GOVERNMENT OF KARNATAKA

WATERSHED DEVELOPMENT DEPARTMENT

SUJALA-I SUCCESS STORY

KARNATAKA WATERSHED DEVELOPMENT PROJECT - I

Documentation Support

Department of Administrative Reforms & Public Grievances

Ministry of Personnel, Public Grievances & Pensions, Government of India

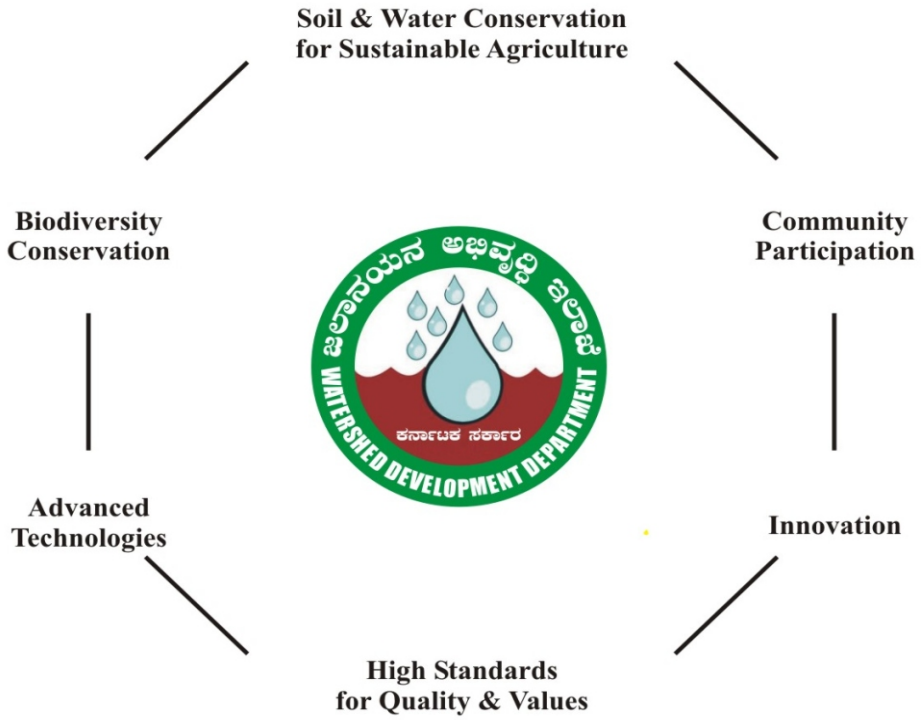
Watershed Development Department

Government of Karnataka, Cauvery Bhavan, Bangalore-560009

Tel: 080-2210 0670 Fax: 080-22100673 E-mail: *comwdd@vsnl.net*

Website: *www.watershed.kar.nic.in*

VISION



MISSION

To strive towards sustainable agriculture through integrated watershed management approach by conserving natural resources such as soil, water & bio-diversity and adopting improved farm practices that are evolved through participatory process involving both scientific and indigenous knowledge system to empower the rural people to enhance their livelihoods.

SUJALA-I SUCCESS STORY

KARNATAKA WATERSHED DEVELOPMENT PROJECT - I

Watershed Development Department
Government of Karnataka, Cauvery Bhavan
Bangalore-560009
Tel: 080-2210 0670 Fax: 080-22100673 E-mail: *comwdd@vsnl.net*
Website: *www.watershed.kar.nic.in*

SUJALA-I SUCCESS STORY

KARNATAKA WATERSHED DEVELOPMENT PROJECT - I

Publisher:
Commissioner,
Watershed Development Department,
Bangalore-560 009

First Print : June 2014 (500 Copies)

Coverpage and Book Design : Ananth D.A.

Printer: Sathyananda Printers, Vijayanagara Pipe Line, Bangalore
E-mail : *shanthu_2001@yahoo.com*

Cover Page depicts the sequential process of Watershed Development

1. Uthanuru watershed pre-development (2002)
2. Sujala - I Activities
3. Post-development
4. The proud farmer Srinivas (2014)
5. The Best watershed - farmer Srinivas, Uthanuru Village, Mulabagal Taluk, Kolar District, Karnataka, receiving award from the President of India on 3rd October 2007 at New Delhi

KRISHNA BYREGOWDA
Minister of State for Agriculture

Telephone No. : 080-22256093
080-22034439
Room No.: 244/245, 2nd Floor
Vikasa Soudha
Bangalore - 560 001

No. AM/ 04 /2013

Date: 22.04.2014.

MESSAGE

More than two-thirds of Karnataka state is under arid and semi-arid conditions and is predominantly agriculture based with more than 70% of its population depending on agriculture and its allied activities. Realizing the importance of developing these drylands due to its drought prone nature, Karnataka has been implementing on watershed based schemes to improve the land and water resources since 1984 onwards.

I am glad to note that Watershed Development Department, Govt. of Karnataka has successfully implemented a World Bank assisted watershed program in seven districts of Karnataka during 2002 to 2009. This program through biophysical, technological and social interventions has made significant impacts on the socio economic and environmental aspects, which has earned a unique distinction both at the National and International level. I am also very happy to note that the best practices of the sujala model are also being replicated not only in Karnataka but also in other states.

I am happy that Watershed Development Department, Govt of Karnataka with the help of Antrix Corporation, ISRO has brought out this report at the instance of Department of Adminstrative reforms and Public grievances, Govt of India. I am sure that this report with valuable insights will attract the attention of the watershed stakeholders encompassing policy makers, implementers, NGO's, academicians, etc

(Krishna Byregowda)

KAUSHIK MUKHERJEE
CHIEF SECRETARY
ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿ

ಕರ್ನಾಟಕ ಸರ್ಕಾರ
GOVERNMENT OF KARNATAKA

ವಿಧಾನ ಸೌಧ ಬೆಂಗಳೂರು – ೫೬೦ ೦೦೧
 # 320, 3rd Floor, Vidhana Soudha
Bangalore - 560 001
e-mail : cs@karnataka.gov.in
cskarnataka@gmail.com
Phone : Off: +91-80-22252442 / 22253716
Fax : +91-80-22258913

Date : 23.04.2014

Adoption of sustainable land management, based on watershed approach, is now no more an option but an imperative necessity to develop drylands and for mitigating the impacts of climate change. Karnataka has been pioneer in implementing watershed development programs since 1984 and has executed an innovative, community driven, participatory program called 'Sujala' from 2002 to 2009 with a holistic and integrated approach in 38 taluks spread across 6 districts of Karnataka, to address not only land based activities but also livelihoods with emphasis on equity, gender, and sustainability. The Sujala project was successful in achieving the desired objectives with positive impacts on the social, Economic and environmental aspects – the three pillars of the sustainable development.

The benefits accrued from the Sujala-I project has attracted the global attention with many national awards and International awards. The Department of Adminstarative Reforms & Public Grieviences (DAPAR), Govt. of India, has selected Sujala which bagged *"e-Governance award (Category-Gold)"* for documentation and dissemination of good governance initiative. In this context, Antrix Corporation, ISRO in association with Watershed Development Department (WDD), Govt. of Karnataka has brought out this comprehensive report highlighting project uniqueness, challenges faced, technology adopted, process and impacts.

This report will be of immense value not only for the Government of Karnataka but also others concerned with watershed based developmental activities. I appreciate the efforts of all the project partners of Sujala for making the project successful and WDD Antrix, ISRO for bringing out this comprehensive report.

Kaushik

KAUSHIK MUKHERJEE

G.V. KRISHNA RAU. I.A.S.,
Additional Chief Secretary and
Development Commissioner
ಜಿ.ವಿ. ಕೃಷ್ಣರಾವು ಭಾ.ಆ.ಸೇ.,
ಅಪರ ಮುಖ್ಯ ಕಾರ್ಯದರ್ಶಿ ಮತ್ತು
ಅಭಿವೃದ್ಧಿ ಆಯುಕ್ತರು

PHONE : 080-22250715 (O)
080-22033308
FAX : 080-22251080
e-mail: devcom@karnataka.gov.in
ಕರ್ನಾಟಕ ಸರ್ಕಾರದ ಸಚಿವಾಲಯ
ವಿಧಾನ ಸೌಧ, ಬೆಂಗಳೂರು – 560 001
KARNATAKA GOVERNMENT SECRETARIAT
VIDHANA SOUDHA, BANGALORE - 560 001

Date : 18.06.2014

MESSAGE

I am extremely happy to know that the Karnataka Watershed Development Department is bringing out a book containing the success achieved under "SUJALA-I" project which was aimed to develop dryland of selected districts in Karnataka on watershed basis with holistic and integrated approach.

One of the unique features of this project was the adoption of the State-of-the art technological tools in all the facets of watershed development viz., planning, resources inventory, preparation of action plan, implementation, monitoring, impact assessment, monitoring & evaluation. Innovative use of technology for governance through web enabled MIS & GIS.

The project ensured greater social inclusiveness, better equitable distribution of benefits and higher gender sensitivity.

I hope that the book will become a source of valuable information for replication in other dryland regions.

(G.V.KRISHNA RAU)

BHARAT LAL MEENA,I.A.S.,
Principal Secretary to Government,

ಕರ್ನಾಟಕ ಸರ್ಕಾರ ಸಚಿವಾಲಯ
ಕೃಷಿ ಇಲಾಖೆ
Karnataka Government Secretariat
Agriculture Department

Date: 21.05.2014

MESSAGE

Karnataka is pioneer in implementing watershed development programme since 1984. However, community driven, participatory programme "SUJALA-I" project was implemented from 2002 to 2009 with World Bank assistance, adopting many new features for sustainability.

The satellite data analysis revealed that the land cover transformation depicting increased biomass, change in the cropping pattern, cropping intensity, increase in agro-bio-diversity, reduction in the extent of waste lands due to reclamation, shift from traditional agriculture to agro-horticulture, agro-forestry and diversified non-farm activities in the project areas.

Sujala-I is being acknowledged as a success story which ushered a new era of hope & confidence in the rural habitats of 1350 villages in Karnataka by evolving & implementing developmental plans with high level of community participation for sustainability.

I hope the book will be useful for replication of this success in other region.

