

Chapter 1

Introduction

Higher agricultural growth is expected to contribute directly to the overall GDP growth and even more so to inclusiveness. Since more than half of the labor force still derives its income from agriculture, faster agricultural growth is perhaps the most effective instrument for reducing rural poverty. It would mean raising farm incomes for land owning farmers and income through allied activities to landless apart from wage incomes. This calls for preservation and improvement of the productivity of land and water resources.

Out of 327 m.ha of geographical area in India, 141 m.ha is the net cultivated area. Of this about 40% is irrigated leaving remaining 60% rain fed. The rain fed areas are subject to wind and water erosion and are in different stages of degradation. Therefore, these areas need improvement in terms of its productivity per unit of water for realizing optimum production. Watershed development is among the flagship programmes of rural development that assist in rural poverty alleviation, particularly in the more marginal semi-arid and rain fed areas. These areas house a large share of the poor, food insecure and vulnerable populations in the country. Further, as the productivity growth in areas which have contributed to green revolution is already showing signs of stagnation (Pingali and Rose grant, 2001) future growth in agricultural production and food security is likely to depend on improving the productivity in the semi-arid rain fed areas (Fan and Hazell, 2000).

Watershed development (WSD) as a technology was demonstrated in late fifties by establishing D.V.C, Hazaribagh, and its management as a philosophy was well articulated through operational research projects by the CSWCRTI and its regional centers at G.R.halli, Chitradurga, Karnataka, Fakot, W.P and Sukhomajri, Haryana in early seventies. Subsequent studies undertaken by the social and natural scientists to examine the socio-economic impacts of the watershed technology have endorsed the programme in terms of costs and benefits (Deshpande and Reddy, 1990; Rama Mohan Rao and Narayana Chowdhary, 1990; Singh et.al, 1995; Nalatwadmath et.al, 1997;

Kolavalli and Kerr, 2002; Jain Ak, 2010) . These studies not only indicated the economic viability of WSD but also underlined that it is the most appropriate strategy for the development of rained agriculture by reestablishing ecological balance in India.

Watershed is a topographically delineated land unit drained through a common outlet / stream system. It is a hydrologic unit used both as a bio – physical, Socio-economic and socio-political unit for planning and implementing resource management activities. Watershed development is a land management technology that would conserve rain water, improve in situ moisture, prevent erosion, and increase groundwater recharge and bio-diversity. Watershed development thus means improving the management of a catchment area by introducing appropriate land configuration systems such as borders, benches with bunds on contour to dispose inevitable runoff safely at non-erosive velocity after retaining adequate runoff into water storage structures such as check dams, ponds and tanks, and plantation of tree species on bunds, common lands and stream banks etc,. It facilitates higher land productivity through improved moisture and water availability for agriculture apart from bringing marginal and waste lands under cultivation.

Watersheds transcend households, communities and even villages and so their sustainable development is critically linked with inter community and inter village co-operation. Hence community participation through appropriate institutional arrangement is sine qua non for sustainable management of the watersheds. It is widely held that impacts of watershed development are effective where community participation is active. Recognizing this aspect, the 1995 watershed guidelines provided a definite design for a participatory approach.

India has one of the largest watershed development programme in the world and has spent Rs.4,841 crores by the end of fifth plan. About Rs. 2,300 crores are being spent annually through different projects supported by government, NGOs and bilateral funds (Table.1). These allocations are doubled during 11th plan. The current annual budget allocations for WSD are above Rs. 2,000 crores. However the cost effectiveness of these allocations and the sustainability of the programme are widely questioned (GOI, 2001)

The broad objective of the watershed development is to promote overall economic development and socio-economic improvement of the resource poor sections of people inhabiting the programme areas. Many projects designed with this approach were taken up by the GOI at different points of time. The Drought Prone Area Programme (DPAP) and Desert Development Programme (DDP) were brought into the Watershed mode in 1987. The integrated watershed development program (IWDP) launched in 1989 under the aegis of the National Watershed Development Board also aimed at development of Waste lands on watershed basis. After these programs were brought under the guidelines for watershed development with effect from 1-04-1995. The focus of these programmes over a period of time shifted to the enhancement of the reliability and quality of rural livelihood support systems. These programmes are implemented in the Pre-selected blocks as such they are location specific.

Prior to 01-04-2001 the cost of treatment ranged between 3000 to 5000 per hectare and the same is revised to Rs.6000 per hectare since then. Since 1995 till 2006 an area of 65.75 lakhs hectares have been covered under this program at an investment of Rs.6429.20 crores. The basic objective of the program is to minimize the adverse effect of drought on the production of crops and live stock and productivity of land, water and human resources thereby ultimately leading to mitigation of ill effects of droughts.

Table 1.1: Area Treated (m ha) and Investment (Rs. in Crores) in Watershed Programmes in India

Programmes	Up to end of 8 th Plan		During 9 th plan		During 10 th Plan till March 2005		Total (till March 2005)	
	Area	Investment	Area	Investment	Area	Investment	Area	Investment
I. Ministry of Agriculture								
a) Notional Watershed Development Project for Rain fed Areas (NWDPRA)	4.22	967.93	2.77	911.01	0.96	519.82	7.95	2398.76
b) River Valley Project (RVP) and Flood Prone Regions (FPR)	3.89	819.95	1.60	696.26	0.60	377.91	6.09	1894.12
c) Watershed Development Project in Shifting Cultivation Areas (WSDSCA)	0.07	93.73	0.15	82.01	0.06	60.61	0.28	236.35
d) Alkali Soils	0.48	62.29			0.08	20.25	0.56	82.54
e) Externally Aided Project (EAP)	1.00	646.00	0.50	1425.01	0.86	2685.25	2.36	4756.26
Sub Total	9.66	2589.90	5.02	3114.29	2.56	3663.84	17.24	9368.03
II. Department of Land Resource (MoRD)								
a) Drought prone areas Programme (DPAP)	6.86	1109.95	4.49	668.26	3.78	845.19	15.13	2623.40
b) Desert Development Programme (DDP)	0.85	722.79	2.48	519.80	2.38	615.19	5.71	1857.78
c) Integrated waste land development Programme (IWDP)	0.28	216.16	3.58	943.88	2.46	1001.77	6.32	2161.81
d) Externally Aided Project (EAP)			0.14	18.39	0.22	194.28	0.36	212.81
Sub Total	7.99	2048.90	10.69	2150.33	8.84	2656.43	27.52	5855.66
III. Ministry of Environmental & Forests (MOEF)								
a) Integrated Afforestation & Eco-Development Projects Scheme (IAEPS)	0.30	203.12	0.12	141.54	0.40	469.07	0.82	813.73
Grand Total	17.95	4841.92	15.83	5406.16	11.80	6789.34	45.58	17037.42

The watershed development programme is expected to promote employment generation in the rural areas besides enhancing people's participation at all stages of development of watershed leading to equity and sustainable development. The main objective are 1) to promote the overall economic development through efficient management of resources ii) generation of employment and iii) augmentation of other income generation activities. Further it also aims to restore ecological balance through easy and affordable technological solutions and sustained community action resulting in over all upliftment of the poor and disnautaged sections of the community. The major activity taken up under the programme are soil and water conservation programme in arable and non arable lands, planting and pasture development in wasteland and promotion of agro forestry and horticulture measures and the needed technology to disseminate knowledge through training, extension and creation of greater degree of awareness among the participants is encourages for effective peoples participation, especially women.

It is evident from the above that watershed development is among the policy thrust areas of rural development in India. It has transformed from resource conservation programme to a comprehensive livelihoods and rural development programme over the years. Establishment of National Rainfed Area Authority in 2008 and bringing watershed development under its purview with doubling of allocations for the watershed development under the common guidelines has confirmend the primacy of the programme at the policy and planning level. Besides, the common guidelines of 2009, expanded the watershed programme beyond 500ha, along with extending the time frame with emphasis on livelihoods. The 2010-2011 annual budget consolidated three schemes viz., IWMP, DPAP and DDP under the Integrated Watershed Management Programme (IWMP) and made a provision of 2021 crore for the programme.

Inclusiveness, a critical element in the strategy of Eleventh Five Year Plan (FYP), was to be achieved by ensuring that growth is broad based an is confirmed with programmes aimed at overcoming deficiencies in critical areas which affect large numbers of the vulnerable sections of our population, particularly Schedule castes (SC), Schedule Tribes (ST), the other Backward Classes (OBC), women and the minorities. The plan sought to

deal with these deficiencies through programmes aimed at providing access to health, education and other essential services and programmes of livelihood support (Mid Term Appraisal Report of XI FYP).

Schedule Castes and Schedule Tribes are the disadvantage section of the society due to socio-economic exploitation and isolation since a long time. Schedule Castes constitute about 166.6 million representing 16.23 percent of total population of India (2001, Census). There are about 1221 SC communities in India and Karnataka state has the largest number of SC communities (101) followed by Orissa (93). About 78 percent of SCs rural in their habitation. Occupation wise, majority of them are agricultural labourers (46 percent) and 20 percent of them are practising cultivation. The population of Schedule Tribes (STs) is 84.3 million constituting 8.2 percent of the population of the country. STs have their own distinctive culture and area geographically isolated with low socio-economic conditions.

The Fifth Five Year Plan (1974-78) adopted the approach of Tribal Sub Plan (TSB) which stipulates that funds should be allocated in proportion to population for the welfare and development of STs. The Implementation of TSP strategy was done through Integrated Tribal Development Plans (ITDPs) in the Tribal concentrated states and further supported by Special Central Assistance (SCA) and grant in Aid schemes for supporting Income Generation Activities, Infrastructure Development and Administrative reinforcement. The Sixth Five Year Plan (1980-85) is the first plan which gave emphasis for the comprehensive development of SCs in terms of special and financial terms through the Special Component Plan (SCP recently changed to Schedule Castes Sub Plan) for Schedule Castes and Tribal sub plan for Schedule Tribes and have been the important strategies used in the planning process for quite some time in order to ensure that outlays and benefits from the general sector of the plans flow into SCs and STs at least in proportion to their population both in physical and financial terms.

Hon'ble Prime Minister in the 51st NDC meeting held on 27/06/2005 emphasised that "SCP and TSP should be an integral part of Annual Plans as well as Five Year Plans, making provisions therein non-divertible and non lapsable with the clear objective of bridging the gap in socio-economic conditions of the SCs and STs with in a period of

10 years". The schemes included under SCP/TSP should therefore, ensure direct benefits to SC/ST individuals or families.

In accordance with the above, these programmes were used as watershed plus activities directed to these communities to have multiplier effect of resource conservation on catchment basis supported by additional funding at the individual/family level for minimizing the gestation period in deriving benefits from resource conservation to the disadvantaged groups. Under SCP for development of schedule caste families, the department has incurred an expenditure of 1718 lakhs during 2009-10 for constructing rainwater harvesting structures in 676 villages falling under 557 panchayats in 169 taluks for benefiting 5641 families. Similarly under TSP, a sum of Rs.1832.03 lakhs was spent to cover 20378 farmers belonging to Schedules Tribes spread over 715 villages in 553 panchayats falling under 169 taluks. Water harvesting structures such as percolation tanks, check dams and farm ponds are made to benefit stakeholders to improve their water resources so as to enable them to protect their crops to tide over the drought. In addition to water harvesting structures, soil and water conservation measure such as earthen bunding, boulder bunding, field bunding and bench terracing were carried out on individual fields for preventing erosion and retaining moisture to improve crop yields. In all 26000, SC and ST families spread over selected districts where programme is implemented are benefitted.

These programmes are implemented with the following objectives:

- To control erosion and improve the soil moisture availability as well as groundwater recharge.
- To improve the soil fertility and thereby production levels.
- To utilise harvested water as supplemental irrigation during critical stages of the crop during drought.

Objectives of the study:

In the past several studies evaluated the key success factors required for effective development but most of the studies were based on micro evidence from a few watersheds. There were no attempts to assess whether these investments are effective

in achieving the stated objectives at a wider scale of the state as a whole. On this backdrop the Department of Watershed Development Govt of Karnataka initiated an impact assessment programme covering all the districts under the programme. The Specific objective includes:

- The quality of works executed
- The process of identification of beneficiaries/ projects and involvement of beneficiaries.
- The impact of the project on agricultural production, productivity, additional usage of ground water by way of recharge mechanism, crop type/ pattern etc.
- Increase in incremental incomes.
- Additional area brought under cultivation/ irrigation, gendering and crop intensification and diversification etc.,

These objectives are assessed with respect to both the programmes implemented during 2009-10, which is the main focus of the present report.

Methodology:

As per the specifications, 1527 beneficiaries are selected randomly across the 8 districts in which the programme is carried out and interviewed using a close-ended questionnaire for determining the performance of the programme.

- Secondary data from the State and district headquarters would be collected and analyzed using appropriate statistical and analytical tools.
- Primary data from sample watershed works and beneficiaries in selected districts and taluks through structured questionnaire.
- The pre and post- situation data/ information would be collected from the farmers of selected villages to evaluate the impact of structures on agriculture production and other socio-economic condition of beneficiaries.

Sample Size:

The following districts have been selected for the study.

Sl. No	Name of the District	Total (beneficiaries)	Percentage
1.	Ramanagar	151	9.89
2.	Tumkur	157	10.28
3.	Shimoga	150	9.82
4.	Hassan	150	9.82
5.	Mysore	152	9.95
6.	Chamaraj Nagar	153	10.02
7.	Gulbarga	153	10.02
8.	Belgaum	157	10.28
9.	Bagalkot	154	10.09
10.	Bijapura	150	9.82
Total		1527	100.00

1.3 Field Work

Before start of the field work in each district, contacts were established with the concerned district administration and discussions were held regarding the implementation of the programme in the respective districts. These meetings were useful to establish contact with the higher-level officials and gave the survey team an opportunity not only to know the government's point of view, but also an opportunity to know about the overall picture of village development at the district level. List of all villages and beneficiaries covered under the programme were sought from the District administration. The requisite numbers of beneficiaries, as specified in the terms of reference (ToR), were considered for capturing required information.

At the Village level, meetings were held with all the available beneficiaries to brief them about the purpose of the study and also to clarify doubts thus avoiding any expectations among the people. Help of the Panchayat Members, ward members, or the members of village level institutions like watershed committee, youth club, village elders were taken to conduct such meetings. In each village all the beneficiary households were considered to select at random for the study through probability proportionate sampling method (approximating). A sample of 150 to 157 farmers was selected from each District. On the whole, detailed information from 1527 farming households was collected spreading over 10 districts. Same data was used for assessing income as well as other benefits accrued due to programme.

1.4 Data Analysis

Household level data were collected mainly under three broad categories viz., bio-physical and economic. Some of the important indicators include soil conservation works, activities related to water harvesting, maintenance of CPRs, etc., under the bio-physical factors; employment generation, diversification in agriculture, income, standard of living, etc; under the economic category and education of children, healthcare, participation in beneficiaries, etc. Each indicator has been assessed for its over all importance in determining the impact of the development.

For analytical purposes as well as to assess the impact of the watershed development programme, all the assessment indicators for which data were collected through surveys were categorized into 2 broad impact categories namely, bio-physical impact, and economic impact.

1.5 Structure of the Report

The impact assessment report is organized in VI chapters. The present introductory chapter provides the project background, objectives and methodology of the study. Chapter two presents profile of Karnataka and Chapter three presents the details of selected Chapter 4, and 5 presents the impact assessment from the communities' perspective.

Chapter – II

Karnataka- A Profile

2.1 Introduction

The Karnataka State is situated between 11° 31' and 18° 45' North latitude and 74° 12' and 78° 40' East longitude and lies in the West-Central part of peninsular India. Its maximum spread from the North to South is about 70 km and East to West is 300km. The state extends over 1.90051 lakh sq.km. with a long coastline of 3000 km. long. For the purpose of general administration it is divided into four revenue divisions namely Bangalore, Mysore, Belgaum and Gulbarga and 29 administrative units. The demographic details as well as land use details of the state are presented in tables-2.1 & 2.2. The population density of the state is 275 as compared to 324 for India (2001). The scheduled cast population constitutes about 16.2% and scheduled tribe is around 6.25% of total population. The percent population below the poverty line is 14.9 of the total population, and it is found to be associated with the population depending upon agriculture and work participation rate. The literacy rate for the state as whole is 66.6%.

Karnataka has three natural regions- (i) coastal region, a narrow belt that lies between the Western Ghats and Arabian Sea encompassing the districts of Dakshina Kannada(DK), Udupi and Uttara Kannada(UK), the region receives 2500 to 3000 mm of rainfall annually, with paddy and coconut as major crops; (ii) Western Ghat region extending over the districts of Belgaum, Dharwad, UK, Shimoga, Chikmagalur, Hassan, Udupi and DK, with much of it occupied by dense rainforest, the rainfall varies from 1000 mm to 3500mm and plantation and commercial crops are popular in this region; and (iii) the plateau region which includes malnad and maidan areas, the deeply dissected ghat edges with their deep gorges, waterfalls, and river captures and watersheds interlacing with evergreen forests constitute the core of malnad; maidan is relatively flat surface area rising between 400 to 760m in the northern parts and 900 to 1200 m in the southern parts. The southern parts are nurtured by kaveri and its tributaries and northern parts by krishna and its tributaries; rice, sugarcane, ragi,

coconut and mulberry are the principle crops in the southern maidan while jowar, cotton oilseeds and pulses are the major crops in the northern maidan.

Table 2.1 Demographic Features of Districts

Sl. No.	District	Rural population (%)	Female population (%)	Total population (Millions)	SC population (%)	ST population (%)
1	BANGALORE	12	5.67	6.54	13.02	1.32
2	BANGALORE(R)	77	37.68	0.85	21.93	5.13
3	RAMANAGARA	79	38.95	1.03	18.54	1.74
4	CHITRADURGA	82	40.07	1.52	22.17	17.54
5	DAVANAGERE	70	34.08	1.79	18.61	11.71
6	KOLAR	71	35	1.39	28.62	4.91
7	CHIKKABALLAPURA	81	39.76	1.15	23.91	11.97
8	SHIMOGA	65	32.35	1.64	16.41	3.41
9	TUMKUR	80	39.67	2.58	18.34	7.5
10	CHIKMAGALUR	80	40.05	1.14	20.43	3.6
11	DAKSHINA KANNADA	62	31.29	1.9	6.91	3.32
12	UDUPI	81	43.59	1.11	6.09	3.74
13	HASSANA	82	41.41	1.72	18.11	1.54
14	KODAGU	86	43.19	0.55	12.29	8.41
15	MANDYA	84	41.77	1.76	14.02	0.97
16	MYSORE	63	30.8	2.64	17.71	10.27
17	CHAMARAJA NAGARA	85	41.7	0.97	24.61	10.99
SOUTHERN KARNATAKA		62	30.54	30.28	16.77	5.59
18	BELGAUM	76	37.28	4.21	10.96	5.78
19	BIJAPUR	78	38.05	1.81	18.5	1.66
20	BAGALKOT	71	35.23	1.65	15.17	4.85
21	DHARVAD	45	21.88	1.6	8.23	4.39

22	GADAG	65	31.9	0.97	14.14	5.6
23	HAVERI	79	38.44	1.44	12.19	8.84
24	UTTARA KANNADA	71	35.15	1.35	7.53	1.76
25	BELLARY	65	32.15	2.03	18.46	17.99
26	BIDAR	77	37.66	1.5	19.89	12.13
27	GULBARGA	73	35.96	3.13	22.92	4.92
28	RAICHUR	75	37.25	1.67	19	18.15
29	KOPPAL	83	41.39	1.2	15.48	11.59
NORTHERN KARNATAKA		72	35.41	22.57	15.45	7.85
STATE		66	32.62	52.85	16.2	6.55

Table 2.2 Bio-physical and Economica Features of Districts

Sl. No.	District	TGA (M. Ha.)	ARF (mm)	FRST (%)	CW (%)	Fallow (%)	NAS (%)	NIA (%)	SLH (Ha.)	CI (%)	LSD (Sq.Km)	% Agril. Pop	WPS (%)	PCI (Rs.)
1	BANGALORE	0.22	14	2.33	2.04	8.97	27.08	5.08	41.82	45.07	178	2.34	5.95	113033
2	BANGALORE(R)	0.23	15.5	4.93	1.7	18.9	45.25	11.6	157.4	86.07	209	27.35	58.73	55934
3	RAMANAGARA	0.36	-11	19.65	0.33	13.12	44.65	11.4	0	67.47	20	30.91	64.19	31515
4	CHITRADURGA	0.77	36	9.57	2.8	8.2	56.5	10.8	75.14	86.87	224	34.17	71.86	29993
5	DAVANAGERE	0.6	20.5	15.05	1.43	4.25	65.22	25.8	70.06	80.51	196	28.57	65.29	31057
6	KOLAR	0.37	17.5	5.5	1.71	14.43	46.1	8.29	128.8	76.37	202	26.71	58.41	31456
7	CHIKKABALLAPURA	0.4	25	12.29	1.52	11.3	42.2	10.8	0	72.22	22	36.61	70.03	25235
8	SHIMOGA	0.85	24.5	32.66	1.92	4.91	26.05	16.2	30.78	59.51	114	26.9	61.83	34611
9	TUMKUR	1.06	24.5	4.24	5.88	9.34	57.12	13.9	65.62	86.78	238	35.45	69.58	26960
10	CHIKMAGALUR	0.72	5	27.77	2.69	3.19	41.1	4.77	42.52	66.37	102	22.53	49.74	32285
11	DAKSHINA KANNADA	0.48	9.5	26.93	6.56	2.73	27.33	14.8	40.49	53.16	146	4.86	9.75	52649
12	UDUPI	0.36	6.5	28.08	10.1	2.84	28.3	9.21	43.4	63.86	121	16.63	37.9	43924

