved and trees were grown on both sides of road. Post office was also started in that period.

In 1990-2000, the infrastructure facilities like anganwadi, higher primary school, high school, college and post office continued to function in Manchaladore village. Only anganwadi and HPS continued to function in all remaining villages under study. The training for Job Oriented Course (JOC), Backward Communities and Minorities (BCM) hostel and a library was started in Manchaladore village. A new building for grampanchayat was constructed in Manchaladore village. Ayurvedic medical hospital started working from 1982.

The condition of road was improved, tar road was made in the Machaladore and Matha villages. Bus transport and vehicles like luggage auto, power tiller and tractor were used for transport.
In 2001-2007, old infrastructural facilities like anganwadi, HPS, high school college, BCM hostel, post office and grampanchayat continued to work efficiently in Manchaladore village. Anganwadi and HPS continued to work in all selected villages. The only change observed was commencement of veterinary hospital and increased facilities in ayurvedic hospital in Manchaldore village. The tar road facility was extended to Kalinganahalli to some extent. The number of vehicles like bus, tractor, power tiller, luggage auto, bikes increased manifold.

**Source:** PRA Method ‘changes and trend analysis’ conducted by the researcher and annual reports (1995 to 2005) at the Grampanchayat, Manchaladore.

### 2.1.2 Adoption practices

#### 2.1.2.1 Population

Bharadwaj and Vijayalakshmi (2001) revealed that life expectancy age is the lowest (54.7 years) in Madhya Pradesh and infant mortality rate of 94 per thousand is the highest and next to Orissa.

#### 2.1.2.2 Crops and cropping pattern

Khalache *et. al.* (1994) concluded that 38.28 per cent of respondents expressed that there was overall increase in production and area of rabi crops and 39.84 % of respondents expressed that there was improvement in crop growth.

Mohad *et. al.* (1995) concluded that after the introduction of watershed project, change in cropping pattern with particular reference to introduction of
rabi crops soybean, wheat, safflower and significant raise in yields were obtained.

Bhople et al. (1997) witnessed that varieties like maldandi 35-1 and local varieties like Dagadi, Gola zipri rabi sorghum were cultivated.

Desai et al. (1997) reported that after introduction of NWDP area under kharif crop was decreased by 3.49 % due to increase in horticulture crops.

Deshmukh et al. (1997) reported that 100 per cent of farmers adopted the improved variety of summer ground nut.

Golyanaik and Jayaramaiah (1997) concluded that the increase in mean adoption scores of improved crop production practices were 8.54, 8.08 and 8.82 for marginal, small and big farmers respectively due to the introduction of Mittemari watershed.

### 2.1.2.3 Soil and water conservation practices

Kadam (1991) concluded that 68 per cent of beneficiaries had adopted dividing the fields with small bunds followed by 38.66% stubble and agro-waste plucking, 32.66% drains or trenches and 23.33% small earthen bunds.

Khalache et al. (1994) reported that 64.84 % of respondents expressed that there was control of soil and water erosion due to watershed activities.

Desai et al. (1997) observed that target work of contour bunding on 7.48 ha was found to be accomplished under Micro Watershed Development Project (MWDP).

Golyanaik and Jayaramiah (1997) concluded that, the increase in mean adoption scores of soil and water conservation practices were 4.56, 7.54 and
8.62 for marginal, small and big farmers respectively due to introduction of Mittemari watershed.

Padmaiah and Ansari (1997) indicated that adoption of recommended watershed practices caused highest positive direct effect on the perception of usefulness of watershed development project of the respondents of watershed area.

2.1.2.4 Package of practices

2.1.2.4.1 Sowing

Deshmukh et. al. (1997) concluded that there was improvement in adoption in method of sowing (66.00%) and time of sowing (85.33%).

2.1.2.4.2 Insect control

Bhople et. al. (1997) concluded that huge majority (99.17 %) of respondents were using insecticides for control of insects in rabi sorghum and treatment of seeds with sulphur was followed.

2.1.2.4.3 Application of manures and fertilizers

Bhople et. al. (1997) studied that there was application of fertilizers up to one bag/ha (50.84%) and more than one bag/ha (5.83%) in farmers fields.

Deshmukh et. al. (1997) reported that over half of the respondents (58.66%) applied recommended fertilizer doses in their fields.

2.1.2.4.4 Plant disease control

Deshmukh et. al. (1997) reported that about 31.33 % of farmers adopted seed treatment with fungicide before sowing of summer groundnut.
2.1.2.4.5 Harvesting and processing

Sankara Rao and Sudarshan Reddy (2002) concluded that 25.33% and 30.00% of farmers were in great need and some need respectively for rice production technology.

2.1.2.4.6 Marketing

Pandiarajan and Manoharan (1996) concluded that 20% of the participants sold their produce fully through the regulated market, while the remaining 80% partially sold through regulated market.

Bhagyalakshmi et. al. (2003) reported that majority of the women in the vegetable production (76.67%) and dairy (58.33%) perceived medium marketing facility.

2.1.2.5 Sources of irrigation and irrigation methods

Deshmukh et. al. (1997) concluded that 34.66% of respondents adhering to irrigation schedule for cultivation of summer groundnut.

2.1.2.6 Farm implements and farm vehicles

Adam (1994) reported that 19.00% of respondents fully adopted the recommended farm implements whereas 22.20 % had symbolically adopted the tractor or auto bike and 14.40% were symbolically partially adopted the usage of T.V.

Padmaiah and Ansari (1997) reported that farm power had substantial indirect effect on perception of usefulness of watershed development programme by the respondents of watershed area.
Sankara Rao and Suddarshan Reddy (2002) concluded that 16.00% of respondents were in great need, 32.00% were in some need of information regarding improved farm implements or equipments in rice cultivation.

Ramesh and Santha (2005) concluded that majority (74.00%) of the respondents were found under medium farm power possession, while 14.00% under low level and 12.00% under high level farm power possession categories.

2.1.2.7 Food habits

Balvinder et. al. (1998) revealed that average milk and milk products increased more than twice from very low to high income group and there was higher intake of cereals in winter and legumes in summer by respondents.

Vimala and Ratnaprabha (2003) concluded that 12% of families consumed non leafy vegetables daily and 14% of families consumed root vegetables two times a week and majority of families (80%) were preparing curry with ladies finger.

2.1.2.8 Sources of income

Singh (1993) reported that income of farmers were raised due to major shifts in cropping systems in favour of superior high value crops due to watershed development activities.

Khalache et. al. (1994) reported that there was increase in earning from pasture due to watershed activities.

Ramesh and Santha (2005) concluded that 73% of respondents had low level of annual income followed by (7%) and (20%) for high and medium respectively. Majority of respondents depended on agriculture and income was low due to low productivity status of land.
2.1.2.9 House, fuel and miscellaneous

Jagdale and Nimbalkar (1993) reported that as source of information were more the respondents had relatively more knowledge about recommended dry farming practices by rabi jowar.

Adam (1994) reported that 12.3% of respondents symbolically and partially adopted thatched house and 20% fully adopted to mud walled house, whereas 48.10 per cent respondents fully adopted brick walled house.

Padmaiah and Ansari (1997) concluded that mass media exposure had positive total indirect effect on perception of usefulness of watershed development programme by the respondents of watershed area.

Oberoi et. al. (1998) concluded that 45% and 47% saving in gas consumption was observed when food was cooked in pressure cooker as compared to patina (a bronze layer at the bottom of vessel) of different methods.

2.1.2.10 Infrastructure and transport facilities

Pandiarajan and Manoharan (1996) revealed that majority of participant farmers (76.66%) used bullock carts followed by bus (10%), lorry (8.35%), cycle (3.33%) and tractor (1.66%) for transportation of the farm produce.

Ratan and Singh (1997) concluded that transportation facilities to the marginal and small farmers for utilizing the markets have to be provided so that farmers need not to go to the other markets of plain areas.
Furtado et al. (2004) concluded that 71.52% of respondents participated in construction of gymnasium followed by 67.72% in construction of school building and 51.89% involved in construction of drinking water supply.

PART -II

2.2.1 Profile characteristics of farmers participated in watershed project

2.2.1.1 Education

Mohad et al. (1995) concluded that education had positively and significantly correlated with training effectiveness of the training programmers organized under NWDP for the project beneficiaries.

Rath and Mohapatra (1996) concluded that education had positive and significant relationship with knowledge behaviour of farmers in NWDPRAMA practices.

Sumana and Reddy (1998) study revealed that majority (71%) of the respondents were illiterates followed by functional literates (19%), primary school (9%) and high school education (1%).

Padmaveni and Asha (1999) concluded that majority (60%) of respondents were illiterates followed by can read only (15%), can read and write only (6%), primary school (12%) ,middle school(4%) and high school (3%).

Sivanarayana and Dubey (1999) concluded that education was having maximum direct effects on information processing pattern in descending order.
Ramesh and Santha (2005) concluded that more than two-fifth (45%) of the respondents were illiterates followed by primary education (31%), middle education (10%), secondary education (8%) and higher secondary education (5%) and only one respondent had collegiate education.

Savitha et al. (2005) concluded that majority of respondents (86.6%) were illiterates followed by functional literates (10%), primary school (3.40%) in goat rearing.

Srinivasulu and Rao (2005) concluded that majority (50%) of respondents were illiterates followed by functionally literates (20%), primary school (12.5%), middle school and above (17.5%).

Nagananda et al. (2006) concluded that majority (42%) of respondents were M.Sc.(Ag), followed by Ph.D (10%) and B.Sc., (Ag) (8%) in determining profile of ADA and AO’S in Karnataka State Department of Agriculture.

Patil et al. (2006) reported that majority of respondents studied up to high school (29.34%), illiterate (11.33%) and college and degree (4%), primary school (27.33%) and middle school (28.00%).

2.2.1.2 Decision making

Vijayalkashmi (1995) revealed that majority (60.00%) of the respondents had medium decision making followed by 21.67% and 18.33% low and high decision making levels respectively.

Sumana and Reddy (1996) witnessed that majority (71%) of respondents had medium decision making, followed by low (15%) and high (14%) decision making.
Nagabhusanam and Nanjaiyan (1998) witnessed that majority (56.60%) of respondents had medium decision making, followed by high (37.74%) and low (5.66%) decision making.

Chaitanya Kumari et. al. (2003) witnessed that decision making was found to be positive relationship with income generation activities of tribal women.

Reddy and Reddi (2003) revealed that rational decision making had positive significant relationship with farming performance in case of large dairy farmer.

2.2.1.3 Empowerment

Joshi (2004) concluded that watershed project interventions have initiated the process of bringing in social-political and economic empowerment of women.

Arneja and Khara (2005) witnessed that watershed helps in empowering women by encouraging them to involve in watershed development project, which acts as supplementary employments.

Abdul Samad (2007) concluded that reservation has played a most important role in empowerment of women in Kerala.

Khullar (2007) concluded that Mahila Samakhya is an innovative programme of the Ministry of Human Resource Development (HRD) that brought about women empowerment.
Singh and Ushakumari (2007) concluded that need based and skill oriented training programmes can bring technological empowerment among farmwomen.

Suneetha (2007) concluded that DWCRA Programme has empowered the women beneficiaries with significant growth in their income and employment in Kurnool district.

2.2.1.4 Communication behaviour

Nishi Sharma (1995) revealed that majority (48%) of respondents had high communication behaviour followed by low (30%) and medium (22%) in total literacy campaign.

Deshmukh and Chole (2003) revealed that majority of respondents (63.33%) had medium communication behaviour followed by high (21.33%) and low (15.33%) communication behaviour.

Singh et al. (2003) concluded that majority of Horticulture Development Officers (65.88%) had fair communication ability followed by good (32.94%) and poor (1.18%) communication ability.

2.2.1.5 Change proneness

Guruvareddy (1998) revealed that majority (69.12%) of respondents had medium change proneness followed by high (16.18%) and low (14.70%) change proneness.

Velusamy and Manoharan (1999) witnessed that majority of respondents (57.50%) had low change proneness followed by medium (25.00 %) and high (17.50%) change proneness.
Neerubala et al. (2003) concluded that vast majority (81.82%) of opinion leaders had high change proneness and 18.18% of respondents had medium change proneness.

Sridevi (2003) witnessed that majority of farmers (64.17%) had medium level of change proneness followed by high (24.17%) and low (11.66%).

2.2.1.6 Value orientation

Lakshmidevi (1983) concluded that value orientation had positive and negative association with their role performance in home and farm management.

Vijayalakshmi (1995) revealed that majority (69.17%) of farm women had medium value orientation followed by high (20.83%) and low (10%) value orientation.

Suresh Kumar and Venkataramaiah (2000) concluded that value orientation had positive and significant relationship with opinion on privatization of extension services in cotton.

Sridevi and Rao (2001) revealed that value orientation had positive and significant relationship with managerial abilities of women farmers.

2.2.1.7 Self reliance

Vivekanand (1994) witnessed that majority (68.00%) of beneficiaries under TRYSEM programme had medium self-reliance followed by 17.90% and 24.10% with high and low self reliance respectively.
Vijayalakshmi (1995) concluded that majority (69.17%) of farm women had medium self reliance followed by high (20.83%) and low (10%) self reliance.

Snehalatha and Reddy (1997) concluded that self reliance had positive and non significant relationship with decision making process of rural women.

Sridevi (2003) concluded that majority of farmers (69.17%) had medium self reliance followed by low (18.33%) and high (12.50%) self reliance.

Singh and Ushakumari (2007) revealed that economic independence and education of women will go a long way in attaining self reliance for women.

2.2.1.8 Economic motivation

Mohad et. al. (1995) concluded that education had positively and significantly corrected with the training effectiveness of the training programmes organized under NWDP for the project beneficiaries.

Chikate et. al. (1996) concluded that economic motivation had positive and significant relationship with adoption of organic production technology.

Satyanarayana (1997) witnessed that majority (45%) of the oil palm growers possessed economic motivation followed by low (28%) and high (27%) economic motivation.

Sankara Rao and Sudarshan Reddy (2002) concluded that economic motivation had positive and significant relationship with information need of respondents on rice production technology.
Bhagyalakshmi et. al. (2003) revealed that good number of (45%) rural women had medium economic motivation and they would like to take up various income generating activities related to their respective enterprise.

Chaitanya Kumari et. al. (2003) witnessed that economic motivation had positive relationship with income generation activities of tribal women.

### 2.2.2 Extent of participation of farmers in watershed project

Khan and Harode (1991) studied that women participated in agricultural operations like preparation of seedbed (21.11%) and sowing (85.56%).

Venugopala Reddy (1996) revealed that majority of farmers had medium participation in three selected watershed project each under NWDPRA, DPAP and NGO. People participation was comparatively high at implementation stage and very low at pre-project stage.

Bhagyalakshmi (1997) concluded that farm women participated to a greater extent in transplanting, weeding, harvesting and post harvesting.

Mounika and Sawhney (1997) concluded that large majority of women participated in agricultural operations like weeding (80.40%) rather than activities like land preparation (53.60%).

Reddy et. al. (1999) found that factors like awareness, willingness and capacity were important in active participation of people in rural development.

Sekhar (1999) reported that it was the youth in the villages who held the key to success of watershed projects like construction of check dams, tanks and string rain water.
Singhal (1999) witnessed that people’s participation during planning stage varies from high to medium and low and level of participation was found high in own agricultural land development.

Chatterjee and Reddy (2002) concluded that majority of beneficiaries of NWDPRA fell under medium (68.33%) level of participation followed by low (18.33%) and high (13.33%) level of participation.

Manjula (2002) witnessed that the participation of female headed households was very poor (27%) and main reason for participation was to get money.

Furtado et al. (2004) revealed that majority (58.28%) of youth participated in construction of sewerage works occasionally, and 51.89% of youth in drinking water supply network in Shramdan of Adarsh Gaon Yojana.

Arneja and Khara (2005) concluded that people’s participation helps in long term sustainability of the watershed development programme and the participatory approach enables the people to initiate activities on their own and take optimal advantage of the project.

Patil (2006) revealed that majority of farmers had medium extent of participation followed by high (16.67%) and low (13.33%) extent of participation in watershed activities.

Ramesh et al. (2007) witnessed that more number of large and medium farmers are involved in organic farming compared to small farmers.

Rath et al. (2007) witnessed exclusive participation of women in agricultural activities such as seed storage, marketing of produce.
2.2.3 Relationship between selected independent variables and extent of participation

2.2.3.1 Education Vs Extent of participation

Prameelamma (1990) revealed that the there was significant positive relationship with education and extent of participation of rural Women in agriculture operations.

Nishi sharma (1995) conducted that family educational status had negative relationship with participation of adult illiterates in total literacy campaign.

Padmaiah and Ansari (1997) revealed that education had vital role in acquisition and understanding of the watershed technologies.

Sumana and Reddy (1998) study revealed that education had positively contributed for variation in awareness for farmwomen about watershed technologies.

Ajbul Islam and Quli (1999) reported that the education had negative and significant relationship with overall participation in various social forestry activities of Chakriya Vikas Paranali.

Chatterjee and Reddy (2002) concluded that education had positive and significant relationship with the level of participation of beneficiaries of NWDPRA.

Prasad Reddy et. al. (2003) revealed that higher the education enabled the individual to grasp facts from different sources, analyze and interpret them in proper way and hence more utilization of watershed technologies.
2.2.3.2 Decision making Vs Extent participation

Vijayakumar *et. al.* (2003) revealed that majority (46.66%) of farmers had medium farm decision making, while 27.50% and 25.84% of respondents had low and high farm decision making respectively.

Mahindra *et. al.* (2004) concluded that decision making had positive and significant relationship with components of community participation like group felt needs, sense of responsibility, popularity figure in use of indigenous knowledge and expertise.

2.2.3.3 Communication behaviour Vs Extent of participation

Kaushik Verma (1995) witnessed that communication behaviour had positive and significant relationship with extent of adoption of energy conservation technologies by rural women.

Nishi Sharma (1995) conducted that communication behaviour had positive and significant relationship with participation of adult illiterates in total literacy campaign.

2.2.3.4 Change proneness Vs Extent of participations

Kaushik Verma (1995) witnessed that change proneness had positive and significant relationship with extent of adoption of energy conservation technologies of rural women.

2.2.3.5 Value orientation Vs Extent of participation

Ahuja *et. al.* (1995) concluded that value orientation had positive and significant relationship with extent of utilization of community facility.
Vijayalakshmi (1995) revealed that value orientation had positive and non significant relationship with extent of participation of form women in turmeric cultivation.

Sridevi and Rao (2001) revealed that value orientation had positive and significant relationship with managerial abilities of women farmers.

Venkatagurunathan (2002) conducted that value orientation has positive and significant relationship with extent of co-ordinating ability.

### 2.2.3.6 Self reliance Vs Extent of participation

Vijayalakshmi (1995) revealed that self reliance had positive but non significant relationship with extent of participation of farm women in turmeric cultivation.

### 2.2.3.7 Economic motivation Vs Extent of participation

Chikate et al. (1996) concluded that economic motivation had positive and significant relationship with adoption of organic production technology.

Narayana Gowda and Jayaramaiah (1997) concluded that economic motivation had positive relationship with technological consequences of watershed development participants.