(BHARAT LAL MEENA)

ಬಹುಮಹಡಿಗಳ ಕಟ್ಟಡ, 3ನೇ ಹಂತ, 4ನೇ ಮಹಡಿ, ಬೆಂಗಳೂರು - 560 001
M.S. Buildings, 3rd Stage, 4th Floor, Bangalore - 560 001, Karnataka, India
Tel. : 080-22250284, 22032595 Fax : 080-22251420 e-mail : prs-ah@karnataka.gov.in

ಆಯುಕ್ತರು
ಜಲಾನಯನ ಅಭಿವೃದ್ಧಿ ಇಲಾಖೆ ಮತ್ತು
ಯೋಜನಾ ನಿರ್ದೇಶಕರು,
ಸುಜಲ ಜಲಾನಯನ ಯೋಜನೆ
Commissioner,
Watershed Development Department and
Project Director
Sujala Watershed Project

ಕರ್ನಾಟಕ ಸರ್ಕಾರ
GOVERNMENT OF KARNATAKA

ದೂರವಾಣಿ : ೨೨೧೨೯೬೦೧
Telephone : 22129601
Fax : 22100665
E-mail : sujala@vsnl.net
watershed@vsnl.net

7ನೇ ಮಹಡಿ, ಕೆ.ಹೆಚ್.ಬಿ. ಕಟ್ಟಡ,
ಕಾವೇರಿ ಭವನ, ಕೆಂಪೇಗೌಡ ರಸ್ತೆ,
ಬೆಂಗಳೂರು-560 009
7th Floor, K.H.B, Building,
Cauvery Bhavan
Kempegowda Road,
Bangalore - 560 009.

Date : 02.06.2014

PREFACE

Karnataka is pioneer in implementing watershed development programmes since 1984, under a large variety of programmes & schemes with different approaches, technology inputs and institutional arrangements. However, these programmes were lacking integrated approach & holistic development.

The World Bank assisted Karnataka Watershed Development Project-I (KWDP-I), popularly known as SUJALA-I Project which was implemented in six districts during 2002 to 2009 demonstrated the methodology and also the best practices for achieving productivity & improved livelihood support to the rural population in the selected dryland districts.

The biophysical and social interventions in "SUJALA" project has resulted in a number of positive changes in the treated watersheds and yielded significant benefits with respect to all the dimensions of the sustainable development viz., economic, social, institutional & environment aspects.

The World Bank acknowledges "SUJALA" as a "Model of Excellence" and "Global Best Practice". The project has been conferred with five National Awards and three International Awards. The best practices have been adopted in the subsequent project NABARD-RIDF assisted SUJALA-IIand it will also be followed in the ensuing World Bank funded Karnataka Watershed Development Project (KWDP-II) viz. SUJALA-III.

The project was also conferred with e-Governance Award (Category-Gold) in 2009. This is also one among the projects selected by Department of Administrative Reforms & Public Grievances (DPAR), Government of India with a view to share the experience for replication.

I take this opportunity to express my sincere gratitude to dignitaries for providing message and all those who contributed to bring out this docment.

(H.G.SHIVANANDA MURTHY)

Contents

Summary

World Bank assisted Karnataka Watershed Development - Sujala-I Project was conferred with e-Governance award (Category-Gold) in 2009. This is one among the projects selected for "Documentation and dissemination of good governance initaiative by Department of Adminstarative Reforms & Public Grieviences (DPAR), in order to share the experience and for replication. This document highlights the salient features of Sujala watershed development project with illustrations to get a glimpse of the uniqueness, process, impacts and the recognitions.

Karnataka is pioneer in implementing watershed development programs since 1984 and executed an innovative, community driven, participatory program called Sujala from 2002 to 2009 with a holistic and integrated approach to address not only land based activities but also livelihoods with emphasis on equity, gender, and sustainability. This Sujala project was implemented with World Bank assistance in 754 watersheds distributed in 38 taluks spread across 5 districts of Karnataka state.

Sujala project was aimed at sustainable alleviation of poverty in predominantly rainfed areas by improving the productive potential of degraded watersheds, enhancing productivity and livelihood systems. It was also intended to strengthen the community and Institutional arrangements for better natural resource management. It was a unique program that was participatory in nature, where in communities were involved in all stages of watershed management viz., planning, implementation, monitoring and maintenance. The project was also aimed at greater social mobilization and capacitation of the communities to facilitate their participation in various facets of watershed development and maintenance. Social mobilization was ensured through the formation of Community Based Organisations (CBOs) of about 6648 Self Help groups (SHG), 4394 Area Groups (AG) and 742 Sujala Watershed Sangha Executive Committee (SWS-EC). The capacity buildings of these CBO's were done through well devised training modules, exposure visits and skill trainings.

As the program was holistic and integrated, both land and non-land based activities like soil & moisture conservation measures, drainage line treatments, horticulture, forest plantations, agro-horticulture, agro- forestry, silvi-horti-pasture, farm demonstrations, livestock, Income generating activity etc. were implemented in a participative manner with scientific inputs.

One of the unique features of this project was the adoption of the state-of-the art technological tools in all the facets of watershed development viz., Planning, resources inventory, participatory action plan preparation and implementation, monitoring and evaluation, impact assessment. Innovative use of technology for governance through web enabled MIS/GIS is a striking feature in the project.

At the end of the project, Sujala made significant impact on the socio-economic conditions of the rural livelihoods as well as the status of natural resources. The thrust on land and water management resulted in the desired and sustainable impact in terms of rejuvenating the natural resource base, reducing the runoff and increasing the water table, arresting the soil erosion and improving the productivity. The project had social impact on the rural livelihoods in terms of greater awareness, improved participation, women empowerment, improved quality of living and better health conditions. The project also ensured greater social inclusiveness, better equitable distribution of benefits and higher gender sensitivity. The project emphasis on holistic approach with both private and common land interventions simultaneously with livelihood components resulted in overall development of the watershed.

Satellite data analysis clearly indicated the land cover transformation depicting increased biomass, changes in the cropping pattern/ cropping intensity, increase in agro bio-diversity, reduction in the extent of wastelands due to reclamation, shift from agriculture to agro horticulture / agro forestry, etc.

The overall tangible significant results achieved for key indicators are: Cropping intensity from 129 to 144%, Crop yield increase by 24%, shift from agriculture to agro-horticulture / agro-forestry by 22%, Average increase in the ground water level by 66 ft and yield(discharge) by 21%. The number of employment generated was 16,000 to 21,000 man days per

micro watershed reducing the out migration by 70%. There was an increase in the household income by 30% and milk yield by 22% at the end of the project. About 10.43 MT of biomass buildup was estimated after the intervention with sequestration of 5.21MT of carbon. Thus the biophysical and social interventions in sujala project had resulted in a number of positive changes in the treated watersheds and yielded significant benefits with respect to all the dimensions of the sustainable development viz economic, social, institutional & environmental aspects.

Today, Sujala is being acknowledged as success story a trail blazer where the natural resources, the existing institutions and people's participation in decision making on the nature of development they perceive and their involvement in the development strategies have been integrated and harmonized. Sujala ushered a new era of hope and confidence into the hearts of rural habitats of 1350 villages by evolving and implementing development plans with a high level of community participation utilizing technology inputs to help the local people build a sustainable future in their own hands.

World Bank acknowledges Sujala as "Model of Excellence" and "Global Best practice". The project has been conferred with many national and International awards and presently the Sujala model is being replicated at State, National and International level.

SUJALA - I UNIQUE FEATURES

- Holistic, Integrated and Multidisciplinary approach
- Public, Private and People Participation
- Role of government, Scientific organisations and NGO's as facilitators
- Participatory Planning, implementation and Monitoring
- Prioritization of watersheds for treatment on scientific basis
- Use of Customized MIS/GIS for tracking the physical and financial progress
- Concurrent process monitoring for quality interventions
- Implementation monitoring using time series satellite data
- SATCOM programs for capacity building and reviews
- IT tools for action plan preparation and Monitoring
- Cost sharing by stakeholders to promote ownership & sustainability
- Resource maps and action plan generation using remote sensing
- Effective training modules and exposure visits for capacity building
- Use of M&E information for corrective measures and policy changes
- Emphasis on equity and Gender in project investment and benefit sharing
- Importance given to operation & maintenance, sustainability of assets
- Community resource persons to act as *Gopal Mitra* and *Jal Mitra*
- Comprehensive monitoring system at all levels to ensure transparency
- Independent external M&E agency from beginning to end of project
- Emphasis on livestock to ensure sustainable income
- Inter-linkages and convergence with other programs.
- Thrust on Environment and social screening to avoid negative externalities
- Performance based payment system to NGO's
- Stress on manual works instead of machinery to create employment
- Livelihood Improvement component to address vulnerable group
- Local, National and international exposures to stakeholders
- Farmers field schools to promote activities among communities

CHAPTER 1

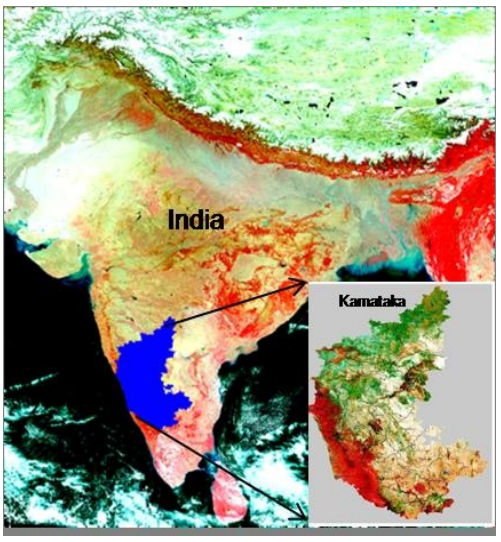
1.0 Situation before the Project

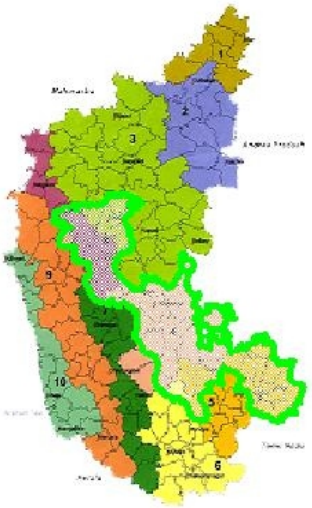
Karnataka State has the highest proportion (79%) of drought prone area among all major states in the country and in absolute terms it has the second largest area of dry land in the country after Rajasthan. In addition, Karnataka also has the second lowest (154.2 M ha M/yr) replenishable ground water resources among major States after Rajasthan. Karnataka state is predominantly agriculture based with more than 70% of its population depending on agriculture and its allied activities for their livelihoods and sustenance. But dry land farming in Karnataka is riddled not only by natural / physical constraints like unfavorable soil, moisture and climatic conditions, but also by the socio-economic conditions of the farmers. The average annual rainfall in the state varies from 400 to 700 mm a year.

Over the years exploitation and unscientific land and water management practices in rain fed areas have led to deteriorating soil fertility, soil loss, and declining crop yield. Depletion of water resources, deforestation, denudation, destruction of natural pastures and diminishing biomass production were the problems prevalent in the area.

