NATURAL RESOURCES MANAGEMENT THROUGH FRONTIER TECHNOLOGIES – A CASE STUDY FROM INDIA

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ABSTRACT

The social and economic development of the state is interlaced with our natural resources, and the manner in which they are managed and exploited. The unplanned development and overexploitation of resources are exerting various kinds of land degradation, biomass deterioration and siltation of tanks. In addition, the low per capita availability of land, uncertain and ill-distribution of rains, undulating topography, improper management, traditional cropping programme and recurrence of droughts have cumulative effect leading to low productivity and high risk particularly in dryland farming. Considering this, in India watershed development based on integrated approach has been given importance for sustainable development in the last two decades. The satellite remote sensing imageries from IRS 1C/1D for two seasons representing *Kharif* (September – October) and *Rabi* (December – February) and in some cases summer season (March – April) data were utilized for 10 sub-watersheds falling in five districts of Karnataka state to prepare the agriculture and water resource action plans. The geographic information system helps in arriving at alternative action plan by overlaying, integrating and analyzing the various thematic maps derived from the satellite data along with the collateral data like socio-economic, demographic, meteorological data etc. Thus, the remote sensing coupled with GIS offers opportunities for integration of multi-layered information (both spatial and non-spatial) that helps in identification of potential limitations and management needs of land and water resources on an integrated basis.

Keywords: Remote sensing, GIS, GPS, Soil, Water, Agriculture

INTRODUCTION

India has vast tract of un-utilized and underutilized rainfed dry lands which are prone to recurrence of droughts. Karnataka has two thirds of its geographical area under arid to semi-arid conditions which are drought prone. These lands are characterized by low productivity, degraded natural resources and widespread poverty. Development of these drylands on watershed basis is the only feasible strategy to mitigate drought and increase agricultural production. Karnataka has been implementing watershed development programs for the last two decades. Currently, the integrated watershed development program assumes greater importance to integrate land, water, livestock, biodiversity and environmental aspects to develop rainfed areas as well as rural livelihoods in a holistic manner in the country.

"Sujala" Watershed Development Project was one such initiative taken by the Government of Karnataka with World Bank Assistance, to develop and improve the degraded watersheds and alleviate poverty in 4.37 lakh hectares of land encompassing 1270 villages distributed across 7 districts of Karnataka state. The project was implemented in 742 micro-watersheds in a phased manner during 2002 to 2009. Sujala has emerged as a model of excellence in the field of watershed and is being acknowledged as a success story not only in Karnataka, but also in the country and other parts of the world. The project is well known for utilization of modern technological tools, enforcing transparency and accountability, adoption of people-public-private (PPP) approach, integrated and holistic development of land and livelihoods etc. Sujala project has achieved the desired objectives, demonstrating positive impacts in the social, economical, environmental and institutional aspects at the end of the project. This paper highlights the various modern technological tools adopted in sujala, which contributed significantly to the success of the project, with a positive impact on the land as well as livelihoods of the people.