### 2.2.4 Constraints as perceived by farmers in watershed project

Bhople et al. (1991) concluded that constraints faced by farmers in adoption of dryland practices were small holdings of land. Easy breakage of bunds as situational, difficult to draw contour lines, non-practicable nature of dry land practices as technical, inadequacy of capital and costly nature of digging of form ponds as economical problems.
Kadam (1991) witnessed that poor water holding capacity of soil, sloppy land, undulating land, land and high evaluation were the constraints identified in utilizing water management technology.

Ingle and Sagne (1992) witnessed that checking of drippers and tubes, damage by rodents, filter breakage were the constraints identified in adoption of drip irrigation system.

Khalache et al. (1994) concluded that major constraints were lack of finance and unavailability of subsidy on horticultural plantation were 68% and 61% respectively.

Sumana (1996) concluded that uncertain and erratic rainfall was the major constraint identified by farm women for adoption of watershed practices.

Veeraraghava Reddy et al. (1998) witnessed that low price for milk, lack of educational programmes in dairy were the constraints identified in dairy production.

Singh and Jagadeeshwar (1999) concluded that lack of purchasing power of construction material (90%) unskilled masons (70%) were some of the constraints in adoption of biogas plants.

Atchutaraju and Murty (2000) witnessed that constraints identified in betelvine cultivation were low price of farm produce (100%), lack of adequate credit (80%), lack of transport facilities (55%) and poor contact of extension workers with farmers (89.17%).

Sawant et al. (2000) concluded that lack of complete and correct knowledge about post harvest technologies (70%) was the major constraint identified in use of recommended post harvest technologies of minor fruit crops.
Singh and Rajput (2000) concluded that lack of technical knowledge (54.28%), marketing facilities (62.85%) and low price of farm produce (74.28%) were the constraints identified by medium farmers in adoption of wheat production technologies.

Tomar (2001) witnessed that small and fragmented holdings, non-availability of the credit and inputs at the right time, drought and erratic rainfall were constraints identified for low productivity of rainfed upland rice.

Chandracharan (2006) revealed that constraints in soil and water conservation practices faced by farmers were fragmentation of land into unconventional shape, water stagnation near bunded area and time consuming operations.

Nagananda et al. (2006) reported that discrimination between different cadres of officers (91.6%) and lack of promotional opportunities (91.6%) were the major constraints encountered by respondents in their job.

Ramesh et al. (2007) concluded that lack of marketing facilities and non-availability of premium prices were most important constraints for the adoption of organic farming.

Rath et al. (2007) concluded that seasonal nature of agricultural production is the constraint which discouraged the participation of women in agriculture.

2.2.5 Suggestions as perceived by watershed farmers to tackle the constraints

Khalache et al. (1994) witnessed that suggestions of respondents to overcome constraints were, before starting terracing work need based views of the farmers may be considered (62%) and terracing work may be carried out with the help of bulldozers only (83%) in watershed activities.
Praveen and Pochaiah (1998) concluded that suggestions for effective transfer of watershed technology were, involvement of mitra kisans in right from planning stage (83.30%), special incentive should be given to mitra gopal to maintain the common property resources (62.50%), quality training to mitra kisans should be given by KVKs and farmers training center (37.50 per cent) mitra kisans should motive the farmers to safe guard the plantation under social forestry (42.50%).

Atchutaraju and Murty (2000) concluded that suggestions perceived by farmers to overcome constraints in betel vine cultivation were timely technical guidance (95.83 per cent), increase the price of farm produce (74.17%) and providing bank loans (58.33%).

Sawant et. al. (2000) concluded that more information regarding post harvest technologies be made available (91%), processed products should get reasonable market rates (78%) were the suggestions given by home scale fruit processors to overcome the constraints in use of post harvest technologies of minor fruit crops.

Nagananda et. al. (2006) reported that good infrastructure facilities (76%), good transport facilities (88.3%), good Audio -Visual aids (90%) were the major suggestions given by agricultural officers to improve the organizational climate of KSDA.

Patil et. al. (2006) reported that suggestions offered by participant farmers were need for more technical information guidance by concerned departments (10%), financial assistance for maintenance of watershed (59.33%) and making available the bank loan at lesser interest rate (25.34%).
2.2.6 Conceptual model of the study

The conceptual model in fig 1 contains three major divisions

1. Farmers participated in watershed project.

2. Profile characteristics of the farmers,

3. Extent of participation in motivational meetings, planning, implementation, maintenance and evaluation.

The profile characteristics of farmers are important since they affect the extent of participation. It is considered as important to be included because it is a dependent variable and the watershed project can become successful only when it ensures active participation of farmer. In addition, it also includes participation of farmers in motivational meetings, planning, implementation maintenance and evaluation.
CHAPTER – III

MATERIALS AND METHODS

In this chapter the methodology adopted for the study namely the research design, sampling procedure, the empirical measurement of variables, collection of data and the statistical tests used are described.

The chapter contains five major divisions and were presented under the following heads

3.1 Research design
3.2 Sampling procedure
3.3 Empirical measurement of variables scoring and categorization
3.4 Instruments and methods for data collection
3.5 Statistical procedures followed

3.1 RESEARCH DESIGN

Ex-post facto research design was adopted to achieve the objectives of the study since the watershed programme is already implemented in the area and no other design will fit in keeping view the objectives of the study.

3.2 SAMPLING PROCEDURE

3.2.1 Locale of the study

Karnataka state (Fig.2) was purposively selected because Sujala Kalinganahalli Halla watershed development project was implemented in the state and the investigator was familiar with the local language which would be of help to build quick rapport and to obtain relevant information.
3.2.2 Selection of district

Tumkur district (Fig.3) was purposively selected since the study project was operated in the said district only. Further, the researcher is well acquainted with this area and hails from Karnataka.

3.2.3 Selection of sub-watershed

Kalinganahalli Halla sub watershed in Gubbi taluk (Fig.4) was selected purposively since the project gained an effective participation of farmers and was popular in Karnataka. Further the researcher is well acquainted with the area.

3.2.4 Selection of micro watersheds

Out of ten micro watersheds, four micro watersheds namely Manchaladore, Kalinganahalli, Yaraballi, Matha were selected randomly.

3.2.5 Selection of villages

Six villages namely Nalluru and Manchaladore (Fig.5); Kalinganahalli (Fig.6), Yaraballi (Fig.7) and Jogihalli; Matha (Fig.8) were selected from Manchaladore, Kalinganahalli, Yaraballi, Matha micro watersheds respectively. A total of 120 farmers respondents were selected by proportionate random sampling procedure, which is presented in the Table 1.

A view of sampling procedure is shown in Fig.9
Table 2: Number of respondents selected from the four micro watersheds

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Micro watersheds</th>
<th>Total population in each micro watershed</th>
<th>Villages</th>
<th>Proportion of farmer respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Manchaladore</td>
<td>444</td>
<td>Manchaladore Nalluru</td>
<td>21 11</td>
</tr>
<tr>
<td>2</td>
<td>Kalinganahalli</td>
<td>339</td>
<td>Kalinganahalli</td>
<td>24</td>
</tr>
<tr>
<td>3</td>
<td>Yaraballi</td>
<td>562</td>
<td>Yaraballi Jogihalli</td>
<td>16 24</td>
</tr>
<tr>
<td>4</td>
<td>Matha</td>
<td>339</td>
<td>Matha</td>
<td>24</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>1684</strong></td>
<td></td>
<td><strong>120</strong></td>
</tr>
</tbody>
</table>

3.3.1 EMPIRICAL MEASUREMENT OF VARIABLES, SCORING AND CATEGORIZATION

Table 3: Selection of variables and their empirical measurement

<table>
<thead>
<tr>
<th>A</th>
<th>Dependent variable</th>
<th>Empirical measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Extent of participation</td>
<td>Scale developed by Rasheed (1999) with suitable modification</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B</th>
<th>Independent variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Decision making</td>
</tr>
<tr>
<td>3</td>
<td>Empowerment</td>
</tr>
<tr>
<td>4</td>
<td>Communication behaviour</td>
</tr>
<tr>
<td>5</td>
<td>Change proneness</td>
</tr>
<tr>
<td>6</td>
<td>Value orientation</td>
</tr>
<tr>
<td>7</td>
<td>Self reliance</td>
</tr>
<tr>
<td>8</td>
<td>Economic motivation</td>
</tr>
</tbody>
</table>
3.3.1 Methods used for measurement of independent variables

3.1.1.1 Education

This refers to formal education of farmer respondents. The scale developed by Venkataramiah (1983) and revised in 2006 was used as detailed below.

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No Schooling (illiterate)</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Functionally literate</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Primary school</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Middle school</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>High school</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>College</td>
<td>5</td>
</tr>
</tbody>
</table>

3.3.1.2 Decision making

Decision making was operationalised as the degree to which farmer respondent justifies by selecting efficient means among the available alternatives on the basis of scientific criteria for achieving economic profits. To quantify decision making, a scale developed by Nandapurkar (1969) with modifications was used.

The decision making based on selected criteria was measured quantitatively on three point continuum with scoring 1, 2, 3 for not considered, considered after consultation with others and considered independently respectively.
The score of each respondent was obtained by adding the respective score on each statement and they were categorized as follows.

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>&lt; Mean – S.D.</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>Mean ± S.D.</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>&gt; Mean + S.D.</td>
</tr>
</tbody>
</table>

3.3.1.3 Empowerment

Empowerment of farmers was operationalised as to gain strength by the farmers of Kalinganahalli Halla watershed development project in terms of social, health, nutrition, economic, political and education. The scale developed by Manjula (1995) was used with suitable modification for quantifying the empowerment.

The empowerment of farmers was measured quantitatively on a three-point scale with a scoring of 2, 1 and 0 for the agree, undecided and disagree for the statements asked by researcher. The scoring was reversed for negative statements. The aggregate score of each farmer respondent was obtained by adding the respective score on each time.

The mean and standard deviation of the score were considered for classifying the respondents as follows:

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>&lt; Mean – S.D.</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>Mean ± S.D.</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>&gt; Mean + S.D.</td>
</tr>
</tbody>
</table>
3.3.1.4 Change proneness

This can be operationalised as the degree to which the individuals have favourable attitude towards change as the best course of action.

The scale developed by Moulik and Rao (1972) followed by Kasiviswaswara Rao (1994) with modifications was used for quantification of change proneness. The scoring 2,1 and 0 was given for agree, undecided and disagree respectively for each positive item. The scoring was reversed for negative items. The total score on change proneness of respondent was obtained by adding the individual item score. The respondents were grouped into three categories based on Mean and S.D. as follows.

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>&lt; Mean – S.D.</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>Mean ± S.D.</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>&gt; Mean + S.D.</td>
</tr>
</tbody>
</table>

3.3.1.5 Communication behaviour

Communication behaviour was operationalised as the behaviour of participated farmers in watershed development project and their communication with other members with respect to discussion abilities, establishing rapport and consultation in the watershed project.

The scale developed by Bharathi (1993) with necessary modifications was used to quantify the data. The statements included in the scale were related to communication behaviour. The scoring of 2,1 and 0 given for frequently, occasionally and never respectively for each item on a three point scale. The scoring was reversed for negative statements.
The aggregate score of each farmers respondent was obtained by adding all the scores allotted to respective statements.

The respondents were grouped into three categories based on mean and S.D as follows:

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>&lt; Mean – S.D.</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>Mean ± S.D.</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>&gt; Mean + S.D.</td>
</tr>
</tbody>
</table>

### 3.3.1.6 Value orientation

Values largely influence the individual’s behavioural pattern. People orient their thinking, feeling and action towards different things in life based on values they hold. As such they become important organizational themes in behavior. The procedure developed by Manandhar (1987) with modifications was used to measure the value orientation of the farmer respondent.

The value orientation of farmer respondents was measured quantitatively on a three-point continuum with scoring of 2, 1 and 0 for agree, undecided and disagree respectively for each positive statement. The scoring was reversed for negative statements. The total score of value orientation of farmer respondent were computed by summing up of all the scores of respondents allotted to respective statements. The respondents were grouped into three categories based on Mean and S.D. as follows.
### 3.3.1.7 Self reliance

It was operationalised as the trust on one’s own resources and capabilities to control his span of life. The procedure developed by Manandhar (1987) with modification was used to measure self reliance.

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>&lt; Mean – S.D.</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>Mean ± S.D.</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>&gt; Mean + S.D.</td>
</tr>
</tbody>
</table>

### 3.3.1.8 Economic motivation

It was operationalised in terms of profit maximization and relative value placed by the farmer on economic needs. The scale developed by Supe (1969) with suitable modifications was used to measure the economic motivation of farmer respondents.

The economic motivation of farmer respondents was measured quantitatively on a three-point continuum with scoring of 4,3,2,1 and 0 for strongly agree, agree undecided, disagree, strongly disagree, respectively for each positive statement. The scoring was reversed for negative statement. The scale consist of three positive statements and one negative statement. The total
score of each farmer respondent were computed by summing up all the scores of respondent allotted to each statement. The respondents were grouped into five categories based on Mean and S.D. as follows.

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very high</td>
<td>&gt; Mean+2S.D.</td>
</tr>
<tr>
<td>2</td>
<td>High</td>
<td>&gt; Mean + 1S.D.</td>
</tr>
<tr>
<td>3</td>
<td>Medium</td>
<td>Mean ± S.D</td>
</tr>
<tr>
<td>4</td>
<td>Low</td>
<td>&lt; Mean-1S.D.</td>
</tr>
<tr>
<td>5</td>
<td>Very low</td>
<td>&lt; Mean - 2S.D.</td>
</tr>
</tbody>
</table>

3.3.2 Method used for measurement of extent of participation

Extent of participation was operationalised as the degree of involvement of farmers in motivational meetings, planning, implementation, maintenance and evaluation of watershed project.

The scale developed by Rasheed (1999) with suitable modification was used to measure the extent of participation of farmers in watershed project.

The scale consists of five main divisions namely motivational meetings, planning, implementation, maintenance and evaluation with 4, 4, 3, 3, 3 statements respectively.

Motivational meetings consist of 2 positive and 2 negative statements. Planning consists of 3 positive statements and 1 negative statement. Implementation consists of 2 positive statements and 1 negative statement. Maintenance consists of 2 positive statements and 1 negative statement. Evaluation consists of 2 positive statements and 1 negative statement.
The extent of participation of farmer respondent was measured quantitatively on three point continuum with scoring 2, 1, 0 for always, occasionally and never respectively for each positive statement and vice versa for negative statement. The total score of each farmer respondent was computed by summing up all the scores of respondent allotted to respective statements. The respondents were grouped into three categories based on Mean and S.D. as follows.

<table>
<thead>
<tr>
<th>Sl.No</th>
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<th>Score</th>
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<tbody>
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</tr>
<tr>
<td>3</td>
<td>High</td>
<td>&gt; Mean + S.D.</td>
</tr>
</tbody>
</table>

### 3.4 INSTRUMENTS AND METHODS OF DATA COLLECTION

#### 3.4.1 Establishment of rapport

Establishing rapport with farmers was followed prior to collection of data. The student researcher devoted first few days for getting acquaintance with farmers with the help of local leaders and field guides of Sujala watershed project. The respondents were convinced about the purpose and importance of the study. It was made clear to them that the study was purely for academic purpose. All these have helped student researcher to develop friendly relations with farmers to elicit the necessary information from them.

#### 3.4.2 Instrument for study

A well structured comprehensive interview schedule had been used for collection of data. The interview schedule was prepared keeping in view the objectives of the study. The required information for development of the
schedule was collected by going through relevant literature, suggestion from extension experts, experts in Watershed Development Department and advisory committee. Unambiguous, relevant and straight questions were included in the schedule keeping in view the various aspects of the problem under study.

3.4.3 Designing interview schedule

The interview schedule was designed into three sections and it starts with general information, which comprises name of the respondent, father’s name, village, taluk and district.

**Section A** deals with profile characteristics of farmer respondents, *viz.* education, decision making, empowerment, communication behaviour, change proneness, value orientation, self reliance and economic motivation.

**Section B** deals with the dependent variable, the extent of participation.

**Section C** deals with constraints and suggestions as perceived by farmers in watershed project.

3.4.4 Pre testing of schedule

Before giving a final shape to the interview schedule, the schedule was pre tested with 9 per cent of the sample in an identical village situations, other than the sample area. Care was taken to select suitable respondents for pre-testing. Based on experience gained in pre -testing the interview schedule was modified wherever needed (APPENDIX I)

3.4.5 Converting schedule to local language

The final interview schedule was converted into local language, i.e., Kannada without distorting the meaning or idea of questions (APPENDIX II).
3.4.6 Method of data collection

Each respondent was interviewed personally in local language i.e., Kannada by the student researcher and the responses were recorded on interview schedule immediately. The data thus collected was coded to statistical analysis.

3.4.7 Method used for tracing historical perspective emphasizing the developmental priorities of farmers in study area was PRA method ‘changes and trend analysis’

During last five decades there had been many changes in the study area. These changes were with respect to increase in growth rate of population, improvement in crops and cropping pattern, adoption of new soil and water conservation practices, utilization of advanced methods of crop production practices and marketing, improvement in sources of irrigation and irrigational methods, usage of advanced farm implements and vehicles, improved food habits, increase in sources of income, improvement in structure of houses, fuel used for cooking, miscellaneous items, adequate infrastructure facilities and changes in these criteria were enquired from recent to past for every 10 years up to last fifty years. Based on these trends, projections were also made for next 10 years. This information indicated whether the villages in the study area have made progress during the last 50 years.

3.5 STATISTICAL PROCEDURES FOLLOWED

For the purpose of statistical analysis of the coded data, the following statistical tools were used.

1. Arithmetic mean \( (\bar{X}) \)
2. Standard deviation \( (\sigma) \)
3. Frequency and percentage
4. Pearson’s correlation coefficient (r)
5. Multiple Linear Regression (MLR)

3.5.1 Arithmetic mean ($\bar{X}$)

It is defined as the sum of all values of the observations divided by the total number of observations. Symbolically it is represented as $\bar{X}$.

$$\text{Arithmetic mean (} \bar{X} \text{)} = \frac{\sum x_i}{n} = \frac{x_1 + x_2 + \ldots + x_n}{n}$$

Where $\bar{X} = \text{Arithmetic mean}$

$x_i = \text{Value of } i^{th} \text{ item of } x$

Where, $i = 1, 2, \ldots, n$

$n = \text{Total numbers of respondents}$

3.5.2 Standard deviation (S.D.)

It is positive square root of the mean of the squared deviations taken from arithmetic mean. It is represented by symbol $\sigma$

$$\text{SD (} \sigma \text{)} = \sqrt{\frac{1}{n} \left[ \sum x^2 - \left( \frac{\Sigma x}{n} \right)^2 \right]}$$

$\Sigma x^2 = \text{Sum of squares of observations}$

$\left( \Sigma x \right)^2 = \text{Square of sum of ‘x’ values}$

$n = \text{number of observations.}$

3.5.3 Frequency and percentage

Frequency and percentages were used to know the distribution pattern of the respondents according to the objectives under study.
Percentages were used for standardization of sample size by calculating the number of individual that would be under the given category if the total number of individuals were 120.