1.1 Baseline situation in the project districts

The project districts Viz Kolar, Tumkur, Chitradurga, Dharwad, Haveri and Chikkaballapur, selected for the implementation of Sujala project lies mainly in the eastern plains and central part of Karnataka state





a) Agro-climatic conditions:

Low and erratic rainfall, high temperature, deficient soil fertility and low water holding capacity characterize the agricultural zones of the area. Rainfall received in these districts ranges from 450 mm to 700 mm and is mostly drought affected. The soils are predominantly red and black and the textures vary from sandy to loamy. The topography is plain with few undulations and hills of varying heights are found only at certain places. The tributaries are small and the water flow is seasonal. Irrigation tanks, constructed long ago, were in poor condition due to heavy siltation and poor maintenance.

The area lack irrigation facilities and the average bore well depth was about 400 ft and open well depth was about 45 ft. Most of the dug wells had dried up and were replaced by bore wells. In some places even the shallow bore well had become dry. About 50 percent of the land was moderately susceptible to erosion and 10 percent was severely erodible. The total forest cover was only about 2.59 percent of the land area. The forest vegetation was mostly open and consists of mixed species and was over exploited for decades. The predominant vegetation consists of thorny shrubs, bushes and rough grasses. They have very few species of wild animals due to poor forest cover. About 10-15 percent of non-arable land recorded very low productivity. In the project area 80-90 percent of the requirement of fuel wood and 50-70% of the fodder needs were met by the external sources.

b) Agriculture scenario

Most farmers on these rainfed lands were growing only one crop a year, with little opportunity to increase cropping intensity or diversify into more valuable cash crops. Average yields for most common crops in these regions were estimated at 2 to 5 times less than the optimal yield. Only traditional crops like Jowar, Maize, Ragi, Ground nut and Pulses were largely grown and average yield was around 2 to 4 qtls per acre. Highly traditional and monotonous cropping pattern was followed in the cultivable lands. Cropping intensity varied between 100-107 percent. The practice of agro-horticulture was relatively low and it was confined to a few pockets. The average household income was only Rs.10,036 per annum i.e, less than the state average of Rs.13,621. Thus on the whole largely it was a community practicing subsistence farming. The bovine population was also limited to certain pockets. The average milk yield of local and hybrid cows were 1.6 and 6.4 litres per animal per day respectively.

Agriculture and allied activities continue to be the mainstay of the populace, despite low productivity and high costs of production. Agriculture was beset

with a number of problems, such as lack of irrigation, lack of finance, lack of marketing facilities, low productivity, low returns. Land holdings were mostly small and scattered. The extent of barren land / was high and cultivable wasteland was significant. Only 6 per cent of the sown area was sown during summer. Land productivity was poor due to low soil fertility, poor farming practices, lack of irrigation and low technology. The topography is plain with few undulations and hills of varying heights are found only at certain places. The tributaries are small and the water flow is seasonal. Irrigation tanks, constructed long ago, were in poor condition due to heavy siltation and poor maintenance.

c) Socio-Economic Environment

The rural population density in the project area was the same as the state average of 235 persons per square kilometer. But the presence of SC and ST population was higher than the state average. Literacy was comparable with the state average of 56% at district level. However, in the sample villages, the literacy rate was low and social condition was poor.

The implemented area inhabited more of small and marginal farmers, landless people most of them were below poverty line (BPL) and illiterate facing hardships for their livelihoods. A significant proportion of population seeks a living from labour. There was a preponderance of small and marginal farmers, whose farming was not at all remunerative. They worked as labourers on other's fields to supplement incomes. Irrigation facilities were non-existent for most households and rainfall being erratic and uncertain and agriculture being unable to offer gainful employment, people were forced to take up labour at distant places. Migration was a regular feature, with all its social and economic ramifications.

There was a problem of fodder and fuel wood due to disappearance of common property resources (CPR) that were used till recently for grazing. CPRs were not there in many villages and in those few villages where CPRs existed, management was poor. Low quality of livestock, in fact, had proved to be uneconomical.

Villages in the selected districts were in lack of basic facilities. Several villages faced the problem of drinking water shortages due to dwindling water sources. Marketing, power, finance, road and transport continue to be daunting problems. Thus there existed a state of backwardness. The districts were resource-poor and required immediate attention for improving the socio-economic status of the region and reversing the trends of environmental degradation.

1.2 Watershed Programs in Karnataka prior to Sujala

Realizing the importance of developing the drylands on watershed basis, Govt. of Karnataka initiated watershed development program in as early as 1984 and carried out watershed development activities under a large variety of programs and schemes with different approaches and technology inputs, cost /subsidies, and Institutional arrangements. However, the earlier programs had several limitations and some of them were:

a) Lack of Integrated, Holistic and participatory approach

Basically the implementation was sector oriented with top-bottom approach. The programs were more of soil and moisture conservation measures lacking integrated and holistic development. Integration of forestry, Horticulture, Livestock and support for livelihood were given less emphasis. Aspirations of the community and their participation in the process of development and benefit sharing were not given adequate importance. Equity and gender issues were not properly addressed.

b) Less usage of Scientific inputs

Modern technological tools like Remote Sensing, Geographical information system (GIS), Global Positioning system (GPS), Management Information System(MIS) etc were not put to optimal use for various facets of watershed development like prioritization of watersheds for treatment, resources inventory, scientific action plan preparation, Monitoring, Evaluation, Impact and sustainability assessment. Absence of Web enabled services for governance.

c) Absence of Robust monitoring and Evaluation system

Earlier Monitoring systems were not robust as desired, since the focus was more on physical and financial progress monitoring and less emphasis was paid to the outcomes and impacts. Evidence based and concurrent process monitoring was lacking which hindered learning's and transparency in the project.

d) Inadequate Capacity building

Capacity Building was not strong earlier, as the training modules to community based organizations like self help groups, Area/User groups, Executive Committees, Gram Panchayats etc. Were not complete, properly

designed, and imparted. Operation and Maintenance (O&M) of assets created and benefit sharing mechanism from the common lands were not given due importance in the training programs.

Thus the programs implemented prior to Sujala had several gaps and limitations in integrating land, water, livestock, biodiversity, and environmental aspects to develop rainfed areas as well as rural livelihoods in a holistic manner adopting the state of the art technological tools.

CHAPTER 2

2.0 Encounters and Challenges faced

Sujala being a pilot project, many challenges were encountered while implementing the scheme. It would have been difficult to achieve the project objectives unless such challenges were suitably addressed at appropriate time. Hence, in sujala most the challenges were used as the best opportunities to make the project as the best model in the field of watershed development.

2.1 Magnitude of the Project:

Sujala being a mega project that had to be implemented within a given span of five years in five districts as per the mutually agreed terms and conditions between GOK and the World Bank itself was the first challenge faced by the project. Poor infrastructure and lack of expertise in the field of social and scientific arena, shift in its approach of implementation were the initial challenges faced by the project much before the project initiation.

Project Profile

No. of Micro Watersheds	: 738
Treatment Area ha.	: 437 lakh
Households benefitted	: 3.5 lakhs
No. of Taluks	: 38
No. of districts	: 6
Budget	: Rs. 678 Cores

2.2 Competent NGOs:

NGO's are the pillars of the project to create awareness, training and capacity building to the Community based organizations (CBOs). Although there were many NGO's available in the state, there was absolutely dearth for NGOs with good social and technical competencies. NGO's were operating at state, district and watershed level. Project had to depend on their expertise for creating awareness, contribution mobilization, action plan preparation and implementation. NGOs onboard with less technical knowhow and heavy staff turnover posed problems in achieving the timely set targets as well as quality implementation.

2.3 Beneficiary Contribution:

Making partial contribution by the beneficiaries towards their works was an integral component of sujala project in order to ensure a sense of ownership, quality and sustainability of the activity. Some of the beneficiaries particularly the vulnerable groups were unable to pay the contribution and hence there was less participation. This hindered the project to adopt ridge to valley concept in implementing the works and make it participatory.

2.4 Gathering accurate data over large area

Assessing the problems and prospects for development of nearly half a million hectares of land in a scientific manner distributed across five districts within a short time and in cost effective manner was undoubtedly a challenge. Prioritization and selection of watersheds, for treatment, preparation of various resource maps, collection of socio economic data, baseline details etc for 754 micro watersheds, generating guidelines for implementation with a road map, was challenging.

2.5 Generation of Sujala Watershed Action Plan (SWAP):

Generation of uniform and standardized SWAP for 754 micro-watersheds in a participatory mode was a daunting and challenging task. Scientific action plans generated from satellite and ancillary data were to be integrated with farmer's aspirations/requirements at the survey number level. .During the first phase of project implementation, action plan was compiled, analyzed and consolidated manually without any software. It was a time consuming process which also consumed lot of manpower, money and other resources. This has not only became an expensive affair but also ended up with lot of errors during analyzing and summarizing the plan at the micro watershed level. Language in which action plan was prepared was another challenge as the World Bank wanted the plan to be in English and the policy makers and the farmer beneficiaries wanted it in local Kannada language.

2.6 Limited Computer literacy and exposure to the technology

NGO's and District officials used to send their target and achievement data in Excel or word and had limited exposure to MIS/GIS developed under the project and were very apprehensive to use the package. It took some time for the project to provide hands on training to the staff and convince the usefulness of the MIS/GIS software package. Subsequently everybody adopted the package and found it very user friendly and generated various

reports, charts, tables besides sending the data through web to the headquarters. Power shortage and non availability of internet facility were other hurdles faced. The problems to some extent was solved in keying the data when power was there and save as dbf files and use nearby cybercafés to transmit the data. Reading and understanding of satellite images for PRA exercises, monitoring the interventions and mpacts was totally new.

2.7 Equity issue:

The concept of watershed has transformed from land based approach to holistic approach. During the initial phase of the project implementation, in order to address the needs of landless and vulnerable sections of the watershed society, project implemented income generation activities at the end of project implementation cycle by providing Rs.35,000 revolving fund to each SHG. However, land based activities were implemented from the first year of the project cycle with no ceiling on the investment for landed class to implement the land based activities. Particularly the big and medium class farmers were benefitted mostly as they were able to contribute and reap the project benefits. This was a real challenge for the project to address the issue of equity

2.8 Compromising quality for progress:

Time bound mode of project implementation enforced the project to compromise quality. In order to achieve the speedy progress and meet the set targets by the World Bank, project encouraged machinery works in the beginning though it had a mandate objective to create employment opportunities and reduce disguised migration in the watersheds by encouraging manual work.

2.9 Resentment to external Monitoring and Evaluation

Concurrent process monitoring and making use of monitored information for learning was a challenging task particularly for the external independent agency. Use of satellite data “An eye in the sky” for monitoring the land based activities to depict evidence based results on the ground sensitized the stakeholders. Independent monitoring staff facilitated harmony among various stakeholders highlighting both negative and positive changes during implementation for corrective measures and replications which helped the project in achieving the objectives.