13	HASSANA	0.66	54	8.79	2.12	10.63	55.29	13.3	70.35	84.64	180	34.99	69.67	25625
14	KODAGU	0.41	9	32.77	2.22	1.58	40.74	0.97	42.67	56.78	60	5.93	12.21	55325
15	MANDYA	0.5	5	4.97	8.42	14.8	46.95	26.3	65.04	88.54	240	35	73.46	22819
16	MYSORE	0.68	-1	9.29	3.17	11.21	50.46	23.5	53.35	109.3	174	24.55	58.39	34987
17	CHAMARAJA NAGARA	0.57	14	48.36	1.34	4.74	32.65	11.2	37.14	49.29	112	32.86	70.77	22274
SOUTHERN KARNATAKA		9.24	269	17.63	3.38	8.01	44.88	13.6	55.06	74.84	173	21.91	48.39	39393
18	BELGAUM	1.34	35	14.16	0.95	12.39	61.96	32.7	75	93.67	233	30.7	68.91	29662
19	BIJAPUR	1.05	-19	0.19	0.52	8.64	83.46	26.4	92.22	110.9	130	27.88	70.15	26735
20	BAGALKOT	0.66	1.5	12.31	0.31	7.6	71.07	34.7	76.42	99.61	262	28.33	65.04	30568
21	DHARVAD	0.43	1	8.25	0.62	9.7	74.51	9.24	81.16	134.9	116	22.64	53.05	41651
22	GADAG	0.47	12.5	5.07	0.22	4.81	82.61	16.4	83.32	125.6	164	32.82	69.66	30110
23	HAVERI	0.49	11	9.78	0.62	3.64	75.28	14.6	78.67	95.79	187	34.39	74.23	25099
24	UTTARA KANNADA	1.02	5	79.4	0.63	1.72	11.19	2.63	14.58	16.69	58	16.84	39.28	30390
25	BELLARY	0.81	-11	11.93	3.05	11.82	57.07	22.9	67.45	90.08	188	30.22	66.53	47607
26	BIDAR	0.54	-12	5.11	3.58	18.18	60.95	8.57	86.15	102.3	143	23.15	62.38	22731

27	GULBARGA	1.61	-21.5	4.29	0.73	12.48	71.9	12	85.83	105.4	162	28.9	67.02	26022
28	RAICHUR	0.84	-11	2.17	1.28	18.82	68.86	22.2	83.4	110.6	236	32.05	73.03	24838
29	KOPPAL	0.55	8.5	5.33	0.46	12.39	69.08	18.2	82.44	107.5	150	33.73	72.75	25287
	NORTHERN KARNATAKA	9.81	0	14.71	1.05	10.48	63.92	19.1	74.38	95.61	169	28.69	65.92	30058
	STATE	19.05	269	16.13	2.18	9.28	54.69	16.4	65.01	85.54	171	24.81	55.71	34726

2.2 Climate and Rainfall:

The climate of the state is determined mainly by the geographical location with respect to the sea, monsoon winds and physiographic. The state has moist monsoon climate on the West coast; semi-arid to arid climate in the southern and northern districts. The State receives an average annual rainfall of 1354.7 mm with a minimum of 552.8mm and a maximum rainfall of 3932.4mm. The analysis of data of actual rainfall received by the seasons for the year 1962-81 (Naidu ,2005) reveals that, 991.7mm is received in the south-west monsoon (June to September), 212.4mm from the north-east monsoon (October to December), 142.3mm in hot weather period (March to May), while, hardly 8.3mm is received in the cold weather period (January and February). In terms of percentage contribution south-west monsoon contributes to a maximum of 73 per cent, followed by north-east monsoon, hot weather and cold weather periods accounting for 16, 10 and one per cent, respectively.

2.3 Land use Pattern

The land use pattern in the state is the result of interaction of various demands of land mainly for agricultural and non- agricultural uses. The land use pattern as on 2007-08 is summarized below based on the available information in table 2.3

Table.2.3: Land use in Karnataka.

Land use pattern	Area in ha	% to the Geographical area
Total geographical Area	19049836	100.00
Forests	3071833	16.13
Land under non-agricultural use -Barren land	1369281 787776	11.32
Cultivable waste	415051	8.58
Permanent waste	929642	
Trees & Groves	289966	
Current Follows	1262420	9.28
Other Follows	505075	
Net area sown	10418792	54.69

It could be seen from the above that about 54.69 percent of the geographical area is sown once while forests occupy 16.13% only when compared to a recommended norm of 30%. The current fallows and cultivable waste lands which have remained fallow over longer periods may have several limitations. These lands need to be brought under cultivation after assessing technical and other causes for their fallow status. In view of mounting demands for food due to rise in population as well as changes in economy, it is essential to retain net cultivable area (121.03 lakh ha) for agriculture as per the land capability. At present only 116.29 lakh ha is cultivated and hence there existed a need to change land use pattern on scientific basis so as to bring more area under cultivation based on watershed approach. An area of 4.08 lakh ha being class IV need to be gradually diversified for promoting, silvi-pasture and silvi-horticulture. Such diversification over time will be possible through watershed approach.

2.4 Agro climatic Zones of Karnataka

Karnataka is predominantly agriculture – based with more than 65 percent of its population depending on agriculture and ancillary activities. Development of agriculture in the state must be relevant and in tune with the available resources. Use of resources must be growth – oriented through optimum use for achieving sustainability. This calls for a system approach by which crops, livestock and related activities are integrated to maximize production and employment considering local conditions. In accordance with the above concept, Karnataka with 29 administrative units has been divided into 10 agro-climatic Zones based on (i) Rainfall pattern- both quantum and distribution; (ii) Soil type including texture, depth and physicochemical properties; (iii) Elevation and topography; (iv) Major crops and vegetation. The details of which are given in Table-2.4.

2.4.1 North Eastern Transition Zone:

The Zone comprises of black soils, lateritic soils and alluvial soils of Basaltic material. The black soils occur on plateau surfaces, slopes and valleys and occupy 6.8 lakh ha in the zone. Lateritic soils of Bidar occupy an area of 1.89 lakh ha and deep black alluvial occupy 1.47 lakh ha.

2.4.2 North Eastern Dry Zone:

The black soils developed from Basalts, Sedimentary and Metamorphic rocks cover about 8.75 lakh ha and distributed in all the eleven taluks of the zone. Red soils developed from gneisses, granites and sand stone occur to an extent of 3.3 lakh ha and distributed in Shorapur, shahapur and Yadgir taluks of Gulbarga and in all the three taluks of Raichur district. Lateritic soils occur to a limited extent and alluvial soils occur in the valleys and occupy 4.43 lakh ha.

2.4.3 North Dry Zone:

This zone comprises of black, (25.27 lakh ha) red (12.03 lakh ha) and alluvial soils (11.73 lakh ha) Black soils are distributed in all five taluks of Bijapur, all the six taluks of Bagalkot district, Bellary, Hadagalli, H.B Halli and Siriguppa taluks of Bellary districts, Harpanahalli taluk of Davanagere district, all four taluks of Koppal, two taluks of Raichur, four taluks of Gadag district, Navalgund of Dharwad district, Athni, Gokak, Ramdurg, Raibag and Saundathi taluks of Belgaum district. These soils are classified as, Entisols, Inceptisols and Vertisols.

The red soils which occupy on area of 12.03 lakh ha are distributed in Badami, Bagalkote, Bilgi taluks of Bagalkote district, Bellary, Hadagalli Hospet, Kudligi, HB Halli, Sandur and Siriguppa taluks of Bellary District, Harpanahalli taluk of Davanagere district, Gangavathi, Koppal, Kustagi and Yelburga taluks of Koppal district, Sindhanur, Lingasagur of Raichur district, Ron, Gadag and Mundargi taluks of Gadag district, Ramdurga, Gokak and Saundathi taluks of Belgaum district. These red soils have developed on sandstone, quartzite, gneisses and granites occur on hills and ridges. These are classified as Alfisols, Inceptisols and Aridisols. The alluvial soils occupy an area of 11.79 lakh ha and distributed in all the valleys and depressions of the eight districts. These soils are classified as Inceptisols and Entisols.

2.4.5 Central Dry Zone:

This zone contains red soils (12.7 lakh ha) and distributed in all six taluks of Chitrdurga district, Jagalur, Harihara and Davanagere taluks of Davanagere district, all six taluks of

Tumkur district, Arsikere taluk of Hasan district and Kadur taluk of Chikamagalur district.

The Black soils occur to an extent of 2.54 lakh ha and found in Chitradurga, Hiriya, Holalakere, Hosadurga and Challakere taluks of Chitradurga District, Jagalur, Harihara, Davanagere taluks of Davanagere district; CN Halli of Tumkur district Arsikere taluk of Hasan and Kadur talu of Chikmagalur districts.

2.4.6 Eastern Dry Zone:

Red soils occur dominantly in this zone to an extent of 10.98 lakh ha (60.9 per cent of TGA of zone) and distributed in all taluks of Tumkur, Bangalore and Kolar districts. These soils have developed on gneisses and granites and to little extent on metamorphic rocks. These soils occur on hills, ridges, rolling to undulating and gently sloping lands of plateau region and in forest areas of Eastern ghats region. Among the red soils, the moderately deep to deep, red gravelly clay soils occur to an extent of 5.20 lakh ha and moderately deep to deep, red clayey soils occur to an extent of 4.35 lakh ha and very deep, red, loamy soils occur to an extent of 1.25 lakh ha.

The lateritic soils occur to an extent of 1.95 lakh ha (10.8 per cent of TGA) and distributed in Sidlaghatta, Srinivasapur, Kolar, Chitamani, Chikaballapur and Malur taluk of Kolar district and Bangalore North, Bangalore South, Hoskote, Devenahalli and Anekal taluks of Bangalore district.

The alluvial soils occupy the valley regions of the zone and are irrigated mostly under tank irrigation. Alluvial soils occur to an extent of 4.00 lakh ha (22.2 per cent of TGA). These soils are distributed in all taluks. These soils are cultivated with rice, irrigated ragi. Mulberry and vegetables. These are potential soils for agriculture.

2.4.7 Southern Dry Zone:

The red soils occur extensively to an extent of 7.52 lakh ha and distributed in all the taluks of Mysore district, four taluk of Chamarajanagar district, Turuvekere and Kunigal taluk of Tumkur district, all the taluks of Mandya district and C.R. Patna taluk of Hassan district.

Black soils occur to a limited extent in this zone covering an area of 0.74 lakh ha and occur in the taluk of Nanjangud, Chamarajanagar and Yelandur taluks. Deep black soils occur to an extent of 0.58 lakh ha (3.7 per cent of TGA). Rest is shallow or medium deep black soil. The black soils occurring in low lying areas in Yelandur and Chamarajanagar taluk under irrigated conditions have drainage and salinity-sodicity problems. The major crops grown are cotton, sorghum, pulses, mulberry and rice.

The alluvial soils occur to an extent of 2.92 lakh ha in all the districts of the zone. The alluvial soils have drainage and salinity problems in patches.

The brown forest soils occur to an extent of 1.20 lakh ha in Gundlupet taluk of Chamarajanagar district in the western ghats and foot hills. These soils are deep to very deep, well drained, dark brown, loam to clayey soils rich in surface organic matter.

Shallow to moderately deep, red, gravelly clay and loamy forest soils occur in Eastern Ghats to an extent of 1.93 lakh ha (12.3 per cent of TGA) and found in Kollegal Chamarajanagar and Gundlupet taluks of Chamarajanagar district. These soils have developed from granites and charnockites. They are classified as Alfisols, Inceptisols and Entisols.

2.4.8 Southern Transition Zone

Moderately deep to deep red clayey soils occur to an extent of 4.00 lakh ha and moderately deep to deep, red, gravelly clay soils to an extent of 4.62 lakh ha. The rest of the area is covered by shallow, red loam soils. The red soils are distributed in three taluks of Hassan district, Tarikere of Chikmagalur district, all the three taluks of Shimoga district.

Black soils occur to an extent of 1.50 lakh ha out of which shallow black soils cover 0.26 lakh ha, medium deep black soils cover 0.85 lakh and deep black soils 0.67 lakh ha. The black soils are found in Honnali and Holenarsipur taluks. The black soils have developed on metamorphic rocks. Major crops grown on black soils are sorghum, pulses and sunflower.

The alluvial soils occur to an extent of 2.84 lakh ha (17.1 per cent of TGA) in the valley regions of all the districts of the zone. The alluvial soils are classified as Entisols and Inceptions.

Laterite soils occur to an extent of 1.17 lakh ha and distributed in Malnad region of Belur, Alur and Arkalgud taluks. Laterite soils are deep, well drained reddish brown and clayey soils. These soils are classified as ultisols and Alfisols. Coffee plantations are the major crops on these soils.

Deep to very deep, Brown forest clayey and gravelly clay soils occur to an extent of 0.86 lakh ha in Western Ghats and their foot hills and distributed in Shikaripur, Shimoga, H.D Kote and Peripatan taluks. These soils are mostly under forest.

2.4.9 Zone -8: Northern Transition Zone

This transition zone includes a part of Western Ghats, Parts of malnad and plateau regions. The Western Ghats has deep to very deep, well drained, dark brown, sandy clay loam surface soil and sandy clay to clay subsoil. The malnad area has very deep, lateritic, well drained, yellowish red to reddish brown sandy clay loam surface soil and clayey subsoil.

The plateau region has dominantly black soils developed on basalt, schist and of alluvium and occurs to an extent of 6.87 lakh ha and out of which shallow black soils cover an area of 1.52 lakh ha in the taluks of Chikkodi, Hukkeri, Belgaum and Bailhongal of Belgaum district. The medium deep black soils occur to an extent of 0.03 lakh ha in shirhatti taluk of Gadag district and deep to very deep, black soils occur to an extent of 5.32 lakh ha in all the taluks of Belgaum district and, Haveri district, Gadag district and Dharwad district of the zone.

The red soils developed on ferruginous sand stone and quartzite occur to an extent of 3.84 lakh ha and are distributed in all taluks of Dharwar district, Haveri district and Shiratti taluk of Gadag district.

The lateritic soils occur to limited extent about 0.26 lakh ha in Belgaum taluk of Belgaum district.

2.4.10 Zone 9: Hilly zone

Lateritic soils occur in Malnad region of Yellapur, Sirsi, Siddapur, Sagar, Mudigere, Sakleshpura and Somwarpet taluks to an extent of 2.59 lakh ha. These soils are under forest in Uttara Kannada, Shimoga and Dharwad districts whereas under plantation crops in other districts.

Red soils occur dominantly in the plateau region to the extent of 4.19 lakh ha and occur in Khanapur, Haliyal, Kalghatgi, Hanagal, Sorah, Chikmagalur and Mudigere taluks. These soils have developed on sedimentary, metamorphic and gneisses rocks. Among red soils, moderately deep, red, clay and gravelly clay soils occur to an extent of 2.42 lakh ha and deep, red clay and gravelly clay soils to an extent of 1.01 lakh ha, rest by shallow red clay and loam soils. Major area is under forest. The agricultural crops grown are groundnut, pulses and upland rainfed rice.

The black soils occur to a limited extent, about 0.62 lakh ha and found in Khanapur, Hanagal and Kalghatgi taluks of the zone. The crops grown are cotton, sorghum, pulses and sunflower.

The alluvial soils occur in the valley regions of the zone in all the districts to an extent of 1.14 lakh ha (5.0 percent TGA). The crops grown are rainfed rice and also plantations of arecanut and coconut. Rocky lands cover an area of 0.18 lakh ha.

(x) Zone-10: Coastal zone

The alluvial soils occur to an extent of 1.60 lakh ha and distributed in all the taluks of three districts. The crops grown are rice, groundnut and pulses, Arecanut and coconut plantations are common. These soils have drainage, salinity and flooding problems.

The brown forest soils of Western Ghats occur to an extent of 4.42 lakh ha and distributed in Sulya, Belthangadi, Puttur taluks of Dakshina Kannada district, Karkala and Coondapur taluks of Udupi districts and Karwar, Ankola, Kumta, Honnavar and Bhatkal taluks of Uttara Kannada District.

2.5 Soils

The state represents varied climate and geological conditions that have resulted in different physiological and vegetative features giving rise to different soils. These soils have different morphological and physicochemical properties that have a bearing on plant growth and influenced crops and cropping patterns. As per the updated soil survey data, the soil of Karnataka have been broadly classified under 13 groups and presented in the Table- 2.4.

2.5.1 Soil classification:

The soils of Karnataka have been classified into traditional groups namely red soils, laterite soils, black soils, colluvio-alluvial soils, brown forest soils and coastal laterite and alluvial soils. Red soils are differentiated based on depth, gravel content and texture. Laterite soils are divided based on iron gravel content and depth whereas black soils are divided on depth basis. The alluvial soils are differentiated based on depth, texture and drainage. The forest soils are sub divided based on depth, gravel content and texture. The important characteristics of the soils are as given below.

2.5.2 Black soils:

Shallow black soils: The shallow black soils (<50cm depth) are well drained, dark grey to dark brown in colour, loamy to clayey with 25 to 55% clay, moderately to strongly alkaline (pH 8.4 to 9.1) slightly to strongly calcareous, having organic carbon 0.33 to 0.43%. These soils have a base saturation of 100 percent and CEC of 48 to 61 Cmol (+) per kg. These are highly susceptible to erosion and are classified as entisols

2.5.3 Medium Black soils:

The medium black soils (50 to 100cm depth) are well drained, dark greyish brown to dark grey in colour, clayey (48 to 60% clay) in texture having montmorillonite mineral, strongly alkaline (pH 8.0 to 9.1) slightly to strongly calcareous with OC content ranging from 0.4 to 0.52 percent, having 100 percent base saturation and CEC of 54 to 64 Cmol(+) per kg. These soils are classified as Inceptisols and highly prone to sheet erosion.

2.5.4 Deep Black soils:

These soils are deep to very deep (>100cm depth) moderately drained, clayey with montmorillonite mineralogy resulting in high swelling and shrinkage, strongly alkaline and calcareous. The O.C content varies from 0.49 to 0.63 and base saturation is 100% and CEC is 49 to 64 Cmol (+) per kg. These soils have problems of workability and suffer from sheet erosion. These are classified as vertisols.

Table.2.5: Extent of Different Soils in Karnataka

Sl. No.	Legend	Area (%)	Area(hectares)
1	Red gravelly loam soils	2.36	452330
2	Red loam soils	1.39	266739
3	Red gravelly clay soils	18.31	3514031
4	Red clay soils	17.41	3341803
5	Lateritic gravelly soils	1.57	301713
6	Lateritic soils	3.14	602175
7	Alluvio-colluvial soils	14.55	2793062
8	Deep black soils	18.69	3585914
9	Medium deep black soils	3.66	702760
10	Shallow black soils	6.17	1184743
11	Forest brown Soils	5.71	1095248
12	Coastal laterite soils	3	576145
13	Coastal alluvial soils	0.37	70227
14	Rock land	2.72	521681
15	Settlements	0.08	15382
16	Water bodies	0.86	165495
Total of 15 classes		100	19189448

Table: 2.4 Agro-Climatic Zones of Karnataka

Zone No	Area M.ha		Rainfall (mm)	Soils	Crops grown	Area covered
	Total	Cultivated figures in Paranthesis indicate area irrigated				
Northern Transition Zone	0.87	0.57 (.07)	830-919	Red, Laterite Shallow to Medium Black	Sorghum, Bajra, Redgram, Oil seeds, Cotton and Sugarcane	Bidar district and two taluks of Gulbarga
Northern Dry zone	1.76	1.31 (.09)	465 to 785	Shallow, Medium and Deep black	Sorghum, Bajra, Oil seeds, Pulses, Cotton and Sugarcane	Eight taluks of Gulbarga and three taluks of Raichur.
Northern zone	5.04	3.55 (0.49)	465 to 785	Black	Sorghum, Maize, Bajra, Groundnut, Pulses, Rice, Sugarcane and Cotton.	Districts of Bijapur and Bellary, 6 taluks of Raichur, 5 taluks of Dharwad and 5 taluks of Belgaum.
Central Zone	1.98	0.93 (0.18)	450 to 715	Red loam and Black	Ragi, Sorghum, Rice, Oil seeds and Pulses.	Chitradurga, 6 taluks of Tumkur and one taluk each in Chikkamagalur and Hassan districts.
Eastern Dry zone	1.8	0.85 (0.23)	680 to 890	Non-gravelly, Red loam and Laterite	Ragi, Rice, Maize, Pulses, Oil seeds, Vegetables and Mulberry	Districts of Bangalore and Kolar and 2 taluks of Tumkur.
Southern Dry zone	1.56	0.74 (0.22)	670 to 890	Red loams and Black	Rice, Ragi, Pulses, Miner millets and Sugarcane	District Mandya, 8 taluks of Mysore, 2 taluks of Tumkur and one taluk of Hassan districts.