### 3.5.4 Pearson’s correlation coefficient (r)

This test was used to study the relationship between the scores of independent variables and the scores of dependent variables. It measures the degree of relationship between the two sets of variables.

\[
\begin{align*}
    r &= \frac{\sum xy - \frac{\sum x \sum y}{n}}{\sqrt{\frac{\sum x^2 - \frac{\left(\sum x\right)^2}{n}}{\sum y^2 - \frac{\left(\sum y\right)^2}{n}}} \\
    \Sigma x &= \text{Sum of scores of independent variables} \\
    \Sigma y &= \text{Sum of scores of dependent variables} \\
    \Sigma x^2 &= \text{Sum of the squares of scores of an independent variables} \\
    \Sigma y^2 &= \text{Sum of the squares of scores of a dependent variable} \\
    \Sigma xy &= \text{the sum of productivity of } x \text{ and } y \\
    n &= \text{size of the sample}
\end{align*}
\]

The calculated ‘r’ value was verified for its by using ‘r’ table value for 5 per cent and 1 per cent level of significance at n –2 degrees of freedom.
3.5.5 Multiple Linear Regression (MLR)

Multiple linear regression analysis was used to study the effect of independent variables on dependent variables. The following multiple linear regression equation was fitted to the data having 8 parameters.

\[ y = a + b_1 X_1 + b_2 X_2 + \ldots + b_8 X_8 \]

Where ‘a’ was the intercept constant and \( b_i \) are partial regression coefficients.

\[ b_i = b_1, b_2, \ldots, b_8 \]

The regression coefficient \( b_i \)’s were tested for their significance and the following formula was used.

\[ t_{(n-k-1)} = \frac{b_i}{S.E(b_i)} \]

Where

- \( n \) = Number of respondents
- \( k \) = Number of independent variables
- \( S.E (b_i) \) = standard error of \( i^{th} \) partial regression coefficient
- \( b_i \) = \( i^{th} \) Partial regression coefficient
- \( t \) = Test for significance
- \( df \) = Degree of freedom
Coefficient of multiple determination ($R^2$) was given by

\[
R^2 = \frac{\text{Regression sum of squares (RSS)}}{\text{Total sum of squares (TSS)}}
\]

Where \(\text{RSS} = b_1 \Sigma x_1 y + b_2 \Sigma x_2 y + \ldots + b_8 \Sigma x_8 y\)

and \(\text{TSS} = \Sigma y^2\)

$R^2$ value is less than unity where it was expressed in percentage. It measures the extent of variation in dependent variable ($y$), which can be explained by the independent variables ($x_i$) together.
Fig. 2: Map showing the Sujala watershed project implemented in Karnataka state.
Fig. 8: Cadastral map of Matha micro watershed
Fig. 5: Cadastral map of Manchaladore micro watershed
Fig. 4: Map showing the Sujala Kalinganahalli Halla watershed project implemented in Gubbi taluk of Tumkur district.
CHAPTER – IV

RESULTS

The data collected through interview schedule were coded and analyzed by applying the suitable statistical methods and results generated out of the analysis are presented in the following sections.

4.1 Historical perspective emphasizing the developmental priorities of farmers in Sujala Kalinganahalli Halla watershed project

4.2 Profile characteristics of farmers participated in watershed project

4.3 Extent of participation of farmers in watershed project

4.4 Relationship between selected independent variables and extent of participation

4.5 Constraints as perceived by farmers in watershed project

4.6 Suggestions as perceived by watershed farmers to tackle the constraints

4.7 Figurative strategy for watershed development
4.1 HISTORICAL PERSPECTIVE EMPHASIZING THE DEVELOPMENTAL PRIORITIES FARMERS IN SUJALA KALINGANAHALLI HALLA WATERSHED PROJECT

The historical perspective emphasizing developmental priorities of farmers of Sujala Kalinganahalli Halla watershed project is explained in two parts firstly, before introduction of watershed project (1960-2000) secondly, after introduction of watershed project (2001-2007). The results of study are depicted in two parts as follows.

4.1.1 Before introduction of Sujala Kalinganahalli Halla Watershed Project

Before introduction of Sujala Kalinganahalli Halla watershed project, growth rate of population was low, crops like ragi, jowar, redgram, sunflower and groundnut; rabi crops like ragi, horsegram were mainly cultivated in that region. The farmers had given priority for high yielding varieties like T.G.1 and Badami for groundnut.; Indaf 9, Indaf 15 and MR-1 for ragi; Mandya Vani and Mandya Vijaya for rice. Horticultural crops like areca nut, coconut, vegetables like tomato and chilli were cultivated in that region. Floriculture was given little priority. As for as soil and water conservation practices were concerned, the farmers were aware of some of watershed practices and had given top priorities for field bunds, brushwood checks, contour bunds, contour furrows traditional check dams and farm pond. A village pond was constructed in Manchaladore village.

As for as package of practices were concerned, sowing was done through traditional practices like broadcasting of seeds, but few farmers had given priority for dibbling, usage of hand seed drill and transplanting techniques.
To control insects, traditional practices like hand picking, hand destruction, flooding and draining were given top priority. After some period, mixed cropping system, usage of clean seed and planting material were given high priority. Later chemical insecticides like DDT, endosulfon, malathion, carbaryl and phorate were given high priority to control insects.

As for as control of disease concerned, earlier, farmers had given priority for field sanitation, crop rotation and early sowing. Later, they started giving priority for disease resistant varieties like CSH-9, chemical fungicides like bavistin, corboxin to control grain smut of sorghum.

As for as fertilizers were concerned, farmers had given priority for FYM, sheep manure, chemical fertilizers, slurry from gobar gas plant and vermi compost.

Earlier, farmers had given high priority for using sickle for harvesting followed by beating harvested crops by bamboo sticks to separate seeds. Later, stoneroller and thresher came into practice. Farmers had given priority for usage of stoneroller for powdering.

As for as marketing was concerned, farmers had given priority for local shandy market. They were carrying the farm produce either by hand or through bullock cart. After some period, farmer’s priority shifted into taluk level APMC market. The truck, tractor and power tillers were used as chief modes of transport.

Sources of irrigation like open well, village pond (Manchaladore only) and borewell existed in that period. Methods of irrigation like flooding was practiced earlier but later farmers drifted towards making waterways, feeding
water to root rhizosphere by pots and lifting water from bore well and village pond through motor. Drip irrigation for areca nut and sprinkler for vegetables were given high priority in that period.

Farmers had given high priority for using farm implements like wooden plough, traditional crusher made up of stone, sickle for harvesting, spade for making water ways and lifting of soil, bamboo and iron basket for carrying farm produce, hand seed drill for sowing, cultivator, leveller and mould board plough for ploughing.

Farmers had given top priority for owning vehicles like bullock cart whose structure improved with time; power tillers and tractors for carrying farm produce. Farmers had given top priority for consuming cereals like ragi, jowar, rice and wheat; pulses like redgram, blackgram and greengram; vegetables like tomato and chilli as vegetarian food, and for sheep meat and chicken as non vegetarian food. Coffee and tea were main beverages preferred by farmers in that period.

Agriculture was considered as the main source of income earlier and later cultivation of new high yielding varieties, short duration varieties were practiced. The subsidiary sources of income like rearing of goat, sheep, cattle and buffalo were practiced in that period. Brokering of farm produce were started in Manchaladore village as part time business.

Few farmers had given priority for owning vehicles like luggage auto, power tiller and tractor for transporting of farm produce of other farmers as part time business on hire basis.
As for as house, fuel and miscellaneous were concerned, initially houses were made up of bamboo, later mud walled with black tiles and houses were attached to each other in a row. After some period, attachment between houses was removed and farmers started giving priority for building walls with bricks plastered with mud or concrete and stone plastered with concrete were started. The houses were well equipped with chimneys and separate cattle shed.

Initially dried farm produce and dried tree parts were used as fuel but later Kerosene stove and pump stove were introduced in villages like Manchaladore and Kalinganahalli. After some period, few rich farmers had given high priority for using gobar gas stove and LPG stove for cooking.

In early 1980’s Radio was popular entertainment source later in early 1990s TV came into existence firstly in Manchaladore village. Telephone facility was also existed in that period.

As for as infrastructure facilities were concerned, anganwadi and higher primary school facility existed in all villages. Only Manchaladore village was blessed with all facilities like grampanchayat, ayurvedic medical hospital, anganwadi, higher primary school, high school, college, Backward Communities and Minorities(BCM) Hostel, co-operative society, library and post office. The mud road existed in all villages. In village like Manchaladore, initially transportation was through bullock cart and later through bus, luggage auto, power tiller and tractor was practiced.
4.1.2 After the introduction of Sujala Kalinganahalli Halla watershed project

Results of the study revealed the fact that after the watershed project, growth rate of population increased (Fig. 10), few farmers started giving top priority for using more high yielding and short duration varieties. Farmers started drifting towards cultivation of high remunerative horticultural crops like areca nut, banana and medicinal crops like gherkins in a large area. However, majority of farmers were still continuing earlier cropping pattern.

As for as soil and water conservation practices were concerned, there was a huge positive impact on yield of crops due to watershed activities taken under NWDPRA and Sujala watershed project. Farmers started giving priority for the new watershed practices like vegetative live hedges on contour, nalabund, rubble checks, cactus checks, *Stylosanthes hamata* vegetation, *in situ* moisture grafting and Khuss lines.

As for as crop production practices were concerned, majority of farmers continued old traditional practices. However, few changes observed in developmental priorities of some farmers, which were introduction of seed cum fertilizer drill for sowing; IPM techniques and chemical insecticides alone for insect control. The farmers had given priority for spraying of fungicides like blitox-50, bordeaux mixture to control plant diseases like mixture along with field sanitation practices such as burning of diseased twigs to control mango anthracnose. Seed treatment with thiram, brassicol was followed to control die back of chillies.

As for as harvesting and processing practices were concerned, few changes were observed like usage of groundnut decorticator and areca nut dehusker as processing instruments. The new improved flourmills started in Manchaladore village.
As for as marketing was concerned, farmers had given priority for district level market and contract farming for gherkins. Truck and railways were used as chief modes for transportation.

As for as irrigational methods were concerned, there was slight improvement in technology of drip system, sprinkler system and lifting water through bore well. Majority of farmers still depended on earlier irrigational methods. There was improvement in technology of farm implements like introduction of motor operated sprayers, bund former, clod breaker and seed cum fertilizer drill. Few farmers had given priority for owning vehicles like high capacity tractors and power tillers. However, majority of farmers still continued to use traditional implements and vehicles.

The high yielding nutritional varieties replaced most of traditional varieties as food crops. Milk from crossbred cow was introduced. Nutritional beverages like Bournvita especially for kids were high priority item in that period. Giriraja broiler became more popular as non-vegetarian food.

Income of farmers was increased due to increase in cultivation of high yielding varieties, short duration varieties and medicinal crops like gherkins along with high remunerative crops like banana and areca nut. Earning high economic profit through rearing of exotic breed Holstein Friesian was given priority in that period.

The structure of houses was improved in this period. Rich farmers had given priority for constructing RCC house with separate cattle shed. However, majority of farmers continued to build houses in earlier fashion.
The farmers had given high priority for using LPG stove, gobar gas stove along with kerosene stove, pump stove and only few farmers were still using dried farm produce as fuel. Usage of radio, TV and telephone continued whereas young farmers had given priority for using mobile phones for communication.

There were improved infrastructure facilities with introduction of veterinary hospital and ayurvedic medical hospital by Government. Tar road facility was extended to Kalinganahalli village. The number of vehicles like bus, tractor, power tiller, luggage auto and bikes increased.

4.2 PROFILE CHARACTERISTICS OF FARMERS PARTICIPATED IN WATERSHED PROJECT

A bird’s eye view of Table 4 depicts that the respondents according to the profile characteristics in the form of distribution table were given covering eight selected independent variables viz., education, decision making, empowerment, change proneness, communication behaviour, value orientation, self reliance and economic motivation. Overall view of table indicates the response to the personal profile characteristics.

To facilitate the reader to get an overall idea about the predictor variables at a glance, an attempt was made to draw each table depicting a single variable and its distribution to apprise the reader as given below.
### Table 4: Profile characteristics at a glance

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Independent variables</th>
<th>Category</th>
<th>Respondents</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Education</td>
<td>Illiterate</td>
<td>9</td>
<td>7.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Functionally literate</td>
<td>11</td>
<td>9.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Primary school</td>
<td>52</td>
<td>49.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle school</td>
<td>4</td>
<td>3.34</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school</td>
<td>17</td>
<td>14.36</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>College</td>
<td>20</td>
<td>16.66</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Decision making</td>
<td>Low</td>
<td>26</td>
<td>21.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium</td>
<td>71</td>
<td>59.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>23</td>
<td>19.16</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Empowerment</td>
<td>Low</td>
<td>20</td>
<td>16.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium</td>
<td>81</td>
<td>67.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>19</td>
<td>15.83</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Change proneness</td>
<td>Low</td>
<td>20</td>
<td>16.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium</td>
<td>78</td>
<td>65.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>22</td>
<td>18.33</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Communication behaviour</td>
<td>Low</td>
<td>15</td>
<td>12.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium</td>
<td>75</td>
<td>62.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>30</td>
<td>25.00</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Value orientation</td>
<td>Low</td>
<td>23</td>
<td>19.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium</td>
<td>69</td>
<td>57.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>28</td>
<td>23.33</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Self reliance</td>
<td>Low</td>
<td>15</td>
<td>12.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium</td>
<td>65</td>
<td>54.17</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>40</td>
<td>33.33</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Economic motivation</td>
<td>Very low</td>
<td>3</td>
<td>2.50</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low</td>
<td>1</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium</td>
<td>85</td>
<td>70.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>34</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very high</td>
<td>7</td>
<td>5.83</td>
<td></td>
</tr>
</tbody>
</table>

F = frequency   
P = percentage
4.2.1 Education

Table 5: Distribution of respondents according to education

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Illiterate</td>
<td>9</td>
<td>7.50</td>
</tr>
<tr>
<td>2</td>
<td>Functionally literate</td>
<td>11</td>
<td>9.17</td>
</tr>
<tr>
<td>3</td>
<td>Primary school</td>
<td>52</td>
<td>49.17</td>
</tr>
<tr>
<td>4</td>
<td>Middle school</td>
<td>4</td>
<td>3.34</td>
</tr>
<tr>
<td>5</td>
<td>High school</td>
<td>17</td>
<td>14.36</td>
</tr>
<tr>
<td>6</td>
<td>College</td>
<td>20</td>
<td>16.66</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>120</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Mean = 2.59 S.D. = 1.48

The data from the Table 5 and Fig.11 revealed that majority of respondents belonged to primary school (49.17%) followed by college (16.67%) high school (14.16%), functionally literates (9.17%), illiterates (7.5%) and middle school (3.34%).

4.2.2 Decision making

Table 6: Distribution of respondents according to decision making

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>26</td>
<td>21.67</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>71</td>
<td>59.17</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>23</td>
<td>19.16</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>120</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Mean = 7.09 S.D. = 2.96
The Table 6 and Fig.12 witnessed that majority of respondents have medium decision making (59.17%) followed by high (21.67%) and low (19.16%) decision making.

4.2.3 Empowerment

Table 7: Distribution of respondents according to empowerment

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>20</td>
<td>16.67</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>81</td>
<td>67.50</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>19</td>
<td>15.83</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean = 18.19  
S.D. = 2.82

The data from Table 7 and Fig. 13 revealed that majority (67.50%) of the respondents had medium empowerment followed by low (16.67%) and high (15.83%) empowerment.

4.2.4 Change proneness

Table 8: Distribution of respondents according to change proneness

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>20</td>
<td>16.67</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>78</td>
<td>65.00</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>22</td>
<td>18.33</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean = 12  
S.D. = 3.261
It could be seen from the Table 8 and Fig. 14 that majority (65%) of respondents and medium change proneness followed by high (18.33%) and low (16.67%) change proneness.

4.2.5 Communication behaviour

Table 9: Distribution of respondents according to communication behaviour

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>15</td>
<td>12.50</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>75</td>
<td>62.50</td>
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<tr>
<td>3</td>
<td>High</td>
<td>30</td>
<td>25.00</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean = 10  
S.D. = 2.44

A cursory look at Table 9 and Fig. 15 shows that majority (62.50%) of the respondents had medium communication behaviour followed by high (25%) and low (12.50%) communication behaviour.

4.2.6 Value orientation

Table 10: Distribution of respondents according to value orientation

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>23</td>
<td>19.17</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>69</td>
<td>57.50</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>28</td>
<td>23.33</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean = 6.03  
S.D. = 1.75
It is evident from Table 10 and Fig. 16 that majority (57.50%) of the respondents had medium value orientation followed by high (23.33%) and low (19.17%) value orientation.

4.2.7 Self reliance

Table 11: Distribution of respondents according to self-reliance

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>15</td>
<td>12.50</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>65</td>
<td>54.17</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>40</td>
<td>33.33</td>
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<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>120</strong></td>
<td><strong>100</strong></td>
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</tbody>
</table>

Mean =3.21  S.D .=0.65

It is clear from Table 11 and Fig. 17 that majority (54.17%) of the respondents had medium self reliance followed by high (33.33%) and low (12.50%) self reliance.

4.2.8 Economic motivation

Table 12: Distribution of respondents according to economic motivation

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very low</td>
<td>3</td>
<td>2.50</td>
</tr>
<tr>
<td>2</td>
<td>Low</td>
<td>1</td>
<td>0.84</td>
</tr>
<tr>
<td>3</td>
<td>Medium</td>
<td>85</td>
<td>70.83</td>
</tr>
<tr>
<td>4</td>
<td>High</td>
<td>34</td>
<td>20.00</td>
</tr>
<tr>
<td>5</td>
<td>Very high</td>
<td>7</td>
<td>5.83</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>120</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Mean =11.98  S.D.=2.006
Table 12 and Fig. 18 revealed that majority of respondents had medium (70.83%) economic motivation followed by high (20.00%), very high (5.83%), very low (2.50%) and low (0.84%) economic motivation.

4.3. EXTENT OF PARTICIPATION

Table 13: Distribution of respondents according to extent of participation.

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>9</td>
<td>7.50</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>77</td>
<td>64.17</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>34</td>
<td>28.33</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean =20.77          S.D.=8.159

It is clear from the Table 13 and Fig. 19 that majority (64.77%) of the respondent had medium extent of participation followed by high (28.33%) and low (75%) extent of participation.

4.3.1 Motivational meetings

Table 14: Distribution of respondents according to participation in motivational meetings.

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>13</td>
<td>10.83</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>75</td>
<td>62.50</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>32</td>
<td>26.67</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean=5.19          S.D.=2.03
It is evident from Table 14 and Fig. 20 that majority of the respondents (62.50%) had medium extent of participation in motivational meetings followed by high (26.67%) and low (10.83%) extent of participation in motivational meetings.

4.3.2 Planning

Table 15: Distribution of respondents according to extent of participation in planning

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>10</td>
<td>8.33</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>82</td>
<td>68.33</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>28</td>
<td>23.33</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean = 4.89  
S.D.=2.14

It is informed from the Table 15 and Fig. 21 that majority of respondents (68.33%) had medium extent of participation in planning, followed by high (23.34%) and low (8.33%) extent of participation in planning.
4.3.3 Implementation

Table 16: Distribution of respondents according to extent of participation in implementation

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>15</td>
<td>12.50</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>75</td>
<td>62.50</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>30</td>
<td>25.00</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean = 3.808  
S.D. = 1.48

It is evident from Table 16 and Fig. 22 that majority (62.50%) of respondents had medium extent of participation in implementation followed by high (25%) and low (12.5%) extent of participation in implementation.