2.10 Political interference:

Though sujala was to implement with least political interference on a democratic set up, lot of political interferences were encountered while selecting watersheds, forming SWS-ECs and deciding the office bearers for the SWS-EC. NGOs had a very tough time in convincing the members and harmonizing the public.

2.11 Preparedness of Watershed Department

The watershed Department had to switch over from traditional top bottom approach to participatory bottom approach involving public private and people in all the stages of project implementation. This involved the change of mind set, their capacity building and coordination.

CHAPTER 3

3.0 Strategies Adopted in Sujala Project

Sujala is basically a community driven, participatory watershed development program which was implemented in five rainfed districts of Karnataka during the period 2002 to 2009 with World Bank financial assistance. Sustainable alleviation of poverty was the main goal of the project with the following objectives.

Improvement in the productive potential of selected watersheds, ensuring production and livelihood systems and strengthening local community institutions for natural resources management

Improvement in the productivity of degraded lands by reducing soil erosion, increasing water availability and, enhancing biomass

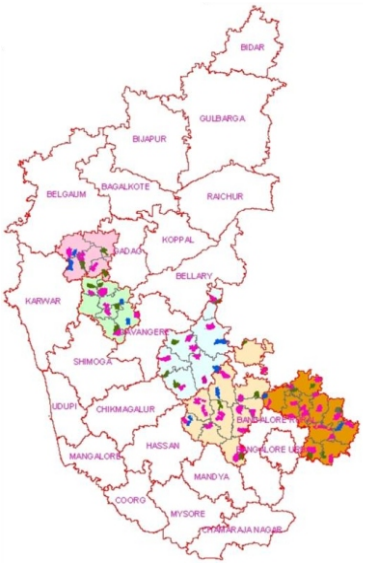
Support to women, landless and vulnerable groups with income generating activities

Strengthen the capacity of communities for participatory involvement in planning, implementation and maintenance in a more socially inclusive manner to ensure sustainability

Integrated and holistic approach with diverse activities such as agriculture, forestry, horticulture, fisheries, sericulture livestock etc

A number of strategies were evolved and adopted in the project during its execution.

3.1 Phase wise Implementation:

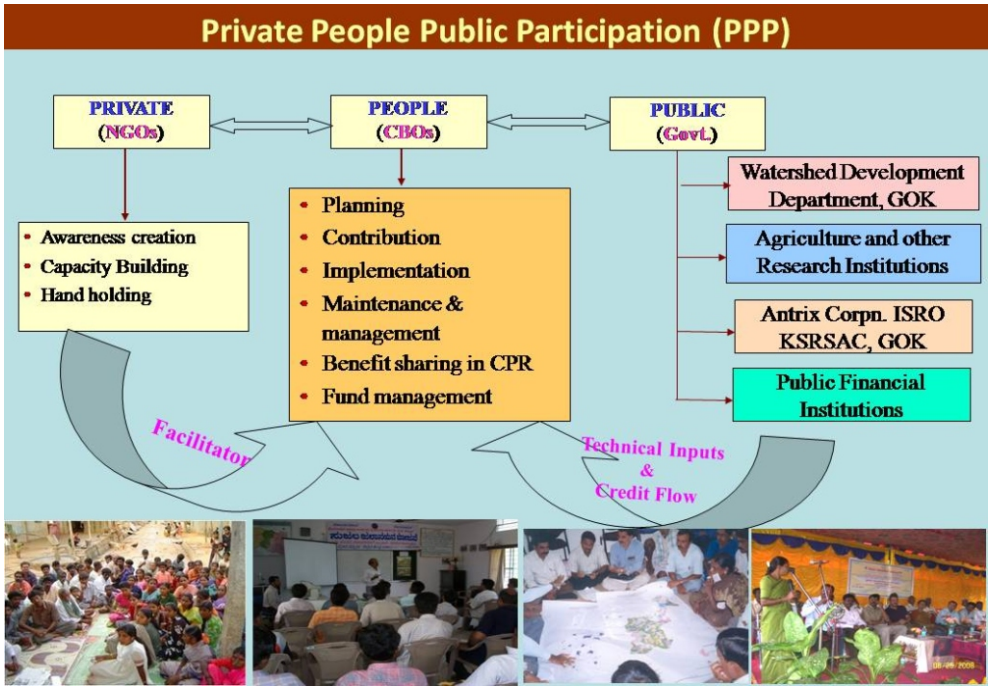


The project was implemented in phased manner and many challenges were faced during the first phase while during the second phase the strategies were experimented to overcome the challenges and subsequently adopted successfully during the third phase of project implementation. In the first phase, 10 sub-watersheds were chosen for implementation, covering an area of 70,000 Ha., benefiting about 42,000 families. The second phase covered an area of 1,11,005 Ha. with 20 sub watersheds

benefitting about 1,10,000 families. The third phase covered a large area of 325,552 Ha., with 47 sub watersheds benefiting about 1,98,000 families. The project encompassed about 1270 villages benefiting about 4 lakh households. Initially the project was conceived for five and half years period which got initiated on 10.09.2001 and was supposed to be completed by the end of 31.03.2007. But the project period was extended for two more years and the project ended on 31.03.2009.

3.2 Public, Private and people (PPP) Approach:

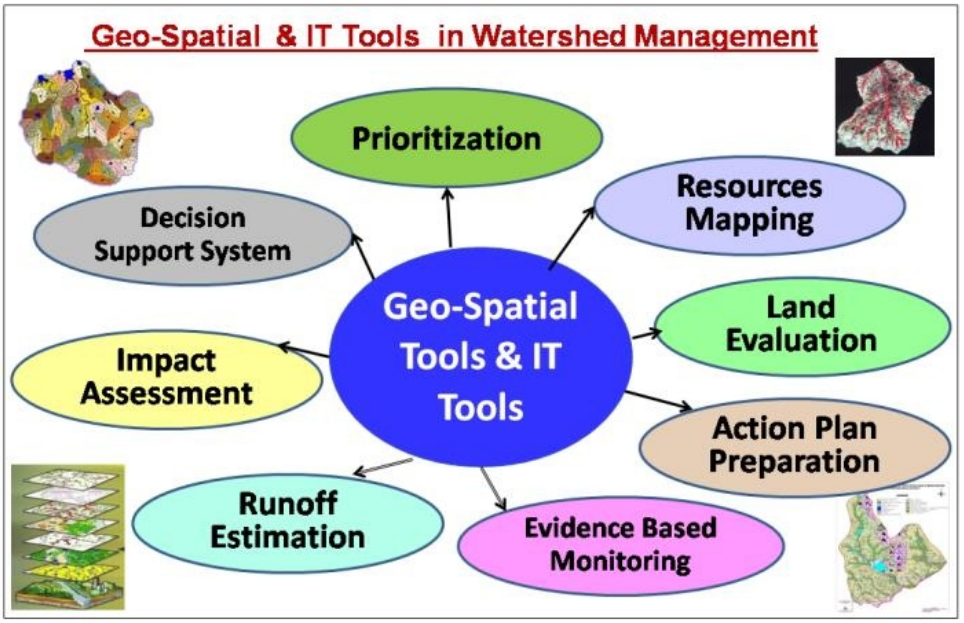
Sujala Project had multiple partners at different levels involving public, private and people participation. The WDD was responsible for the overall project management and played a facilitator role to achieve the objectives. Non - Government Organisations (NGO's) at the state level (Partner NGO), District level (Lead NGO) and Field level (Field NGO) were identified and deployed to carryout social mobilisation, capacity building, mobilise contribution and facilitate action plan preparation and implementation etc. Technical capacity building was provided by the University of Agricultural sciences, Bangalore and Dharwad, to empower the communities with knowledge and skills. Antrix Corporation (ISRO) was an independent external agency carried out the Monitoring and Evaluation task of the project. Karnataka State Remote Sensing Application Centre (KSRSAC)



provided satellite based thematic maps and action plans with a GIS database. Field level demonstrations were carried out by ICRISAT organisation. Consultants - Ravi and Iyer and YCK associates were the financial management consultants for project accounting and project auditing respectively. The project provided a unique place for community based organizations (CBOs) to play an active role in planning, implementation, monitoring and maintenance.

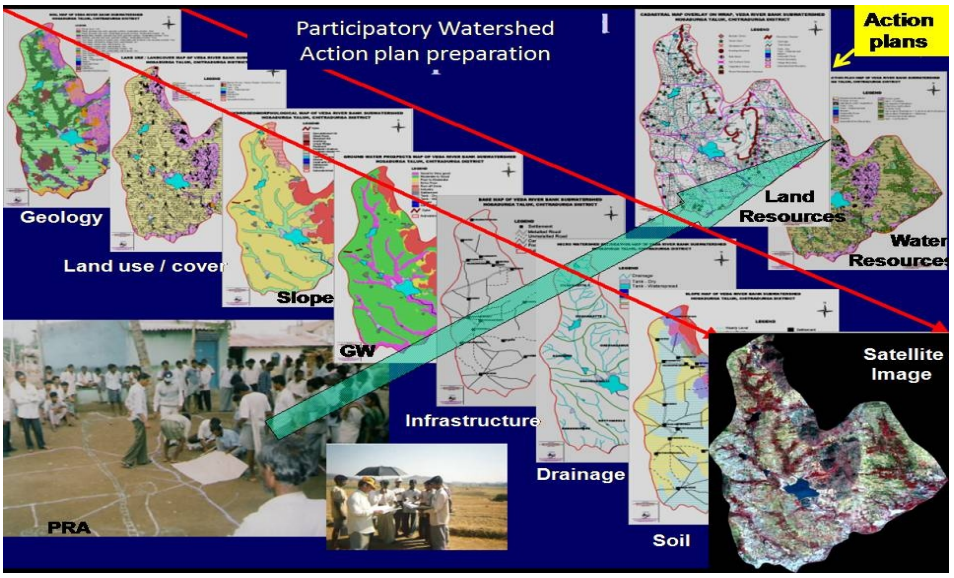
3.3 Use of Remote Sensing (RS) and Geographic Information System (GIS):

Remote Sensing and GIS were the core technologies extensively utilized in all the facets of sujala watershed development such as Prioritization, resource mapping, run off estimation, database generation, action plan preparation, Implementation monitoring, Impact Evaluation and sustainability Assessment. Geographic Information System (GIS) was adopted for integrating the spatial and non-spatial data and was used as an information database, analytical tool and decision support system. Thematic information generated from satellite imagery and other ancillary information was integrated under GIS domain to generate location specific action plans on micro watershed basis.



3.4 Natural Resource Mapping:

Resource maps play an important role to understand the problems and prospects of the area and also the spatial nature and interrelationship that exists between different resources. In Sujala, resource maps viz., land use / land cover, soils, slope, hydro-geomorphology, drainage, transport network & settlement locations, land parcels etc 1:12,500 scale have been generated using high resolution satellite images and other ancillary data micro watershed wise. These resource maps were integrated with other non-spatial data like demography, rainfall, literacy etc. in GIS domain and other ancillary data for generating sujala watershed action plans. The cadastral boundaries were overlaid on the action plan maps to derive survey number wise information.