Southern Transition zone	1.66	0.68 (0.20)	610 to 1050	Red loams	Rice, Ragi, Sorghum and Tobacco	5 taluks each of Hassan and Shimoga districts 3 of Mysore and one taluk of Chikkamagalur.
Northern transition zone	1.13	0.86 0.052	620 to 1300	Red loams and Black	Sorghum, Rice, Groundnut, Sugarcane Cotton and Tobacco.	Ten taluks of Dharwad and 4 taluks of Belgaum.
Hilly zone	2.27	0.58 (0.13)	900 to 3700	Laterite	Plantation crops Rice, Ragi and Pulses	1 taluk in Belgaum, 6 taluks in Uttara Kannda; 4 in Shimoga, 5 in Chikkamagalur, 1 in Dharwad, 1 in Hassan , All 3 of Kodagu.
Coastal Zone	0.98	0.23 (0.08)	3000 to 4700	Red, Laterite Coastal Alluvial	Rice, Pulses, Groundnut, Sugarcane	Uttara Kannada and 5 taluks of Dhakshina Kannada.

2.5.5 Laterite soils:

These soils are well drained and very deep. yellow red to dark red in colour with iron gravel (33 to 66%), slightly acidic to neutral (pH 6.4 to 6.7), with organic carbon of 1.03 to 0.67 percent, base saturation of 68 to 72 percent and CEC of 9.0 to 10.8 Cmol (+)per kg. These soils have problems of surface crusting and compaction with the result runoff is high and soil erosion is severe.

2.5.6 Red soils:

The red soils are shallow to moderately deep, yellowish red to dark red in colour, gravelly sandy clay with well developed cambic and argilic horizons. The clay content varies from 11 to 46% with 0.4 percent carbon, slightly acidic in reaction (pH 6.5 to 6.8), base saturation 90 to 100% and CEC of 9.2 to 14.4 Cmol (+)per kg. The red soils are classified as Alfisols and Inceptisols.

2.5.7 Alluvial soils:

These soils are deep to very deep, well drained to moderately drained, loamy to clayey in texture, occasionally with high water table and stratified light and heavy textures. The physico chemical characteristics of these soils are similar to deep black soils and classified as vertisols. These soils have constraints of drainage, salinity and sodicity in patches.

2.5.8 Brown Forest soils:

These soils are deep to very deep, well drained, dark brown loamy to clayey soils rich in organic matter and low to medium in base saturation. These soils are classified as Ultisols and Inceptisols. The major constraints are steep slopes and crusting.

These soils have 18 to 45 percent clay, 0.98 to 4.51% organic carbon, strongly acidic (pH 5.4 to 6.0), 3 to 99 percent base saturation and CEC of 4.8 to 18 Cmol(+) per kg. The extent of different soils in different agro-climatic zones is as given below in 2.5a and 2.5b:

2.6 Soil erosion

Soil Degradation is rampant across the state due to excessive biotic pressures coupled with absence of resource conservation measures. Except 15.56% of the area, the remaining is subjected to moderate to severe erosion (Figure-2.1). Consequent to such severe erosion deep soils get converted into medium and medium into shallow soils over a period of time, reducing moisture storage capacity of the soil and there by vulnerability to drought leading to poor socio-economic conditions. It is therefore, essential to develop these areas by adopting appropriate soil and water conservation measures on watershed basis for reducing environmental impacts of droughts.

2.7 Droughts

Droughts present a more serious problem in Karnataka than floods. About two third areas of the State having 750mm rainfall and less is considered to be drought prone. Rigorous statistical analysis on the occurrence of droughts in the state revealed that a tendency of 3 years cycle in the northern districts and a four year cycle in the southern districts, determined through growing period is given in Fig- 2.2 The impacts of the

drought depend not only on the magnitude, duration and frequency of rainfall deficits but also on differing responses of plants and soil moisture storages. The essence of drought management lies in conserving moisture through appropriate conservation measures and crop management strategies, adopting watershed approach.

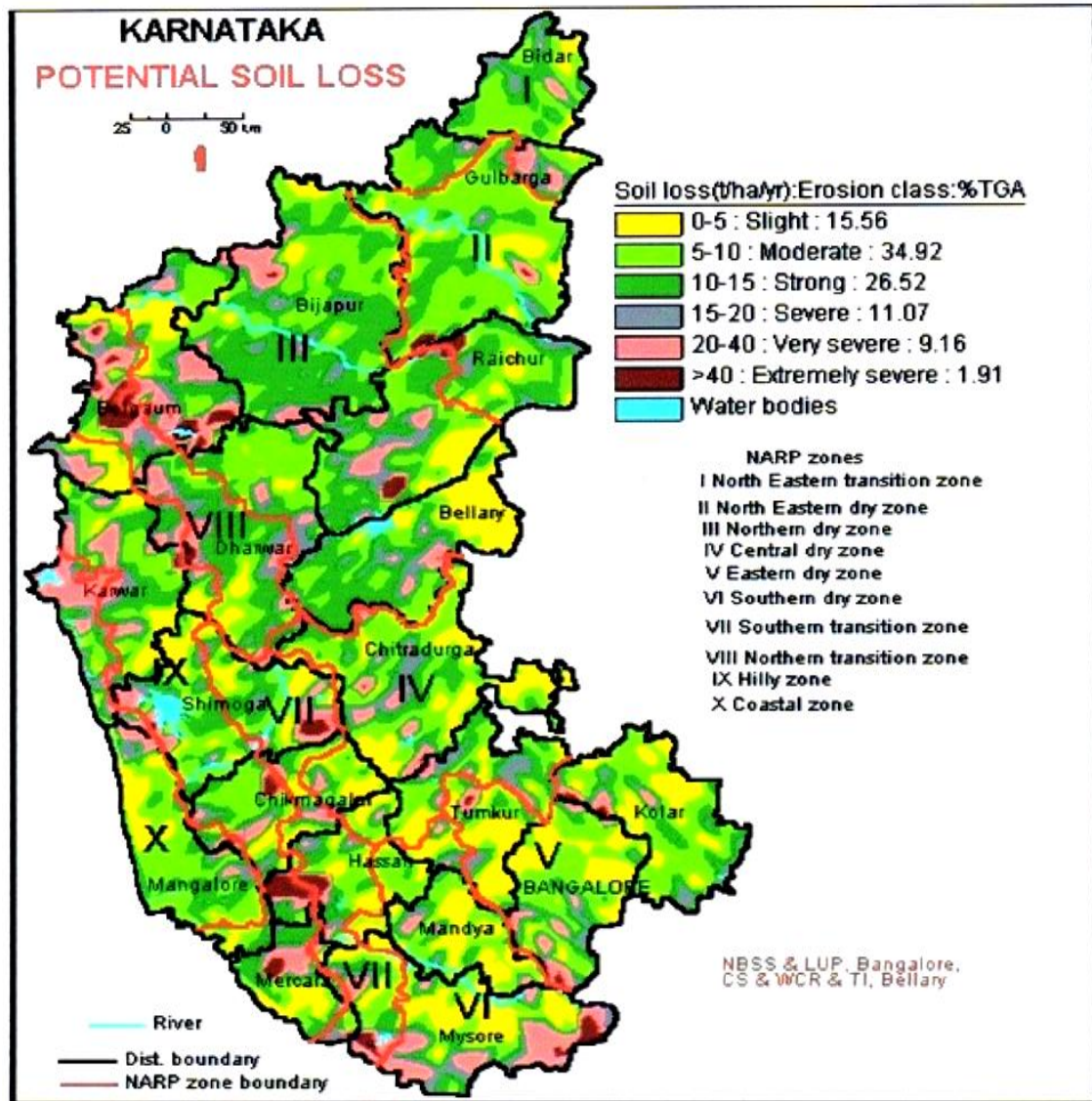


Fig.2.1: Soil erosion in Karnataka

Source: NBSS&LUP Regional Centre, Bangalore

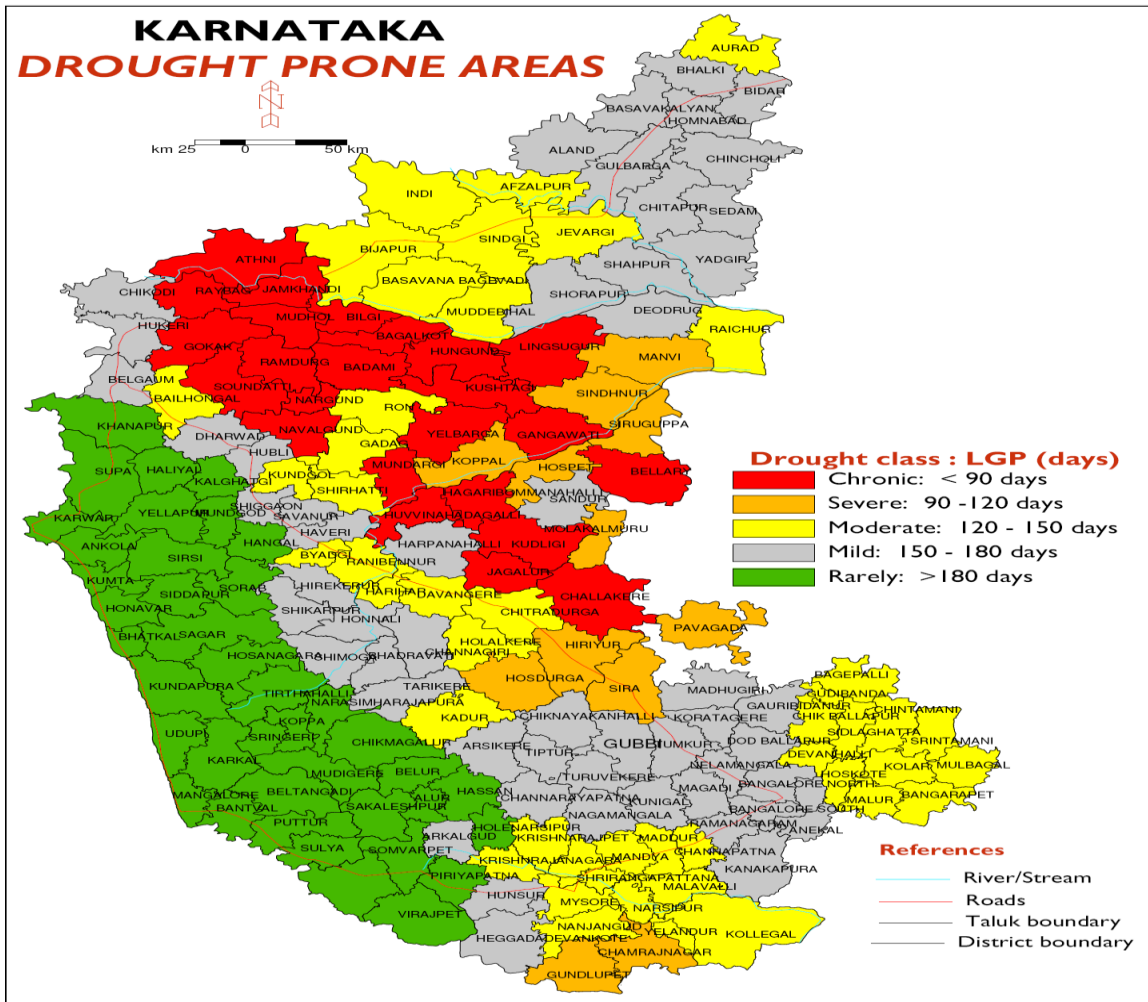


Fig 2.2 -Drought prone areas in Karnataka as determined by Length of growing season.

Source: NBSS&LUP Regional Centre, Bangalore

2.8 Agriculture and allied sectors:

2.8.1 Agriculture

Agriculture is the mainstay of the people in the state. Cultivators and agricultural laborers form about 56 percent of the workforce (2001 census). Agriculture in the state is characterized by wide crop diversification and is highly dependent on the vagaries of the southwest monsoon. Out of the net area sown, only 29 percent is irrigated. The vast extent of dryland, located primarily in northern Karnataka, casts its long shadow on the socio-economic development of the local people in many significant ways.

2.8.2 Crops

Paddy, Jowar, Ragi, Maize, Bajra and Wheat are the major cereals grown in the state. The extent of these crops under rainfed and irrigation is as given below:

Table.2.6 a: Crops and their extent under irrigation.

Crop	Area	% Area under irrigation	Average yields Kg/ha		Attainable yields Kg/ha	
			Rainfed	Irrigated	Rainfed	Irrigated
Paddy	13.18	68	2911	2526	2310 to 3796	2640 to 4264
Jowar	19.55	7.0	832	1835	1169 to 2400	2277 to 4000
Ragi	9.77	6.5	1495	2526	1800 to 2642	3085 to 3998
Maize	4.50	54.6	2906	3381	3000 to 4000	5500 to 6625
Bajra	3.73	11.9	546	1099	1040 to 1200	2560
Wheat	2.39	36.6	456	1315	1200 to 1336	2140 to 2400

Table 2.6 b AREA UNDER IMPORTANT CROPS 2007-08

No.	DISTRICTS	Paddy	Ragi	Jowar	Bajra	Maize	Wheat	Minor Millets	Bengal Gram	Tur	Other Pulses	Groundnut	Sugarcane	Cotton	Total area under cultivation
1	CHITRADURGA	6674	5877	26300	2293	65021	473	6265	10428	7366	19682	146798	65	10648	307890
2	DAVANAGERE	78132	23699	30268	722	172282	232	695	5622	4594	4781	19732	7222	6174	354155
3	SHIMOGA	129977	2095	423	0	55184	0	0	55	392	3219	1677	9044	4063	206129
4	TUMKUR	29872	197206	2265	193	21055		2611	895	13744	49059	159083	2003	1046	479032
5	CHIKMAGALUR	42007	52463	9223	0	4209	10	876	6702	811	17219	4606	827	1868	140821
6	HASSANA	52425	75651	3478	0	47433	0	120	1726	2072	30928	1310	5049	1108	221300
7	CHAMARAJA NAGARA	19701	19011	18878	782	36029	1	36	3103	1913	32691	11194	8465	2248	154052
8	BELGAUM	69424	1111	157336	36172	152786	62963	3938	47765	5702	48721	67648	102845	21050	777461
9	GADAG	1990	27	74259	1950	42423	37370	364	43512	3051	102772	54602	101	49518	411939
10	HAVERI	41867	920	45613	47	140516	1112	7046	1208	2807	20293	19586	2189	78900	362104
11	UTTARA KANNADA	80977	26	90	0	2934	0	0	16	82	2227	3084	1484	5596	96516
12	GULBARGA	90811	0	253837	61870	2681	17936	479	138387	429589	196272	52263	12797	26035	1282957
13	RAICHUR	160227	0	120018	62077	1168	3155	73	58483	17912	14932	46551	81	22259	506936
14	KOPPAL	75190	0	68197	72360	27172	8876	5207	17926	9449	46602	31901	0	12819	375699

It could be seen from the table above that considerable untapped yield potential exists in almost all the crops. There is an immediate need to bridge the gap by educating the farmers about the improved seeds and technologies suitable to different regions by adopting appropriate extension, strategies so as to replace subsistence farming (need based agriculture) to science based commercial farming. This could be achieved by forming user groups based on individual crops and build their capacities through intensive trainings so as to convert them as resource managers.

2.8.3 Pulses and Oil seeds:

The major pulses crops are redgram, bengalgram and horsegram and other short duration pulses are greengram, blackgram, cowpea and fieldbeans. The major oil seed crops grown in the state are groundnut, sunflower, safflower, sesamum and soybean.

In addition to the above, commercial crops such as cotton, sugarcane, tobacco, sericulture, coffee, tea, pepper, cloves and cardamom are also grown. In addition to the above horticulture and vegetable crops are grown both under rainfed and irrigation. In most of the cases considerable untapped yield potential exists due to non adoption of improved practices and absence of support services. A balanced development of total landuse planning involving all land based production activities like food, commercial and plantation crops, horticulture, sericulture, animal husbandry, forestry and aquaculture can only ensure optimum land use and improve economic well being of all sections of society maintaining quality of the environment. Hence the major challenge would be to realign the cropping pattern/farming systems based upon the yield potentials vis a vis natural resource identification of new techniques and technologies and their adoption and converging all developmental programmes with a common goal of area development so as to reestablish ecological balance.

Soil Conservation: Dry land farming is the mainstay of agriculture in the State, which implies emphasis on watershed development, promotion of water conservation etc. The area covered under soil conservation measures is anticipated to be 49.34 lakh hectares by the end of 2008-09.

Forestry: Forest covers 16.13percent of the total State's geographical area as against a requirement of 30%. The State has 5 National Parks and 21 Wild Life Sanctuaries covering an area of 6446 sq.kms,which constitute 15% of the total forest area.

Horticulture: Horticulture covers an area of 17.25 lakh hectares in the State with a production of 130 lakh tonnes. The focus of horticultural policy is on area expansion covering marginal and culturable waste lands, dissemination of new technology, for increasing production and supply of improved planting materials. To promote wine varieties of grapes in the State and to encourage the wine industry, a wine policy has been in force in the State since the year 2007-08.

Livestock and Poultry: The livestock and poultry population of the State is 5.29 crores as per the 17 Livestock, Census 2003 and the livestock density /sqkm is 171. The Karnataka Milk Federation has 21 dairy processing plants with a capacity of 26.65 lakh liters a day and 42 chilling centers having 14.60 lakh liters of chilling capacity and 4 product dairies equipped to produce 62 MTs of milk powder per day. In the State 9668 Dairy Co-Operative Societies are functioning and 19.80 lakh farmers were enrolled. In the view of above considerable feasibility exists for improving livestock sector.

Pisciculture: The total fisher folk population of the State is 8.61 lakh comprising of 2.33 lakh marine and 6.28 lakh inland fishermen. Export of marine products for the last three years is 53,037 metric tones with a foreign exchange earning of Rs.329.68 crore. Other programmes taken up for the socio-economic upliftment of fishermen include group insurance, housing, support to fishermen co-operatives, assistance for mechanization of traditional fishing boats, assistance for fish processing and marketing etc.

2.9 Employment

The Fifth Economic Census data reveals that the total number of persons usually working in establishments comprising of agricultural and non agricultural activities registered an increase of 20.79% from 52.53 lakh persons in 1998 to 63.46 lakh in 2005. With regard to female employment, there has been an increase by 30.96% during this period. There has been a decline in child labour by 65.54% during the same period. Out of the total workforce, 59% are literates, of which the majority (33.8%) are below matriculate level without any technical skills. Organized sector employment in the state is 21.73 lakh at the end of September, 2008. Public sector employment accounts for 10.55 lakh and private sector, 11.18 lakh. The MGNREGS has been extended to all the districts of the State from 2008-09.

2.10 Problems

Karnataka has the highest proportion (79%) of drought prone area among all major states in the country and in absolute terms it has the second largest area of dryland in the country after Rajasthan. In addition, Karnataka also has the second lowest (154.2 M ha M/Yr) replenishable groundwater resources among major States after Rajasthan. The watershed concept for development of rainfed agriculture has gained importance over the years and it amply demonstrated that watershed development tools are very effective in meeting the developmental objectives with a mission approach.

The development of rainfed agriculture in the state of Karnataka started with the implementation of watershed development projects under different management approaches, with different sources of funding. This included, State implemented National Watershed Development Project for Rainfed Area (NWDPRA), DANIDA assisted Karnataka Watershed Development project, District Watershed Development Project through Dry land. Development Board (DLDB) and the World Bank assisted Integrated Watershed Development project under multi-sectoral approach. The total area covered under different programmes would add up to about 49.82 lakh hectares, which means still about 79.88 lakh hectares remains to be treated(i.e. 61.58% of the total area to be treated under Watershed programme). This indicates that there is an overwhelming need of Watershed development programme to be adopted in the State.

The fact that large number of agencies involved in watershed development programs followed different approaches, the Karnataka Government felt that it is essential to bring all the programmes under one umbrella. Keeping this in view the Government established Directorate of Watershed Development with head office at Bangalore and District Watershed Development Offices involving multidisciplinary staff with effect from 1-1-2000. All Watershed Development Programmes under state sector including externally funded projects were brought under WDD, whereas centrally sponsored schemes were implemented by District Watershed Development Office under the administrative control of Zilla Panchayat. Watershed Development has thus become the central focus for rural development in Karnataka for reasons which among other things include:

- The need to develop rainfed areas in order to maintain the momentum for agricultural growth.
- Increased land degradation affecting productivity adversely requiring immediate action.