4.3.4 Maintenance

Table 17: Distribution of respondents according to extent of participation in maintenance

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>5</td>
<td>4.17</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>81</td>
<td>67.50</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>34</td>
<td>28.33</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Mean = 3.26  
S.D. = 1.60
The Table 17 and Fig. 23 evident that majority of respondents (67.50%) had medium extent of participation followed by high (28.33%) and low (4.17%) extent of participation in maintenance of watershed development activities.

4.3.5 Evaluation

Table 18: Distribution of respondents according to extent of participation in evaluation

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low</td>
<td>5</td>
<td>4.17</td>
</tr>
<tr>
<td>2</td>
<td>Medium</td>
<td>80</td>
<td>66.67</td>
</tr>
<tr>
<td>3</td>
<td>High</td>
<td>35</td>
<td>29.16</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

\[ n = 120 \]

Mean=3.75 S.D.=1.59

It is evident from Table 18 and Fig. 24 that majority (66.67%) of respondents had medium extent of participation in evaluation followed by high (29.16%) and low extent of participation in evaluation.

4.4 RELATIONSHIP BETWEEN SELECTED INDEPENDENT VARIABLES AND EXTENT OF PARTICIPATION

To find out the relationship between selected eight independent variables, the zero order correlation co-efficient were worked out and the results were furnished in the Table 19.
Table 19: Correlation coefficients between independent variables and dependent variable

\[ n = 120 \]

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Independent variables</th>
<th>Correlation coefficient (r)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Education</td>
<td>0.5527**</td>
</tr>
<tr>
<td>2</td>
<td>Decision making</td>
<td>0.7254**</td>
</tr>
<tr>
<td>3</td>
<td>Empowerment</td>
<td>0.5843**</td>
</tr>
<tr>
<td>4</td>
<td>Change proneness</td>
<td>0.6623**</td>
</tr>
<tr>
<td>5</td>
<td>Communication behaviour</td>
<td>0.663**</td>
</tr>
<tr>
<td>6</td>
<td>Value orientation</td>
<td>0.5678**</td>
</tr>
<tr>
<td>7</td>
<td>Self reliance</td>
<td>0.7300**</td>
</tr>
<tr>
<td>8</td>
<td>Economic motivation</td>
<td>0.6694**</td>
</tr>
</tbody>
</table>

\[ r_{118} = 0.1730 \quad ** = 1 \text{ per cent level of significance} \]

Testing of hypothesis

Null Hypothesis (H\(_0\)) : There will be no significant relationship between the selected independent variables and dependent variable.

Empirical Hypothesis (EH) : There will be significant relationship between the selected independent variables and dependent variable.

It is clear from Table 19 that the computed correlation coefficient for education, decision making empowerment, change proneness, communication behaviour, value orientation self reliance and economic motivation was found to be 0.5527, 0.7254, 0.5483, 0.6623, 0.6632, 0.5678, 0.7300 and 0.6694 respectively. These were positively and significantly correlated with extent of participation. Hence, the null hypothesis was rejected by accepting the empirical hypothesis.
**MULTIPLE LINEAR REGRESSION (MLR) ANALYSIS**

Table 20: Relationship between profile characteristics of farmers and extent of participation in watershed project  

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Independent variable</th>
<th>Regression Coefficient</th>
<th>Standard Error</th>
<th>t Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>X₁</td>
<td>Education</td>
<td>0.3358</td>
<td>0.4079</td>
<td>0.8322</td>
</tr>
<tr>
<td>X₂</td>
<td>Decision making</td>
<td>0.5820</td>
<td>0.2673</td>
<td>0.1773*</td>
</tr>
<tr>
<td>X₃</td>
<td>Empowerment</td>
<td>-0.1054</td>
<td>0.2837</td>
<td>1.3553</td>
</tr>
<tr>
<td>X₄</td>
<td>Change proneness</td>
<td>0.3844</td>
<td>0.2837</td>
<td>1.3553</td>
</tr>
<tr>
<td>X₅</td>
<td>Communication behaviour</td>
<td>0.4003</td>
<td>0.2259</td>
<td>1.7721</td>
</tr>
<tr>
<td>X₆</td>
<td>Value orientation</td>
<td>0.2966</td>
<td>0.3737</td>
<td>0.7935</td>
</tr>
<tr>
<td>X₇</td>
<td>Self reliance</td>
<td>3.3360</td>
<td>1.0920</td>
<td>3.0599**</td>
</tr>
<tr>
<td>X₈</td>
<td>Economic motivation</td>
<td>0.9356</td>
<td>0.3140</td>
<td>2.9795**</td>
</tr>
</tbody>
</table>

Intercept = -14.82  

\[ R^2 = 0.6990 \]  

* 5% level of significant  

** 1% level of significance
**Null Hypothesis (Ho)**

All the independent variables had no significant contribution towards the variation in the dependent variable i.e., extent of participation of farmers in watershed project.

**Empirical Hypothesis (EH)**

All the independent variables had a significant contribution towards the variation in dependent variable “extent of participation” of farmers in watershed development programme.

Hence empirical hypothesis was rejected by accepting the null hypothesis. An overview of table indicates that out of eight selected variables fitted in Multiple Linear Regression (MLR), independent variable decision making was found to be contribute significantly at 0.05 level of probability with extent of participation of farmers in watershed project. The variables self reliance and economic motivation contributed significantly at 0.01 level of probability with extent of participation of farmers in watershed project.

Coefficient of Multiple Determination ($R^2$) was found to be 0.6990 indicating that all the independent variables put together could explain a variation in extent of participation of farmers in watershed project to the extent of 69.90 per cent.
### 4.5 Constraints as Perceived by Farmers in Watershed Project

**TABLE 21: Constraints as perceived by farmers in watershed project**

\[ n = 120 \]

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Constraints</th>
<th>F</th>
<th>P</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Uncertain and erratic rainfall</td>
<td>11</td>
<td>92.50</td>
<td>I</td>
</tr>
<tr>
<td>2</td>
<td>Small fragmentation of lands.</td>
<td>34</td>
<td>28.33</td>
<td>XII</td>
</tr>
<tr>
<td>3</td>
<td>Low investment capacity of farmers.</td>
<td>10.4</td>
<td>86.60</td>
<td>II</td>
</tr>
<tr>
<td>4</td>
<td>No remunerative price for farmers produce.</td>
<td>69</td>
<td>57.50</td>
<td>VII</td>
</tr>
<tr>
<td>5</td>
<td>Water ways running through holding of different farmers lead to social problems</td>
<td>80</td>
<td>66.66</td>
<td>IV</td>
</tr>
<tr>
<td>6</td>
<td>Less productivity of soil.</td>
<td>54</td>
<td>45.00</td>
<td>XI</td>
</tr>
<tr>
<td>7</td>
<td>Poor water holding capacity of soil.</td>
<td>62</td>
<td>51.67</td>
<td>VIII</td>
</tr>
<tr>
<td>8</td>
<td>Lack of adequate mechanical devices.</td>
<td>74</td>
<td>61.67</td>
<td>V</td>
</tr>
<tr>
<td>9</td>
<td>Lack of understanding and co-operation between farmers and field functionaries</td>
<td>59</td>
<td>49.70</td>
<td>IX</td>
</tr>
<tr>
<td>10</td>
<td>Recommended soil and water conservation practices were not practically feasible</td>
<td>70</td>
<td>58.33</td>
<td>VI</td>
</tr>
<tr>
<td>11</td>
<td>Inadequate draught power to carry out farm works</td>
<td>57</td>
<td>47.50</td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>Vegetative live hedges on contour, lead to operational inconveniences in farmer’s fields</td>
<td>81</td>
<td>67.50</td>
<td>III</td>
</tr>
</tbody>
</table>

F=Frequency   P=Percentage   R=Ranking
It was clear from the Table 21 and Fig. 25 that uncertain and erratic rainfall was the major constraint (92.5%) as perceived by farmers followed by low investment capacity of farmers (86.6%), vegetative live hedges on contour led to operational inconveniences (67.5%), waterways running through holdings of different farmers led to social problems (66.66%), Lack of adequate mechanical devices used for implementing watershed development practices (61.67%), recommended soil and water conservation practices were not practically feasible (58.33%), no remunerative price for farmer’s produce resulted in non-implementation of soil and water conservation practices in their fields (57.50%), Poor water holding capacity of soil discouraged the implementation of watershed activities (51.67 %), lack of understanding and co-operation between farmers and field functionaries (49.17%) inadequate draught power to carry out farm works (47.50 %), less productivity of soil was major limiting factor in adopting watershed practices, and lastly small fragmentation of land led to difficulty in implementing soil and water conservation practices (28.33%).
### 4.6 SUGGESTIONS AS PERCEIVED BY WATERSHED FARMERS TO TACKLE THE CONSTRAINTS

Table 22: Suggestions as perceived by watershed farmers to tackle the constraints

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Suggestions</th>
<th>F</th>
<th>P</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Farmer’s co-operation with each other is necessary.</td>
<td>57</td>
<td>47.5</td>
<td>II</td>
</tr>
<tr>
<td>2</td>
<td>Government has to announce minimum support price / better price for their product in market.</td>
<td>26</td>
<td>21.67</td>
<td>V</td>
</tr>
<tr>
<td>3</td>
<td>Use of efficient mechanical devices for implementing watershed activities.</td>
<td>52</td>
<td>43.33</td>
<td>III</td>
</tr>
<tr>
<td>4</td>
<td>Co-operation between farmers and field functionaries of the watershed project is required.</td>
<td>43</td>
<td>35.83</td>
<td>IV</td>
</tr>
<tr>
<td>5</td>
<td>The soil and water conservation practices recommended by watershed Development Department should be practically feasible.</td>
<td>10</td>
<td>8.33</td>
<td>VII</td>
</tr>
<tr>
<td>6</td>
<td>Increasing the efficiency of draught power .</td>
<td>12</td>
<td>10</td>
<td>VI</td>
</tr>
<tr>
<td>7</td>
<td>Financial aid from banks viz., Nationalised, Co-operative for implementing watershed practices.</td>
<td>63</td>
<td>52.5</td>
<td>I</td>
</tr>
<tr>
<td>8</td>
<td>Increasing the land holding by avoiding fragmentation of lands.</td>
<td>8</td>
<td>6.67</td>
<td>VIII</td>
</tr>
<tr>
<td>9</td>
<td>Huge capital investment is necessary .</td>
<td>7</td>
<td>5.83</td>
<td>IX</td>
</tr>
</tbody>
</table>

F=Frequency     P=Percentage     R=Ranking
It was evident from the Table 22 and Fig. 26 that financial aid from banks *viz.*, Nationalised, co-operative, for implementing watershed practices (52.50%) followed by farmer’s co-operation with each other (47.50%), usage of efficient mechanical devices (43.33%), co-operation between farmers and field functionaries of watershed project (35.23%), government must announce minimum support price or better price for their produce in market (21.67%), increasing the efficiency of draught power (10%), recommendation of soil and water conservation practices by Watershed Development Department should be practically feasible (8.33%), increasing the land holding by avoiding fragmentation of lands (6.67%) and huge capital investment is necessary for implementing watershed development practices (5.83%) were the suggestions perceived by respondents to tackle the constraints in watershed project.

### 4.7 FIGURATIVE STRATEGY FOR WATERSHED DEVELOPMENT

One of the objectives of study was to suggest a figurative strategy for watershed according to constraints and suggestions as perceived by watershed farmers and with the vision of researcher. Details of developed strategy over a paradigm were discussed under the discussion chapter.
Fig. 10: Population chart
Fig. 11 : Distribution of respondents according to education

Fig. 12 : Distribution of respondents according to decision making
Fig. 13: Distribution of respondents according to empowerment

Fig. 14: Distribution of respondents according to change proneness
Fig. 15: Distribution of respondents according to communication behaviour

Fig. 16: Distribution of respondents according to value orientation
Fig. 17: Distribution of respondents according to self reliance

Fig. 18: Distribution of respondents according to economic motivation
Fig. 19 : Distribution of respondents according to extent of participation

Fig 20 : Distribution of respondents according to extent of participation in motivational meetings
Fig. 21: Distribution of respondents according to extent of participation in planning
Fig. 22: Distribution of respondents according to their extent of participation in implementation

Fig. 23: Distribution of respondents according to extent of participation in maintenance
Fig. 24: Distribution of respondents according to extent of participation in evaluation
Uncertain and erratic rainfall
Small fragmentation of lands
Low investment capacity of farmers
No remunerative price for farmers' produce
Problems different farmers leading to social
Waterways running through holdings of
Less productivity of soil
Poor water holding capacity of soil
Lack of adequate mechanical devices
Lack of understanding and co-operation
Practically feasible conservation practices were not
Recommended soil and water
Ram works
Dependable draught power to carry out the
Vegetative live hedges on contour

Fig. 25: Constraints as perceived by farmers in watershed project
Farmer’s co-operation with each other is necessary. Government has to announce minimum support price or better price for their product in market. Use of efficient mechanical devices for implementing watershed activities is required. Co-operation between farmers and field functionaries of the Watershed Development Programme is necessary. The soil and water conservation practices recommended by Watershed Development Department should be practically feasible. Increasing the efficiency of draught power to carry out watershed activities is necessary. Financial aid from banks viz., Nationalised, co-operative for implementing watershed activities is required. Increasing the land holding by avoiding fragmentation of lands is necessary. Huge capital investment is necessary.

Fig. 26: Suggestions as perceived by watershed farmers to tackle the constraints.
CHAPTER - V

DISCUSSION

In Chapter V the contents of the previous chapters were used as raw material. The findings were looked at and interpreted in relation to the reputed findings of other researchers investigations. It also contains the conclusions drawn for the study, which is variously referred to as generalizations, implications inference, interpretations, recommendations etc. These are presented under the following heads.

5.1 Historical perspective emphasizing the developmental priorities of farmers in watershed project.

5.2 Profile characteristics of farmers in watershed project

5.3 Extent of participation of farmers in watershed project

5.4 Relationship between selected independent variables and extent of participation

5.5 Constraints as perceived by farmers in watershed project.

5.6 Suggestions as perceived by farmers in watershed project.

5.7 Figurative strategy for watershed development.

5.8 Empirical model of study
5.1 HISTORICAL PERSPECTIVE EMPHASIZING THE DEVELOPMENTAL PRIORITIES OF FARMERS IN SUJALA KALINGANAHALLI HALLA WATERSHED PROJECT

5.1.1 Population

Based on results obtained in previous chapter, it could be inferred that growth rate of population was found to be high after the introduction of Sujala Kalinganahalli Halla watershed project. The reason for this trend might be increased medical facilities of ‘ayurvedic hospital’ which prevented mortality rate and consumption of nutritious food made them to live longer.

5.1.2 Crops and cropping pattern

On perusal of results about crops and cropping pattern, majority of farmers continued to grow earlier varieties of crops with few exceptions like growing horticulture crops like banana, areca nut and gherkins rather than food crops. The attitude of farmers towards achieving higher economic profits and confidence to grow successfully by implementing good watershed technologies was the elicited reason for this trend. Similar findings were recorded by Lokesh (2004) and Desai et al. (1997).

5.1.3 Soil and water conservation practices

A close observation of results on soil and water conservation practices gave a clear indication of the fact that after the watershed project, a considerable impact on yield of crops occurred due to watershed activities taken under NWDPRA and Sujala watershed project. The farmers started giving priority for new watershed practices like nalabunds, vegetative live hedges on contour, rubble checks and growing Stylosanthes hamata vegetation.
The plausible reason for this might be the participation of farmers in motivational meetings, interaction with different sources of information and high extent of utilization of recommended watershed technologies. Similar findings were reported by Prasad reddy et. al. (2003).

5.1.4 Crop production practices and marketing

As for as package of practices and marketing were concerned results shown that before introduction of watershed project sowing was done though broadcasting, putting seeds in furrows after tillage, dibbling, use of hand seed drill. Top priorities for insect control had given to hand picking, flooding, draining, cultural practices like use of trap crops, crop rotation and mixed cropping along with use of chemical insecticides like endosulfan, carbaryl, malathion and DDT.

Disease control was mainly done through field sanitation, crop rotation, early sowing, and usage of disease resistant varieties. The chemical fungicides like bavistin and carboxin were used to control grain smut of sorghum.

A close look at the results obtained by harvesting and processing revealed that sickle was the main harvesting equipment. However, earlier processing instruments continued. Shape of sieves was improved. Stone roller was used for threshing and flour mill for powdering of farm produce.

Top priority for marketing had given to local shandy market by farmers. They were carrying their produce by hand or through bullock cart. Farmer’s priority given for taluk level APMC market. Tractor, power tiller and mini truck were considered as chief modes of transport.
After the introduction of watershed project, earlier practices of sowing, insect control, disease control, harvesting and marketing were continued but only few changes occurred which were, usage of seed cum fertilizer drill for sowing, IPM practices for insect control, use of fungicides like blitox-50, bourdeaux mixture along with cultural methods along with field sanitation, burning for twigs for control of mango anthracnose, seed treatment with thiram and brassicol to control die back of chillies were given high priority. Areca nut dehusker and groundnut decorticator were used for processing. Farmers had given top priority for contract farming methods for gherkins, district level market for marketing; truck and railways for transportations.

5.1.5 Manures and fertilizers

It was observed from the results that before introduction of watershed project, the manures like FYM, sheep manure, chemical fertilizers, slurry obtained from gobar gas plant and vermi compost were given priority to apply in their fields. After introduction of watershed project, bio fertilizers were applied by few farmers in their fields. The high priority was given by farmers to bio fertilizers like rhizobium, BGA, azatobacter, azo spirillum. The elicited reason for this trend might be cheap cost and higher efficiency of bioferilizers.

5.1.6 Sources of irrigation and irrigational methods

It was evident from the results that farmer’s top priority for traditional irrigational methods was continued but only change observed after implementation of watershed project was few farmers priorities changed towards adopting improved technology of drip system, sprinkler irrigation and lifting of water through bore well. The plausible reason for this might be high
priority given by few farmers to adopt improved technology to achieve higher economic profits. The finding was in relation with finding of Rath and Mohapatra (1996).

5.1.7 Farm implements and farm vehicles

The results revealed the fact that majority of farmers had given top priority for using indigenous implements. Some of the farmers started giving high priority for using implements like motor operated sprayer, bund former clod breaker and seed cum fertilizer drill replaced indigenous implements. Vehicles like tractors and power tillers rather than bullock carts. Some of the farmers from time to time heard about several agricultural practices, implements and vehicles and tried to adopt them. This might have contributed for the observed trend.

5.1.8 Food habits

It was evident from results that before introduction of the watershed project, farmers priorities for consumption of cereals like ragi jowar, wheat, rice; pulses, like redgram, blackgram and green gram; vegetables like tomato, chilli, and bhendi were continued as vegetarian food with beverages like coffee, tea and milk. Non vegetarian food like sheep meat and chicken were given a high priority before introduction of watershed project. Improved high yielding varieties of crops, Holstein Friesian cow’s milk as vegetarian and giriraja broiler as non vegetarian food were considered as the main food habits of the farmers after the implementation of watershed project. The reason for this change in food habits might be increase in self reliance of people to grow more high yielding varieties, maintaining the exotic breed of cattle and by
conserving water through effective watershed activities to gain high economic profits. The finding was in relation with findings of Desai et. al. (1997) and Mohad et. al. (1997).