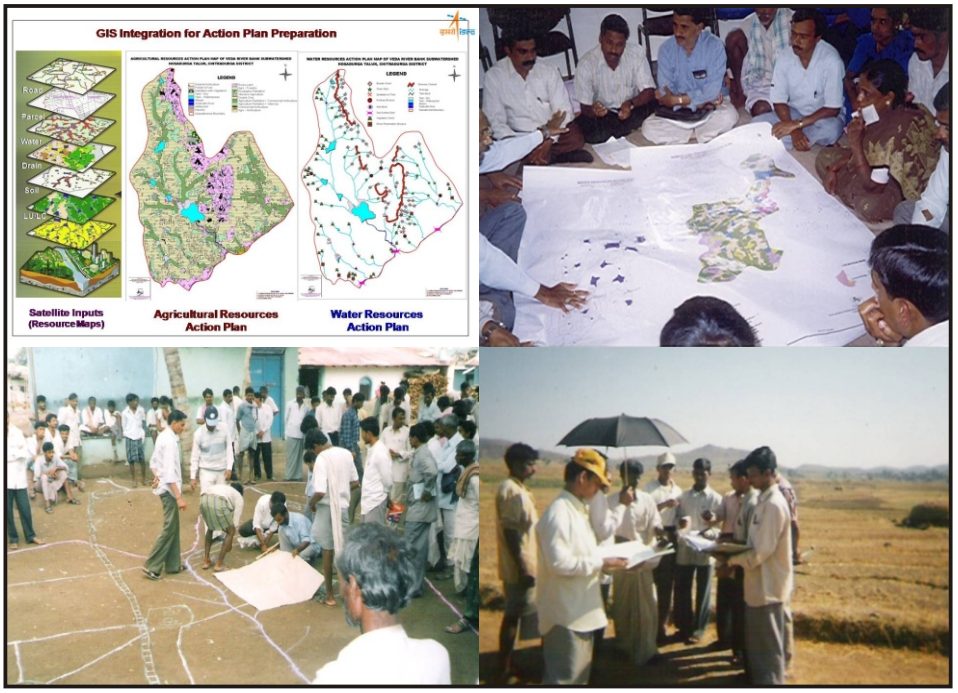


3.5 Scientific Sujala watershed Action plan preparation (SWAP):

The locale specific action plans for sustainable development of land and water resources were generated on micro watershed basis, integrating thematic information generated using satellite data with collateral / conventional information viz., soil, slope, land use / land cover, ground water prospects, land capability / suitability and socio-economic inputs with special emphasis on community needs, incorporating their aspirations to generate a final action plan map. The action plan was basically the recommendations towards improved soil and water conservation for ensuring enhanced productivity, while maintaining ecological / environmental integrity of the micro-watershed. The action plans also

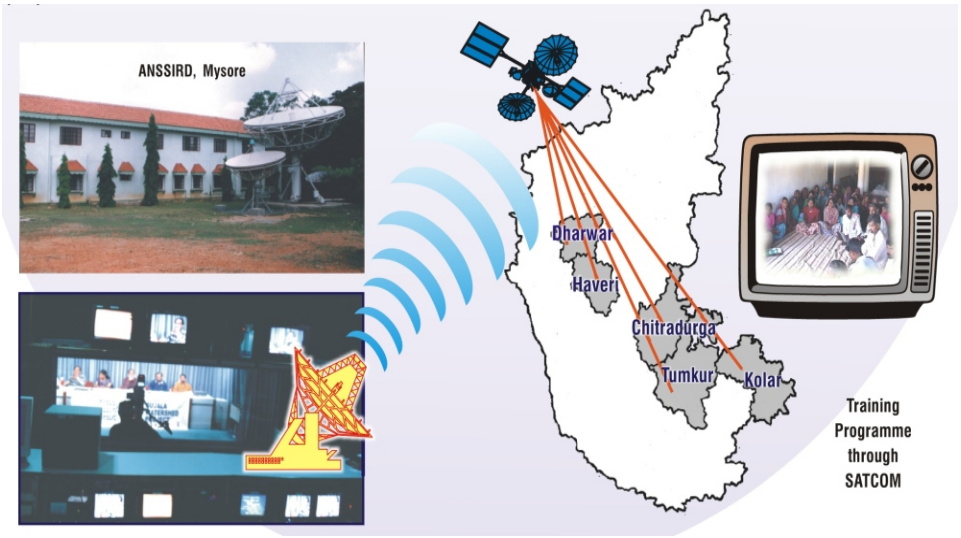
addresses the identification of sites / areas for surface water harvesting, ground water recharge, soil conservation measures through check dams, vegetative bunding, sites etc. It also specifies sites for improved/diversified farming systems with fodder, fuel wood, agro-forestry, agro-horticulture etc. and also income generating activities, livestock, Farm demonstrations etc. These action plans were generated through participatory process jointly by technical experts, field NGO and beneficiaries. Thus, the uniqueness of the Action plan lies with participation of community in designing their own destiny, setting up their own priorities, spelling out their constraints and arriving at their own solutions with the help of scientific inputs.

This process was facilitated by a bilingual software package, which not only addresses systematic database creation but also provides varieties of report generation possibilities for impact analysis. The package was named as Sukriya-Sujala Kriyayojana. This package allows beneficiary wise database creation through well structured information on size class, cast and location for any given activity at the AG level. This package had resulted in significant reduction in time, cost and manpower in addition to enhancing the accuracy of the statistical analysis of the action plan.



3.6 Satellite Communication (SATCOM) for Training and Capacity Building:

It was a unique approach where two ways audio and one way video broadcast made through satellite media to all the six districts simultaneously from State Institute of Rural Development, Mysore. The best practices and success stories were disseminated besides experiences sharing by the stakeholders through SATCOM programs. Capacity building to a number of stake holders spread in seven districts was a daunting task. Hence, Along with the traditional methods of classroom trainings, Sujala had effectively used the satellite based communication technology (SATCOM) for capacity building of the rural communities and other field functionaries in the project.



3.7 Performance Based Payment to NGOs:

In order to improve the efficiency of the NGOs working in the project and to make them competitive with the other NGOs in the project, performance based payment system was brought into the system during the third phase of project implementation. This encouraged NGOs to perform much better than the earlier as every effort of NGO was yielding the fruits. At the same time, in order to hasten the process of entry point activity implementation, each NGO was provided with an engineer to assist estimate preparation, providing alignment, recording the measurements and ensuring timely payments.

3.8 Differential unit rates:

To encourage manual works for providing employment opportunities to the vulnerable sections of the watershed community and to ensure quality of the work, project had resorted for differential unit rates for manual and machinery work. Project had fixed comparatively higher unit rates for the manual work than that of machine made works. This not only helped to improve the quality of the works but also provide employment opportunities and avoid disguised migration in the watersheds.

3.9 Revolving fund to SHGs:

In order to ensure equity in the watershed by reducing the per head investment gap between the landed and landless class, project had revised the amount of revolving fund from Rs.35,000 to Rs.75,000 per SHG group. This helped the vulnerable section of the society to improve their livelihood through self employment opportunities and increased household income.

3.10 Transparency and Accountability:

Transparency and Accountability was the hallmark of Sujala watershed project. It was one of the important reasons for the project success and getting a number of national as well as international honors. Transparency and accountability are crucial for promoting good governance and essential for drawing more stakeholders and supporters in the development process.

Project had adopted a number of transparency and accountability measures at various levels like monthly grama sabha at the micro watershed level, a number of wall writing on various themes such as different stages of project cycle, beneficiary wise action plan and implementation status along with contribution, wage rates in the project to support landless laborers etc, participatory planning, implementation and monitoring, proper documentation and reporting systems, payments to the beneficiaries directly through crossed cheque, issue of beneficiary pass book containing the planned activities, annual auditing by the competent authority, regular audio and Teleconferences to review the progress, a website to update the ongoing activities in the project and an independent Monitoring and evaluation agency right from the beginning of the project.

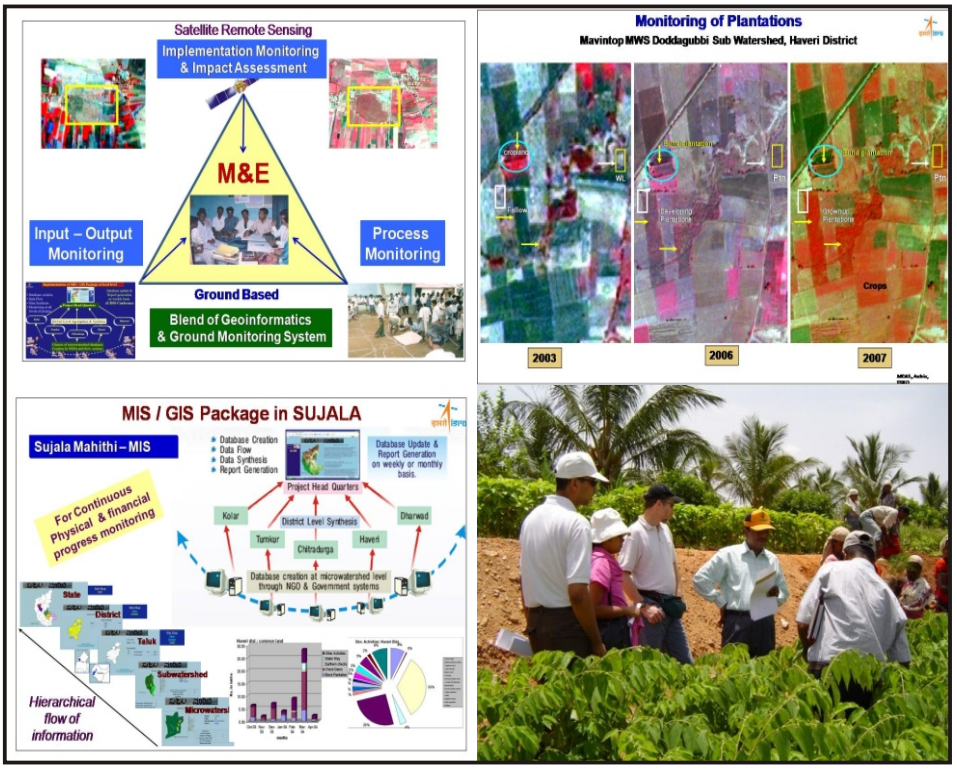
3.11 Community Participation

Various innovative measures were adopted in the project to gain the confidence of watershed community and to involve them actively in decision making process for local development starting from planning, implementation, monitoring and maintenance. Strategies adopted helped the stakeholders to identify themselves with the project and develop a sense of ownership and belongingness. Open house meetings, wall paintings, training programs and exposure visits, social auditing etc greatly contributed towards participation, quality implementation, avoiding misuse of resources ensuring equity and enhancing transparency.