- Increasing demand for water and excessive exploitation of groundwater along with neglect of traditional water saving techniques and water saving initiatives.

In accordance with the above starter perspective plan is prepared for treating the remaining area (Table.2.7)

Table.2.7: Plan wise area phasing out for watershed treatment in Karnataka.

Sl. No.	Item		Details		
			No. of MWS	Area in lakh ha.	
1	Total area in the state		34299	190.50	
2	Area not available for treatment		8359	60.80	
3	Area available for treatment		25940	129.70	
4	Total area under different Schemes(treated + ongoing		9964	49.82	
5	Balance area to be treated		15976	79.88	
6	Projects sanctioned during 09-10	119 projects	966	4.91(5.35)	
7	Projects proposed to be taken during 10-11	127 projects	1189	5.46(5.96)	
8	Projects proposed to be taken during 11-12	200 projects	1699	7.97	
9	Plan for covering balance area*		12 th plan	6558	32.79
			13 th plan	3910	19.55
			14 th plan	1635	8.27
			Total	15976	79.88

Chapter III

Details of Sample Districts under study

Brief profile of ten districts considered for undertaking evaluation study of works implemented under Special Component Programme and Tribal Sub plan is furnished here under.

1. Ramanagaram

Ramanagara district is one of 30 districts of Karnataka State. Ramanagara district was carved out of the Bangalore Rural district on 23 August, 2007, comprising erstwhile taluks, Channapatna, Kanakapura, Ramanagara and Magadi of the undivided district. The total geographical area of the district is 3,556 km². The total population of Ramanagaram, as per the 2001 Census is 1,030,546 covering with population density of 290/Sq.Km. Of this, 5312 are Scheduled Tribes (STs) and 44605 are Scheduled Caste (SC). Scheduled Castes and Tribes also form a sizeable part of the population (16.4%). 35% of the total population are main workers, of this, 8% are agricultural labourers, 16.1% cultivators, and 11% constitute 'other workers'. 4.7% of the total population are marginal workers while almost 60% are non-workers.

By and large this district is Agriculture based. Ragi is the main crop though mulberry is raised over considerable tracts. Fifty-six per cent of the area under floriculture and horticultural crops in the district. The contribution of Horticulture to the Economy of the district is quite substantial. Ramanagaram is the largest cocoon market in Asia, is also known as Silk Town of India. Channapatna is famous for manufacturing of wooden toys and known as *Gombegala Ooru* (toy Town) The Bee keeping industry has covered 38 villages in Kanakapura taluk and there are 150 bee keepers who maintain 300 bee colonies.

2. Bagalkote

Bijapur district was bifurcated into two districts Viz, Bijapur and Bagalkot districts. The district is located in the Northern Karnataka Plateau. The exact geographical location of the district is 16A⁰ 45' North and 75A⁰ 45' East. Bagalkot town is the official headquarters of the district. The district receives an annual average rainfall of 565 mm. The district receives an annual average rainfall of 565 mm.

The District Population is 1, 652232 inhabitants with a population density of 251 persons / Sq.Km. The population of SC is 250604 and that of ST is 80181. The percentage of literacy in the district 57.81. The total Population of SC /ST is 330785. The district has a literacy rate of 64%. The Agricultural labourers strength in the district is 272149 labourers.

The soil of this district is blessed with fertile plains. Due to improper planning the natural resources potentials were not fully utilized. The percentage of forest area in the district is about 5.84% of the geographical area. The major agricultural crops of the district are jowar, sunflower, bengalgram and safflower.

3. Chamaraja Nagar

Chamarajanagar district is located in the south central part of the state. The Chamarajanagar District was carved out of Mysore District in 1998. The total extent of Chamarajanagar District 5686 Sq. Kms consisting of 4 Taluks and 16 Hobli's, 446 habitated Villages, 66 non habitated Villages, 461 revenue Villages. The 4 Taluks are namely Chamarajanagar, Gundlupet, Kollegal and Yelandur.

The district receives an annual average rainfall of 750 mm. It is situated in the southern dry zone under the agro-climatic zones. The district is predominantly agrarian and agriculture is the backbone of the economy. The main occupation of the people of the district is farming and most of the lands are dry lands. Growing mulberry crop and rearing of silk worms is the main occupation. Since the irrigation facility is very sparse in district, the

farmers of this district are dependent on seasonal rains to grow their crops. Sericulture is a traditional activity in the district. The district is having 431 Sericulture villages/hamlets with 11032 Seri culturists, of which 5,358 were small and marginal farmers respectively (48%). The total district population is 965462 (489940 are males and 475522 are females) with a population density of 189 / Sq.Km. The literacy rate of the district is 51.26 % which is lowest when compared to other districts. The forest area of the district is 2,75,610. ha, constituting 48.36% of the geographical area. Having a large percentage of forest cover, the district also has a high population of forest-dwelling tribal; prominent among them are the Soligas, Yeravas, Jenu Kurubas and Betta Kurubas. These tribal have their own dialect and their total population in the district is about 73,000. The district has a SC population of 24.61% and that of ST population of about 10.99%. Chamarajanagara is known for a good extent of forest land within its boundaries. Thus, characteristic feature of the district is its large population of Scheduled Caste and Scheduled Tribe communities.

4. Bijapur

Bijapur is one of the largest districts in Karnataka and has an area of 10541 sq Km. Accounting for 5.49% of the area of the state. It lies between 15⁰ 50' and 17⁰ 28' North latitude and 74⁰ 54' and 76⁰ 28' East longitude. The district is bounded by Solapur district on the north and Sangli on the north-west (both of Maharastra state), by the district of Belgaum on the west, Bagalkote on the south, Gulburga on the East and by Raichur on the south-east. Thus, it is a land-locked district on the northern boundary of Karnataka.

The district's population (18.10 lakhs) constitutes 3.42% of the total population of the state. The SC population of the district is 334254 and that of ST is 30051. The population growth during 1981-91 was less than state average of 2.10% per annum. About 80% (14.48 lakh) of the population live in rural area as against the state average of 69%. Scheduled Castes and Scheduled Tribes account for 18.50% and 1.66% of the population. The

density of population is 172 per Sq K.M. far less than the state average of 244.6 Workers as a percentage to total population are 39.81% which is comparable to the state figure of 44.1% The strength of the agricultural labourers of Bijapur district is 287778.

The literacy rate at 56% stood marginally above the state figure of 55. The literacy rate among male is 57.95% whereas among the female it is only 39.14%.

The District, criss-crossed by several streams and rivers, is drained mainly by the Krishna river which is one of the two great rivers of South India. Bhima, Don. The average annual rainfall for the district is 552.8 mm with 37.2 rainy days. Of the total geographical area of 10.53 lakh ha an area of 7.76 lakh ha is available for cultivation which is 74% of the total area. The area under forest accounts for only 0.19% (1,977 ha) of the total area. Only 17.3% of the net cultivable area is irrigated and balance 82.7% of the area has to depend on monsoon. The major agricultural crops grown in the district are food crops like jowar, maize, bajra and wheat among cereals, redgram, bengalgram and green gram among the pulses. The major oilseed crops are sunflower, groundnut and sunflower. sugarcane and cotton. Bijapur is basically a horticultural district with important horticulture crops like grapes, pomegranate, guava, sapota, lime are also grown in the district. The district exports horticultural fruit like grapes, pomegranate, and banana has manufacturing units of Juice, Jam, Jelly and Pickles. There is Tissue culture unit for production of grape and pomegranate seedlings

5. Gulbarga

Gulbarga District is situated between 76°.04' and 77°.42'-east longitude, and 16°.12' and 17°.46' north latitude, covering an area of 16,224 square kilometers. The population of the district is 2.5 million. The district comprises 10 taluks namely Gulbarga, Aland, Chincholli,

Afzalpur, Jevargi, Yadgir, Sedam, Shahpur, Shorapur, & Chitapur. The climate of the district is generally dry and healthy with temperature ranging from 5°C in the winter to 45°C in the summer, and an annual rainfall is about 750 mm. The entire district is situated in Deccan Plateau and the general elevation ranges from 300 to 750 meters above mean sea level. The district is located in drought prone area. A large part of the land is under dry land cultivation as the area under irrigation is only 18.8 percent of the net area sown. Therefore, employment is not available on regular basis in the dry area. Agricultural labourers constitute 39 percent of the main workforce therefore seasonal migration is a regular feature in these areas of the district. Two main rivers, Krishna and Bhima, flow in the district. Black soil is predominant in the district. The district has a large number of tanks, which, in addition to the rivers, irrigate the land. The Upper Krishna Project is the major irrigation venture in the district. bajra, redgram, sugarcane, groundnut, sunflower, sesame, castor, beans, black gram, jowar, wheat, cotton, ragi, bengal gram, etc., are grown in this district.

The district has total area of 16174 Sq. Kms. This constitutes 5.93% of the area of the state. The district is devoid of forest except in the hilly portion of Aland and Chincholi. The area under forest is 4.2% of the total area.

The population of the district as per 2001 census is 31,30,922 of which male population is 15,92,789 and female population is 15,38,133. The population is spread over the geographical area and the density of population is 192 per sq.km. Gulbarga district has a sizable part of Scheduled Caste Population. It is 23% of the total population of the district. It is ranked 3rd in the state in respect of this next to Kolar and Chamrajnagar. In absolute numbers, the position of the district (7,17,595) is next to Bangalore Urban (8,51,047). The SC and ST population forms 22.92 and 4.92 percent of total population respectively. High proportion of agricultural labourers and non workers as well as the SC / ST population indicates high incidence of poverty in the district.

6. Tumkur

Tumkur District is one of the progressive districts of Karnataka situated in the southern part of Karnataka. The district is located 74 km. north west of Bangalore. Geographically the district lies in the eastern part of the state, between 12° 45' and 14° 20' North latitude and 76° 20' to 77° 31' East longitude. The district has an area of 10596sq.kms. The region falls under three watersheds- the Krishna watershed- covers north and western part; the Cauvery watershed – covers south and southwestern part and the Pennar watershed- covers east and northeastern part of the district. The temperature varies between 9⁰c to 38⁰c. Red soil is found in south whereas sandy soils are found. In few places we can also find black cotton soils as a derivative of trap rocks.

The land in the district under cultivation is 1,72,634 hectares. Dryland agriculture surpasses the wet and Horticulture. Agriculture is the backbone of the economy of this district. About 1/3 income accrues from agriculture. Out of 10,64,755 hectares of geographical land, 52 to 63 percent of land is under cultivation and only 4.22 percent of land is under forest cover. The remaining land is either barren or used for other human activities. There are no major rivers flowing in the district. In fact the highlands give birth to many rivers like Jayamangali, Shimsha, Suvarnamukhi, Boranakanive, Marconahally, Mangala. The district's average rainfall is 575mm. The dry crops grown in the district are ragi, jowar, bajra, millets, pulses; oil seeds like castor, groundnut ; cotton; sugarcane, paddy in the wet land; coconut , arecanut, yelakki, banana, mulberry in the garderns. Apiculture is taking its roots recently.

The District has a Population of 25,79516 (census -2001) roughly equals to 1/20 of the total population of the state .The Density of the population is 243 which is less than the state average (270 k.m.). Population of SC and ST is more in Sira, Pavagada and Madhugiri region. Lumbani people and Iruligas are found in the district. The Literacy rate of total male population as on 2001 is 76.88 and the literacy rate of the female is 57.18 .The total Literacy has 57.18.

7. Shimoga

Shimoga district with sprawling area of 8465 Sq. Kms, is situated between 13^o 27' and 14^o 39' North - latitude and between 74^o 38' and 74^o 4' East longitude. Shimoga district consists of seven taluks viz., Shimoga, Bhadravathi, Hosanagar, Sagar, Shikaripur, Soraba and Thirthahalli. Shimoga the administrative headquarters of district lies on the banks of the Tunga River.

Shimoga is located almost at the central part of Karnataka state in the Malnad region bounded by Sahyadri ghats on the east direction. The eastern part of the district comes under the semi-malnad zone with plain topography and occasional chains of hills covered with semi-deciduous vegetation. The District has 7 distinct rivers flowing through the district namely Tunga , Bhadra , Sharavati, Kumudavati, Vedavati, Varada and Kushavathi. The Sahyadri ranges part of the Western Ghats, feed the rivers round the year, and inundate the fertile alluvial soil, this nature's blessing makes it the *bread basket of Karnataka*.

The total population of Shimoga district is 1642545, with population density of 193 /Sq.Km. The district has SC Population of 269519 (16.41%) and that of ST Population of 55997 (3.41%). The literacy rate of the district is 74.86 per cent. Shimoga district is rich in flora and fauna, the dense forest and green shrub jungles are main producers of sandalwood, rosewood, teak and other exotic timber. Mango, jackfruit, tamarind etc.. are the other important trees found around the district with rich yields. The dense forests of the district is home for wild animals like Elephant, The Area under Forests is 1291.67 Sq.Km constituting 12.19% of forest area to the geographical area of the district. Average rainfall is 1381.9 mm. Shimoga is an agriculturally self sufficient district, and thus sometime called as the "***Rice bowl of Karnataka***". Shimoga falls in the Southern Transition Zone of Agroclimatic zones of Karnataka. The climate of Shimoga is tropical wet and dry. The temperatures vary between 20 to 35 degree Celsius. The district has 81,000 Hectares of land different horticulture products are grown with an production of 61600 tonnes of horticulture products Production of food crops, vegetables, spices, condiments, decorative plants, establishing orchards and plantations, Proper packing and management of fruits and vegetables are the major activities supported by the Horticulture department.

8. Belgaum

Belgaum (earlier known as "Venugrama" or the "Bamboo Village") is one of the oldest, strong, prominent and well cultured historical place nestling high in the Western Ghats. The old town area with cotton and silk weavers stands gloriously besides the modern, bustling, tree-lined British Cantonment. It is also called *The Cradle of Infantry*. It is located between north latitude of 15°23' and 16°58' and east longitudes of 74°5' to 75°28'. The district has an area of 12,000 square kilometers. The district is divided into ten taluks namely, Belgaum, Athani, Bailhongal, Chikkodi, Gokak, Hukkeri, Khanapur, Raibagh, Randurga, and Soundatti. The languages spoken in this district include **Kannada and Marathi**. The literacy rate of the district is 14%. As per 2001 Census of India, it has a population of 4,214,505 with a population density of 314 per sq. km. It extends over an area of 13,415 sq. kms, which is 6.99 percent of the total geographical area of the state. The district is located at an elevation varying from 900 to 4,500 metres above mean sea level. The elevated parts of the district lie to the west and the south along the line of the Sahyadri range. The forest covers an area of 2063.20 sq.km constituting 20.03 % of the geographical area of the district. The SC Population of the district is 462020(10.96%) and that of ST is 243451 (5.78%) The normal rainfall in the district decreases from more than 1859 mm in Khanapur taluk in the southwest, to less than 491 mm in Raybag taluk towards northeasterly direction. Those areas, that receive less than 750 mm annual rainfall are classified as semi-arid and thus drought prone. Hence, the entire district except, the southwestern part is categorized as semi-arid and drought prone. Total normal rainy days vary from 90 in Khanapur to 37 in Athani. Eastern and northeastern parts of the district are prone to drought of mild nature.

Agro-Climatologically the district can be divided into three zones i.e. high rainfall "Hilly zone", "Northern transitional zone" and "Northern dry zone" from southwest to northeast respectively. The Agricultural labour strength of the district is about 395876. Major soils of the district vary from shallow to very deep black soils to red loamy soils and lateritic soils etc. The major Agricultural crops grown in the district are - jowar, maize, paddy, wheat, bajra, grams, redgram, groundnut, sunflower, sugarcane, cotton, tobacco etc. The climate of

the district as a whole can be termed as semi-arid. The variation in the maximum temperature during the year ranges from 27.0°C to 35.70°C and minimum from 13.90°C to 20.60°C. The district also experiences pleasant winter and hot dry summer. Sericulture is gaining prominence in the district with nearly 481.90 hectares under Mulberry cultivation. Major fruits grown in the Belgaum district are banana, papaya, mango, sapota, grapes, citrus, guava, pomegranate, etc.

9. Hassan

Hassan district lies partly in the "malnad" tract and partly in the southern "maidan"(plains) tract of Karnataka state. The district is located at 12° 13' and 13° 33' North latitudes and 75° 33' and 76°38' East longitude. Hassan district has a geographic area of 6826.15 km². The district comprises of 8 taluks namely; Hassan, Arkalgud, Holenarasipura, Channarayapatna, Arasikere, Belur, Alur and Sakaleshapura . The district had a population of 1,721,669 of which 17.70% were urban and of this 859086 were males and 862583, female. The population density is 253 people/km². Its chief tributary is Yagachi from Belur. The average rainfall is about 1031 mm annually. Coffee, Black Pepper, Potato, Paddy and Sugarcane are the major agricultural crops.

The total forest area of the district is 879.25 sq.km which constitutes roughly 12.90% of the geographical area. Hassan District has relatively a sound economic basis due to the cultivation of commercial crops like coffee, pepper and cardamom. The crops of malnad region are coconut, potato, paddy, ragi, groundnut, cotton, sugarcane, pulses and other agricultural and horticultural crops. Arasikere is noted for its coconut market. There are 85145 agricultural labourers in the district. Forests play an important part in the economy of the district especially in malnad Taluks. The economy of the district rests mainly on agriculture and horticulture including plantation crops. The district is yet to be developed industrially. The SC and ST population of the district is (18.11%) 311726 and 26451 (1.54%) respectively. There are 21% families below poverty line in the district. The literacy rate of the district is 68.75% of the population of the district.

10. Mysore District-

Mysore district forms a distinct land unit, besides being a cultural entity lying between 11°30' N to 12°50' North latitudes and 75°45' E to 77°45' East longitudes. It covers an area of 6854 sq. km. that is, 3.57 per cent of the state's total geographical area. It holds the sixth place in the state in terms of the area with a population of 2.641 million as per 2001 census with a population density of 383/sq km. Mysore district lies in the southern Maidan and it is in the southernmost part of Karnataka State. Physiographically, the region in which the district is located may be classified as partly maidan and partly semimalnad (malnad hilly lands). The average altitude is 770 Mysore, the administrative head quarters of the district, is the second largest city in the state of Karnataka, and is also called the *City of Palaces*. Mysore is a tourism hot spot within the state of Karnataka and also acts as a base for other tourist places in the vicinity of the city. The district is divided into seven taluks namely: K.R.Nagar, Mysore, T.Narasipur, Nanjangud, H.D.Kote, Hunsur, Periyapatna,

Mysore district is endowed with a number of perennial and non-perennial rivers. The Cauvery which is the major river system of the district traverses the Mysore plateau from northwest to east along with its tributaries Kabini, Suvarnavathi, Laxmanathirtha and others. It is the only river which has been harnessed for irrigation from ancient times and it is estimated that as much as 95 per cent of its surface flow is put to use before it enters into the Bay of Bengal. The important tributaries of river kabini are the Gundluhole, the Nuguhole, and small streams such as the Taraka, the Vodehattihole and the Sarathihole which flow from H D. Kote and reach the Kabini River only in the rainy season. The soils of the districts can be broadly classified as the laterite, red loam, sandy loam, red clay and black cotton soils. The laterite soil occurs mostly in the western part of the district while the red loam is found in the northwest. The average annual rainfall of the district is 782 mm. Temperature influences considerably the socio-economic activities of the people in the region. The temperatures vary from 11°C to 38°C. The district enjoys cool and equable climate .Thus the climate of Mysore district is temperate with moderate variations in temperature in different seasons.

The area covered by forest is 1449.87 sq. km, constituting 23.13 per cent of the geographical area. Mysore has two types of forests and they are moist deciduous and dry deciduous forests. Mysore district is the third richest in forest wealth in the State. The Principal species of trees in the forests are teak, honne, rosewood, dindiga, eucalyptus and sandalwood.. Indirectly, forests of the region confer various ecological benefits on the land such as salubrious climate and good rainfall. SC and ST population of HD.Kote, Nanjangud, Hunsur and Periyapatna have low standard of living and also low literacy level. The SC population of the district is 467640 (17.71%) and that of ST is 271351(10.17%). The percentage of SC is more in H.D.Kote (25.79%), compared to remaining blocks of the district. The percentage of ST population is least in Periyapatna taluk (3.43%). The literacy rate of the district is 63.69% of the total population. Agriculture is the predominant occupation of people in the district.

Chapter-IV

Project Performance-Physical and Financial

IV.1 Introduction

With a view to help in the better understanding of the programme the present chapter attempts at reviewing the physical and the financial progress made under this programmes across the different districts in the state. The chapter also analyses the allocations and the performance under various physical works executed with a view to implement the different Soil and Water Conservation Measures. The required data for this purpose was obtained from the department.