### 5.1.9 Sources of income

On close observation of results it could be inferred that after watershed project sources of income were increased as the farmers drifted from agriculture to horticulture and also with the introduction of new high yielding varieties and short duration varieties. Medicinal crops like gherkin cultivation on contract basis were given high priority which raised the profits. Holstein Friesian cow introduction had given high economic profits. The high economic motivation might be the reason for this trend. However, majority of farmers still had given priority for traditional sources of income. There is a need to motivate them by a new income generating activities and attract them to the side of development. The findings were in correlation with earlier findings of Chaitanya kumari et. al. (2003).

### 5.1.10 House, fuel and miscellaneous

The results revealed the fact that period the introduction of watershed project saw a few changes like rich farmers drifted towards RCC houses LPG Stove, gobar gas stove for cooking; mobile phones for communication. However, majority of them lived in traditional houses like mud bricks and stone walled houses and dependent on dried farm produce, kerosene stove, pump stove for cooking and entertainment sources like radio and TV. The possible suggestions to improve their condition might be empowering them by providing higher education facilities and high exposure to mass media, so that they can think of good life style.
5.1.11 Infrastructure and transport facilities

It was evident from results that watershed project had indirect effect on improvement of some of the infrastructure facilities in villages under study. Before the introduction of the watershed project, HPS and anganwadi facilities existed in all villages; vehicles like tractor, luggage auto, power tiller and bikes; education facilities like HPS, anganwadi, high school, college, BCM hostel, library, co-operative society, post office and grampanchayat; ayurvedic medical hospital and tar road facility in Manchaladore village were existed. The change occurred after the watershed project was introduction veterinary hospital and tar road facility to Matha and Kalinganahalli village; increase in vehicles like bus, tractor, power tiller luggage auto and bikes. Most of the infrastructural facilities remain unchanged due to watershed project as they were the works of other developmental departments.

5.1.12 Projections for next ten years

Based on the results obtained in the previous chapter about developmental priorities of farmers projections for next decade were made which is presented below.

- Growth rate of population is expected to increase

- Farmers priorities for intercropping of sorghum / pigeonpea, ragi / sorghum, pigeonpea / groundnut along with cultivation of gherkins and banana are expected in wide spread area.
- Introduction of new watershed practices like crescent bund, grass turfing, gabian structure, ‘V’.trenches, nala stabilization, nala diversion, roof water harvesting and graded bund are expected.

- Farmers priorities to drip method is expected to continue and introduction of improved check basin method for crops like coconut, paddy which acted as cheap method of irrigation is expected.

- Farmers priorities to seed cum fertilizer drill for sowing IPM practices along with chemical insecticides for insect control, chemical fungicides for plant disease control are expected to continue for next ten years.

- Top priority for sickle for harvesting, arecanut dehusker, groundnut decorticator for processing are expected to continue. The introduction of tractor mounted sprayers and tractor mounted cultivators are expected largely in next decade which proved larger farm operations with less drudgery and in quick period of time.

- Area under contract farming is expected to increase. Farmers priority for state level markets are expected in next ten years.

- Farmers top priority for tractor and power tiller for farm operations are expected to continue for next decade.

- Processed products like atta, jams and other products from agro based industries may be introduced in next decade but most of the earlier food habits are expected to continue.
Farmers top priority for poultry and dairy enterprises are expected in next decades as they are providing better profits. Contract farming of gherkins is expected in wide spread area.

Farmers priorities for constructing house with roof water harvesting, well structured cattle shed and tractor parking is expected in the next decade. Continuation of gobar gas stove, LPG stove solar cooker for cooking and extensive usage of mobile phones for communication are expected in next decade.

The education facilities up to college and tar road facilities to all villages are expected in next ten years.

5.2 PROFILE CHARACTERISTICS OF FARMERS IN WATERSHED PROJECT

5.2.1 Education

From the Table 5, it was evident that majority of the respondents (49.17%) studied up to primary school followed by college (16.77%), high school (14.16%), functionally literates (9.17%), illiterates (7.50%) and middle school (3.34%). The reasons for this trend could be non-availability of higher educational facilities in villages under study and poor economic situation of farmers prevented them from going to college in nearby town. Therefore efforts should be made for creating awareness about functional literacy and adult education. The finding is in concurrence with finding of Sumana (1996).
5.2.2 Decision making

From Table 6, it could be inferred that majority of respondents (59.17%) had medium decision making followed by low (21.67%) and high (19.16%) decision making. The plausible reasons for this trend might be majority of farmers had lower education level, less aware about choosing suitable kind of watershed activities in their own field and were average at self reliance. The finding was in concurrence with the finding of Chaitanya kumari et al. (2003).

5.2.3 Empowerment

Results presented in Table 7 revealed that majority of respondents had (67.50%) medium empowerment followed by low (16.67%) and high (15.83%) empowerment. The plausible reasons for this trend might be the majority of farmers were having average level of education, awareness about health and nutrition and co-operation with each other. They were having medium awareness about new watershed technologies. The empowerment of farmers could be done by giving quality education formally or informally. The finding is related with early finding of Singh and Ushakumari (2007) and Sunetha (2007).

5.2.4 Communication behaviour

The Table 9 revealed that majority (62.5%) of respondents had medium communication behaviour followed by high (25.00%) and low (12.50%) communication behaviour. Majority of farmers were medium at friendliness, solving problems by discussing with neighbors and giving solutions to
neighbour’s problems. This might be the reason for medium communication behaviour.

However, a few farmers were having high communication behaviour had friendliness and were willing to give and take help from neighbour farmers about watershed activities. It might be the possible reason for this trend.

A few farmers had low communication behaviour which could be removed by increasing their self confidence, removing mutual hatredness by involving them in group activities like selection of members for village development community, selection of crop loan beneficiaries and collectivization for community work. Similar trend was observed by Deshmukh and Chole (2003).

5.2.5 Change proneness

The result furnished in the Table 8 indicated that majority (65%) of the respondents, had medium change proneness followed by low (16.67%) and high (18.33%) change proneness. Sticking to old traditions practices and medium level acceptance of modern watershed technologies by farmers were appeared to be the possible reasons for large percentage of middle change proneness. However, few farmers who were having innovative nature had high change proneness but a few farmers having reserved nature towards old traditional practices had low change proneness Similar trend was observed by Sridevi (2003).
5.2.6 Value orientation

It is evident from Table 10 that majority (57.50%) of the respondents had medium value orientation followed by high (23.33%) and low (14.17%) value orientation. Frequent contact with information sources and positive mental attitude towards improved watershed technologies and knowledge of few farmers about them were the elicited reasons for high value orientation. However, majority of farmers were average in this respect. The possible solution to improve farmers having low value orientation could be conducting need based and value oriented training programmes and informal education through extension workers of Governmental and Non-Governmental organizations.

5.2.7 Self reliance

It is clear from Table 11 that majority (54.17%) of respondents had medium self reliance followed by high (33.33%) and low (12.50%) self reliance. The perusal of the study is an indicative of the fact that majority of respondents were found to be at medium self reliance because of less education and were not aware of bank loans for agriculture. The remedies could be educating them through adult education programmes and conducting awareness generating programmes by Non-Governmental organizations. The findings were in relation with Singh and Ushakumari (2007).

5.2.8 Economic motivation

The Table 12 depicts that majority (70.83%) of farmers had medium economic motivation followed by high (20.00%) very high (5.83%), very low (2.5%) and low (0.84%) economic motivation. The majority of farmers had
medium economic motivation. The reasons for this trend might be less education, no proper awareness about micro credit programmes. Farmers having high economic motivation were willing to take calculated risks like hiring improved mechanical devices like clod breaker, slit type blade harrow, multi furrow opener and tractor for their field operations. The farmers having very high economic motivation were big farmers and dare enough to invest huge capital on construction of permanent watershed practice like farm pond in their fields and were interested in purchase of mechanical devices and tractor for field operations. The reasons for farmers with low and very low economic motivation might be less education, less exposure to modern agricultural technologies and the remedies for this could be improvement in their education level, financial aid from banks, co-operation and guidance by improved farmer neighbors. Similar findings were also observed by Chaitanya kumari et. al. (2003) and Bhagya lakshmi et. al. (2003).

5.3 EXTENT OF PARTICIPATION

From the Table 13, it could be inferred that majority (64.17%) of farmers had medium extent of participation followed by high (28.33%) and low (7.5%) extent of participation. The similar trend was observed in profile characteristics of farmers and hence the same result reflected in their participation in watershed activities. The reasons for high extent of participation might be collective effort from Watershed Development Department and Non Governmental organizations which were directly related to people and convinced them to participate in watershed activities. The encouragement and proper suggestion by fellow farmers also might have contributed for farmer’s participation in watershed project. The finding is in conformity with findings of Patil (2006) but in few cases the communication
gap and less co-ordination between farmers and field functionaries of project might have contributed for low extent of participation of farmers in watershed project.

5.3.1 Motivational meetings

It was clearly noticed from Table 14 that majority (62.50%) of respondents had medium extent of participation in motivational meetings followed by high (26.67%) and low (10.83%) extent of participation in motivational meetings. More than half of the respondents understood the concept of watershed development and were willing to discuss their problems with neighbour farmers, officials and field functionaries of project but their participation was observed at medium extent due to busy schedules of their farm works and personal problems. However, a few respondents who were enthusiastic, attended motivational meetings regularly in spite of their busy schedule in farm works. The high economic motivation and communication behaviour might have contributed mainly for their high extent of participation. But a few respondents had low extent participation due to their reserved character and trust in old traditional ways of agriculture and poor economic conditions. Improved farmers and village leaders should encourage these farmers to participate in motivational meetings to discuss their problems and doubts regarding soil and water conservation practices.

5.3.2 Planning

It was visible from Table 15 that majority of respondents (68.33%) had medium extent of participation followed by high (23.33%) and low (8.33%) extent of participation in planning of watershed activities. A perusal of study
gave a clear indication of the fact that planning was the function of many parameters like knowledge, confidence level, responsibilities bearing capacity.

It was observed that majority of respondents were average in these parameters and their extent of participation was medium. However, some of the respondents had favourable condition regarding these parameters and hence their extent of participation was observed high in planning of watershed activities. Possible remedies to increase the extent of participation of few respondents who were having un favourable conditions regarding these parameters which decide the planning could be greater exposure to mass media, encouragement from neighbours and education which might bring them at high extent of participation in planning of watershed activities.

5.2.3 Implementation

It was evident from Table 16 that majority of respondents (62.50%) had medium extent of participation followed by high (25.00%) and low (12.50%) extent of participation in implementation of watershed activities. Factors like adoption of recommended watershed practices, contribution of land, labour, money and participating in group discussions were related to implementation. However, majority of farmers showed average level of interest and participation regarding these factors due to their economic situation prevented them from trying modern technologies in their fields but some of the respondents with comfortable economic situation and educated were participated to high extent and achieved high economic profits.

The attention should be paid by governmental and non-governmental organizations by extending financial aid, conducting awareness campaigns and conducting result demonstrations to remove evils like poverty and ignorance
about new watershed technologies which were the main reasons for low extent of participation in implementation of watershed activities.

5.3.4 Maintenance

Results presented in Table 17 indicates that majority (67.50%) of respondents had medium extent of participation followed by high (28.33%) and low (4.17%) extent of participation in maintenance of watershed structures and assets. The study revealed that maintenance was related to many factors such as social responsibility, literacy level, friendliness and community feelings of respondents. Majority of them were at medium level in these aspects but a few friendly, educated respondents were at high level in these aspects and were interested to maintain watershed assets. The immediate attention should be paid by Watershed Development Department and NGO’S to create awareness about watershed assets and explain importance of these assets in gaining good yields and achieving economic profits.

5.3.5 Evaluation

It was visible from Table 18 that majority (67.50%) of the respondents had medium extent of participation followed by high (29.16%) and low (4.17%) extent of participation in evaluation of watershed project. The reasons for medium extent of participation might be the medium communication behaviour and economic motivation of respondents were highly interested in providing feedback, sharing past experiences with present results and their participation in evaluation was found to be high. The reasons for low extent of participation might be illiteracy, poverty, less economic motivation which have to be removed by constant efforts of village organizations such as SHG’S and village development committee.
5.4 RELATIONSHIP BETWEEN SELECTED INDEPENDENT VARIABLES AND EXTENT OF PARTICIPATION

5.4.1 Education Vs Extent of participation

The perusal of Table 19 indicated that education had positive and significant relationship with extent of participation of farmers in watershed project. Education enables farmers to acquire new knowledge about watershed activities. It helps in identifying the needs and problems of farmers in watershed development project. The educated farmers normally shows tendency of high participation in watershed activities. Similar findings were recorded by Chatterjee and Reddy (2002).

5.4.2 Decision making Vs Extent of participation

An overview of Table 19 indicated that decision making was found to be positively and highly significantly related with extent of participation of farmers in watershed project. Choosing suitable kind of watershed development practices among possible alternatives by interacting with officials and fellow farmers creates a sense of responsibility in adopting and evaluating the result of new chosen practice. A proper decision making always result in good results which enables farmers to participate more in watershed activities to adopt further watershed practices. This finding was in conformity with findings of Mahindra et. al. (2004).

5.4.3 Empowerment Vs Extent of participation

The Table 19 fortify that empowerment showed positive and highly significant relationship with extent of participation. The reason for this type of
relation could be due to the fact that the farmer’s empowerment through education and financial assistance enables them to acquire new knowledge about watershed technologies and adopt them in their fields which result in their high extent of participation in watershed project.

5.4.4 Communication behaviour Vs Extent of participation

It was seen from Table 19 that communication behaviour had positive and highly significant relationship with extent of participation of farmers in watershed project. Discussion with co-farmers and get the doubts clarified about new soil and water conservation practices creates a sense of friendliness and provokes them to implement good watershed practices in order to win respect from other farmers. As a result, their extent of participation in watershed project increases. This might be the possible reason for such type of relation between communication behaviour and extent of participation. Similar findings were recorded by Kaushik Verma (1995).

5.4.5 Change proneness Vs Extent of participation

It was evident from Table 19 that there is a positive and highly significant correlation of change proneness with a extent of participation of farmers in watershed project. Change proneness of farmers makes them to be aware of new soil and water conservation practices and provokes them to adopt them in their fields. Hence, farmers having high change proneness participate more in watershed activities. The findings were in relation with findings of Kaushik Verma (1995).
5.4.6 Value orientation Vs Extent of participation

It is clear from Table 19 that value orientation was found to be positively and highly significantly related with extent of participation of farmers in watershed project. It implies that more the value orientation of farmers more will be the extent of participation. This trend might be due to the fact that frequent control with different sources of information enables the farmer to grasp fact about useful watershed practices, analyse, interpret them in proper way and try to adopt them to get high returns.

5.4.7 Self reliance Vs Extent of participation

It was seen from Table 19 that self reliance had positive and highly significant relationship with extent of participation of farmers in watershed project. A self reliant farmer will have a faith on his capabilities and interact with co-farmers and officials about improved watershed practices and try to implement on his own cost. This might be the reason for this type of relation.

5.4.8 Economic motivation Vs Extent of participation

The Table 19 revealed that economic motivation had positive and highly significant relationship with extent of participation of farmers in watershed project. A farmer with high economic motivation work towards adopting latest worthful watershed activities to maximise yield and gain economic profits. This might be the reason for the type of relation showing higher economic motivation of farmers leaded to higher extent of participation in watershed project.
5.4.9 Multiple Linear Regression (MLR) analysis of extent of participation of farmers and eight selected independent variables

It was observed from Table 20 that coefficient of Multiple Determination (R²) was found to be 0.699 indicating that all the independent variables put together could explain variation in extent of participation of farmers in watershed project to the extent of 69.90%. The computed ‘F’ value for ‘R’ was found to be 32.31 with 8 and 11 degrees of freedom.

Out of 8 selected variables fitted in Multiple Linear Regression (MLR), independent variable decision making was found to be contributed significantly at 0.05 level of probability and independent variables self reliance and economic motivation contributed very significantly at 0.01 level of probability with extent of the participation of farmers in watershed project.

It could be concluded from the finding that the decision making, self reliance and economic motivation were the predictors of extent of participation of farmers in watershed project. Though these three independent variables are predictive of extent of participation, the other characteristics of farmers can not be ignored because of their interaction effects.

5.5 CONSTRAINTS AS PERCEIVED BY WATERSHED FARMERS

The detailed study of Table 21 gave a clear indication of the fact that there were twelve noticeable constraints observed during study which are explained below. Uncertain and erratic rainfall was the first major constraint (92.5%). and there were possibilities of incurring losses by farmers due to failure of monsoons after watershed practices carried out. The findings were in line with findings of Sumana (1996).
Other constraints include

Low investment capacity of farmers (56.6%) hindered the activities of watershed project. Poor farmers were not willing to take economical risk due to possibilities of crop failure.

Vegetative live hedges on contour lead to operational inconveniences (67.5%). The plausible reason for this might be non availabilities of proper instruments to work on contour and live hedges prevented continuity of field operations.

Running water ways through holdings of different farmers lead to crop damage and wastage of land resulted in quarrel (66.66%).

Lack of adequate farm mechanical devices (61.67%) like mouldboard plough, bund former, clod breaker, multi furrow opener, bullock drawn harrow, blade and tyne combined harrow to carry out effective watershed practices. The findings were in relation with the findings of Khalache (1994).

Recommended soil and water conservation practices like cactus checks, were not practically feasible and were damaged within short duration of time (58.33%).

No remunerative price for farmer’s produce (57.5%). Lack of good marketing facilities and transport facilities for perishable commodities were possible reasons for this problem. The findings were in relation with findings of Singh and Rajput (2000).

Poor water holding capacity of soil and possibilities of crop failure due to delayed rains (51.67%).
Lack of understanding and co-operation between farmers and field functionaries (49.17%). It was due to communication gap between them.

Inadequate draught power to carry out watershed practices (47.5%). The probable reasons for this might be lack of pasture for grazing and poor economic condition of farm prevented them to bring artificial feeds to their bullock.

Less productivity of soil (45%). The reasons for this might be salinity and improper farming practices. The finding was in relation with earlier finding of Sumana (1996).

Small and fragmented land holdings (28.33%). It prevented farmers from carrying out watershed practices like construction of farm pond, chute spillways and nalabunds.

5.6 SUGGESTIONS AS PERCEIVED BY WATERSHED FARMERS TO TACKLE THE CONSTRAINTS

The perusal of the research arrived at suggestions as perceived by watershed farmers to tackle the constraints and were depicted in the Table 22. The close observation of table revealed that first major suggestion (52.5%) was financial aid from banks for implementing watershed activities might encourage farmers to adopt watershed practices. The finding was in relation with earlier finding of Atchutaraju and Murty (2000). Other suggestions include:

Co-operation between farmers (47.5%). The participatory projects like watershed development could become successful only when people work
together with greater co-operation was the central theme of the suggestion. Similar findings were observed by Praveen and Pochaiah (1998).