3.12 Robust Monitoring and Evaluation (M&E) System

Monitoring and Evaluation was an integral part of the project's day-to-day operations rather than a periodic off-line activity. In addition to conventional monitoring which tends to focus only on physical and financial progress, the emphasis was given to outcomes, impacts and sustainability. Learning and adaptation was given more focus.

A comprehensive robust M&E system was in place with a component of concurrent process monitoring, web enabled MIS/GIS for input-output monitoring, participatory M&E, use of satellite images for objective assessment etc.. Monitoring by several agencies Viz Implementing authority, Communities, NGO's, External Independent agency and Donor made the M&E system strong and effective. Dissemination and compliance mechanism established by the project helped in quality implementation. Concurrent evaluations were planned on various aspects time to time to help in understanding and rectifying the problems/gaps in the project. Utilization of M&E observations for corrective measures and policy changes were emphasised.



CHAPTER 4

4.0 Results Achieved

Poverty alleviation, development of capacity and local level Institutions and restoration of ecosystems were the results achieved. The impact assessment at the end of the project as compared to the baseline data indicated that project investment of Rs.488.98 crores had generated measurable impact on various indicators representing the project development objectives. The biophysical and social interventions in sujala project had resulted in a number of positive changes in the treated watersheds and yielded significant benefits with respect to all the dimensions of the sustainable development viz economic, social, institutional and environmental aspects. Difference between pre and post and control data revealed the following tangible benefits.

Cropping Intensity (%)	▲	**129 to 144**
Cropping Diversity (Crops/farm)	▲	**2-4 to 4-7**
Crop Yield (%)	▲	**24**
Agriculture to Agro-horti/ Agro-forestry (%)	▲	**22**
Ground Water Level (ft)	▲	**66**
Water Yield /Discharge (%)	▲	**22**
House Hold Income (%)	▲	**30**
Employment (Mandays/mc)	▲	**21,000**
Milk Yield (%)	▲	**22**
Households Benefited (Lakhs)	▲	**3.5**
BPL Families (%)	▼	**42**
Distressed Migration (%)	▼	**70**
Estimated Biomass (Mt)	:	**10.43**
Estimated Carbon Stock (Mt)	:	**5.21**
Estimated Sequestrated atmospheric CO_2 (Mt)	:	**18.6**
CBOs Formed (Nos)	:	**11,784**
Area Treated (lakh Ha)	:	**5.2**

4.1 Impacts on the life of rural community

Significant impact on the rural livelihoods in the treated area compared to control has been observed with respect to household income, empowerment, skills and knowledge, lifestyle, access to basic amnesties like education for children, health and water.

There was a considerable improvement in the household income in almost all categories viz., Landless, Marginal, Small and Big Farmers, compared to baseline and end of the project. Annual household income has increased by 30% due to employment opportunities created, income generating activities and improvements in agricultural productivity. Significant increase in the income (by 2.5 times) was observed particularly among the landless category (which was almost equivalent to the increase recorded among the big farmer category). There was an increase in income of about 1.7 and 1.8 times in the marginal and small farmers category respectively. Reduction was observed in the Below Poverty Line (BPL) families by 42 percent and migration from villages also reduced by 70 %. A number of milk yielding animals were purchased under IGA component and in addition to this silvi pasture activities, VBTs, Animal health camps and door delivery services by Gopala mitra through para vet services resulted in milk production increase by 20%.

The capacity building programs under the project with well-structured modules had significant impacts. This empowered the communities in decision-making ability, improved the level of participation, increased their

confidence and self-esteem, created environmental awareness, motivated them to take up IGA's, increased their access to basic resources and employment. IGA's have helped the womenfolk giving them voice and choice, leading to empowerment and self reliant in the society achieving one of the millennium development goals Women empowerment and gender equality. The environmental awareness has substantially increased among the community due to capacity building. Adoption of biological control of pests and switching over to bio-fertilizers, reduction in the intake of chemical fertilizers was observed in the watersheds

4.2 Impact on Rural Employment

Sufficient employment opportunities were created under the project by restricting the usage of machinery; which mainly benefited the landless and marginalized poor. During the project 16,000 to 21,000 man days of employment per Micro watershed was generated which helped the rural community to improve their living standards and meet the basic needs. Increased employment and income had an impact on migration, which reduced to an extent of 70% in the short term. Among the womenfolk, income generating activities initiated under the project has given sustainable livelihood opportunities by self employment.

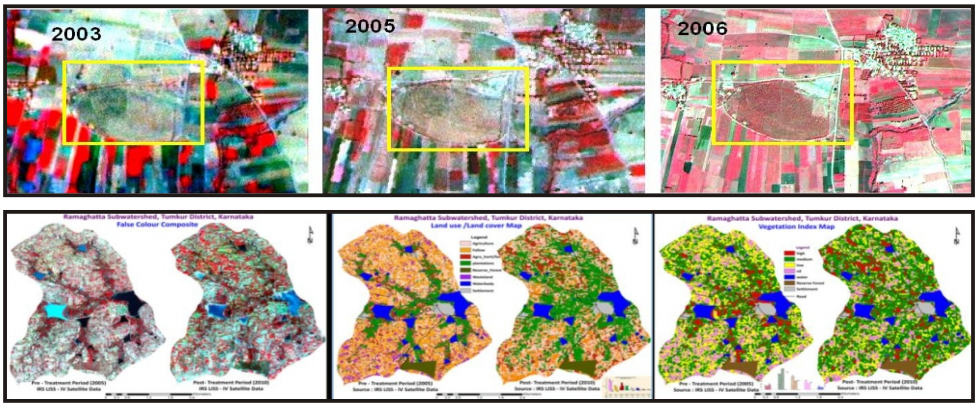
4.3 Environmental Impacts

Difference in difference estimates between pre and post and control data analysis has shown a positive changes on environmental aspects. Increase in average crop yield (quintals/acre) of the major crops like ragi, maize, groundnut, cotton, sunflower, Jowar, were recorded across all the three agro-climatic zones. The overall increase in crop yield of 24% was observed and could be attributed to various interventions carried out under Sujala. Diversification has taken place after interventions to include horticulture crops, vegetables, forestry species and commercial crops.

The paradigm shift from mono cropping to mixed cropping, agriculture to agro horticulture and agro forestry (planting of tree species on bunds, etc), has resulted in increasing the biomass and agro bio-diversity in the treated areas. The estimated biomass in agro-horticulture species was found to be 22.4(+/- 1.8) t/ha and the carbon stock estimated was 11.2(+/- 11.2 t C/ha whereas Agro-forestry had 25.4(+/- 1.6) t/ha and the carbon stock was 12.7(+/- 0.8) tC/ha. The estimated amount of sequestrated atmospheric carbon dioxide was 41.0 t CO_2 / ha and 46.48 t CO_2 / ha for agro-horticulture and Agro-forestry respectively. This has greatly contributed in reducing environmental pollution and climatic aberrations. The dry land fertility had notably improved with greenery for most part of the year. Planting of horticulture and forestry trees had contributed not only to the soil cover but also for carbon sequestration.

Due to various soil and moisture conservation activities undertaken in the project like field bunds in 1,23,734 ha land, 4,83,700 mts of boulder bunding, 54,899 rmts of revetment, 6,730 water harvesting structures like check dams, percolation tanks, farm ponds, recharge pits etc had resulted in an improvement in ground water table by 66%, an improvement in ground water discharge from 1979 gallons per hour to 2396 gallons per hour with a change of 21 % in the treated area, while in non treated area there was a reduction by 11%. The availability of surface water (like gokatte, tanks, nalaflow etc), which was 2to3 months in a year during pre treatment period, was increased to 4 to 6 months. This has contributed to the increase in cropping intensity from 129% to 144% and changes in cropping pattern.

Satellite based runoff estimation using SCS curve number approach indicated reduction in the runoff volume ranging between 7000 to 18000 cu.m per ha across different agro climatic zones due to different land use / land cover changes and interventions undertaken in wastelands and fallow lands belonging to common and private. The biophysical interventions have contributed towards reducing the runoff and arresting the soil erosion. Satellite data analysis clearly indicated the land cover transformation depicting increased biomass, changes in the cropping pattern/ cropping intensity, increase in agro bio-diversity, reduction in the extent of wastelands due to reclamation, shift from agriculture to agro horticulture / agro forestry, etc.



4.4 Institutional Impacts

Since the project supports decentralized, participatory, community driven watershed development about 11,784 Community Based Organisations (CBOs) were formed which includes 6648 SHGs, 4394 AGs and 742 SWS-ECs. These community based organizations were the pillars and played an important role as they were the grass root level beneficiaries in the project. Several self help groups have joined together to form federations and are working together.

In a nutshell, the project had achieved significant impacts in the social, economical, institutional and environmental aspects

CHAPTER 5

5.0 Sustainability

The real success of any rural development project lies with the extent of usage of project assets; not only during the project period but also after the withdrawal of the project. In Sujala watershed project a number of efforts were made by the project to ensure the sustainability of its efforts as watershed activities provide more of a long term impacts and less of a short term impacts. The efforts made by sujala and the outcome of such efforts in ensuring sustainability are brought out through following issues.

5.1 Institutional sustainability

There were two major types of institutions who worked for the success of sujala project, these include community based informal institutions and the formal institutions that supported the community based institutions. Self Help Groups (SHGs), Area Groups (AGs) and Sujala Watershed Sangha-Executive Committees (SWS-ECs) were the Community based institutions which acted as pillars of sujala project. The other formal institutions/organizations which served as back bone for these CBOs includes Agriculture Universities, NGOs, watershed and other government departments, Antrix Corporation-ISRO, ICRISAT and a host of others.

As many as 6648 Self Help Groups (SHGs), 4394 Area Groups (AGs) and 742 Sujala Watershed Sangha-Executive Committees (SWS-ECs) were formed in the project to build a strong foundation, strengthen them through a number of capacity building programs so as to impart know how by stressing the importance of watershed interventions, ensuring their quality and the need for their maintenance in the long run. However mixed results were seen with respect to the sustainability of these institutions in the project. More than 80 percent of the SHGs have sustained and working effectively with regular social banking activities and IGAs in the project areas. Federations have been formed at certain places.

The sustainability of Area Groups and SWS-ECs were not satisfactory due to the obvious reasons that they were set up to deliver during project period and that was quite effective. They had no real common purpose / agenda to continue during the post project period. However, the activities taken up in the private land with the help of these AGs were maintained by the respective farmers without any project support after the withdrawal of the project. Incidences are there where few AG's are continuing their activity and taking up common interest work together.