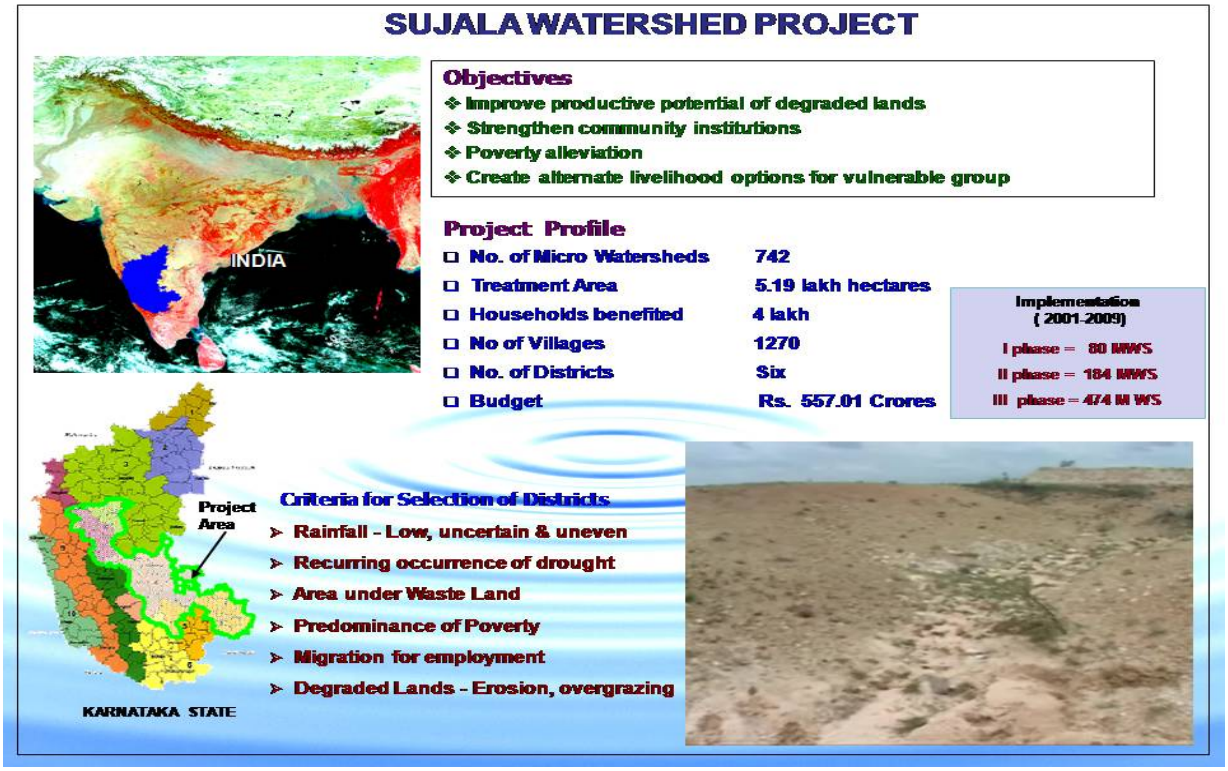

Figure 1: Sujala Watershed Project at a Glance

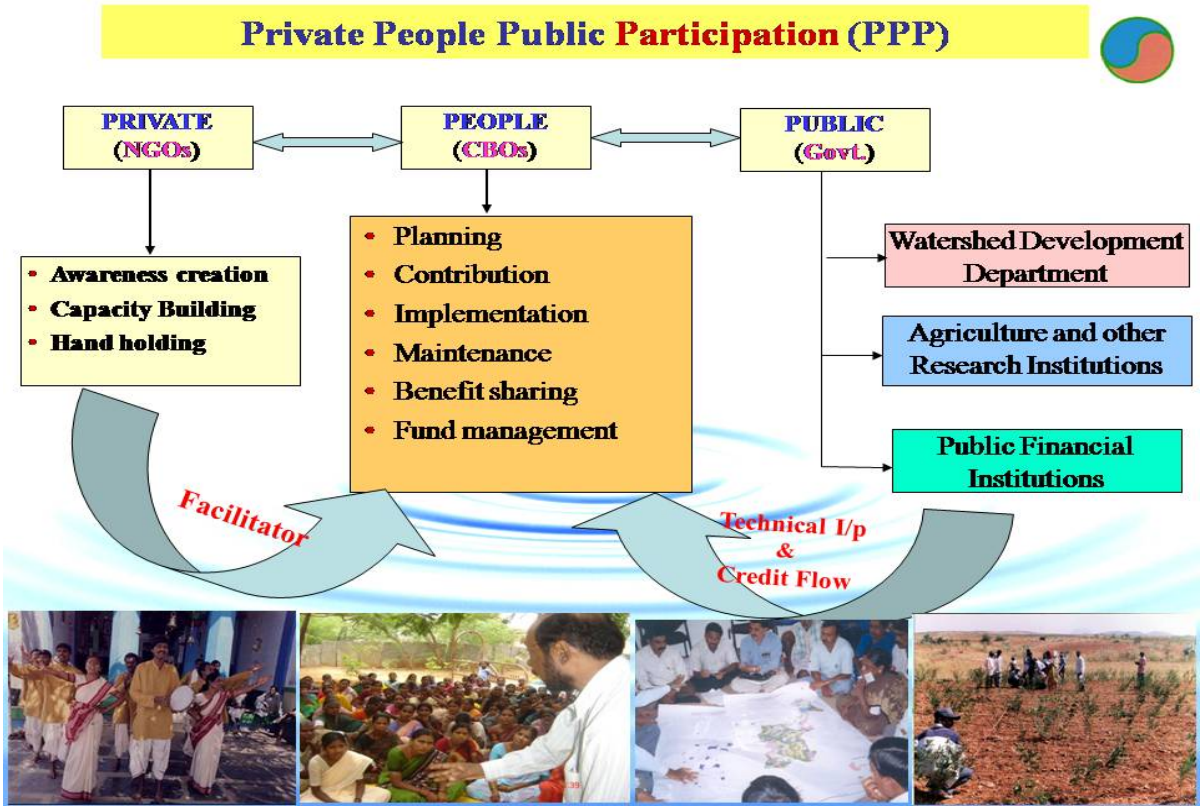

Figure 2: Public – Private – People Participation (PPPP) Model