Use of efficient mechanical devices (43.33%). Farmers expressed that devices like Mould board plough and bund former which helps in performing watershed activities quickly and efficiently. The finding was in relation with finding of Khalache (1994).

Co-operation between farmers and field functionaries (35.83%). Farmers perceived that this might help in implementing watershed practices effectively. Government has to announce minimum support price or better price for their product in market (21.67%). This will encourage farmers in implementing watershed activities which are cost initiative.

Increasing the efficiency of draught power (10%), so that farm work has to be carried out efficiently and effectively.

Recommendation of practically feasible soil and water conservation practices (8.33%) by Watershed Development Department which enable them to have a trust on field functionaries.

Increasing the land holding by avoiding fragmentation of land to carry out watershed activities (6.67%). The suggestion reflects the foresight, constructive attitude of few farmers.

Huge capital investment to carry out watershed activities (5.83%) so that permanent watershed practices carried out which could sustain for so many years.
5.7 FIGURATIVE STRATEGY FOR WATERSHED DEVELOPMENT

One of the objectives of the study was to develop a figurative strategy for watershed development. It will assist Watershed Development Department and Non-Governmental organization for implementing the future watershed projects efficiently and effectively according to needs and wishes of farmers who are direct stakeholders in watershed project. So, based on constraints and suggestions as perceived by watershed farmers coupled with researcher vision, the figurative strategy was formulated as given below.

5.7.1 Constraints identification

The first task was thorough analysis of constraints identified by farmers and prioritize the constraints which they faced while participating in watershed project. The constraints identified by farmers were listed below.

1. Uncertain and erratic rainfall.
2. Low investment capacity of farmers
3. Vegetative live hedges on contour leaded to operational inconveniences in farmer’s fields.
4. Waterways running through holding of different farmers leaded to social problems.
5. Lack of adequate mechanical devices.
6. Recommended soil and water conservation practices were not practically feasible.
7. No remunerative price for farmer’s produce.
8. Poor water holding capacity of soil.
9. Lack of understanding and co-operation between farmers and field functionaries.

10. Inadequate draught power to carry out watershed practices.

11. Less productivity of soil.

12. Small and fragmented lands.

**5.7.2 Suggestions as perceived by farmers to tackle the constraints**

1. Financial and from banks viz., Nationalized, co-operative for implementing watershed practices.

2. Farmer’s co-operation with each other is necessary.

3. Use of efficient mechanical devices for implementing watershed activities.

4. Co-operation between farmers and field functionaries of watershed project.

5. Government has to announce minimum support price or better price for their product in market.

6. Increasing the efficiency of draught power to carry out watershed activities.

7. The soil and water conservation practices recommended by Watershed Development Department should be practically feasible.

8. Increasing the land holding by avoiding fragmentation of land to carry out watershed activities.

9. Huge capital investment is necessary for carrying out efficient watershed activities.
5.7.3 **Figurative strategy for watershed development**

In case of more number of constraints and suggestions, normally a relation existed between a specific constraint and suggestion perceived by farmers. The geographical, biological, social, economical feasibilities of suggestions have to be closely examined.

So, keeping this in view, a figurative strategy (Fig. 27) was developed for watershed development which is depicted below.

1. Geographical, climatic survey including slope of land, soil type, rainfall be conducted by Watershed Development Department before implementing the watershed projects.
2. The brief history of earlier watershed activities carried out is that area must be clearly assessed.
3. Watershed development project must be preferably carried out in degraded lands, areas with acute shortage of water, and area inhabited mainly by economically poor people.
4. Watershed development project should aim at removing poverty by increasing productivity of land and generate employment by involving participation of farmers inhabiting the area.
5. Planning the watershed activities in such way that they should be practically feasible, economically viable and should be in line with needs of farmer.
6. Implementing watershed activities with efficient mechanical devices, which are cost effective and providing financial assistance to farmers to purchase them to carry out watershed activities in their fields.
7. Proper technical guidance should be given from Watershed Development Department and field functionaries so that farmers should carry out watershed activities in their fields without hindrance.

8. Conducting awareness campaigns through Governmental organizations and Non – Governmental Organizations (GO-NGO) about improved watershed activities, income generating activities, animal husbandry practices and teaching about the importance of co-operation between farmers in implementing participatory projects like watershed development and maintaining watershed assets.

9. Monitoring and evaluation by experts by getting proper feed back from farmers and opinion leaders.

10. Government has to announce minimum support price for farmer’s produce and should provide subsidy for inputs.

5.8 EMPIRICAL MODEL OF THE STUDY

The Fig. 28 showed that profile characteristics of farmer’s viz., education, decision making, empowerment, communication behaviour, change proneness, value orientation, self reliance, economic motivation had positive significant relationship with extent of participation. This thereby concluded that all these characteristics increase the extent of participation of farmers in positive direction.
Respondents

FARMERS PARTICIPATED IN WATER SHEED PROJECT

Independent variables

Education
Decision making
Empowerment
Communications behaviour
Change proneness
Value orientation
Self reliance
Economic motivation

Dependent variable

Extent of Participation

Fig. 28 Empirical model of the study
CHAPTER – VI

SUMMARY

India blessed with rich natural resources with total geographical area of 329 m² ha out of which 187 m² ha of land in India is degraded due to misuse, unscientific cultivation practices. The similar scenario is observed in Karnataka. This state has total geographical area of 19.0 m² ha. The net cultivated area is 10.41 m² ha. Percent of net irrigated area to net cultivated area is 25.4%. Conservation programmes for natural resources to sub serve primary production on the basis of watershed has been existence since long time, but it became popular in eighties where large number of model watersheds under National Watershed Development project (NWDP) were launched in the country. Watershed projects are meant to check soil erosion. Optimum rainwater utilisation encourage pattern of land use and cropping and agronomic practices, which will enhance the production potential in an integrated approach. During 1991-92 National Watershed Development Programme for Rainfed Areas (NWDPRRA) started aiming at conservation, development of natural resources by restoring ecological balance in the degraded and fragile rain fed ecosystem and thereby enhance the agricultural productivity.

In Karnataka, Centrally Sponsored Scheme (CSS), State Sector Scheme (SSS), District Sector Scheme (DSS) and externally aided schemes like DANIDA, Swiss, British assisted projects brought remarkable progress in up gradation of land, increasing underground water level and conservation of natural resources.
The ‘Sujala’, which was operated in the State from 2001 to 2007 in five districts enabled rural people in rainfed regions to prevent, arrest and reverse the degradation of natural resources particularly land and water so as to produce biomass in a sustainable and equitable manner and thus became popular. The project comprises of participation of farmers and generated massive employment opportunities. It is generally accepted that farmer inhabiting the area and have a genuine stake in local resource should participate in watershed project. Keeping this in view, present study entitled, ‘A study on participation of farmers in Sujala Kalinganahalli Halla watershed of Tumkur district of Karnataka’ was designed with following specific objectives.

6.1 OBJECTIVES OF THE STUDY

1. To trace the historical perspective emphasizing the developmental priorities of farmers in Sujala Kalinganahalli Halla watershed project.

2. To study the profile characteristics of farmers in watershed project.

3. To assess the participation of farmers in watershed project.

4. To unearth the relationship between participation and profile characteristics of watershed farmers.

5. Constraints and suggestions as perceived by watershed farmers so as to develop a figurative strategy for watershed development.
6.2 SAMPLING PROCEDURE

The study was conducted by ex-post facto research design. Tumkur district in Karnataka was purposively selected as researcher is well acquainted with the area, Kalinganahalli Halla sub watershed selected purposively and out of ten micro watersheds, four were selected randomly. The villages Manchaladore and Nalluru; Yaraballi and Jogihalli; Kalinganahalli, and Matha were selected for Manchaladore, Yaraballi, Kalinganahalli, and Matha micro watersheds respectively. The proportionate random sampling procedure was followed for selection of one twenty respondents.

The Independent variables education, decision making, empowerment, communication behaviour, change proneness, value orientation, self reliance and economic motivation were selected to study the profile characteristics of farmers and dependent variable extent of participation was used to assess the extent of participation in watershed project.

Data collected through pre tested, well structured, comprehensive schedule. To collect historical perspective emphasizing the developmental priorities of farmers, the PRA method like changes and trend analysis was applied.

The collected data was coded, classified and tabulated and statistical tools like mean, Standard Deviation (S.D.) correlation coefficient (r), Multiple Linear Regression (MLR) were used for arriving at meaningful findings and drawing conclusions.
6.3 SALIENT FINDINGS OF STUDY

6.3.1 Historical perspective emphasizing the developmental priorities of farmers in Sujala Kalinganahalli Halla watershed project

Prior to the implementation of the watershed project. The farmers were practicing traditional ways of cropping system, soil and water conservation practices; package of practices and marketing of farm produce; sources of irrigation and irrigational methods; old type of farm implements and vehicles; food habits, sources of income, house fuel and miscellaneous with minimum infrastructure facilities in all villages.

Considerable improvement was observed in developmental priorities of farmers after introduction of watershed project. Farmers drifted towards more horticultural commercial, high yielding and short duration varieties; new watershed practices like nalabund, rubble checks and in situ moisture conservation practices. They started using irrigational methods like improved drip system and sprinkler system. Seed cum fertilizer drill was given high priority for sowing whereas use of IPM techniques for insect control; fungicides like blitox-50 for mango anthracnose control; seed treatment with thiram to control die back of chillies; areca nut dehusker and ground nut decorticator for processing were given high priority. The contract farming for gherkins started whereas truck and railways were used as chief modes of transportation. There was considerable change in their food habits. Farmers started consuming food from nutritional varieties of crops. Giriraja broiler became more popular as non vegetarian food. The new type
of implements for farm operations like bund former, clod breaker and motor operated sprayers were used. Sources of income increased as farmers started horticulture and rearing of exotic breed of cattle called Holstein Friesian. There was considerable improvement in structure of houses with new improved type of cattle shed. The gobar gas stove, LPG stove along with kerosene stove and pump stove were used for cooking. Earlier infrastructure facilities like HPS, anganwadi, high school, college, library, post office, grampanchayat, ayurvedic medical hospital were continued. Tar road facilities in Manchaladore village, HPS anganwadi in all villages; veterinary hospital and tar road facility in Kalinganahalli village were started after watershed project. As a result, the number of vehicles for transportation like bus, tractor, power tiller luggage auto and bike increased. Based on study of developmental priorities of farmers for last fifty years, projections are made for next decade which predicted the overall improvement in developmental priorities of farmers in the study area.

Most of the earlier developmental priorities of farmers are expected to continue with few expectations which include the improvement in developmental priorities of farmers like new intercropping systems like sorghum/pigeon pea and pigeon pea/ground nut; cultivation of banana and gherkins; introduction new watershed practices like grass turfing, crescent bund; improved drip system for irrigation, seed cum fertilizers drill for sowing; tractor mounted sprayer for spraying chemicals; usage of chemical insecticides and fungicides; more dependency on farm vehicles like tractors; consumption of food products from agro based industries and improved structure of house with well structured cattle
shed; gobar gas stove, LPG stove and solar cooker for cooking; increased number of mobile phones for communication; college facilities and tar road facilities in all villages expected in next ten years.

6.3.2 Profile characteristics of farmers

Majority for respondents were studied up to primary school (49.17%) had medium decision making (59.17%), had medium empowerment (67.50%). It was observed that majority of respondents had medium change proneness (65.00%), had medium communication behaviour (62.05%), had medium value orientation (57.50%). Majority of respondents had medium self reliance (70.83%).

6.3.3 Extent of participation of farmers in water watershed project

It was observed that majority (64.17%) respondents had medium extent of participation followed by high (28.33%) and low (7.5%) extent of participation.

Majority of respondents had medium extent of participation in motivational meetings (62.50%), planning (68.33%) implementation (62.05%), maintenance (67.50%) and evaluation (66.67%).

6.3.4 Relationship between profile characteristics and extent of participation of farmers in watershed project

All the independent variables namely education, decision making, empowerment, change proneness, communication behaviour, value orientation. Self-reliance and economic motivation showed highly significant relationship with extent of participation of farmers in watershed project.
The Multiple linear regression clearly indicated that all the eight independent variables put together explained 69.9 per cent of variation in the extent of participation of farmers in watershed project.

The contribution of decision making was significant while self reliance and economic motivation was highly significant to the variation in extent of participation of farmers in watershed project leaving rest for extraneous effect.

6.3.5 Constraints as perceived by farmers in watershed project

It was observed that uncertain and erratic rainfall was the major constraint (92.50%) followed by low investment capacity of farmers (86.60%), operational inconvenience due to vegetative live hedges on contour (67.50%), social problems due to running of waterways through holdings of different farmers (66.60%) lack of adequate mechanical devices for implementing watershed practices (58.33%), no remunerative price for farmer’s produce (57.50%), poor water holding capacity of soil (51.67%), lack of understanding and co-operation between farmers and field functionaries (49.17%), inadequate draught power to carry out farm works (47.5%), less productivity of soil (45%), small and fragmented lands leaded to difficulty in implementing watershed practices (22.33%) were constraints identified by farmers while participating in watershed project.
6.3.6 Suggestions as perceived by watershed farmers to tackle the constraints

Financial aid from banks viz., Nationalized and Co-operative for implementing watershed practices was the major suggestion (52.50%) followed by co-operation between farmers (47.50%), use of efficient mechanical devices for implementing watershed activities (43.33%), co-operation between farmers and field functionaries (35.83%), minimum support price from Government or better price for their produce in market (21.67%), increasing the efficiency of draught power to carry out watershed activities (10.00%), increasing the land holding by avoiding fragmentation of land (6.67%), huge capital investment to carry out watershed activities were suggestions as perceived by farmers to tackle the constraints.

6.4 IMPLICATIONS OF THE STUDY

1. Study revealed that majority of respondents (49.17%) studied up to primary school only so, the immediate attention should be paid by government to conduct adult education and functional literacy programmes.

2. The results of the study indicated that majority (67.50%) of respondents had medium empowerment, so there is a need for conducting training programmes about health, nutrition and awareness about micro credit programmes.
3. The study showed that majority of respondents (64.17%) had medium extent of participation in watershed project. Therefore Watershed Development Department has to create awareness on improved soil and water conservation practices, field functionaries should develop good rapport with villagers and convince them to participate in watershed project by providing technically feasible economically viable watershed practices. Necessary steps have to be taken by government to provide financial aid for implementing watershed activities.

4. It was observed from the study that farmers had given top priority for HYV’s, horticultural crops, usage of improved mechanical devices like clod breaker, bund former, seed cum fertilizer drill, improved drip and sprinkler irrigation system. Therefore government has to pay attention in supplying these inputs in subsidy rate and nationalised banks also should provide financial assistance to farmers with less interests.

5. On perusal of study it was concluded that farmers had given high priority for chemical pesticides and fungicides as plant protection measures. So, Government has to furnish these inputs timely and with subsidy rates.

6. It was clear from the study that there was no remunerative price for farmers produce which discouraged them to try new watershed practices. Hence, government has to fix minimum support price for the farmers produce.

7. It was evident from study that recommended soil and water conservation practices were not practically feasible. So, efforts should be made by Watershed Development Department to go through geographical, climatic survey of the project area for recommending the soil and water conservation practices best suited to the operational area.
8. A thorough observation on constraints and suggestion as perceived by farmers coupled with researcher’s vision, a figurative strategy has been developed which is useful to Watershed Development Department and NGO’s for implementing new projects successfully by considering them.

6.5 SUGGESTIONS FOR FUTURE RESEARCH

1. The present investigation was conducted in Tumkur district of Karnataka. Similar studies may be undertaken in other districts where watershed projects are located.

2. The historical perspective emphasizing the developmental priorities of farmers in Sujala Kalinganahalli Halla watershed area studied in present research. Similar work can be carried out in other watershed project area.

3. The study included only selected profile characteristics of farmers as independent variables. Future studies may be conducted with more independent variables and dependent variable.

4. The present research focussed on constraints and suggestions perceived by farmers in watershed project. Future research may study in depth about them.
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* Original not seen

**Note:** The pattern of literature cited presented above is in accordance with the guidelines for thesis presentation, Acharya N. G. Ranga Agricultural University, Hyderabad.
APPENDIX-I
INTERVIEW SCHEDULE

A study on participation of farmers in Sujala Kalinganahalli Halla Watershed of Tumkur District of Karnataka

Name of the Respondent : 
Father’s Name : 
Village : 
Taluk : 
District : 

Section – A
Profile Characteristics of Farmers in Watershed Project

1. Education

<table>
<thead>
<tr>
<th>Level</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Schooling (Illiterate)</td>
<td>(      )</td>
</tr>
<tr>
<td>Functionally literate</td>
<td>(      )</td>
</tr>
<tr>
<td>Primary School</td>
<td>(      )</td>
</tr>
<tr>
<td>Middle School</td>
<td>(      )</td>
</tr>
<tr>
<td>High School</td>
<td>(      )</td>
</tr>
<tr>
<td>College</td>
<td>(      )</td>
</tr>
</tbody>
</table>

2. Decision Making

In implementing watershed development practices farmers has to take decision. Please tell me whether you have taken decision for each of the following. (NC=Not Considered, CC=Considered after consultation with others and CI=Considered Independently)
### Sl.No. | Decision criteria |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To try new soil and water conservation practices like bench terracing and boulder checks</td>
</tr>
<tr>
<td>2</td>
<td>Borrowing money for implementing watershed development practices</td>
</tr>
<tr>
<td>3</td>
<td>Choosing suitable kind of watershed development practice in your own field</td>
</tr>
<tr>
<td>4</td>
<td>Discussion with other farmers while implementing soil and water conservation practices.</td>
</tr>
<tr>
<td>5</td>
<td>Hire farm workers in implementing watershed development practices</td>
</tr>
<tr>
<td>6</td>
<td>To switch over firmly to implement new soil and water conservation practices</td>
</tr>
</tbody>
</table>

### 3. Empowerment

The following are the statements about empowerment of farmers. kindly indicate the degree of Agreement or Disagreement on three point continuum.