These results were achieved mainly due to the project efforts in terms of robust training modules, establishment of linkages, and financial assistance through revolving fund to establish IGAs.

5.2 Technical Sustainability

Soil and moisture conservation through participatory approach being the major objective of the project a number of technical trainings were being imparted by the project with the help of NGOs, Agriculture universities, Watershed Department and ICRISAT. These training not only helped to ensure the quality of soil and moisture conservation interventions carried out in the project but also had become lifetime learnings for the farmers. These learnings that were imparted through technical trainings, exposure visits, field demonstrations were not only helped during the project period but also in the day today farming operations and for all the forthcoming agriculture related programs. Hence sujala has created a strong technical knowledge bank in the minds of the farmers. The result of these trainings was seen in terms of maintenance of activities implemented in the private lands and the transparency ensured in the project while implementing the activities. However, lack of financial resources in the Gram Panchayats has led to poor maintenance of CPR assets in the project. The technical sustainability is also seen through the use high yielding varieties/breeds, use of micro nutrients, adoption of IPM practices, shift from traditional crops to commercial and plantation crops etc.

5.3 Technological Sustainability

The ICT supported technological innovations adopted in sujala are found to be highly sustainable. With respect to the RS, GIS and SATCOM, the sophisticated space based information is highly transparent and technically fool proof. It is also highly secured since it requires specified skill and training to interpret. Any specific attributed data or information can be protected at any level. Identified personnel are trained in the above field for the specific purpose. These skilled personnel play the role of facilitators as per the requirement of the project from grass root level to the top management. Any project requiring the RS information like land use/land cover, soil, drainage, settlements etc can make use of this technology as per the needs.

In case of MIS, the sustainability intricately correlates with its level of user friendliness and adoptability to other sectors or projects. Even persons with bare minimum computer knowledge can be trained in the usage of the package. The package is so designed so as to work in a stand-alone mode even in the absence of Internet connectivity. The entered/processed data can be stored in an ordinary external storage disc and then transmitted.

The MIS system has a wide scope for revenue generation being a marketable product by itself with minimum changes made so as to customize to the other sectors. Besides it substantially reduces the cost that would incur in the process otherwise. The specific packages developed like Sukriya (SWAP), Sukriya Nakshe are bilingual (English as well as local language i.e., Kannada) and hence highly adoptable at all level and it can be replicated in any language.

Replication of above mentioned ICT based technological innovations and software packages in Sujala II (RIDF), IWDP and planned to adopt in the forth coming World Bank aided projects in Karnataka as well as a number of projects across the country and outside the country speaks about the technological sustainability in sujala project.

5.4 Financial Sustainability

A number of Soil and Moisture conservation measures, capacity building programs and adoption of Income generating activities have created a strong financial base with the farmers through increased crop yield; cropping intensity, shift from traditional to commercial crops, increased milk yield, increased area under plantation crops, ample employment opportunities and revenue generated from IGAs. As the project had different strategies to both landed as well as landless class, the efforts of project greatly helped the farmers to improve and sustain financially irrespective of their caste and land holding.

5.5 Ecological and Environmental Sustainability

In Sujala 59,000 ha of horticulture and 29,000 ha of forestry plantation is done. This large scale plantation would have incremental positive impacts down the years on the ecology and environment in terms of reducing the runoff, checking the soil erosion, enhancing the biomass, influencing the local weather conditions. In addition to this a huge number of soil and moisture conservation structures also augment soil moisture, aid in increasing the crop yield and cropping intensity, generated additional flora, fauna and a source of drinking water to the local animals.

5.6 Economic Sustainability

The assets crated in sujala are a real wealth to the local farmers. This includes the interventions in the private land, the structures constructed in the drainage line, the plantation taken up both in private as well as the public lands, crop and livestock demonstrations, the assets created for IGAs. These assets have already started yielding economic returns either directly or indirectly to the farming community. These returns are increasing over the years as any watershed intervention is expected to yield increasing returns over the years. For instance the horticulture plants planted had started yielding fruits after 2 to 3 years and the yield is increasing over the years and will stabilize after 10 to 15 years depending on the species and variety elucidates economic sustainability in sujala.

5.7 Institutional Sustainability

The strong foundation created by the project in terms of awareness and sensitizing the community, local level institution building and intensive training and capacity building made the communities to actively participate in the project implementation process. The project had ensured participation of even the marginalized or the vulnerable sections of the society in the decision making process especially the household women members. The strong bondage and mutual understanding among the members with diversified economic background had created a socially desirable environment. It has also empowered women to actively participate in the banking transactions, fight against social evils in the society, participate actively in the decision making process at home, enjoy more leisure time and income through initiation of IGAs. This has not only benefitted sujala but also has the spill over effect on the other rural development schemes where people were empowered to demand for their rights, ensure transparency and accountability while using the public funds.

In nutshell, after the implementation of sujala project, “Sujala” has not just remained as a name but it has become a “Brand Name” for watershed development not only in Karnataka but also in other States and even outside the country. All the learnings, best practices, monitoring mechanism evolved, successful experiments and experiences gained from sujala were already replicated in NABARD assisted Sujala II (RIDF), IWMP projects in Karnataka. Hence sujala is a sustained model in the field of watershed development.


Open Well Recharge Pit

CHAPTER 6

6.0 Lessons learnt and Best Practices

Sujala was a pilot project implemented in five drought prone districts in a phased manner. The very purpose of implementing the project in the phased manner was to adopt the learning's of initial phase in the subsequent phases. Several corrective measures and policy changes were made based on the lessons learnt. A number of new initiatives in the field of watershed were experimented and succeeded during the project period

6.1 Shift from soil and moisture conservation to holistic and integrated approach:

In addition to soil and moisture conservation(SMC), many more related sectors like Agro-forestry, Agro-horticulture, Fisheries, Animal husbandry, livelihood activities were integrated into the project and were given due importance while planning and implementing the activities. For instance S&MC activities dominated during the phase one while during the subsequent phases, policy change was brought in to ensure 60:20:20 ration for agriculture, horticulture and forestry activities. Similarly animal husbandry and Income Generating Activities (IGA) were given greater importance during the later phases. The timing of implementing IGA activities was also advanced in the second and third phases to ensure better sustainability of the IGAs.

6.2 Differential unit rates to encourage employment opportunities

Unlike uniform unit rates for both machinery and manual works sujala had evolved differential unit rates for machinery and manual works. The unit rates for manual works were envisaged higher than machinery works so as to create more and more employment opportunities to the landless laborers and to reduce distressed migration from watersheds to the nearby towns and cities. This h elped to create about 21,000 man days of employment per micro watershed and reduce migration up to 70 percent. Encouragement of manual works also contributed greatly for ensuring quality works.

6.3 Treatment of private and public lands:

During initial days of project implementation private lands were given greater preference while common lands were by and large neglected for treatment. It was realised that treatment of common lands were equally important to achieve the project objectives and the same was adopted in the later phases. The community based organizations, especially the SHGs were optimally utilized for planning and implementation of common land

works to ensure sustainability of the works. Rain water harvesting Structures, plantations, fodder and fuelwood species were some of the activities undertaken to reduce soil erosion, runoff and improve biomass in the common lands. Benefit sharing mechanism was also evolved on a participatory made to share the benefits that would be accrued from the activities implemented in the common lands.

6.4 Use of customized software for action plan preparation:

Initially action plan was prepared either by manual calculations or with excel. The reports so generated were time consuming, non-uniform, poor technical support and underwent many revisions. This necessitated project to think of a software called "Sukriya" a customized software for action plan preparation which took care of all the problems faced earlier and was user friendly. The tool helped them to generate reports both in English as well as in local kannada language within a short time. A special team called District Resource Group (DRG) was set up for technical scrutiny of these reports before taking administrative approval. Similarly, another customized GIS based software called "sukriya Nakshe" was developed which helped to monitor the progress against the planned activities.

6.5 Performance Based Payment System (PBPS) for NGOs:

During phase one and two of the project, NGOs were equally paid irrespective of their performance. Later it was learnt that equal payment to NGOs discourages better performing NGO without due credit to their hard work, innovativeness and achieving better results. Hence, during the third phase of the project implementation, NGOs were given targets and paid on par with their achievement. This had created a sort of competitive atmosphere among the project NGOs to a chieve better results. This type of PBPS method is highly useful tool especially for the time bound projects like sujala to achieve better results within a given time frame.

6.6 Greater emphasis to livelihood improvement component:

Though livelihood component was in-built since the inception of the project, it was learnt that rural development projects like sujala needs greater emphasis on IGA to involve the vulnerable families for better implementation, ensure sustainability and equity in the project. A number of changes were incorporated into livelihood component which includes early initiation of the IGAs, enhancing revolving fund from Rs.35000 to Rs 75000 per SHG, appointment of specialist NGOs for handholding and to

establish market linkages after completing EAP and skill trainings. This had resulted in better implementation of the program vis-a-vis active involvement of vulnerable families in the project.

6.7 Extensive capacity building to CBOs:

Realizing the importance of capacity building in the project; a number of capacity building activities were planned in the project and were implemented. However, a number of gaps were identified during phase one with respect to quality of training, utility, methods of training, participation of members, sequencing of the training modules etc and the gaps were plugged in during the subsequent phases by restructuring and re-sequencing the modules, usage of more audio visual aids such as charts, posters, video shows, games to improve the efficiency and effectiveness of training and to have better participation of the CBOs in the project. In addition to this a number of local, inter-state exposure visits were also planned for the CBOs for better participation of watershed community in the sujala project. Project facilitated specialized NGO's for handholding of SHG's and create better market and bank linkages.

6.8 Customized Management Information System (MIS) software:

Use of customized Web enabled MIS/GIS software was one of the many technological tools used in sujala project for physical and financial progress monitoring. During the early days of project implementation, NGOs had their own formats to generate reports which were not uniform and it was very difficult to consolidate the data, prepare relevant tables and charts for timely decision making. This necessitated the project to go in for a customized and user-friendly MIS/GIS package which helped in generating uniform reports across the sub watersheds as well as the districts, obtain consolidated reports for any given period and for any given sector, automatically generate relevant charts etc. The reports generated through MIS were effectively used by the top management for weekly review through audio conferencing as well as during monthly review meetings.

6.9 The Best Practices

The unique practices followed in the project are highlighted below

Involvement of multiple stakeholders and adopting Public-Private-People (PPP) approach i.e., Community, Government Departments, Non-Government Organizations (NGOs) and Scientific Organizations like ISRO, ICRISAT, Agricultural Universities etc.

Adoption of Community driven, Participatory and Holistic approach

Formation of local Institutions -Community based organizations (CBO's) and their capacity building.

Involvement of Rural communities in planning, implementation, monitoring and benefit sharing.