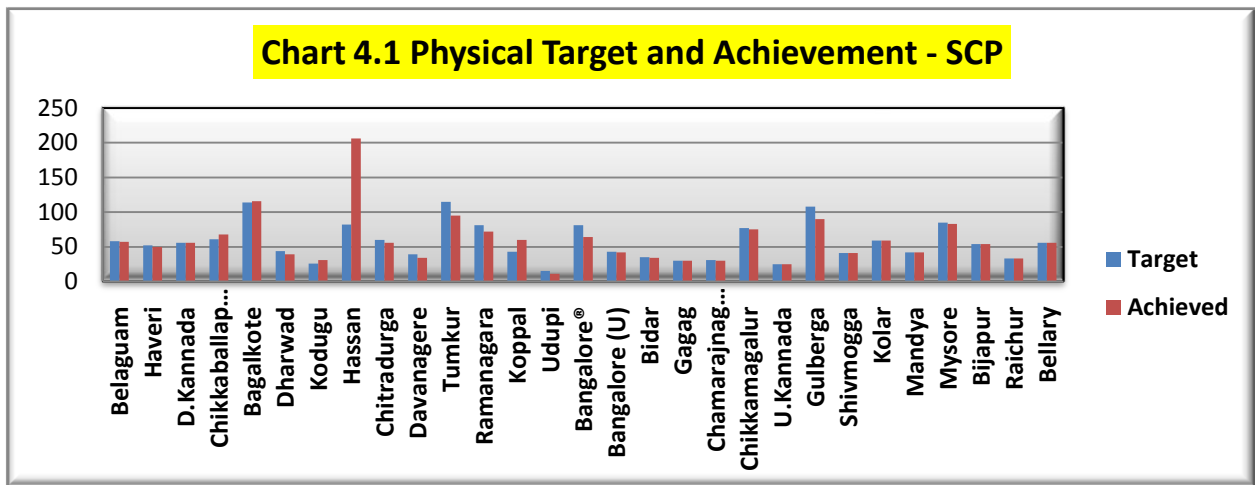
IV.2: Physical and Financial Progress under SCP:

Physical Target and Achievements: The total number of targeted beneficiaries identified under the programme is 1646. The share of target beneficiaries for districts such as Bagalakote, Tumkur and Gulbarga are about 10 percent each. The number of target beneficiaries identified is only 15 for Udupi district which is the least among the districts. Thus, it is found that the number of beneficiaries is found to vary across the districts. The total number of beneficiaries finally covered is 1709 which is 4 percent higher than the physical targets set. The achievements in many of the districts such as Hassan are almost two and half times more than the targets. (See Table 4.1). In some of the districts such as Ballary, Raichur, Bijapur, the targets have been totally achieved. This is also seen from the Chart-4.1.

Table 4.1: Physical Targets and Achievements under SCP by Districts

Districts	Target	Achieved
Belaguam	58	57
Haveri	52	50
D.Kannada	56	56
Chikkaballapur	61	68
Bagalkote	114	116
Dharwad	44	39
Kodugu	26	31
Hassan	82	206
Chitradurga	60	56
Davanagere	39	34
Tumkur	115	95

Ramanagara	81	72
Koppal	43	60
Udupi	15	11
Bangalore (R)	81	64
Bangalore (U)	43	42
Bidar	35	34
Gagag	30	30
Chamarajnar	31	30
Chikkamagalur	77	75
U.Kannada	25	25
Gulberga	108	90
Shivmogga	41	41
Kolar	59	59
Mandya	42	42
Mysore	85	83
Bijapur	54	54
Raichur	33	33
Bellary	56	56
Total	1646	1709



IV.3 Physical Targets and Achievements under TSP

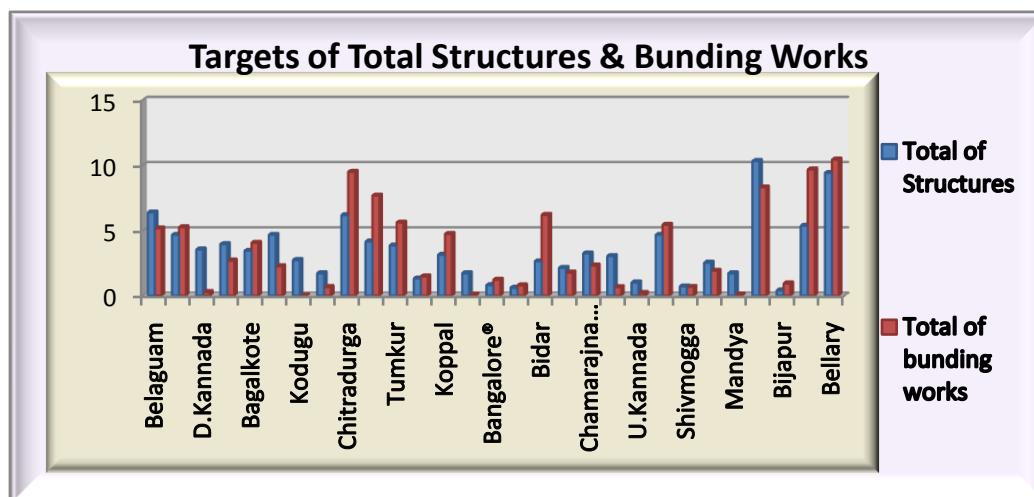
The targets set under the programme for the period under review was 988 in respect of structures. The districts of Mysore and Bellary had a target of 10.32 and 9.41 percent respectively. Few of the districts such as Bangalore Rural, Bangalore Urban, Shimoga and

Bijapur had a target of less than 1 percent. In the other districts it varied from about 1 percent to 7 percent.

Table 4.2: Physical Targets and Achievements under TSP by Districts

Sl. No	District	Total of Structures				Total of bunding works			
		Target		Ach.		Target		Ach.	
		Phy.	%	Phy.	%	Phy.	%	Phy.	%
1	Belagum	63	6.38	67	7.84	1486.61	5.16	1148.59	5.44
2	Haveri	46	4.66	28	3.27	1510.71	5.25	1234.84	5.84
3	D.Kannada	35	3.54	29	3.39	80.85	0.28	46.5	0.22
4	Chikkaballapur	39	3.95	39	4.56	774.46	2.69	632	2.99
5	Bagalkote	34	3.44	34	3.98	1166.18	4.05	770.51	3.65
6	Dharwad	46	4.66	37	4.33	646.76	2.25	434.19	2.05
7	Kodugu	27	2.73	21	2.46	0.00	0.00	0	0.00
8	Hassan	17	1.72	23	2.69	190.27	0.66	11	0.05
9	Chitradurga	61	6.17	56	6.55	2732.72	9.49	1735	8.21
10	Davanagere	41	4.15	35	4.09	2208.37	7.67	2087.5	9.88
11	Tumkur	38	3.85	33	3.86	1611.96	5.60	931	4.41
12	Ramanagara	13	1.32	10	1.17	425.55	1.48	235	1.11
13	Koppal	31	3.14	11	1.29	1360.99	4.73	1313.7	6.22
14	Udupi	17	1.72	15	1.75	22.70	0.08	3	0.01
15	Bangalore®	8	0.81	8	0.94	352.00	1.22	291	1.38
16	Bangalore (U)	6	0.61	7	0.82	226.00	0.79	202	0.96
17	Bidar	26	2.63	20	2.34	1782.80	6.19	1292.3	6.12
18	Gagag	21	2.13	18	2.11	509.40	1.77	354.13	1.68
19	Chamarajnar	32	3.24	30	3.51	663.75	2.31	448	2.12
20	Chikkamagalur	30	3.04	25	2.92	187.00	0.65	102	0.48
21	U.Kannada	10	1.01	7	0.82	59.20	0.21	0	0.00
22	Gulberga	46	4.66	38	4.44	1567.20	5.44	1300	6.15
23	Shivmogga	7	0.71	5	0.58	191.67	0.67	149.19	0.71
24	Kolar	25	2.53	35	4.09	550.10	1.91	203	0.96
25	Mandya	17	1.72	17	1.99	29.56	0.10	10	0.05
26	Mysore	102	10.32	70	8.19	2390.78	8.30	1697.12	8.03
27	Bijapur	4	0.40	3	0.35	271.67	0.94	212.85	1.01
28	Raichur	53	5.36	44	5.15	2786.32	9.68	2067.51	9.78
29	Bellary	93	9.41	90	10.53	3002.69	10.43	2221	10.51
	Total	988	100.00	855	100.00	28788.27	100.00	21132.93	100.00

The interventions under this component also included the construction of various types of bunding works. The targets set for this programme was 28788.27 hectares. This includes works such as contour bund, field bund, bench terracing, land leveling and land reclamation and SSD works. The allocations for the different districts are found to vary.



The achievements in respect of construction of structures are 86.53 percent and in respect of bunding works it is 73.40 percent. The under performance is due to shortage in releases of funds.

The review of the performance across the districts reveals that in districts such as Koppal not even 50 percent of the target is reported to have been achieved. On the other hand in districts such as Kolar and Belgaum the achievements have exceeded the targets. A similar variations are also observed in respect of bunding works.

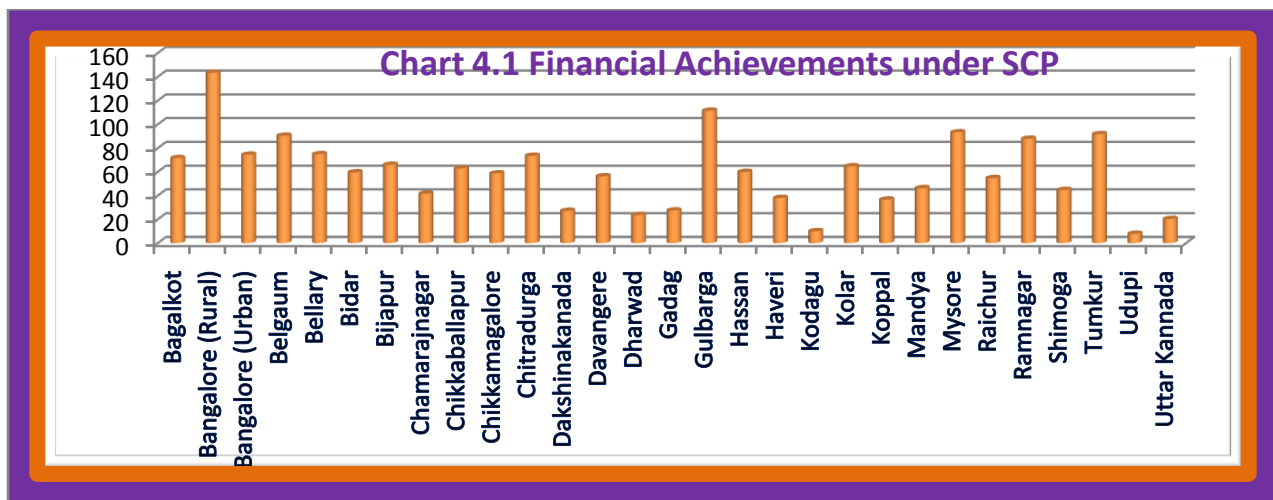
IV. 4: Financial Target and Progress under SCP & TSP:

Target: The total amount allocated under the SCP and the TSP component is of the order of Rs.4160.7 lakhs. Out of this the amount earmarked for SCP and TSP is Rs.1718 and Rs.2442.7 lakhs respectively. Thus in terms of percentage about 41.29 percent was earmarked for SCP component and 58.70 percent under TSP component.

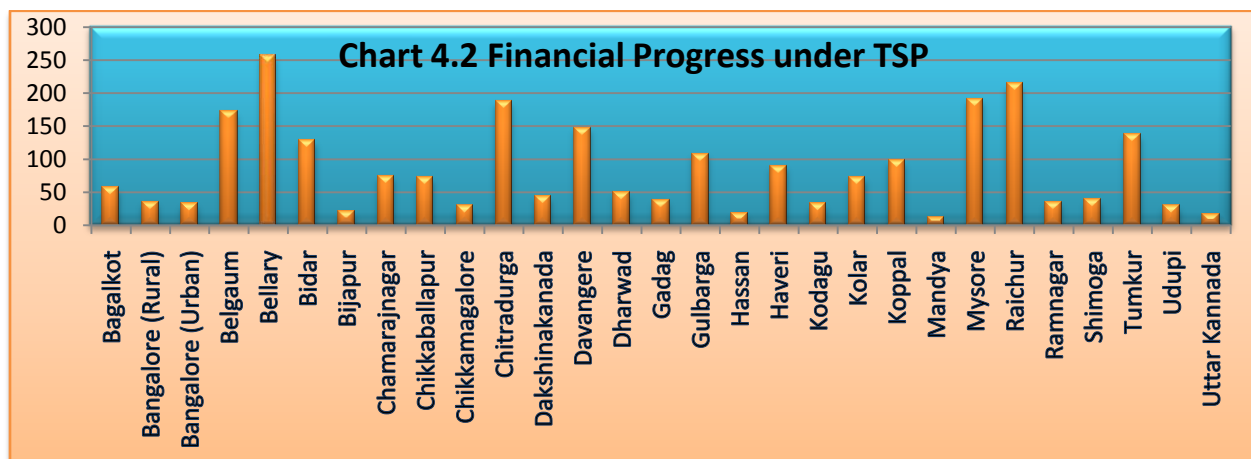
**Table: 4.3 District wise Financial Progress under SCP and TSP by Districts
(Rs. in Lakhs)**

Sl. No.	Districts	SCP		TSP	
		Target	Achievement	Target	Achievement
1	Bagalkot	71.52	71.52	56.53	124.60
2	Bangalore (Rural)	143.30	143.30	36.00	75.97
3	Bangalore (Urban)	74.36	74.36	32.63	25.81
4	Belgaum	90.36	90.36	171.63	59.81
5	Bellary	74.84	74.84	257.07	63.07
6	Bidar	59.52	59.52	128.46	36.22
7	Bijapur	65.91	65.91	21.19	5.06
8	Chamarajnar	41.51	41.51	74.81	13.44
9	Chikkaballapur	62.91	62.91	72.51	153.02
10	Chikkamagalore	58.63	58.63	28.92	142.15
11	Chitradurga	73.47	73.47	187.70	101.39
12	Dakshinakanada	27.11	27.11	44.37	23.97
13	Davangere	56.19	56.19	147.84	72.28
14	Dharwad	23.55	23.55	49.66	17.80
15	Gadag	27.47	27.47	38.36	26.86
16	Gulbarga	111.39	111.39	108.71	20.08
17	Hassan	59.86	59.86	18.65	93.50
18	Haveri	38.00	38.00	89.65	29.06
19	Kodagu	10.00	10.00	32.51	43.28
20	Kolar	64.60	64.60	72.51	29.15
21	Koppal	36.60	36.60	97.70	8.29
22	Mandya	46.20	46.20	12.12	85.80
23	Mysore	93.20	93.20	191.30	28.42
24	Raichur	54.70	54.70	213.64	48.77
25	Ramnagar	87.80	87.80	36.00	8.87
26	Shimoga	44.70	44.70	39.48	138.04
27	Tumkur	91.70	91.70	136.64	13.11
28	Udupi	7.80	7.80	29.34	151.11
29	Uttar Kannada	20.30	20.30	16.77	193.10
Total		1718.0	1718.0	2442.70	1832.03

A cursory look at the Table-4.3 in terms of distribution of the targets reveals that under SCP, the Bangalore Rural district has received the highest allocation (Rs. 143.30 lakhs) followed by Gulbarga district with Rs.111.39 lakhs. On the other hand, Udupi district has received the lowest share of Rs. 7.80 lakhs and Kodagu district Rs. 10.00 lakhs. The varied distribution of the target amount across the different districts is revealed from the following graph.



In respect of allocations under TSP, it is found that the highest amount of Rs. 257.07 lakhs is allocated to Ballary district and Rs.213.64 lakhs to the Raichur District. On the other hand, Rs. 16.77 lakhs only is allocated to the Uttar Kannada district which is the least among all the districts in the state. The allocations for the different district is depicted in Chart 4.2



Achievement:

The achievements under the SCP and TSP components during 2009-10 are Rs. 1718 lakhs and Rs. 1832.03 lakhs. It is found that under the SCP component the allocated amount has been completely spent. On the other hand in respect of TSP the total amount spent is Rs. 1832.03 lakhs and this works out to 75 percent of the targeted amount. The reasons for non-achievements is due to non release of 25% of the amount under TSP.

Under the SCP component, 100 percent achievement has been made in all the district in the state. On the other hand, in respect of TSP there is both under spending and over spending of the targets. Thus, while the earmarked funds under TSP for Uttar Kannada district was only of the order of Rs.16.77 lakhs, the achievement reported is of the order of Rs. 193.10 lakhs. Thus, the achievement is more than 10 time the targeted amount. On the other hand, in the Belgaum district the allocation was Rs. 171.63 lakhs while the achievement was only Rs.59.81 lakhs. The discussions with the officials have revealed that in certain cases the non-availability of the target population is also one among the many factors responsible for under spending. This is inspite of the fact that the programme provides for allocations based on the population and the holdings held by the target group in the Taluks. Thus, it is necessary to ensure a better compliance to the guidelines issued to the district level.

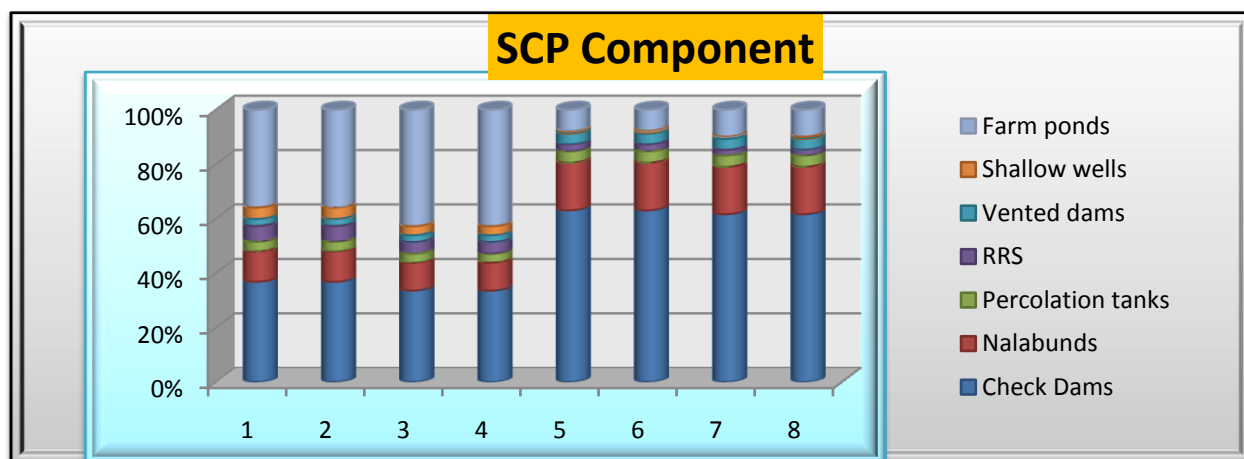
IV.5 Programme Implementation Component-wise:

SCP Component:

Table: 4.4: Details of Physical and Financial Progress Component wise under SCP for 2009-10

Sl. No.	Component	Physical				Financial			
		Target		Achievement		Target		Achievement	
		No.	% to Total	No.	% to Total	No.	% to Total	No.	% to Total
1	Check Dams	606	36.82	574	33.59	1083.22	63.05	1058.80	61.63
2	Nalabunds	184	11.18	175	10.24	300.74	17.51	299.20	17.42
3	Percolation tanks	58	3.52	56	3.28	71.93	4.19	71.08	4.14
4	RRS	95	5.77	73	4.27	45.34	2.64	36.10	2.10
5	Vented dams	43	2.61	43	2.52	65.92	3.84	68.42	3.98
6	Shallow wells	69	4.19	57	3.34	17.25	1.00	14.28	0.83
7	Farm ponds	591	35.91	731	42.77	133.60	7.78	170.12	9.90

Total	1646	100.00	1709	100.00	1718.00	100.00	1718.00	100.00
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Broadly 7 components have been identified for implementation under this programme. Under physical aspects, both in terms of target and achievements the number of beneficiaries under check dams and farm ponds are higher than the other components. The percentage of beneficiaries under both these components is found to vary from 33 percent to 42 percent. The number of beneficiaries under vented dams is found to be the least. Thus, the major interventions carried out under SCP is the construction of check dams and farm ponds which are constructed for individual farmers.

It is interesting to note that under financial progress, nearly two thirds of the funds allocated and spent is for the construction of check dams. The percentages is of the order of 63.05 percent under allocations and 61.63 percent under actual spendings. Thus, the major investments under SCP are towards the provision of check dams which is expected to help the individual farmer to take up agricultural activities during rabi season and rabi summer season. The next higher allocation and investments have gone for construction of nala bunds. In terms of percentage to total spending, it accounts for 17 percent. The allocations and investments for all other components is found to be very marginal.

4.5.1 Construction of Check Dams:

The distribution of beneficiaries for this component is found to be varied across the districts. The highest number of target was for the Gulbarga district (56 numbers) followed by Bellary (42 numbers) and Bangalore Rural (52 numbers). The achievements in terms of numbers of units constructed is either the same as the targets or it is marginally lower than the target. In certain cases it has exceeded the target number. The variations in the progress achieved is said to be either related to the identification of target population or the feasibility of constructing it in individual agricultural plots.