(A = Agree, UD = Un Decided, DA = Dis Agree)

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Decision criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>It is better to try new soil and water conservation practices for maximization of profits and minimization of losses.</td>
</tr>
<tr>
<td>2</td>
<td>Educational empowerment enables farmers to acquire new knowledge</td>
</tr>
<tr>
<td>3</td>
<td>Functional literary and adult education centre in Sujala project area not empowered farmers to tackle varied tasks in their fields.</td>
</tr>
<tr>
<td>Sl.No.</td>
<td>Decision criteria</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>4</td>
<td>Health and nutrition are two basic needs for social empowerment of farmers to achieve quicker and real development in Sujala project area.</td>
</tr>
<tr>
<td>5</td>
<td>Access to resources do not enhance decision making ability to meet some physiological needs like self esteem and confidence in implementing Watershed Development Programme successfully.</td>
</tr>
<tr>
<td>6</td>
<td>Micro credit programme in Sujala project area adds to economic empowerment of farmers by extending crop loans that generate income to allow them to take care for themselves and their families.</td>
</tr>
<tr>
<td>7</td>
<td>Farmers collectivization in Sujala Project area has not brought them together in the form of co-operative societies has become an integral part of an economic activity reflecting economic empowerment.</td>
</tr>
<tr>
<td>8</td>
<td>Technological empowerment through capacity building skills among Sujala farmers in order to increase their productivity.</td>
</tr>
<tr>
<td>9</td>
<td>The transfer of technology approach which mainly includes mass media is not paying due attention towards dissemination of watershed development technology through the farmers in project areas.</td>
</tr>
<tr>
<td>10</td>
<td>Training programmes in watershed project area should initially be organized on their felt needs and then be switched over to onset but essential needs.</td>
</tr>
<tr>
<td>11</td>
<td>Indigenous practices like farm pond, Nalabund are implemented by farmers should be paid due attention for blending with modern soil and water conservation technologies.</td>
</tr>
</tbody>
</table>
4. Communication behaviour

Some of the items for interaction with co-farmers are given below. Please indicate the degree to which they occur. (F=Frequently, O=Occasionally and N=Never)

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Items</th>
<th>F</th>
<th>O</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Discussion with co-farmers to increase their knowledge about watershed practices.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Get the doubts clarified by consulting co-farmers about soil and water conservation practices.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Not getting constant help and encouragement from other farmers to implement watershed development practices.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Try to win respect from neighbours by implementing good watershed development practices.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Establish good rapport with village farmers.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Willing to assist other farmers in implementing watershed development practices.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Be friendly with other farmers.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Change proneness

The following are the statement about the change proneness of the farmers kindly indicate the degree of agreement or disagreement on the following three point continuum (A=Agree, UD=Un Decided and DA=Dis Agree).
<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Decision criteria</th>
<th>A</th>
<th>UD</th>
<th>DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>From time to time, I have heard about several practices and I tried out most of them in last few years.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I usually do not want to see what results my colleagues obtain before I try out the new watershed development practices.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Some how, I believe that the traditional ways of watershed development practices are the best.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I am not cautious about trying new soil and water conservation practices like contour furrows and khuss lines.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>After all, our predecessors were wise in using traditional practices in watershed development activities in sujala project area.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Often new soil and water conservation are not successful. However, if they are promising, I would surely like to adopt them.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>I don’t try to keep myself up to date information on improved soil and water conservation practices like field bunds and recharge pits.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>I feel restless till I tryout a new methods of soil and water conservation that I have heard about.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Value orientation

A set of statements given below represents value orientation of respondents. Please indicate the degree of your agreement (A), Disagreement (DA) on following three point continuum.
<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Decision criteria</th>
<th>A</th>
<th>UD</th>
<th>DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To get more information about soil and water conservation practices we should have frequent contact with different sources of information.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Adoption of improved watershed development practices like in-situ moisture conservation and contour bund will certainly give higher returns.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>If one adopts improved soil and water conservation practices like seepage pond and filed bund, more problems will be created so there are more chances of loss.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Satisfying with the existing soil and water conservation practices in Sujala Kalinganahalli Halla Watershed project area will lead to unsuccessful implementation of watershed project.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. **Self reliance**

    How much of your future you feel depend upon yourself out of 100 please indicate one of the following items.

    a.  100%
    b.  75%
    c.  50%
    d.  25%
    e.  Not at all dependent

8. **Economic motivation**

    A set of statements given below represents economic motivation. Express your feelings about the statements by indicating the degree of your agreement or disagreement on the five point continuum.(SA=Strongly Agree, A=Agree, UD=Un Decided, DA=Disagree, SD=Strongly Disagree)
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Statements</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A farmer should work towards higher yield and economic gains by practicing</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>the principles of soil and water conservation.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>The most successful farmer is one who produces high yields and makes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>more profits through watershed development practices.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>A farmer should not practice in-situ moisture conservation and watershed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>development practices which may earn him more money.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>It is difficult for the farmers children to make good start unless</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>they are aware of soil and water conservation practices of economic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>importance.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section - B

EXTENT OF PARTICIPATION OF FARMERS IN WATERSHED PROJECT

Please indicate your extent of participation

(A=Always, O=Occasionally and N=Never)

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Items</th>
<th>Extent of participation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td><strong>I. Motivation meetings</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Participation by expressing your views/ideas and interacting with officials.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Participating in motivational meetings without sending advance in formation</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Participation by suggesting effective utilization of resources and encouraging fellow participants.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Participation without suggesting alternative methods of watershed development practices and interaction with officials and fellow farmers.</td>
<td></td>
</tr>
<tr>
<td><strong>II. Planning</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Participation in identification of needs and problems in watershed project.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Participation in mitigating the problems and constraints without plan of work.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Participation in selecting members for village development committee.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Participation in selecting the beneficiaries for crop loans under watershed project.</td>
<td></td>
</tr>
</tbody>
</table>
### III Implementation

<table>
<thead>
<tr>
<th></th>
<th>Participation by adopting the recommended watershed practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Participation without contributing land, labour and money in watershed project.</td>
</tr>
<tr>
<td>3</td>
<td>Participation in group discussion about soil and water conservations practices.</td>
</tr>
</tbody>
</table>

### IV Maintenance

<table>
<thead>
<tr>
<th></th>
<th>Participation in maintenance of soil and water conservation structures and assets.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Participating in implementing new watershed development activities without improving the existing soil and water conservation structures and assets</td>
</tr>
<tr>
<td>3</td>
<td>Participation in fixing the responsibilities to the village development committees.</td>
</tr>
</tbody>
</table>

### V Evaluation

<table>
<thead>
<tr>
<th></th>
<th>Participation in evaluation without providing feedback information.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Participation by suggesting suitable alternative methods and contingency plans about watershed development practices by sharing experience.</td>
</tr>
<tr>
<td>3</td>
<td>Participation in evaluating results of activities with past experiences.</td>
</tr>
</tbody>
</table>
Section – C

Constraints and suggestions as perceived by watershed farmers

While participating in watershed development activities, choose those constraints faced by you.

1. Uncertain and erratic rainfall. ( )
2. Small fragmentation of lands leads to difficulty in implementing soil and water conservation practices. ( )
3. Low investment capacity of farmers leads to non-implementation of watershed practices. ( )
4. No remunerative price for farmer’s produce leads to non-implementation of soil and water conservation practices in their fields. ( )
5. Waterways running through holdings of different farmers leading to social problems. ( )
6. Less productivity of soil in major limiting factor in adopting watershed practices. ( )
7. Poor water holding capacity of soil. ( )
8. Lack of adequate mechanical devices for implementing watershed development practices. ( )
9. Lack of understanding and cooperation between farmers and field functionaries. ( )
10. Recommended soil and water conservation practices are not practically feasible. ( )
11. Inadequate draught power to carryout farm works. ( )
12. Vegetative live hedges on contour, leads to operational inconveniences in farmer’s fields. ( )

Any suggestions from your side to tackle these constraints

a. .................................................................
b. .................................................................
c. .................................................................
d. .................................................................
## 1. ವಾಯುಮಾನಗಳು

<table>
<thead>
<tr>
<th>ವಾಯುಮಾನ</th>
<th>( )</th>
</tr>
</thead>
<tbody>
<tr>
<td>ಬಹುಭಾಗ (ಅಂತಿಮವಾಗಿ)</td>
<td>0</td>
</tr>
<tr>
<td>ವರ್ಷಾಶೀಲ ಪ್ರತಾಪ</td>
<td>1</td>
</tr>
<tr>
<td>ಮಾದರಿಯ ವಾಯು</td>
<td>2</td>
</tr>
<tr>
<td>ವಾಯುಮಾನ ತಾಣ</td>
<td>3</td>
</tr>
<tr>
<td>ಪ್ರವಾಹ</td>
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<td>ಭಾರ</td>
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## 2. ವಾಯುಮಾನ ಸಂಖ್ಯೆಗಳು:

ಸಂಖ್ಯೆಗಳು ವಾಯುಮಾನ ಸಂಖ್ಯೆಗಳಾಗಿ ಸಮಾಧಾನವಾಗುವ ಕ್ರಮವಲ್ಲು ಮಗು ಸುಮಾರು ವಾಯುಮಾನ ಸಂಖ್ಯೆಗಳಿಗಿಂತಿದ್ದು ಸಂಖ್ಯೆಗಳಾಗಿದ್ದು. ವಾಯುಮಾನ ಸಂಖ್ಯೆಗಳು ಸ್ಥಳೀಯ ಲಕ್ಷಣಗಳ ಮೂಲಕ ಸುಮಾರು ಸಂಖ್ಯೆಗಳಾಗಿದ್ದು (ಯಾವುದು = ಅ, ಪ್ರವಾಹಕರು = ಜ, ಕೆಲಸಿಕೆಗಳು = ಸ, ಭಾರತೀಯಾರು = ಸುಮಾರು).

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<tr>
<th>ನಂ.</th>
<th>ವಾಯುಮಾನ ಸಂಖ್ಯೆಗಳು</th>
<th>ಅ</th>
<th>ಜ</th>
<th>ಸ</th>
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</thead>
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<td>ಸಂಖ್ಯೆಗಳು ಮತ್ತು ವಾಯುಮಾನ ಸಂಖ್ಯೆಗಳು ಸಮಾಧಾನವಾಗುವ ಕ್ರಮವಲ್ಲು ಮಗು ಸುಮಾರು ವಾಯುಮಾನ ಸಂಖ್ಯೆಗಳಿಗಿಂತಿದ್ದು.</td>
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<td>2.</td>
<td>ವಾಯುಮಾನ ಸಂಖ್ಯೆಗಳು ಸ್ಥಳೀಯ ಲಕ್ಷಣಗಳ ಮೂಲಕ ಸುಮಾರು ಸಂಖ್ಯೆಗಳಾಗಿದ್ದು.</td>
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<td>3.</td>
<td>ವಾಯುಮಾನ ಸಂಖ್ಯೆಗಳು ಸ್ಥಳೀಯ ಲಕ್ಷಣಗಳ ಮೂಲಕ ಸುಮಾರು ಸಂಖ್ಯೆಗಳಾಗಿದ್ದು.</td>
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<tr>
<td>Sr. No.</td>
<td>ಕೃತಿಧಾರ್ಯ ನಿಬಂಧ</td>
<td>ಗುಣ</td>
<td>ಮೂಲಕ.</td>
<td>ಸ್ಥಳ.</td>
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<td>4.</td>
<td>ಮೊದಲು ತಿಳಿಸಿ ಸ್ಥಳೀಯ ಸೂತ್ರಾಂಶದಲ್ಲಿ ಸುತ್ತಿಲ್ಲದೇ ಜೋಡಿಸಿ ತುದಿಯಲ್ಲಿ ಹೋಗಿಲು ಮಾಡುವ.</td>
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<td>5.</td>
<td>ಸಾರೂರು ಅಧ್ಯಯನ ಕೋಟ್ಯಾಂಶಗಳನ್ನು ಸುತ್ತಿಲ್ಲದೇ ಜೋಡಿಸಿ ತುದಿಯಲ್ಲಿ ಹೋಗಿಲು ಮಾಡುವ.</td>
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<td>6.</td>
<td>ಸಾರೂರು ಅಧ್ಯಯನ ಕೋಟ್ಯಾಂಶಗಳನ್ನು ಸುತ್ತಿಲ್ಲದೇ ಜೋಡಿಸಿ ತುದಿಯಲ್ಲಿ ಹೋಗಿಲು ಮಾಡುವ.</td>
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</tbody>
</table>

3. ಸಂಪರ್ಕಾಂಶಗಳು:
ಇನ್ನೊಂದು ವಿವರಣೆಯು ಆಧ್ಯಯನ ಸೂತ್ರಗಳು ಸೂಚಿಸಲು ಹೊತ್ತಿರುವ ಉದ್ದೇಶಗಳಿಗಾಗಿ. ಇದರ ಆಧ್ಯಯನ ವಿಷಯ ರೇಖೆಯ ನಿಬಂಧದಲ್ಲಿ ಸ್ವೀಕರಿಸಬೇಕಾದ ಉದಯಾಂಶ. (ಮೊದಲು = ಮ, ಮೂಲಕ = ಸ, ಸ್ಥಳಾಂಶ = ತ)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>ಕೃತಿಧಾರ್ಯ ನಿಬಂಧ</th>
<th>ಗುಣ</th>
<th>ಮೂಲಕ.</th>
<th>ಸ್ಥಳ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>ಗೊರಾಡು ಆಧ್ಯಯನದ ತಾಂತ್ರಿಕ ರೂಪದಲ್ಲಿ ಸ್ಥಿತಿಯಲ್ಲಿ ಮಾಡುವ. ಆಧ್ಯಯನದ ತಾಂತ್ರಿಕ ರೂಪದಲ್ಲಿ ಮಾಡುವ.</td>
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<td>2.</td>
<td>ಮಹಾಭ್ರತದಲ್ಲಿ ಸಂಯೋಜ್ಯಾಂಶಗಳು, ಕ್ರಮೇಣ ಸಾರೂರು ಅಧ್ಯಯನದ ತಾಂತ್ರಿಕ ರೂಪದಲ್ಲಿ ಮಾಡುವ. ಆಧ್ಯಯನದ ತಾಂತ್ರಿಕ ರೂಪದಲ್ಲಿ ಮಾಡುವ.</td>
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<td>3.</td>
<td>ಸಾರೂರು ಸಾರೂರು ಅಧ್ಯಯನ ವೈಜ್ಞಾನಿಕ ವಿಷಯದಲ್ಲಿ ಸಂಯೋಜ್ಯಾಂಶಗಳು, ಕ್ರಮೇಣ ಸಾರೂರು ಅಧ್ಯಯನದ ತಾಂತ್ರಿಕ ರೂಪದಲ್ಲಿ ಮಾಡುವ. ಆಧ್ಯಯನದ ತಾಂತ್ರಿಕ ರೂಪದಲ್ಲಿ ಮಾಡುವ.</td>
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<td>4.</td>
<td>ಕುರುತ ಅಧ್ಯಯನ ವೈಜ್ಞಾನಿಕ ವಿಷಯದಲ್ಲಿ ಸಾರೂರು ಅಧ್ಯಯನದ ತಾಂತ್ರಿಕ ರೂಪದಲ್ಲಿ ಮಾಡುವ. ಆಧ್ಯಯನದ ತಾಂತ್ರಿಕ ರೂಪದಲ್ಲಿ ಮಾಡುವ.</td>
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<td>स. सं.</td>
<td>विवरण</td>
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<tr>
<td>5.</td>
<td>सरकारेकडे रुपचार, जेणेकरून सर्वांनी हे जाणून घेतले, किंमती अनुसार गौरवाची कायमीता कायम राहते. नवीनचर्या माध्यमीतून सरकारेकडे, नवीनचर्याचा संवाददाता बनून सर्वांना अनुभव करावे असा माहिती दिली.</td>
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<td>6.</td>
<td>हे साक्षात मानावं, सरकार जपाटवरून सर्वांना गौरवाची कायमीता कायम राहते. नवीनचर्या माध्यमीतून सर्वांना किंमती अंक प्रदेशात स्थानापेक्षा अधिक गौरवाची कायमीता कायम राहते. सरकारेकडे नवीनचर्या माध्यमीतून गौरवाची कायमीता कायम राहते.</td>
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<td>7.</td>
<td>हे साक्षात मानावं, सरकार जपाटवरून सर्वांना गौरवाची कायमीता कायम राहते. नवीनचर्या माध्यमीतून सर्वांना किंमती अंक प्रदेशात स्थानापेक्षा अधिक गौरवाची कायमीता कायम राहते. सरकारेकडे नवीनचर्या माध्यमीतून गौरवाची कायमीता कायम राहते.</td>
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<td>8.</td>
<td>सरकारवार रुपचार, किंमती अंक नवीनचर्या माध्यमीतून सर्वांना गौरवाची कायमीता कायम राहते. नवीनचर्या माध्यमीतून सर्वांना किंमती अंक प्रदेशात स्थानापेक्षा अधिक गौरवाची कायमीता कायम राहते.</td>
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<td>9.</td>
<td>सरकार नवीनचर्या माध्यमीतून सर्वांनी हे जाणून घेतले, किंमती अंक प्रदेशात स्थानापेक्षा अधिक गौरवाची कायमीता कायम राहते.</td>
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<td>10.</td>
<td>सरकारेकडे नवीनचर्या माध्यमीतून सर्वांनी हे जाणून घेतले, किंमती अंक प्रदेशात स्थानापेक्षा अधिक गौरवाची कायमीता कायम राहते.</td>
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<td>11.</td>
<td>सरकार नवीनचर्या माध्यमीतून सर्वांनी हे जाणून घेतले, किंमती अंक प्रदेशात स्थानापेक्षा अधिक गौरवाची कायमीता कायम राहते.</td>
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4. ಸೂಚಿತ ಶ್ರೇಣಿಗಳು:

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<th>ಹಾಗೆ</th>
<th>ಅಲೂ</th>
<th>ಮಾ.</th>
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<tbody>
<tr>
<td>1.</td>
<td>ಜಲ ಸೂತ್ರ ಅಧಿಕೃತ್ರಾಣಗಳಿಗೆ ರಚನೆಯಾದ ಆಧಾರ ವಿದ್ಯೆಗಳಿಗೆ ಈಗ ಉಪಯೋಗಿಸುತ್ತಾರೆ.</td>
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<td>2.</td>
<td>ಜಲ ಸೂತ್ರ ಅಧಿಕೃತ್ರಾಣಗಳಿಗೆ ರಚನೆಯಾದ ಆಧಾರ ವಿದ್ಯೆಗಳಿಗೆ ಈಗ ಉಪಯೋಗಿಸುತ್ತಾರೆ.</td>
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<td>3.</td>
<td>ರಚನೆಯಾದ ಆಧಾರ ವಿದ್ಯೆವುಗಳನ್ನು ಉಪಯೋಗಿಸುವ ಜಲ ಸೂತ್ರವು ರಚನೆಯಾದ ಆಧಾರವನ್ನು ಉಪಯೋಗಿಸುತ್ತಾರೆ.</td>
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<td>ರಚನೆಯಾದ ಆಧಾರ ವಿದ್ಯೆವುಗಳನ್ನು ಉಪಯೋಗಿಸುವ ಜಲ ಸೂತ್ರವು ರಚನೆಯಾದ ಆಧಾರವನ್ನು ಉಪಯೋಗಿಸುತ್ತಾರೆ.</td>
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<td>ಜಲ ಸೂತ್ರ ಅಧಿಕೃತ್ರಾಣಗಳಿಗೆ ರಚನೆಯಾದ ಆಧಾರ ವಿದ್ಯೆಗಳಿಗೆ ಈಗ ಉಪಯೋಗಿಸುತ್ತಾರೆ.</td>
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<td>ರಚನೆಯಾದ ಆಧಾರ ವಿದ್ಯೆವುಗಳನ್ನು ಉಪಯೋಗಿಸುವ ಜಲ ಸೂತ್ರವು ರಚನೆಯಾದ ಆಧಾರವನ್ನು ಉಪಯೋಗಿಸುತ್ತಾರೆ.</td>
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<td>7.</td>
<td>ಜಲ ಸೂತ್ರ ಅಧಿಕೃತ್ರಾಣಗಳಿಗೆ ರಚನೆಯಾದ ಆಧಾರ ವಿದ್ಯೆಗಳಿಗೆ ಈಗ ಉಪಯೋಗಿಸುತ್ತಾರೆ.</td>
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5. ಸೂಚಿತ ಶ್ರೇಣಿಗಳು ಲಗ್ನ ವಿಧಾನಗಳು:

<table>
<thead>
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<th>ಪಾದ</th>
<th>ಹಾಗೆ</th>
<th>ಅಲೂ</th>
<th>ಮಾ.</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>ಜಲದ ಒಟ್ಟಾಗಿಯುತ್ತಾರೆ ಜಲ ಅಧಿಕೃತ್ರಾಣಗಳಿಗೆ ರಚನೆಯಾದ ಆಧಾರ ವಿದ್ಯೆಗಳಿಗೆ ಈಗ ಉಪಯೋಗಿಸುತ್ತಾರೆ.</td>
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<td>2.</td>
<td>ಜಲದ ಒಟ್ಟಾಗಿಯುತ್ತಾರೆ ಜಲ ಅಧಿಕೃತ್ರಾಣಗಳಿಗೆ ರಚನೆಯಾದ ಆಧಾರ ವಿದ್ಯೆಗಳಿಗೆ ಈಗ ಉಪಯೋಗಿಸುತ್ತಾರೆ.</td>
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<tr>
<td>Sr. No.</td>
<td>Holsap</td>
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<tr>
<td>3.</td>
<td>ഭൂമി, കാലുന്നാമ്പ ആനക്ക് ഗ്രാമസ്ഥാനത്ത് വരുത്തി പ്രാഥമിക പരിപാലനം നടത്തി.</td>
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<td>4.</td>
<td>മേഥ നൊരുവതായ വിമർശണം കാനവാവണം വരുത്തി. പിന്നീട് പുറംതുറക്കാൻ വരുത്തി.</td>
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<td>5.</td>
<td>സമയം പരിശീലനം കൊള്ളുന്നതിനായി മേഥ നൊരുവതായ വിമർശണം നടത്തി.</td>
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<td>6.</td>
<td>ഹൈടെക്സ് ഓഫീസ് പാരമ്പര്യ പ്രവൃത്തികൾ തുടങ്ങുന്നത് നാല് വനാംകിരീടുകളിലെ പണയിലെയുള്ള പരിഗണനകൾ നടത്തി.</td>
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<td>7.</td>
<td>സമ്മേളനങ്ങളുടെ മുന്നാറുകൾ പരിശീലനം നടത്തുന്നതിനായി</td>
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<td>8.</td>
<td>സമ്മേളനം മുന്നാറുകൾ പരിശീലനം നടത്തുന്നതിനായി</td>
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</table>

6. **വിവരവും:**

ഏതെന്തു വിധത്തിൽ നിത്യം ലഭിക്കുന്നു. സമയത്ത് തുടങ്ങുന്നു അനുസരിച്ച് പരിഷ്കരണങ്ങൾ സമയം മാനുവാൻ അവശ്യമാണ്. (അംഗം 3 = 1, അംഗം 3 = 2, അംഗം 3 = 3)

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Holsap</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>സമയം വ്യാവസ്ഥ പരിധിയിലാണ് വരുത്തി പ്രാഥമിക പരിപാലനം നടത്തി.</td>
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<td>2.</td>
<td>സമയം പരിശീലനം വ്യാവസ്ഥ പരിസ്ഥിതിയിലാണ് വരുത്തി. പിന്നീട് പുറംതുറക്കാൻ വരുത്തി.</td>
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<td>3.</td>
<td>സമയം പരിശീലനം നടത്തി.</td>
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<tr>
<td>ಸೂ. ಸಂ.</td>
<td>ಸಾರಾಂಶ</td>
<td>ಸಂ.</td>
<td>ವ.</td>
<td>ಸ.</td>
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<td>4.</td>
<td>ಕ್ರಮಕ್ರಮದಲ್ಲಿ ಬೆಂಬಲಪ್ರಾಂಕ ಯೋಜನೆಯ ವಿವರಗಳು ಸಹಾರಾರುಗಳು.</td>
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</table>

7. ಸುತ್ತರವಾಗಿ:

ನಂಬಾರಿಗಳು ವರ್ಗೀಕರಣ ಉಪಕ್ರಮ ಎಕ್ಸಾಮ್ಯಂ ಸುತ್ತರಾಟವು ಹೆಚ್ಚುವು 100ರಿಂದ ಮತ್ತೊಂದರೆ
ಇತರಾ್ಯಂತ ಕೂಡಾ ಹೊಂದುತ್ತದೆ.

ಚಿ 100 ( )
ಚಿ 75 ( )
ಚಿ 50 ( )
ಚಿ 25 ( )
ಅನೇಕಿಂದಿಗಳು ( )

8. ಅಧ್ಯಯನ ಪ್ರದರ್ಶನ:

ಇತರವೊಂದರೂ ಹೆಚ್ಚಾಗುವ ಅಧ್ಯಯನ ಪ್ರದರ್ಶನಗಳಲ್ಲಿ ಪ್ರತ್ಯೇಕವಾಗಿಯೇ. ತನ್ನು ಇದರ ತಮ್ಮ ವಿಮುಖತೆಗಿಂತ
ನಂಬಾರಿಗಳು ಕರ್ಮಚಾರಿಗಳು ವ್ಯಕ್ತಿಗಳಿಗೆ ಆರೋಗ್ಯ ಸರೋಕಾರ ಮತ್ತು ಸಮರ್ಪಣ ಮೇಟಿಕೆಯ ಮೇಲೆ ಜೂನೇಷನ್ ಪ್ರಕಟಣೆ ಮಾಡಿದ್ದವು.
(ನಂಬಾರಿಗಳು ನಂಬಾಲೂ ಡಾ.ವಿ, ನಂಬಾರಿಗಳು ಡಾ. ನಂಬಾರಿಗಳು ಡಾ. ನಂಬಾರಿಗಳು ಡಾ. ನಂಬಾರಿಗಳು ಡಾ. ನಂಬಾರಿಗಳು ಡಾ.)

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<th>ಸೂ. ಸಂ.</th>
<th>ಸಾರಾಂಶ</th>
<th>ಮ.ಸ.</th>
<th>ಸ.</th>
<th>ವ.</th>
<th>ಇ.</th>
<th>ಮ.ಸ.</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>ಅನ್ನ ತೀವ್ರವಂದ ಮಾತ್ರೆ ಅನ್ನದ ಸಂಶೋಧನೆ ಹಾಗೂ ಅಧ್ಯಯನದ ಪ್ರಕಟಣೆಗಳು ಸಂಸ್ಕೃತಿಯ ಮೇಲೆ ಪ್ರಾರಂಭವಾಗಿನ ಸಾಧನೆಗಳು ಕೂಡಾ ಕೆಲಸ ಮಾಡಿದ್ದವು.</td>
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<td>2.</td>
<td>ಅತ್ಯಂತ ಆಸ್ತಿಯಿಂದ ಅಸ್ತಿತ್ವದ ಸಂಚಾರ ಹಾಗೂ ಅಧ್ಯಯನದ ಅಧಿಕಾರ ಸಂಪ್ರದಾಯದ ಆರೋಗ್ಯ ಸರೋಕಾರ ಮತ್ತು ಸಮರ್ಪಣ ಮೇಟಿಕೆಯಿಂದ ಜೂನೇಷನ್ ಪ್ರಕಟಣೆ ಮಾಡಿದ್ದರು.</td>
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<td>3.</td>
<td>ಅನ್ನ ತೀವ್ರವಂದ ಮಾತ್ರೆ ಅನ್ನದ ಸಂಶೋಧನೆ ಹಾಗೂ ಅಧ್ಯಯನದ ಪ್ರಕಟಣೆಗಳು ಆರೋಗ್ಯ ಸರೋಕಾರ ಮತ್ತು ಸಮರ್ಪಣ ಮೇಟಿಕೆಯಿಂದ ಜೂನೇಷನ್ ಪ್ರಕಟಣೆ</td>
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<tr>
<td>ಸೆ. ಸಂ.</td>
<td>ವರ್ಗಸಂಪದ್ಯ</td>
<td>ಬ್ಯಾ.</td>
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<td>ಮಿ.</td>
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<td>4.</td>
<td>ಕ್ರಮಾಂಕಾಂತಿಯ ವರ್ಗಸಂಪದ್ಯ.</td>
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**ಮುಖ್ಯ ಅಂಕ - ‘ಜೀ’**

ಕ್ರಮಕ್ರಮದ ಅಂಕದ ಕ್ರಮಾಂಕವನ್ನು ತಾಳದಲ್ಲಿ ಭಾಷಣಗೊಳ್ಳುವುದು ಉತ್ತಮ. (ಮಿ.ಮುಂದು = ಮು, ಮಿ.ಬೀಳಿಸಿದಂತೆ = ಅಂ, ಮಿ.ಮುಂದು ಮಿ.ಸ್ಥಳ = ಅ)

1. ಕ್ರಮಾಂಕದ ಸಂಖ್ಯೆ:

<table>
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<tr>
<th>ಸೆ. ಸಂ.</th>
<th>ವರ್ಗಸಂಪದ್ಯ</th>
<th>ಮುಂದುಕರಾಡುವ ಸಂವಿಧಾನ ತಾಳ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>ನಿಂದಾ, ಸರ್ಕಾರು / ಕುಂಠಿಯನ್ನು ಅಂಕಕ್ರಮವಾಗಿ ಸರ್ಕಾರದಲ್ಲಿ ಕ್ರಮಾಂಕಮಾಡಿರಲಿಲ್ಲಲು ಮಾತ್ರಾಗಿರುತ್ತದೆ.</td>
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<td>2.</td>
<td>ಮುಂದುಕರ ಆದಾಯ ಸರ್ಕಾರದಲ್ಲಿ ಮುಂದುಕರಾದಂತಹ ಕ್ರಮಾಂಕಾಂತಿ ಮಾತ್ರಾಗಿರುತ್ತದೆ.</td>
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<td>3.</td>
<td>ಮುಂದುಕರ ಸರ್ಕಾರದಲ್ಲಿ ನಿರ್ಧಾರೀಯ ವೈಸ್ಮಯ ಮುಂದುಕರ ಆದಾಯ ಸರ್ಕಾರದಲ್ಲಿ ಮುಂದುಕರಾದಂತಹ ಕ್ರಮಾಂಕಾಂತಿ ಮಾತ್ರಾಗಿರುತ್ತದೆ.</td>
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<td>4.</td>
<td>ನಿಂದಾ ಅಂಕದ ಕ್ರಮಾಂಕ ಸರ್ಕಾರದಲ್ಲಿ ಮುಂದುಕರಾದಂತಹ ಕ್ರಮಾಂಕಮಾಡಿರಲಿಲ್ಲಲು ಮಾತ್ರಾಗಿರುತ್ತದೆ.</td>
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2. ಮೇಲೆಕೃತ:

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<th>ಮುಹ್ಯಪ್ರತಿಯಾದ ಪತ್ರ ಸೂಚಿ</th>
<th>ಮುಹ್ಯಪ್ರತಿಯಾದ ಪತ್ರ ಸೂಚಿ</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>ಸಾರಾಂಶ ಮೂಲಾಂಕದ ಕೋಡದಲ್ಲಿರುವ ಮೂಲಾಂಕದ ವಿಸ್ತಾರವಾಗಿ ಸಾರಾಂಶವನ್ನು ಮುಂದುವರಿಸಬಹುದು.</td>
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<td>2.</td>
<td>ಸಾರಾಂಶದಲ್ಲಿ ಕುರಿತ ಹೇಳಿದ್ದೇ ಇಲ್ಲ, ಮೂಲಾಂಕದ ವಿಸ್ತಾರ ಮೂಲಾಂಕದ ಪ್ರತಿಯಾದ ಪತ್ರಕ್ಕೆ ಮುಂದುವರಿಸಬಹುದು.</td>
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<td>3.</td>
<td>ಕುರಿತ ಮೂಲಾಂಕದ ವಿಸ್ತಾರ ಮೂಲಾಂಕದ ಪ್ರತಿಯಾದ ಪತ್ರಕ್ಕೆ ಮುಂದುವರಿಸಬಹುದು.</td>
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<td>ಸಾರಾಂಶದಲ್ಲಿ ಕುರಿತ ಹೇಳಿದ್ದೇ ಇಲ್ಲ, ಮೂಲಾಂಕದ ವಿಸ್ತಾರ ಮೂಲಾಂಕದ ಪ್ರತಿಯಾದ ಪತ್ರಕ್ಕೆ ಮುಂದುವರಿಸಬಹುದು.</td>
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3. ಮುಂದುವರಿನಿಂದ:

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<th>ಮುಹ್ಯಪ್ರತಿಯಾದ ಪತ್ರ ಸೂಚಿ</th>
<th>ಮುಹ್ಯಪ್ರತಿಯಾದ ಪತ್ರ ಸೂಚಿ</th>
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<tbody>
<tr>
<td>1.</td>
<td>ಮೂಲಾಂಕದ ವಿಸ್ತಾರ ಮೂಲಾಂಕದ ಕೋಡದಲ್ಲಿರುವ ಮೂಲಾಂಕದ ವಿಸ್ತಾರವಾಗಿ ಸಾರಾಂಶವನ್ನು ಮುಂದುವರಿಸಬಹುದು.</td>
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<td>2.</td>
<td>ಮೂಲಾಂಕದ ವಿಸ್ತಾರ ಮೂಲಾಂಕದ ಕೋಡದಲ್ಲಿರುವ ಮೂಲಾಂಕದ ವಿಸ್ತಾರವಾಗಿ ಸಾರಾಂಶವನ್ನು ಮುಂದುವರಿಸಬಹುದು.</td>
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<td>ಮೂಲಾಂಕದ ವಿಸ್ತಾರ ಮೂಲಾಂಕದ ಕೋಡದಲ್ಲಿರುವ ಮೂಲಾಂಕದ ವಿಸ್ತಾರವಾಗಿ ಸಾರಾಂಶವನ್ನು ಮುಂದುವರಿಸಬಹುದು.</td>
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<tbody>
<tr>
<td>1.</td>
<td>ಮೂಲಾಂಕದ ವಿಸ್ತಾರ ಮೂಲಾಂಕದ ಕೋಡದಲ್ಲಿರುವ ಮೂಲಾಂಕದ ವಿಸ್ತಾರವಾಗಿ ಸಾರಾಂಶವನ್ನು ಮುಂದುವರಿಸಬಹುದು.</td>
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<td>ಮೂಲಾಂಕದ ವಿಸ್ತಾರ ಮೂಲಾಂಕದ ಕೋಡದಲ್ಲಿರುವ ಮೂಲಾಂಕದ ವಿಸ್ತಾರವಾಗಿ ಸಾರಾಂಶವನ್ನು ಮುಂದುವರಿಸಬಹುದು.</td>
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<tr>
<td>स. सं.</td>
<td>संदर्भ</td>
<td>पुरुषोक्ति, स्त्रीलिङ्ग, जन्मदिन</td>
<td>मृत्यु</td>
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<td>3.</td>
<td>कलङ्किता संगी द्वारा उर्वरित होनेवाले सदास्यों से स्कूल के स्कूल स्थल पर अनादर प्रदर्शित किया गया।</td>
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<tr>
<th>स. सं.</th>
<th>संदर्भ</th>
<th>पुरुषोक्ति, स्त्रीलिङ्ग, जन्मदिन</th>
<th>मृत्यु</th>
<th>वयस्क</th>
<th>जीवनसाप्ताहिक संख्या</th>
</tr>
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<tbody>
<tr>
<td>1.</td>
<td>अनन्त कार्यक्रम में अंतिम स्थल पर आगामी दिनों में पहुंचेंगे।</td>
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<td>2.</td>
<td>सरकार की विभागों में अग्रवाल होगी। समय में अधिनस्त नहीं होगे। संगी स्थल पर काम करेगा। वेंटाइल नहीं होगा। स्पष्टता की स्थ्यावर्त की होगी।</td>
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ಮಾಡಿ - 'ಇ'

ಇದ್ದು ಪ್ರತಿಯೊಂದು ಅಧ್ಯಯನ ಮಾಡಿ ಸೇರಿಸಿಕೊಂಡರು

1. ಆಧ್ಯಾತ್ಮಿಕ ವಿಷಯ ಸಂದೇಶಗಳು ( )
2. ಮೂಲ ವಿಷಯ ಅಧ್ಯಯನದ ಎಣ್ಣೆಯಲ್ಲಿ ಉಂಟು ಏರುವ ಸಮಸ್ಯೆಗಳನ್ನು ಅಧ್ಯಯನ ಮಾಡಿಕೊಂಡರು ( )
3. ಪ್ರತಿ ತಿಂಗಳಲ್ಲಿ ಮಾಡಿಸೇ ಅಧ್ಯಯನದ ವಿಷಯದ ಪ್ರತಿಯೊಂದು ವಿಷಯ ಅಧ್ಯಯನ ಮಾಡಿಕೊಂಡರು ( )
4. ಪ್ರತಿ ತಿಂಗಳಲ್ಲಿ ಅಧ್ಯಯನದ ಎಣ್ಣೆಯಲ್ಲಿ ಉಂಟು ಏರುವ ಸಮಸ್ಯೆಗಳನ್ನು ಅಧ್ಯಯನ ಮಾಡಿಕೊಂಡರು ( )
5. ಮಾಡಿಸಿದರೆ ಅಧ್ಯಯನದ ವಿಷಯದ ಪ್ರತಿಯೊಂದು ವಿಷಯದಲ್ಲಿ ಪ್ರತಿಯೊಂದು ವಿಷಯದ ಅಧ್ಯಯನ ಮಾಡಿಕೊಂಡರು ( )
6. ಮೂಲ ವಿಷಯ ಸಂದೇಶಗಳು, ಇದ್ದು ಅಧ್ಯಯನ ಮಾಡಿದರು ( )
7. ಮೂಲ ವಿಷಯ ಸಂದೇಶಗಳು, ಇದ್ದು ಅಧ್ಯಯನ ಮಾಡಿದರು ( )
8. ಮೂಲ ವಿಷಯ ಸಂದೇಶಗಳು, ಇದ್ದು ಅಧ್ಯಯನ ಮಾಡಿದರು ( )
9. ಪ್ರತಿ ತಿಂಗಳಲ್ಲಿ ಮಾಡಿಸೇ ಅಧ್ಯಯನದ ಎಣ್ಣೆಯಲ್ಲಿ ಉಂಟು ಏರುವ ಸಮಸ್ಯೆಗಳನ್ನು ಅಧ್ಯಯನ ಮಾಡಿಕೊಂಡರು ( )
10. ಮೂಲ ವಿಷಯ ಸಂದೇಶಗಳು, ಇದ್ದು ಅಧ್ಯಯನ ಮಾಡಿದರು ( )
11. ಮೂಲ ವಿಷಯ ಸಂದೇಶಗಳು, ಇದ್ದು ಅಧ್ಯಯನ ಮಾಡಿದರು ( )
12. ಮೂಲ ವಿಷಯ ಸಂದೇಶಗಳು, ಇದ್ದು ಅಧ್ಯಯನ ಮಾಡಿದರು ( )

ಹಂಚಿಕೊಂಡ ವಿಷಯದಲ್ಲಿ ವಿಷಯ ಎಣ್ಣೆಯಲ್ಲಿ ಉಂಟು ಏರುವ ಸಮಸ್ಯೆಗಳನ್ನು ಅಧ್ಯಯನ ಮಾಡಿಕೊಂಡರು?