Integration of all the related sectors ie., Agriculture, Forestry, Horticulture, Animal Husbandry, Fisheries etc for achieving the project goal.

Use of state of the art technology such as remote sensing and Geographic Information System (GIS) and Management Information System (MIS) for planning and monitoring with customized software**,** Satellite Communication (SATCOM) for capacity building CBOs.

Sustainable action plan preparation using technology inputs and farmers requirements.

Independent monitoring and evaluation agency from the beginning of the project to the end. Concurrent monitoring and evaluation for improvements in the implementation of the project.

Adaptive Management - Use of evidence based M&E data for corrective measures and policy changes

System ensuring multilevel transparency and accountability.

Soil health cards indicating soil fertility status at the farmer level to maximize yield and productivity.

Ensuring Environment and Social safeguard Assessment (ESA) for every project activity.

OK card system for ensuring the quality of engineering structures.

Use of locally available resources for implementing project activities.

Gopala Mitra- local youths trained to provide livestock services and Jalamitras develop community persons to serve as a resource person for farming activities.

Audio & Video conferences for effective progress monitoring and information dissemination.

Convergence with other related government projects and schemes for overall development of the watershed.

CHAPTER 7

7.0 Replicability

India has vast tract of rainfed area which constitutes about 60% of the total arable land characterized by low productivity, degraded natural resources and widespread poverty. It is an imperative necessity to develop these dry lands in order to ensure food security and improve the rural livelihoods. Watershed development program is considered as an effective tool for addressing problems of dry lands and is recognized as potential engine for agriculture growth and alleviate poverty.

There is a huge potential to scale up Sujala Watershed Model for the improvement of rain fed lands across the country on watershed basis, since Sujala project is being acknowledged as a success story wherein the natural resources, the existing institutions and people's participation in decision making on the nature of development they perceive and their involvement in the development strategies have been integrated and harmonized. The sujala model is well known for People-Public-Private approach, innovative use of technology, maintaining transparency and accountability, addressing both land resources and livelihoods and demonstrating positive impacts on social, economical and environmental aspects. The project has received five national and three international awards for its achievements.

World Bank acknowledges it as "Model of Excellence "and "Global Best Practice".Sujala model is being replicated at national and international level.

7.1 National Level

Presently, in Karnataka, the sujala-I model is being replicated in NABARD assisted Prime Minister's relief program for distressed districts as well as Integrated Watershed Development Program(IWMP)

Andhra Pradesh Forest Department, Govt. of Andhra pradesh, has adopted the best practices of sujala including Web MIS and technology application for World Bank assisted community forestry project.

World Bank has also accorded approval to fund for another six districts of Northern Karnataka to be implemented on similar lines of sujala with innovative and science based approaches.

CHAPTER 8

8.0 Awards / Recognitions

The project had demonstrated significant positive impacts on the social, economic and environmental aspects for which several national and international awards have been conferred.

8.1 National Awards

"National Productivity Award 2006 and 2009" National Productive Council, Ministry of Agriculture and Cooperation, Govt. of India, for improving the agricultural productivity in the treated watersheds..

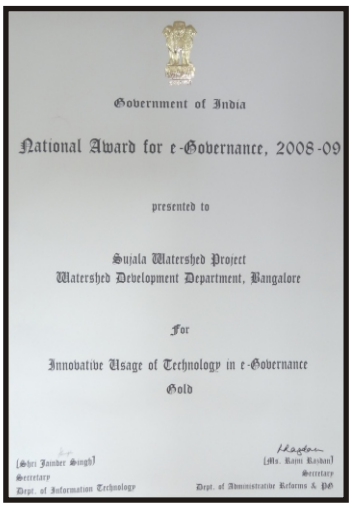
"National Water Award" 2007, Ministry of Water Resources, Govt of India for adoption of innovative practices for ground water augmentation through rain water harvesting and artificial recharge through peoples participation

"Earth Care Award" 2008, Award for excellence in Mitigation and Adaptation to climate change with respect to water resources, Land Use change and Forestry, Instituted by JSW- The Times of India, New Delhi.

"National e-Governance Award Category- Gold 2009" For Innovative use of Technology in e-Governance, by Ministry of Information Technology, Government of India, New Delhi, for Innovative usage of technology in e-Governance.

8.2 International Awards

Globe Sustainability Research Award 2010", The Globe Forum, Stockholm, Sweden, for outstanding contribution to improve rural livelihoods and productivity of degraded lands using Space and Information technology .


Government of India

National Award for e-Governance, 2008-09

presented to

Sujala Watershed Project
Watershed Development Department, Bangalore

For

Innovative Usage of Technology in e-Governance

Gold

[Shri Jasbir Singh]
Secretary
Dept. of Information Technology

[Ms. Rami Rashmi]
Secretary
Dept. of Administrative Reforms & PG

Geospatial Excellence Award -2010", Map Asia, Kaulalumpur, Malaysia, for Effectively applying geospatial technological tools for rural development through sujala watershed development program.

Good Practice award for M&E 2011' Independent Evaluation Group (IEG), World Bank, Washington DC for effective Monitoring and Evaluation of India's Karnataka Sujala watershed project.

8.3 Visit of International Delegation

The Sujala project had attracted national and International attention. Officers from various countries like Srilanka, Senegal, Bangladesh, Yemen, Nepal, Ethiopia, etc have visited Sujala project for learning the innovativeness and possible adoption of best practices in their country.

Abbreviations / Acronyms

AG	–	Area Group
AO	–	Agriculture officer
AAO	–	Asst. Agriculture officer
ADA	–	Asst. Director of Agriculture
CBO's	–	Community Based Organisations
DWDO	–	District Watershed Development Office
DLRC	–	District Level Review Committee
DRG	--	District Resource Group
EIA	–	Environmental Impact Assessment
ESA	–	Environment & Social Impact assessment
EPA	–	Entry Point activity
EDP	--	Entrepreneurship Development Programme
EC	–	Executive committee
FNGO	–	Field Non- Government Orgnisation
FMTSC	–	Financial Management Technical Support Consultancy
GIS	--	Geographical Information System
GPS	–	Global Positioning System
GOK	–	Government of Karnataka
GOI	–	Government of India
ICM	--	Integrated Crop Management
IGA	–	Income Generating Activity
IPM	–	Integrated Pest Management
INM	–	Integrated Nutrient Management
ISRO	--	Indian Space research Organization
IT	–	Information Technology
ICRISAT	–	International Crop Research Institute for Semi Arid Tropics
KSRSAC	–	Karnataka state remote sensing application centre
LNGO	--	Lead Non-governmental Organisation
MOU	–	Memorandum of Understanding
MIS	–	Management Information System
M&E	–	Monitoring & Evaluation
ME&L	--	Monitoring, Evaluation & Learning
MWMG	–	Micro watershed management group
PNGO	–	Partner Non-Governmental Organisatrion
PRA	–	Participatory Rural Appraisal
PRI	--	Panchayat Raj Institute
PFMS	–	Project Financial Management System
PPMU	–	Project Planning Management Unit
RS	–	Remote sensing
SATCOM	--	Satellite Communication
SWAP	–	Sujala Watershed Action Plan
SWS	–	Sujala Watershed Sangha
SWS-EC	–	Sujala watershed sangha executive committee
UMB	--	Urea Molasses Blocks
VBT	–	Village Based training

SUJALA-I SUCCESS STORY

Documented by:

Watershed Development Department
Government of Karnataka, Cauvery Bhavan
Bangalore-560009
Tel: 080-2210 0670 Fax: 080-22100673
E-mail:comwdd@vsnl.net
Website: *www.watershed.kar.nic.in*

&

Antrix Corporation Limited, ISRO
Antariksha Bhavan, New BEL Road
Government of India, Department of Space
Bangalore-560 094.
Ph : 080 - 2217 8302 Fax : 080 - 2217 8341
Website: *www.antrix.gov.in*

Documentation supported by:
Department of Administrative Reforms & Public Grievances
Ministry of Personnel, Public Grievances & Pensions
Government of India, New Delhi

Watershed Development Department

Watershed Development Department (WDD) in Karnataka state is established in the year 2000, with a multi disciplinary team for the effective implementation of all the watershed programmes in Karnataka under various schemes.

Mandate:

- Create awareness about the need of conservation of natural resources.
- Conserve & develop the resource base through appropriate technology.
- Promote alternative production systems.
- Improve rural livelihood opportunities by imparting entrepreneurship skills.
- Increase the agricultural production.
- Establish linkage with related institutions to promote watershed programmes.

Functions of WDD:

- To minimize run off & soil erosion, to increase infiltration in to soil & recharge ground water.
- To organize people for alternative enterprises, to strengthen community based institutions for sustainable natural resources management.
- Formulation of watershed development projects as per the guidelines of donor agencies.
- Prioritization of watersheds to be taken up for treatment and project planning in accordance with perspective plan.
- To seek funds from State Government, Centrally Sponsored Schemes (GOI), NABARD and External Agencies (World Bank, Kfw, DANIDA, DFID etc.).
- Co-ordination with other line departments, Non-Government Organizations (NGO's), University of Agricultural Sciences (UAS), Government of India Institutions etc. for effective implementation of watershed development projects.
- Implementation of watershed development projects as per common guidelines of Government of India.
- Convergence with different programmes of agriculture, horticulture, livestock, pasture development, forestry, fisheries and income generating activities in an integrated manner on watershed basis.
- Online monitoring of progress of all watershed development activities and reporting the progress to respective project funding agencies.
- Ensuring equity by way of effective participation of vulnerable groups including women and landless in the planning, implementation and benefit sharing in the watershed projects.
- Engaging the external agencies for monitoring, evaluation, learning and documentation

WDD has implemented several watershed development projects viz., *Sujala-I* (World Bank), *Sujala-II* (NABARD), *Sujala-III* (World Bank) and many Integrated Watershed Management Projects (IWMP). *Sujala-I* has received many national & international awards for e-Governance and adopting best practices. WDD also received National Productivity Award from National Productivity Council, GOI during 2006 and 2009.

Karnataka is the first State to create Watershed Development Department in the country. Having its Head Office at Bangalore is providing required expertise to all the 29 districts Watershed Development Offices in the State. It is also the State Level Nodal Agency (SLNA) for the Department of Land Resources, Ministry of Rural Development, Government of India.

Karnataka Watershed Development Department is the first in the country to get the ISO 9001:2008 Certificate for quality management system for the services rendered by the department.

For further information contact
Commissioner
Watershed Development Department
Government of Karnataka
7th Floor, KHB Complex, Cauvery Bhavan,Bangalore-560009
Tel: 080-2210 0670 Fax: 080-22100673 E-mail:*comwdd@vsnl.net*
Website: *www.watershed.kar.nic.in*

2014 - 500 copies Design: ANANTH D.A.