The financial targets for the different districts are found to be related to the number of units proposed in the districts. Thus, the Gulbarga district with a physical target of 56 numbers is provided with a allocation of Rs.94.73 lakhs. On the contrary, the Bijapur district which had only a target of 10 members has been provided with Rs. 19.90 lakhs only. In view of the considerable expenditure incurred under this component at the state as a whole it is found that in most of the district's the financial achievements either is the same as the allocated amount or exceeded the allocations. Thus, in the Raichur district a sum of Rs. 54.27 lakhs which was allocated under the check dams component is reported to have been spent completely. On the other hand, in Gulbarga district the performance has been of the order of Rs. 102.98 lakhs as against an allocation of Rs. 94.73 lakhs. These variations in spending could be due to the site conditions or subsequent changes in the number of units constructed.

4.5.2 Construction of Farm Ponds:

The another important component which is found to have been received well by the farmers belonging to the scheduled castes is the farm ponds. The total number of farm ponds targeted is

591. It is interesting to note that more numbers of targeted population in the district such as Mysore, Bagalakot, Hassan were to be provided with farm ponds under this programme. The targets for districts such as Chitradurga, Davanagere, Bangalore Urban, Chamarajanagar is found to be very low while Udupi, Bangalore Rural and Raichur had no targets for this component for the year 2009-10.



From the Table 4.7 it is found that in the Hassan district, 202 farm ponds have been constructed as against the target of 54 for the year. Similarly in the Koppal district the target has been exceeded. Thus the increase in the number of farm ponds constructed is indicative of the demand for this from the farming community for reasons such as availability of water for various purposes including agriculture, recharge of ground water, washing etc.,

The performance of the other component such as the nala bunds, percolation tanks, and shallow wells is also found to vary both in terms of physical and financial aspects.

TSP Component:

Table: 4.5: Details of Physical and Financial Progress Component wise under TSP for 2009-10

Sl. No.	Component	Physical				Financial			
		Target		Achievement		Target		Achievement	
		No.	% to Total	No	% to Total	Fin.	% to Total	Fin	% to Total
1	Check Dams	329	33.30	285	33.33	533.1	60.85	474.88	60.54
2	Nalabunds	67	6.78	68	7.95	109.31	12.48	105.72	13.48
3	Percolation tanks	28	2.83	19	2.22	36.85	4.21	30.09	3.84
4	RRS	75	7.59	57	6.67	34.73	3.96	27.9	3.56
5	Vented dams	35	3.54	35	4.09	55.48	6.33	53.99	6.88
6	Shallow wells	59	5.97	49	5.73	14.2	1.62	11.22	1.43
7	Farm ponds	395	39.98	342	40.00	92.56	10.57	80.57	10.27

Total of Structures		988	100.00	855	100.00	876.05	100.00	784.36	100.00
8	Contour Bund	6881.8	23.90	5725.12	27.09	309.35	19.75	253.26	24.17
9	Field Bund	20155.16	70.01	14952.44	70.75	909.04	58.02	678	64.72
10	Bench Terracing	212.4	0.74	158.5	0.75	33.99	2.17	26.08	2.49
11	Land levelling	1204.95	4.19	0	0.00	190.27	12.15	0	0.00
12	Land Reclamation SSD works	334.01	1.16	296.87	1.40	124	7.91	90.33	8.62
Total of bunding works		28788.32	100.00	21132.93	100.00	1566.65	100.00	1047.67	100.00

Physical Progress:

Construction of Structures: The total physical target for the construction of different types of water harvesting structures under the TSP component was 988 (Table 4.5). The distribution among the different types reveals that 33.30 percent of the proposed structures were check dams while nearly 40 percent were farm ponds. The targets for the other type of water harvesting structure are found to be very small.

The physical performance relating to construction of structures is the same as that of targets set under the programme.

The analysis on the targets and the achievements relating to check dams reveals that relatively highest targets were set for district such as Raichur, Bellary, Chitradurga and Gulbarga. (See Table 4.5). The increased demand for these works in these districts as compared to others may be due to geographical and natural conditions. In all, the districts with a relatively higher targets is reported to have been accomplished. On the other hand, there is under performance in the other districts.

In all, the targets set for the construction of farm ponds under the TSP component was of the order of 395 units. Of this nearly 20 percent were to be constructed in the Bellary district, while around 40 percent were to be constructed in the Mysore district. The Scheduled Tribe farmers of the Bagalkot and Dharwad districts were also targeted for this component. The performance in terms of the construction of farms ponds has not been very encouraging in almost all the district in the state. The lack of preference for the farm ponds may be due to the size of the land holding held by the target population and the location of the plots in the upper reach of the watershed.

Bunding Works: The total bunding works proposed under TSP for 2009-10 was of the order of 28,788.32 Hectares. The targets set for field bund was 20,155.16 Hectares which accounted for 70.01 percent of the targets. The contour bund accounted for 23.90 percent of the total targets. The performance under the contour bund component is marginally higher than the targets set. On the other hand the progress under field bund is the same as the targets.



The physical targets set for field bund works for the district of Bellary (3002.69 ha.) and Chitradurga (2732.72 ha.) is the highest among all the districts in the state. On the other hand in the Bijapur district the field bund works targeted was to be of the order of 271 ha only. The performance of the district in terms of the achievement of the targets set under this component is not found to be very satisfactory. For instance in the district of Mysore the target set for field bund activity was 2390.78 ha. as compared to the achievement of only 1947.12 ha. Similarly in Belgaum and Chitradurga districts also the performance is for below the targets set at the district level. The underperformance in this component may be due to lack of technical feasibility in undertaking this in the lands held by the scheduled tribes.

The targets set for all the districts in the state for the implementation of contour bund activity was of the order of 6881.8 mtrs. This is found to account for about 25 percent of the total targets of bunding works. The activity is found to be targeted mainly in districts of Raichur, Bijapur, Mysore, Gulbarga, Bagalkot. The physical targets set for these districts are also not achieved completely due to short release of grants.

Financial Progress:

Table:4.6: Details of Financial Targets and Achieved under TSP

Sl. No	District	Construction of Structures	
		Financial Target	Financial Achieved
1	Belaguam	55.81	51.00
2	Haveri	32.35	19.18
3	D.Kannada	21.47	17.97
4	Chikkaballapur	31.73	30.85
5	Bagalkote	19.35	19.5
6	Dharwad	17.94	14.98
7	Kodugu	6.75	5.06
8	Hassan	7.35	7.68
9	Chitradurga	75.97	76.15
10	Davanagere	45.91	43.81
11	Tumkur	55.00	50.82
12	Ramanagara	12.86	14.76
13	Koppal	35.00	13.07
14	Udupi	20.10	17.10
15	Bangalore®	13.45	12.41
16	Bangalore (U)	12.00	13.80
17	Bidar	44.58	34.57
18	Gagag	15.75	13.20
19	Chamarajnagar	22.33	23.05
20	Chikkamagalur	16.84	15.30
21	U.Kannada	6.78	8.29
22	Gulberga	42.21	37.28
23	Shivmogga	5.25	4.75
24	Kolar	29.74	39.72
25	Mandya	8.25	8.25
26	Mysore	67.50	50.71
27	Bijapur	5.00	3.50
28	Raichur	67.24	58.25
29	Bellary	81.54	79.30
	Total	876.05	784.36

Construction of Structures: It can be seen that a some of Rs. 876.05 lakhs was set as a financial targets towards the provision of different kinds of structures mainly for the scheduled tribe population. (See Table 4.6). The allocation for the different districts in the state is found to vary

with the number of structures proposed. Thus, the Mysore district which had a target of 102 units was provided with Rs.67.50 lakhs. On the other hand, the Chitradurga district with a physical target of 61 units was earmarked with Rs. 75.97 lakhs. These variations could be a result of the type of structures proposed under this programme. The district of Bangalore Rural and Urban were provided with only about 10 lakhs under this component.

The financial achievements as a result of construction of 855 units is reported to be of the order of Rs. 784.36 lakhs. The highest spending was in the district of Bellary with about Rs.79.30 lakhs. The district which stood second in terms of financial spending was Chitradurga district. (76.15 lakhs). The spending was the least in Shimoga district with a reported expenditure of Rs. 4.75 lakhs only.

Construction of Bunding Works:

Review of Progress of SCP and TSP in Selected Districts.

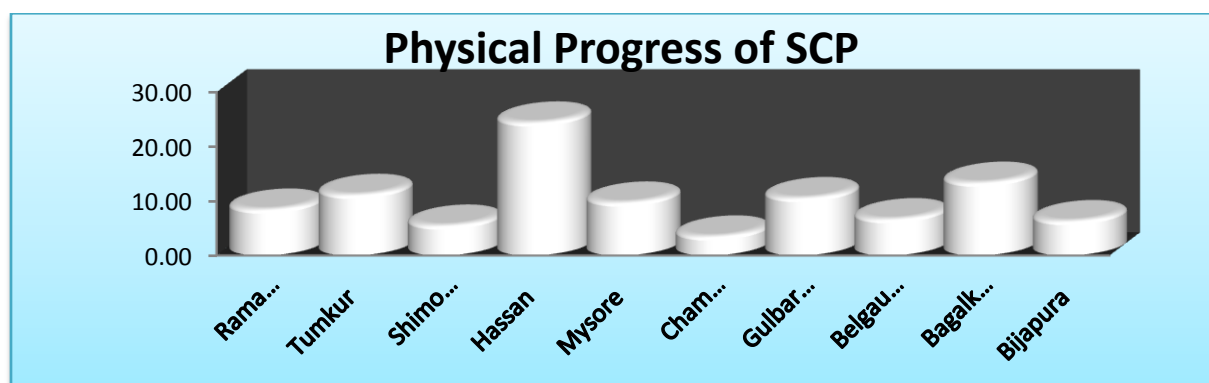
Physical Progress:

SCP : In all about 850 structures are reported to have been constructed under this programme. Out of this about 25 percent of the structures are reported to have been constructed in the Hasan district. About 10 percent of the progress is made in the districts of Tumkur, Mysore, Gulbarga and Bagalkot. (Table- 4.7). Thus the progress is found to vary.

Table: 4.7: Physical Progress –SCP

Sl. No.	Name of the District	Water Harvesting Structures														Total	
		Check Dam		Nala Bund		Percolation Tank		RRS		Shallow Wells		Farm Ponds		Vented Dams			
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Ramanagar	34	14.66	10	12.66	0	0.00	0	0.00	0	0.00	28	6.24	0	0	72	8.47
2	Tumkur	18	7.76	21	26.58	21	65.63	9	33.33	0	0.00	26	5.79	0	0	95	11.18
3	Shimoga	16	6.90	0	0.00	0	0.00	0	0.00	13	86.67	6	1.34	6	75	41	5.53
4	Hassan	0	0.00	2	2.53	0	0.00	0	0.00	0	0.00	202	44.99	2	25	206	24.47
5	Mysore	35	15.09	7	8.86	0	0.00	0	0.00	0	0.00	41	9.13	0	0	83	9.76
6	Chamaraj Nagar	14	6.03	6	7.59	0	0.00	4	14.81	0	0.00	6	1.34	0	0	30	3.53

7	Gulbarga	61	26.29	0	0.00	0	0.00	4	14.81	2	13.33	23	5.12	0	0	90	10.59
8	Belgaum	29	12.50	12	15.19	1	3.13	10	37.04	0	0.00	5	1.11	0	0	57	6.71
9	Bagalkot	17	7.33	6	7.59	3	9.38	0	0.00	0	0.00	90	19.60	0	0	116	13.41
10	Bijapura	8	3.45	15	18.99	7	21.88	0	0.00	0	0.00	24	5.35	0	0	54	6.35
Total		232	100.00	79	100.00	32	100.00	27	100.00	15	100.00	449	100.00	8	100	850	100.00



The farm ponds and the check dams are two of the important structures implemented under this component. Nearly 50 percent of the farm ponds have been constructed in the Hassan district as compared to only 1 percent in districts such as Chamarajanagar, Belgaum and Shimoga. On the other hand, the Gulbarga district accounts for more than 25 percent of the check dams constructed under this programme. The performance in the other district is found to be varied.

TSP:

The analysis on the interventions carried out relating to water harvesting reveals that about 50 percent of the units constructed are the farm ponds (138 units). Of the total farm ponds constructed, more than a third is constructed in the Mysore district (36.96 percent). The Bagalkot district accounts for 18.84 percent of the total units constructed. Under the TSP component 88 check dams are reported to have been constructed. About a fourth of the check dams have been constructed in Gulbarga district alone. The Mysore district accounts for more than 20 percent of the structures constructed.

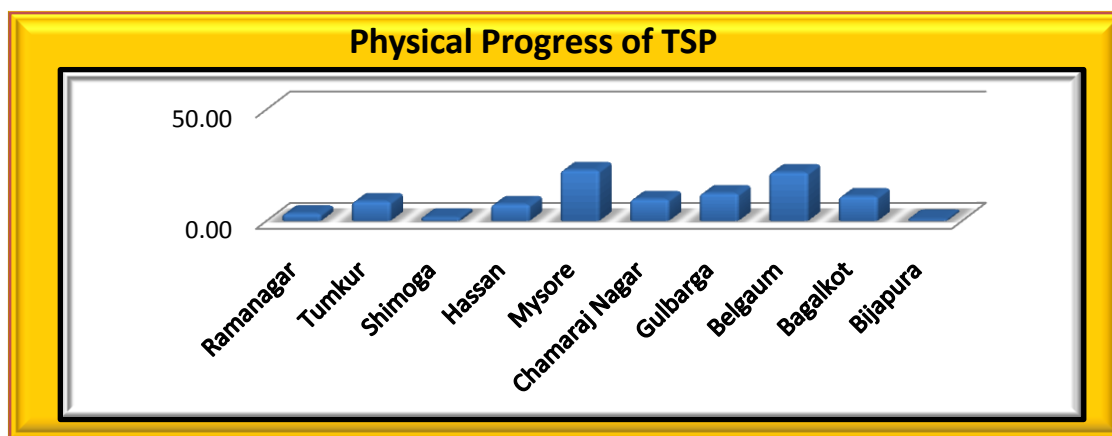


Table: 4.8: Physical Progress under TSP

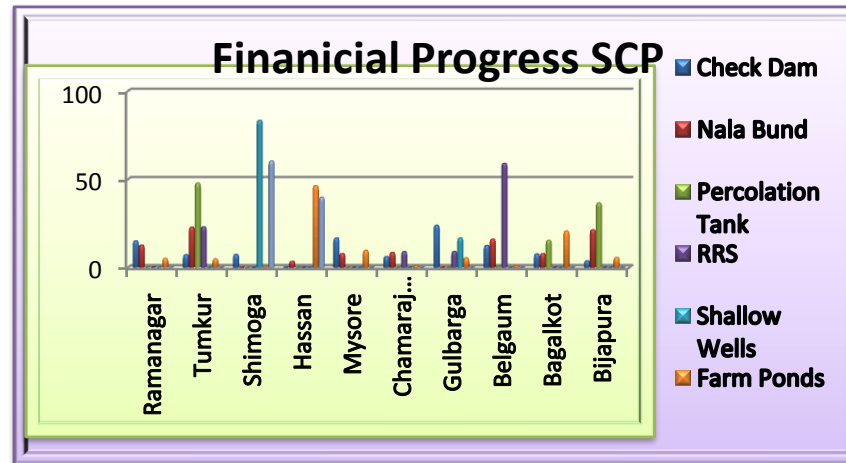
Sl. No.	Name of the District	Water Harvesting Structures															
		Check Dam		Nala Bund		Percolation Tank		RRS		Shallow Wells		Farm Ponds		Vented Dams		Total	
		Phy.		Phy.		Phy.		Phy.		Phy.		Phy.		Phy.		Phy.	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Ramanagar	8	9.09	1	4.5455	0	0	0	0.00	0	0.00	1	0.72	0	0.00	10	3.26
2	Tumkur	12	13.64	14	63.636	0	0	1	0.00	0	0.00	6	0.72	0	0.00	33	8.79
3	Shimoga	0	0.00	0	0	0	0	0	0.00	2	5.71	0	0.00	3	15.79	5	1.63
4	Hassan	1	1.14	0	0	0	0	0	0.00	0	0.00	22	15.94	0	0.00	23	7.49
5	Mysore	19	21.59	0	0	0	0	0	0.00	0	0.00	51	36.96	0	0.00	70	22.80
6	Chamaraj Nagar	8	9.09	1	4.5455	0	0	3	60.00	0	0.00	18	13.04	0	0.00	30	9.77
7	Gulbarga	23	26.14	0	0	0	0	2	40.00	8	22.86	5	3.62	0	0.00	38	12.38
8	Belgaum	11	12.50	1	4.5455	0	0	0	0.00	25	71.43	14	10.14	16	84.21	67	21.82
9	Bagalkot	4	4.55	4	18.182	0	0	0	0.00	0	0.00	26	18.84	0	0.00	34	11.07
10	Bijapur	2	2.27	1	4.5455	0	0	0	0.00	0	0.00	0	0.00	0	0.00	3	0.98
Total		88	100.00	22	100	0	0	5	100.00	35	100.00	138	100.00	19	100.00	307	100.00

Financial Progress

Special Component Plan-The total amount spent under the special component plan in the selected districts is Rs. 758.1 lakh. Of this Rs. 431.43 lakhs is spent for the construction of check dams, Rs.141 lakhs for nala bund and so on. The increased spending towards the construction of check dams is due to the higher physical targets set for it. The review of the financial progress among the selected districts reveals that about 15 percent of the funds has been utilized by the Gulbarga district followed by Tumkur (12.11 percent), Ramnagar (11.58 percent) and Belgaum (11.92 percent). The expenditure is the least in Chamarajanagar district (5.47 percent). The amount spent towards the construction of water harvesting structures across the districts is found to vary.

Table: 4.9: Water Harvesting Structures

Sl. No.	Name of the District	Water Harvesting Structures														Total	
		Check Dam		Nala Bund		Percolation Tank		RRS		Shallow Wells		Farm Ponds		Vented Dams			
		Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%
1	Ramanagar	64.74	15.01	17.7	12.55	0	0.00	0	0.00	0	0.00	5.35	5.04	0	0.00	87.79	11.5
2	Tumkur	31.1	7.21	32.18	22.82	18.27	47.70	5.09	22.99	0	0.00	5.13	4.83	0	0.00	91.77	12.1
3	Shimoga	31.8	7.37	0	0.00	0	0.00	0	0.00	3.25	83.33	0.6	0.56	9.1	60.26	44.75	5.9
4	Hassan	0	0.00	4.75	3.37	0	0.00	0	0.00	0	0.00	49.11	46.24	6	39.74	59.86	7.9
5	Mysore	72	16.69	11	7.80	0	0.00	0	0.00	0	0.00	10.25	9.65	0	0.00	93.25	12.3
6	Chamaraj Nagar	26.39	6.12	12	8.51	0	0.00	2	9.03	0	0.00	1.11	1.05	0	0.00	41.5	5.4
7	Gulbarga	102.98	23.87	0	0.00	0	0.00	2	9.03	0.65	16.67	5.77	5.43	0	0.00	111.4	14.6
8	Belgaum	53.6	12.42	22.5	15.96	0.21	0.55	13.05	58.94	0	0.00	1	0.94	0	0.00	90.36	11.9
9	Bagalkot	32.92	7.63	10.9	7.73	5.85	15.27	0	0.00	0	0.00	21.85	20.57	0	0.00	71.52	9.4
10	Bijapura	15.9	3.69	30	21.28	14	36.55	0	0.00	0	0.00	6	5.65	0	0.00	65.9	8.6
Total		431.43	100.00	141	100.00	38.3	100.00	22.14	100.00	3.9	100.00	106.2	100.00	15.1	100.00	758.1	100.0

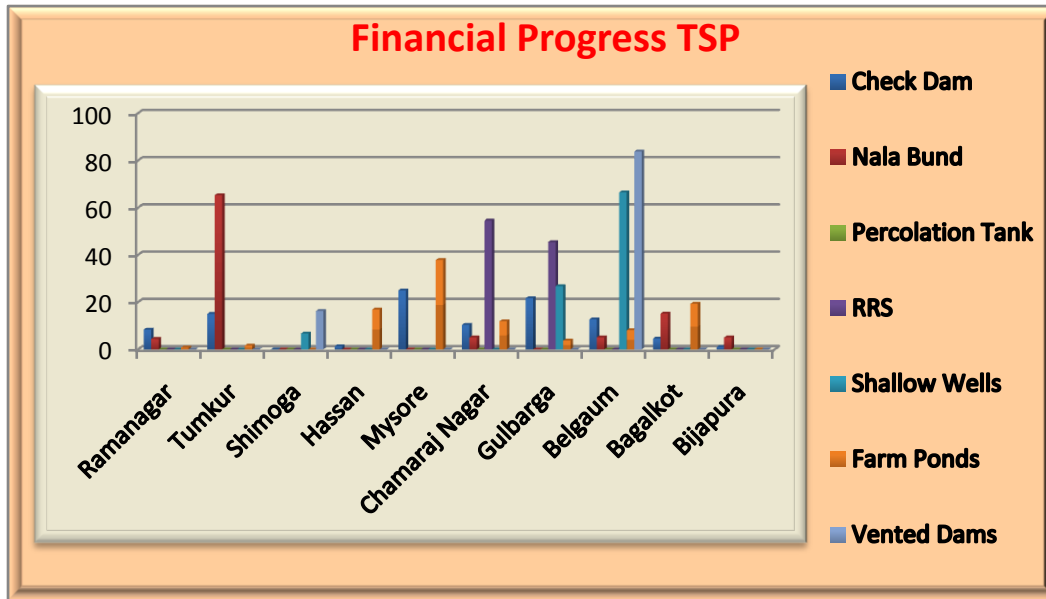


Tribal Sub Plan- The total spending under this component in respect of construction of water harvesting structures is Rs. 261.56 lakhs. Of this nearly 60 percent of the spending is for the construction of check dams followed by nala bund with a reported expenditure of 15 percent. In respect of other structures the investments is found to be marginal.

The districts of Tumkur and Belgaum have reported an expenditure of about 20 percent in each from out of the total investment made in this regard. The Bijapur district is reported to have incurred expenditure to the tune of Rs. 3.5 lakhs which accounts for 1.34 percent of the total expenditure. The expenditures within the districts for the construction of different water harvesting structures are also found to vary.

Table: 4.10: Financial Progress under TSP

Sl. No.	Name of the District	Water Harvesting Structures															
		Check Dam		Nala Bund		Percolation Tank		RRS		Shallow Wells		Farm Ponds		Vented Dams		Total	
		Fin.		Fin.		Fin.		Fin.		Fin.		Fin.		Fin.		Fin.	
		Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%	Rs.	%
1	Ramanagar	12.76	8.37	1.75	4.41	0	0	0	0.00	0	0.00	0.25	0.74	0	0.00	14.76	5.64
2	Tumkur	22.9	15.03	25.88	65.29	0	0	0	0.00	0	0.00	0.54	1.60	0	0.00	50.82	18.86
3	Shimoga	0	0.00	0	0.00	0	0	0	0.00	0.5	6.69	0	0.00	4.25	16.23	4.75	1.82
4	Hassan	2	1.31	0	0.00	0	0	0	0.00	0	0.00	5.68	16.85	0	0.00	7.68	2.94
5	Mysore	37.96	24.91	0	0.00	0	0	0	0.00	0	0.00	12.75	37.83	0	0.00	50.71	19.39
6	Chamaraj Nagar	15.84	10.40	2.01	5.07	0	0	1.2	54.55	0	0.00	4	11.87	0	0.00	23.05	8.81
7	Gulbarga	33.03	21.68	0	0.00	0	0	1	45.45	2	26.77	1.25	3.71	0	0.00	37.28	14.25
8	Belgaum	19.38	12.72	2	5.05	0	0	0	0.00	4.97	66.53	2.73	8.10	21.93	83.77	51.01	19.50
9	Bagalkot	7	4.59	6	15.14	0	0	0	0.00	0	0.00	6.5	19.29	0	0.00	19.5	7.46
10	Bijapura	1.5	0.98	2	5.05	0	0	0	0.00	0	0.00	0	0.00	0	0.00	3.5	1.34
	Total	152.37	100.00	39.64	100.00	0	0	2.2	100.00	7.47	100.00	33.7	100.00	26.18	100.00	261.56	100.00

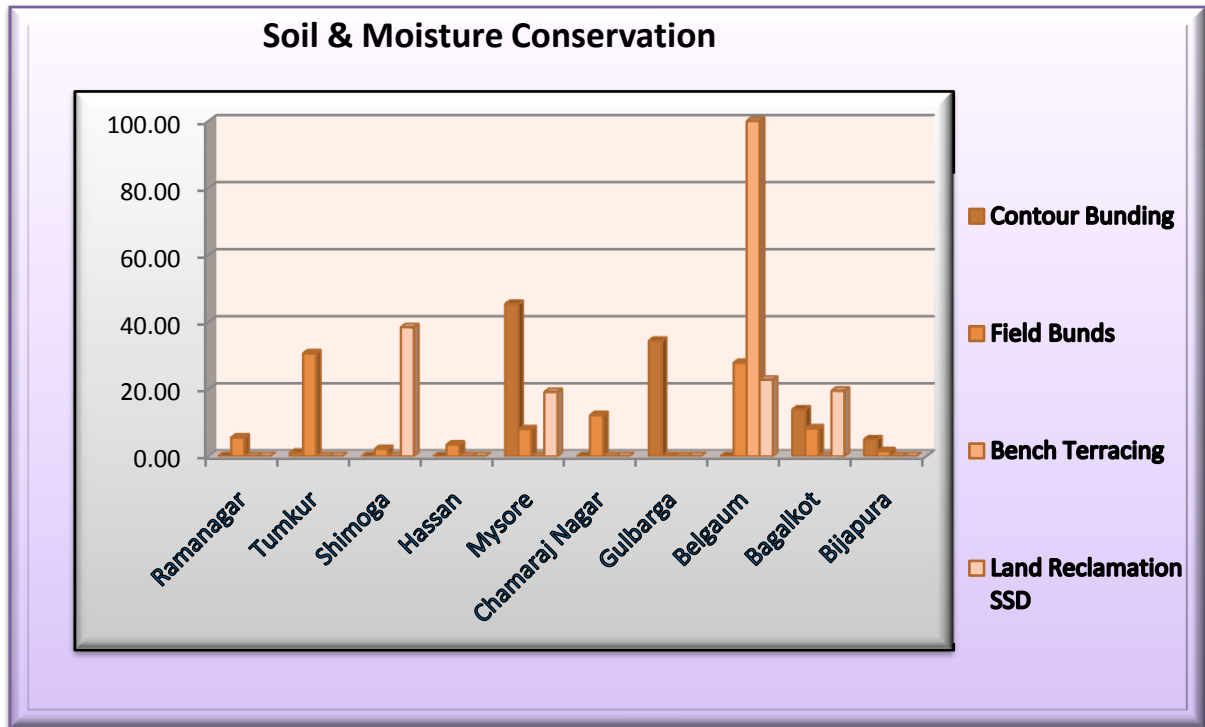


The expenditure incurred towards the soil and moisture conservation is Rs.514.41 lakhs. Of this nearly 33 percent is for the field bunds followed by 27.37 percent for contour bunding. Thus these are the two important activities carried out under TSP. The analysis by districts reveals that the expenditure in Mysore district is about 26 percent of the total expenses. The districts such as Chamarajnagar, Bijapur, Hassan and Ramnagar have recorded a very low expenditure. (See Table 4.11)

Table: 4.11: Soil and Moisture Conservation

Sl. No.	Name of the District	Soil and Moisture Conservation								Total		Grand Total	
		Contour Bunding		Field Bunds		Bench Terracing		Land Reclamation SSD					
		Fin.	%	Fin.	%	Fin.	%	Fin.	%	Fin.	%	Fin.	%
1	Ramanagar	0.00	0.00	9.21	5.59	0.00	0.00	0.00	0.00	9.21	1.79	23.97	3.09
2	Tumkur	1.50	1.07	50.57	30.69	0.00	0.00	0.00	0.00	53.57	10.42	101.39	13.26
3	Shimoga	0.00	0.00	3.60	2.18	0.00	0.00	20.07	38.47	23.67	4.61	28.42	3.66
4	Hassan	0.00	0.00	5.76	3.50	0.00	0.00	0.00	0.00	5.76	1.12	13.44	1.73
5	Mysore	64.04	45.47	13.29	8.07	0.00	0.00	10.00	19.17	151.37	29.45	136.04	26.04
6	Chamaraj Nagar	0.00	0.00	20.23	12.28	0.00	0.00	0.00	0.00	20.23	3.94	43.28	5.58
7	Gulbarga	48.52	34.45	0.00	0.00	0.00	0.00	0.00	0.00	97.04	18.88	85.80	17.31
8	Belgaum	0.00	0.00	45.90	27.86	15.80	100.00	11.90	22.81	73.60	14.32	124.61	16.06

9	Bagalkot	19.67	13.97	13.70	8.32	0.00	0.00	10.20	19.55	63.24	12.30	63.07	10.66
10	Bijapura	7.11	5.05	2.50	1.52	0.00	0.00	0.00	0.00	16.72	3.25	13.11	2.61
Total		140.8	100.0	164.8	100.0	15.8	100.0	52.2	100.0	514.4	100.1	775.1	100.00



Thus, the above analysis of the physical and financial progress has revealed that to a great extent it is achieved. However, there is need for reviewing the process achieved in the implementation of the programme.

Chapter- V

Biophysical Impacts of Special Programmes

Poverty is multi-dimensional and poverty reduction efforts have to be multipronged and are expected to show impact on wide and diverse targets. Watershed development encompasses three distinct and inter linked components viz., bio-physical, economic and institutional. In the context of special programmes bio-physical and economic factors are intertwined due to organic linkages between natural resource base and production factors. The present exercise is an attempt to assess the impact of the special programmes across sample districts by a selected section of the community.

The land development components such as contour bunding, field bunding, bench terracing, land levelling and reclamation are targeted to arrest erosion and reduce runoff so as to improve soil moisture. These in turn will improve productivity of land, by conserving nutrients and moisture and facilitate better crop growth and thereby higher crop yields. Rainwater harvesting structures such as nala bund, check dams, percolation tank and farm ponds help to retain part of the inevitable runoff, and make water available at the individual farm level for growing nurseries, horticultural plants, for providing supplemental irrigation to the crops grown nearby to tide over the drought for recharging groundwater and for meeting livestock demands. However, the intensity of these impacts are linked to the soil conditions and rainfall. The important bio-physical and environmental impacts assessed in the present case are changes in the crops and cropping pattern and changes in the availability of water and water sources.

5.1 Perceptions about the Programme:

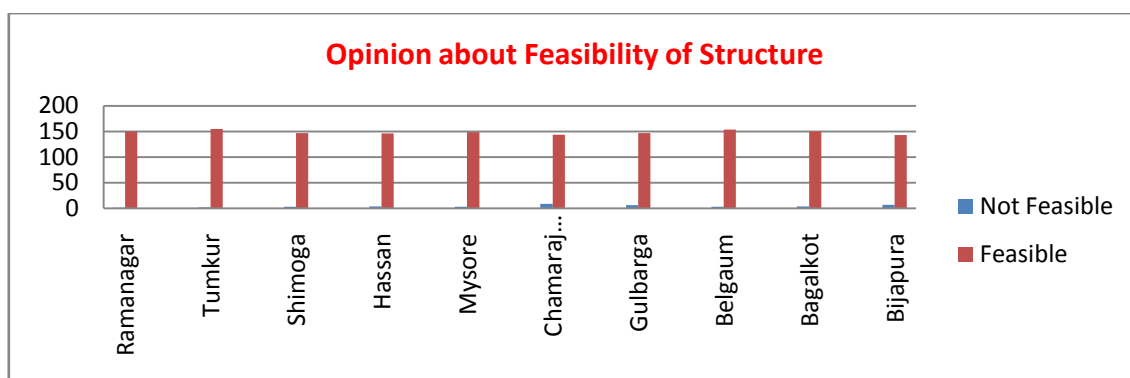
The necessity, quality and usefulness of the interventions made under the programme were assessed through personal interviews with all the beneficiaries under the special component programme.

5.1.1 Necessity of the Programme

Such programmes to be sustainable, as the interventions need to be maintained during post-operative period, for accruing the benefits on a continuous basis. People/community should feel the necessity of such interventions. Hence, perceptions of the beneficiaries are captured through personal interviews and focus group discussions. Across the districts 97.2 per cent of the beneficiaries felt the need for the programme, while 2.8 per cent of the beneficiaries have no idea about the programme [Table 5.1]. In Chamarajanagar, Bijapur and Gulbarga, 4 to 5 per cent of the beneficiaries expressed their ignorance about the programme. The above indicates that the programme is acceptable and is required for enhancing their economic wellbeing.

Table 5.1: Opinion about Feasibility of Structure

Sl. No.	Name of the District	Not Feasible	Feasible	Total
1	Ramanagar	1	150	151
		0.66	99.34	100.00
2	Tumkur	2	155	157
		1.27	98.73	100.00
3	Shimoga	3	147	150
		2.00	98.00	100.00
4	Hassan	4	146	150
		2.67	97.33	100.00
5	Mysore	3	149	152
		1.97	98.03	100.00
6	Chamaraj Nagar	9	144	153
		5.88	94.12	100.00
7	Gulbarga	6	147	153
		3.92	96.08	100.00
8	Belgaum	3	154	157
		1.91	98.09	100.00
9	Bagalkot	4	150	154
		2.60	97.40	100.00
10	Bijapura	7	143	150
		4.67	95.33	100.00
Total		42	1485	1527
%		2.75	97.25	100.00



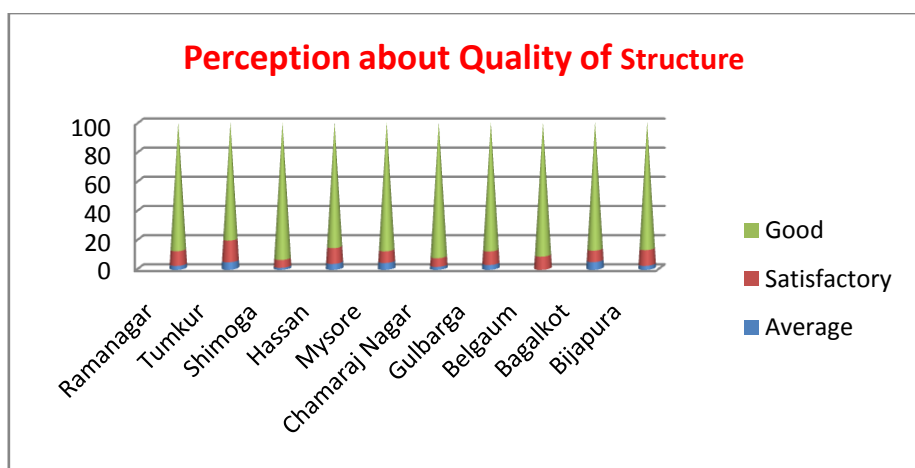
5.1.2 Quality of the Works Implemented

Regarding quality of the works, 87.8 per cent of the stakeholders under the programme informed that the quality of work is good and they are highly satisfied, while 9.1 per cent considered it the works as satisfactory and 3.0 per cent of the beneficiaries felt that it is average. Such grading could be due to their field location in the catchment with respect to intervention. If the structures are located within their fields, the benefits are immediate and if the stakeholders are far away from the interventions the benefits would occur after a certain gestation period. However, it is evident that the quality of construction is good which means less maintenance problems.

Table 5.2: Opinion about Quality of the Structures

Sl. No.	Name of the District	Average	Satisfactory	Good	Total
1	Ramanagar	4	15	132	151
		2.65	9.93	87.42	100.00
2	Tumkur	8	23	126	157
		5.10	14.65	80.25	100.00
3	Shimoga	2	8	140	150
		1.33	5.33	93.33	100.00
4	Hassan	6	16	128	150
		4.00	10.67	85.33	100.00
5	Mysore	7	12	133	152
		4.61	7.89	87.50	100.00
6	Chamaraj Nagar	3	9	141	153
		1.96	5.88	92.16	100.00
7	Gulbarga	5	14	134	153

		3.27	9.15	87.58	100.00
8	Belgaum	0	14	143	157
		0.00	8.92	91.08	100.00
9	Bagalkot	8	12	134	154
		5.19	7.79	87.01	100.00
10	Bijapura	4	16	130	150
		2.67	10.67	86.67	100.00
Total		47	139	1341	1527
%		3.08	9.10	87.82	100.00



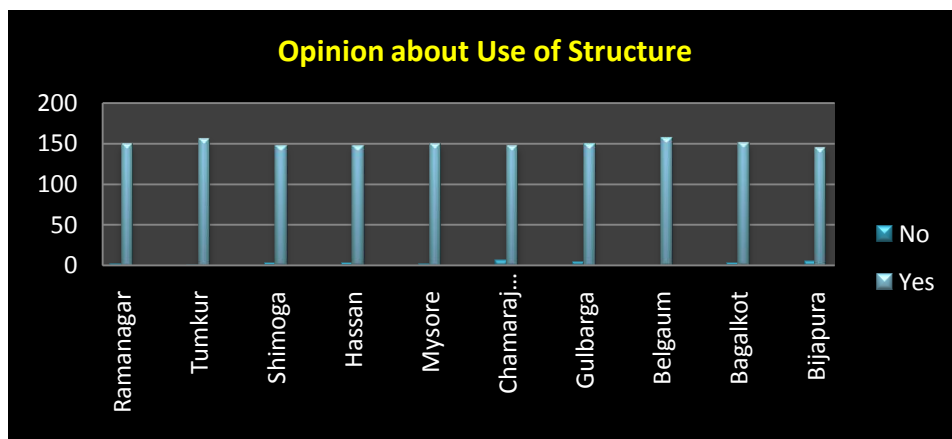
5.1.3 Usefulness of the Interventions

The investments made on the interventions becomes in fructuous if they do not provide any benefits to the stakeholder. Hence, the usefulness of the interventions was assessed through personal interview with the stakeholders. The results are presented in Table 5.3. It is gratifying to note that 98.1 per cent of the people have felt that the interventions are highly useful. Almost 100 per cent of the stakeholders in Tumkur and Belgaum are highly useful.

Table 5.3: Usefulness of the Intervention

Sl. No.	Name of the District	No	Yes	Total
1	Ramanagar	2	149	151

		1.32	98.68	100.00
2	Tumkur	1	156	157
		0.64	99.36	100.00
3	Shimoga	3	147	150
		2.00	98.00	100.00
4	Hassan	3	147	150
		2.00	98.00	100.00
5	Mysore	2	150	152
		1.32	98.68	100.00
6	Chamaraj Nagar	6	147	153
		3.92	96.08	100.00
7	Gulbarga	4	149	153
		2.61	97.39	100.00
8	Belgaum	0	157	157
		0.00	100.00	100.00
9	Bagalkot	3	151	154
		1.95	98.05	100.00
10	Bijapura	5	145	150
		3.33	96.67	100.00
Total		29	1498	1527
%		1.90	98.10	100.00



5.4 Crops and Cropping Pattern

Sustainable usage of natural resources is essential to realise sustainable agricultural growth and development to improve economic conditions of rural population. In this context, the concept of watershed and bio-physical concerns become useful. The interventions such as, contour bunds,

field bunds and bench terraces aimed to control runoff and thereby erosion will also help to stabilise agriculture in marginal lands which are remaining fallow in the absence of the above measures. Hence, efforts were made to collect information from individual stakeholder regarding cultivation for one season or two seasons is collected and analysed for the changes due to interventions. The information is presented in table 5.4.

Table 5.4 Crops and Cropping Pattern

Sl. No.	Name of the District	Before Intervention			Total	After Intervention				Total
		One Crop	Two Crops	Two to Three Crops		One Crop	Two Crops	Two to Three Crops	to	
1	Ramanagar	138	5	0	143	142	9	0		151
		91.39	3.31	0.00	94.70	94.04	5.96	0.00		100.00
2	Tumkur	140	4	0	144	146	11	0		157
		89.17	2.55	0.00	91.72	92.99	7.01	0.00		100.00
3	Shimoga	136	3	1	140	141	7	2		150
		90.67	2.00	0.67	93.33	94.00	4.67	1.33		100.00
4	Hassan	128	7	2	137	132	13	5		150
		85.33	4.67	1.33	91.33	88.00	8.67	3.33		100.00
5	Mysore	144	3	0	147	144	8	0		152
		94.74	1.97	0.00	96.71	94.74	5.26	0.00		100.00
6	Chamaraj Nagar	151	2	0	153	151	2	0		153
		98.69	1.31	0.00	100.00	98.69	1.31	0.00		100.00
7	Gulbarga	149	4	0	153	149	4	0		153
		97.39	2.61	0.00	100.00	97.39	2.61	0.00		100.00
8	Belgaum	144	7	0	151	144	10	3		157
		91.72	4.46	0.00	96.18	91.72	6.37	1.91		100.00
9	Bagalkot	144	5	0	149	144	10	0		154
		93.51	3.25	0.00	96.75	93.51	6.49	0.00		100.00
10	Bijapura	142	8	0	150	142	8	0		150
		94.67	5.33	0.00	100.00	94.67	5.33	0.00		100.00
Total		1416	48	3	1467	1435	82	10		1527
%		92.73	3.14	0.20	96.07	93.98	5.37	0.65		100.00

It is evident from the data presented that across the districts only 96.1 per cent of the stakeholders are cultivating their lands with 92.7 per cent of them growing one crop and 3.1 per cent of them growing two crops. This means 4 per cent of the stakeholders are keeping their lands fallow. It could be seen that 7 stakeholders in Ramnagar, 13 in Tumkur, 10 in Shimoga,

13 in Hasan, 5 in Mysore, 6 in Belgaum and 5 in Bagalkot started cultivating their lands which were left fallow prior to the programme. Further, in the transition zone comprising Shimoga, Hasan, Mysore districts, the number of stakeholders growing two crops in place of one crop increased significantly. This is also true with Bagalkot and Ramnagar. These results clearly establish that measures to prevent soil erosion helps to improve the cropping prospects as well as its intensity in marginal lands.

5.5 Shifts in Crops

The changes that have taken place in rainfed as well as irrigated crops is presented **Annexure – I**. It is seen from the data presented in table that Paddy has become more popular under irrigation after the interventions in Ramnagar and Tumkur. In other districts like Chamarajanagar, Mysore, Hasan and Belgaum commercial crops like tobacco, mulberry, sugarcane and vegetables and onions have either been introduced and / replaced traditional crops. This clearly establishes better moisture conditions prevailing on their lands when compared to pre-treatment period.

5.6 Water Resources

Improved water resources arguably hold the key for success of agriculture and promotion of livelihoods. As a result of interventions water resources are well developed through additional storages, increased groundwater recharge and availability over time and space. The number of water storages created and changes in ground water levels in different districts is presented in Table 5.6. It could be seen across the districts the number of functioning bore wells increased from 84 to 107 which is about 27 per cent in absolute terms. In other words, 23 wells dried have been rejuvenated due to the interventions. Similarly, out of 9 shallow open wells dried have become operational due to ground water recharge. The water yield from the deep bore wells improved by nearly 100 per cent. Consequent to creation of additional water resources 6 open wells and 5 deep bore wells are dug to create additional water facilities. The recovery of dried wells is by 50 per cent in dry areas such as Ramnagar and Tumkur and by 100 per cent in high rainfall areas such as Hassan.

Sl. No.	Name of the District	Before Intervention		After Intervention		Before Intervention		After Intervention		Before Intervention		After Intervention		Additional Open Well Dug	Additional Borewell Dug
		No. of Borewells		No. of Borewells		No. of Openwells		No. of Openwells		Borewells		Borewells			
		Functioning	Dried	Functioning	Dried	Functioning	Dried	Functioning	Dried	Water Yield (In Inches)	Depth (in fts.)	Water Yield (In Inches)	Depth (in fts.)		
1	Ramanagar	9	4	11	2	4	2	6	0	1.5-2.00	700-800	3 - 3.5	450-550	0	0
2	Tumkur	11	6	14	3	0	0	0	0	1.5-2.00	700-800	2.5 - 3	450-550	0	1
3	Shimoga	9	3	12	0	6	1	7	0	2.5- 3	350-450	3 to 4	200-300	0	1
4	Hassan	10	5	15	0	5	2	6	1	2 - 2.5	400-500	3 - 3.5	250-350	0	3
5	Mysore	8	3	9	2	3	1	4	0	2 - 2.5	400-500	3 - 3.5	300-400	0	0
6	Chamaraj Nagar	2	2	3	1	0	0	0	0	1.5-2.00	600-700	2 - 2.5	300-400	0	0
7	Gulbarga	4	1	5	0	0	0	0	0	2- 2.5	600-700	2.5 - 3	400-500	1	0
8	Belgaum	13	5	16	2	8	3	10	1	2.5- 3	400-500	3 to 4	250-350	2	0
9	Bagalkot	10	4	12	2	0	0	0	0	2.5- 4	450-500	4 to 4	200-250	3	0
10	Bijapura	8	2	10	0	0	0	0	0	2- 2.5	600-700	2.5 - 3	400-500	0	0
Total		84	35	107	12	26	9	33	2					6	5

Table 5.6: Water storages created and changes in ground water levels in different districts

5.7 Vegetation Improvement:

Vegetation in terms of improved tree cover plays an important role in the livelihoods of communities living in rain-fed areas. In order to improve rain fed cover, other programmes are converged with the special component programmes. As a result, 3540 seedlings of forest species to benefit 91 stakeholders and 1675 fruit tree benefiting 71 stakeholders and facilities to lift water for irrigation are created to benefit 19 stakeholders across the districts [Table 5.7]. Maximum planting with respect to forest species has taken place in Tumkur, Mysore and Belgaum whereas with respect to fruit species maximum planting was done in Mysore and Belgaum followed by Hasan.

Table 5.7: Details of Convergence with other Line Departments (in no. s)

Sl. No.	Name of the District	Forestry (Types of Plants Planted)					Horticulture (Types of Plants Planted)					Total Beneficiaries' Covered	Kerosene Engine/ Pedal Water Lift Machine From Agriculture Department
		Teak	Silver Oak	Honge	Total	No. of Beneficiaries Benefited	Mango	Sapota	Coconut	Total	No. of Beneficiaries Benefited		
1	Ramanagar	0	0	0	0	0	0	0	0	0	0	0	2
2	Tumkur	320	200	0	520	12	20	0	60	80	8	20	3
3	Shimoga	250	0	0	250	6	50	0	80	130	5	11	1
4	Hassan	120	400	0	520	22	75	0	150	225	15	37	4
5	Mysore	250	150	350	750	15	100	0	250	350	13	28	0
6	Chamaraj Nagar	0	0	0	0	0	50	0	0	50	2	2	0
7	Gulbarga	350	0	0	350	7	125	60	0	185	8	15	3
8	Belgaum	600	0	0	600	12	80	150	250	480	10	22	3
9	Bagalkot	150	50	0	200	5	50	75	0	125	5	10	1
10	Bijapura	350	0	0	350	12	50	0	0	50	5	17	2
Total		2390	800	350	3540	91	600	285	790	1675	71	162	19

5.8 Overall Performance:

The performance of the programme in terms of bio-physical or environmental impact is positive. The marginal lands which were hitherto cultivated are brought under cultivation. The water resources improved significantly by reviving dried wells ranging from 50 to 100 per cent. The discharge from borewells increased by about 100 per cent. Planting of forest and fruit species have helped to improve the livelihoods.

Chapter VI

Economic Impact

Economic impacts are critical for the success and sustainability of any developmental programme. Unless the bio-physical benefits are translated into economic benefits, farmers may not show much interest in maintaining the developments done so as to yield continuous benefits. Many studies have revealed that resource conservation measure bring about positive economic benefits ranging from 20 to 40 percent an more in favorable environments (Rao 2000, Gok 2001, Jain AK 2011). The economic development cannot be aptly summarized by any single indicator. All developmental activities that help to bring economic development will ultimately result in total income derived by the family. Since the programme is only one year old, information collected on other aspects could be varying and will have limited value. Hence, the net income generated by the stakeholders is used to estimate economic impacts in the present case.

The total no.of participants considered for collecting the information is 1527. Out of the total beneficiaries considered for evaluation 54.4 percent belong to Schedule caste and 45.6percent belong to Schedule tribes. 63.5 and 72.5 percent stakeholders possess land less than 1.0 under rainfed and irrigation conditions. The percent stakeholders holding land more than 2.0ha constitute 10.4 under rainfed conditions with 2.4 percent having irrigation facilities (Table 6.2).

Among the districts Mysore and Chamarajnagar have least number of stakeholders (2 and 4) with irrigation facilities. The other districts have more than 8 stakeholders with irrigation facilities but most of them are holding less than 1.0 ha. The literacy rate is much less among the stakeholders with 33.6 being illiterate and 36.74% being up to lower primary school (Table 6.3). The major livelihood next to farming, on which the stakeholders depend, is livestock's raring for milk and meat and the details are given in table (6.4). Sheep and goat are the major live stock on which the stakeholders depend for livelihood apart from farming.

The interventions carried out under the programme has improved their incomes when compared to pre-project income. The changes in the incomes are presented in table 6.5. Across the districts, the percent of stakeholder having less income (<Rs.12000) reduced from 69.8 to 63.7. The percent stakeholders earning from 12000 to 20000 increased from 20.2 to 23.0 and similarly the stakeholders earning 20001 to 30000 and more than Rs.30000 increased from 7.5 to 10.3 and 2.5 to 3.0 respectively. However, not many changes in the income changes were noticed in Hassan and Mysore. But in all other districts farmers having lower income (obviously having less then < 1.0 ha) improved in their income which could be due to intensive cultivation using own labour when compare to others. Thus the programme has a positive impact on poverty reduction though not to a significant effect. If such programmes are combined with proper capacity building for adopting farming system approach with improved cultivars and management, the positive effects can be more so that all the people can realize an income ranging from Rs.20,000 to Rs.30,000.

Table 6.1. General information about beneficiary

Sl. No.	Name of the District	SC	%	ST	%	Total
1	Ramanagar	99	65.56	52	34.44	151
2	Tumkur	74	49.01	83	54.97	157
3	Shimoga	82	54.30	68	45.03	150
4	Hassan	103	68.21	47	31.13	150
5	Mysore	65	43.05	87	57.62	152
6	Chamaraj Nagar	72	47.68	81	53.64	153
7	Gulbarga	89	58.94	64	42.38	153
8	Belgaum	72	47.68	85	56.29	157
9	Bagalkot	81	53.64	73	48.34	154
10	Bijapura	94	62.25	56	37.09	150
Total		831	54.42	696	45.58	1527

Table 6.2.Details of Land Holdings of the stakeholders

Sl. No.	Name of the District	Dryland							Irrigated Land						
		< 1 ha	%	1 to 2 ha	%	> 2 ha	%	Total	< 1 ha	%	1 to 2 ha	%	> 2 ha	%	Total
1	Ramanagar	115	76.16	23	15.2	13	8.61	151	8	88.89	1	11.11	0	0.00	9
2	Tumkur	98	62.42	39	24.8	20	12.74	157	9	81.82	2	18.18	0	0.00	11
3	Shimoga	78	52.00	56	37.3	16	10.67	150	5	55.56	3	33.33	1	11.11	9
4	Hassan	89	59.33	49	32.7	12	8.00	150	6	60.00	4	40	0	0.00	10
5	Mysore	96	63.16	44	28.9	12	7.89	152	5	62.50	3	37.5	0	0.00	8
6	Chamaraj Nagar	103	67.32	36	23.5	14	9.15	153	1	50.00	1	50	0	0.00	2
7	Gulbarga	83	54.25	48	31.4	22	14.38	153	3	75.00	1	25	0	0.00	4
8	Belgaum	92	58.60	41	26.1	24	15.29	157	10	76.92	2	15.385	1	7.69	13
9	Bagalkot	106	68.83	34	22.1	14	9.09	154	8	80.00	2	20	0	0.00	10
10	Bijapura	110	73.33	28	18.7	12	8.00	150	6	75.00	2	25	0	0.00	8
Total		970	63.52	398	26.06	159	10.41	1527	61	72.62	21	25.00	2	2.38	84

Table 6.3.Literacy level of the respondents

Sl. No	Name of the District	Illiterate	LPS	HPS	High School	College	Total
1.	Ramanagar	48	49	33	17	4	151
		31.79	32.45	21.85	11.26	2.65	100.00
2.	Tumkur	44	57	31	22	3	157
		28.03	36.31	19.75	14.01	1.91	100.00
3.	Shimoga	39	82	22	5	2	150
		26.00	54.67	14.67	3.33	1.33	100.00
4.	Hassan	52	46	31	21	0	150
		34.67	30.67	20.67	14.00	0.00	100.00
5.	Mysore	33	68	30	18	3	152
		21.71	44.74	19.74	11.84	1.97	100.00
6.	Chamarajnaragar	63	47	29	14	0	153
		41.18	30.72	18.95	9.15	0.00	100.00
7.	Gulbarga	71	48	23	11	0	153
		46.41	31.37	15.03	7.19	0.00	100.00
8.	Belgaum	53	54	25	22	3	157
		33.76	34.39	15.92	14.01	1.91	100.00
9.	Bagalkote	59	49	29	15	2	154
		38.31	31.82	18.83	9.74	1.30	100.00
10.	Bijapur	51	61	32	4	2	150
		34.00	40.67	21.33	2.67	1.33	100.00
Total		513	561	285	149	19	1527
%		33.60	36.74	18.66	9.76	1.24	100.00

Table 6.4. Livestock details of the respondents

Sl. No.	Name of the District	Milch Animals	Sheeps/ Goats	Others	Total
1	Ramanagar	52	488	98	638
		8.15	76.49	15.36	100.00
2	Tumkur	56	370	98	524
		10.69	70.61	18.70	100.00
3	Shimoga	65	410	103	578
		11.25	70.93	17.82	100.00
4	Hassan	52	280	135	467
		11.13	59.96	28.91	100.00
5	Mysore	48	255	86	389
		12.34	65.55	22.11	100.00
6	Chamaraj Nagar	22	380	81	483
		4.55	78.67	16.77	100.00
7	Gulbarga	38	420	116	574
		6.62	73.17	20.21	100.00
8	Belgaum	53	272	96	421
		12.59	64.61	22.80	100.00
9	Bagalkot	72	346	145	563
		12.79	61.46	25.75	100.00
10	Bijapura	68	245	98	411
		16.55	59.61	23.84	100.00
Total		526	3466	1056	5048
%		10.43	68.72	20.94	100.08

Table - 6.5. Economic Changes in the Stakeholders

Sl. No.	Name of the District	Pre Intervention					Post Intervention				
		<12001	13001 to 20000	21001 to 30000	>30001	Total	<12001	13001 to 20000	21001 to 30000	>30001	Total
1	Ramanagar	83	46	16	6	151	71	49	24	7	151
		54.97	30.46	10.60	3.97	100.00	47.02	32.45	15.89	4.64	100.00
2	Tumkur	101	39	13	4	157	93	39	19	6	157
		64.33	24.84	8.28	2.55	100.00	59.24	24.84	12.10	3.82	100.00
3	Shimoga	91	31	21	7	150	78	40	25	7	150
		60.67	20.67	14.00	4.67	100.00	52.00	26.67	16.67	4.67	100.00
4	Hassan	95	40	10	5	150	95	40	10	5	150
		63.33	26.67	6.67	3.33	100.00	63.33	26.67	6.67	3.33	100.00
5	Mysore	114	22	12	4	152	112	22	14	4	152
		75.00	14.47	7.89	2.63	100.00	73.68	14.47	9.21	2.63	100.00
6	Chamaraj Nagar	126	19	7	1	153	113	27	11	2	153
		82.35	12.42	4.58	0.65	100.00	73.86	17.65	7.19	1.31	100.00
7	Gulbarga	132	18	2	1	153	121	23	8	1	153
		86.27	11.76	1.31	0.65	100.00	79.08	15.03	5.23	0.65	100.00
8	Belgaum	106	36	13	2	157	93	39	20	5	157
		67.52	22.93	8.28	1.27	100.00	59.24	24.84	12.74	3.18	100.00
9	Bagalkot	111	25	13	5	154	101	31	16	6	154
		72.08	16.23	8.44	3.25	100.00	65.58	20.13	10.39	3.90	100.00
10	Bijapura	107	32	8	3	150	96	41	10	3	150
		71.33	21.33	5.33	2.00	100.00	64.00	27.33	6.67	2.00	100.00
Total		1066	308	115	38	1527	973	351	157	46	1527
%		69.81	20.17	7.53	2.49	100.00	63.72	22.99	10.28	3.01	100.00

Chapter VII

Observations and Findings

The SCP and the TSP component is under implementation during 2009-10 in the state. The Department has already initiated action for the implementation during 2011-12 as well. Thus, the programme is being evaluated after a short time interval of its implementation.

Positive Aspects:

1. The important achievement of the programme is that through this programme the small and the marginal farmers belonging to the targeted groups in the state has been provided with the required benefits.
2. All the targeted beneficiaries are found to have received the benefits proposed under this programme.
3. The programme has resulted in bringing about certain changes in the income levels as a result of shift in the type of crops viz., rain-fed crops to vegetable cultivation, cropping intensity – from rabi or kharif to rabi or kharif and short duration crops during summer. These are found to vary across the different agro-climatic zones. For instance, in the Hassan, Shimoga, Tumkur districts during rabi season the beneficiaries have taken up the cultivation of vegetables [ginger, paddy, sericulture, coconut cultivation, banana etc.,] and in the Belgaum, Gulbarga, Bijapur and Bagalkote districts the farmers have shifted to cultivation of crops such as the green gram, black gram etc., While they have continued with the cultivation of traditional crops, there is shift to the improved variety which is expected to enhancing the

yield and thus, the incomes. It is also observed that there is a shift to perennial crops such as the sugar cane and grapes.

4. As a result of the implementation of the various types of bunding works, the fallow lands, the undulated lands have been brought under cultivation.
5. The greatest impact of the programme is seen in terms of recharge of ground water. This is found to vary with the type of structures executed. The check dams, nala bunds, RRS. MPT and vented dams is reported to have not only resulted in recharging of ground water sources in the targeted plots, but has had its impacts on the water sources in the surroundings as well [beyond 500 mtrs.]
6. In certain cases, the farmers are reported to have shifted from single crops to multiple crops. Thus, the farmers are reported to be taking up the cultivation of the vegetables in the coconut gardens as a result of the availability of water.
7. In a certain number of cases or districts, the programme is implemented in convergence with the other programmes implemented by the Agriculture Department. For example, in the event of the provision of the farm pond under the present programme, implements such as kerosene pumps, manual water lifting equipments, provision of seeds such as haemata, mango saplings / saplings etc., In addition, through the NREGA saplings such as Teak, Silver oak and others is provided to be used for planting on the bunds on the different structures. The Department of Fisheries has also provided fingerlinks to help the farmers to undertake the fishing activity which is also reported to have helped in enhancing

the income levels of the farmers. The Horticulture Department is found to have provided seeds kit to promote kitchen garden in and around the farm ponds.

8. The benefits of the programme is just not confined to agricultural purposes, but non-agricultural purposes as well. Thus, it is found that the water that is stored in the major harvesting structures is used for domestic purposes. In certain cases it has resulted in recharge of village drinking water borewells.
9. Due to the enhanced vegetations in the villages, there is increased no. of milch animals and also marginal increase in the production of milk from the milch animals.
10. The works such as bunding and water harvesting structures is said to have resulted in creation of employment for the rural community in general and beneficiary in particular.
11. The programme is said to have resulted in enhanced social status and self-esteem among the targeted beneficiaries.

Negative Aspects:

1. The Watershed Development Department has been implementing a number of schemes with similar type of interventions. While the SCP and the TSP programme has provided a number of interventions to the beneficiaries, the details of the assistance provided under this programme is not displayed on site.

Such practices are expected to help in eliminating the duplications in the assistance provided to the beneficiaries.

2. The process of documentation i.e. the collection of various documents from the beneficiaries is not found to be uniform in all the districts. There is need to issue strict guidelines to follow the stipulated guidelines. This will help in the effective implementation of the programme as well.
3. It is found that there has been certain shortfalls in the selection of the sites for the erection of the structures resulting in wastage of the scarce resources, dissatisfaction among the beneficiaries and other problems as well.
4. The implementation of the programme is not coupled by adequate sensitization and awareness building on the various aspects of the programme that is implemented. It is found that there is poor maintenance of the drainages, inlets, silt traps etc., This is a result of the poor awareness and the participation in the implementation of the programme as well.
5. In a certain percentage of cases relating to farm ponds, due to non-provision of the outlets for the excess water, this has resulted in breach of the pond giving rise to unintended problems to the farmers.
6. It is necessary to give increased attention towards the various technical issues both in the planning and implementation phases of the programme as well. It is necessary to consider such factors such as the

soil type in the implementation of the programme. In certain cases, check dams and farm ponds and vented dams have been constructed in such locations where there is very little possibility of collection of water. As a result, these structures are not effectively utilized.

7. It is reported that the bunding works are taken up only for the tribal communities. However, there is increased demand for it from the scheduled caste beneficiaries as well. Thus, it is felt that there is need to implement the programme in 'shelf-of-activities' approach providing various options to the beneficiaries. Thus, the programme could be made more successful.
8. The selected farmers in few districts are not satisfied with the design in the formation of bunds. However, the departmental personnel have expressed limitations in implementing it due to financial ceilings provided under the programme.

Suggestions:

1. The SCP and the TSP programmes needs to be implemented with a 'shelf-of-activities' approach providing for appropriate interventions desired by the target group.
2. The targets set under these programmes have to be more realistic and based on the needs and the concentration of the target groups.

3. The department may evolve a strategy to train the SCP and the TSP beneficiaries on the various aspects of the maintenance of the structures created under the programme either by outsourcing to a professional agency or by implementing the same through the department.
4. In view of the merger with the Agriculture Department, the Department may focus greater attention in implementing other programmes through the process of convergence. This is also true for departments / programmes such as the Department of Animal Husbandry and Veterinary Services, Mahatma Gandhi National Rural Employment Guarantee Programme, Department of Horticulture, Department of Forestry and Department of Fisheries.
5. At the taluk level, an appropriate committee under the Chairmanship of the President of the Taluk Panchayath with appropriate members from the different line departments to be constituted with powers relating to the selection of the beneficiaries, timely execution and monitoring and more importantly to ensure the implementation on a 'mission' mode.
6. The Department may further issue appropriate guidelines towards ensuring proper documentation.