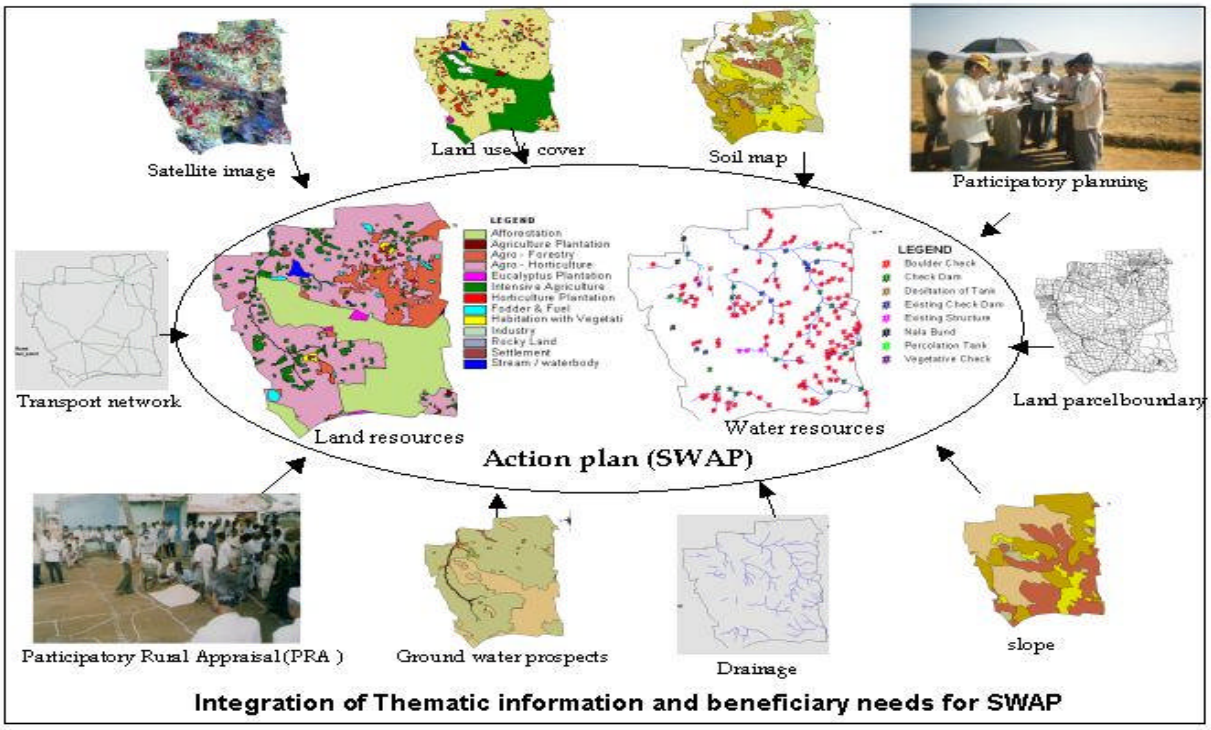

Figure 3: Integration of thematic information and beneficiary needs for SWAP

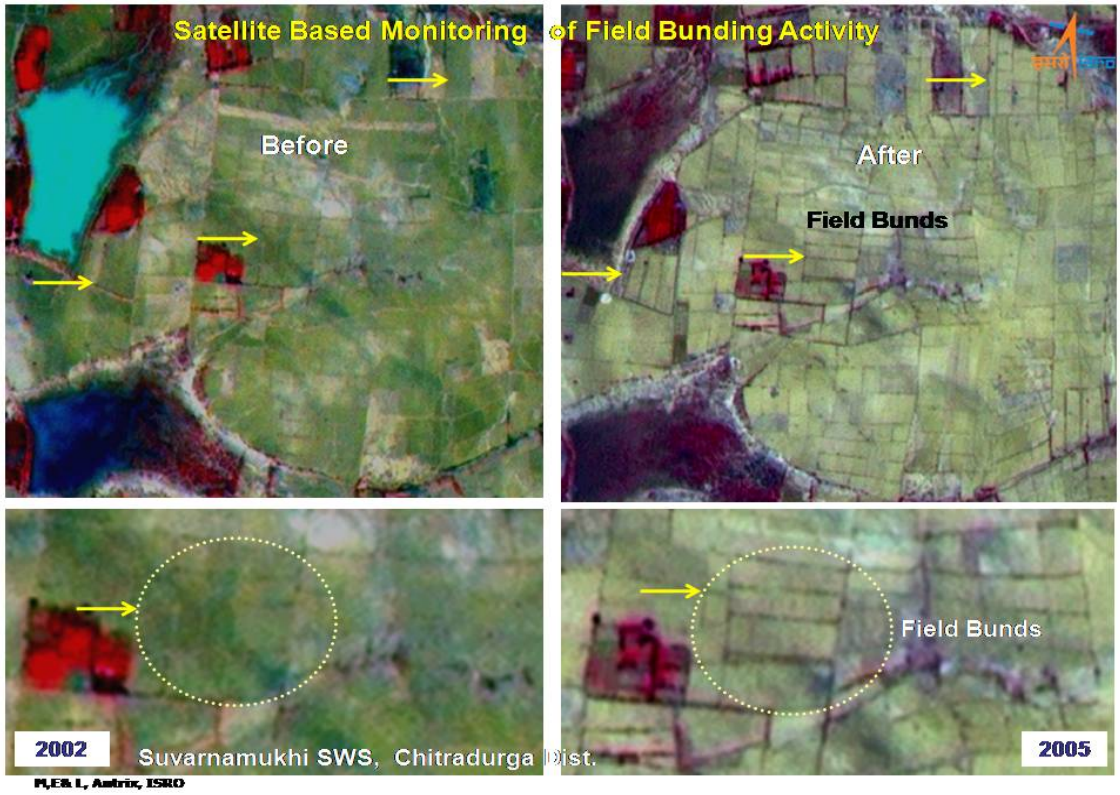

Figure 4: Satellite based monitoring of field activities

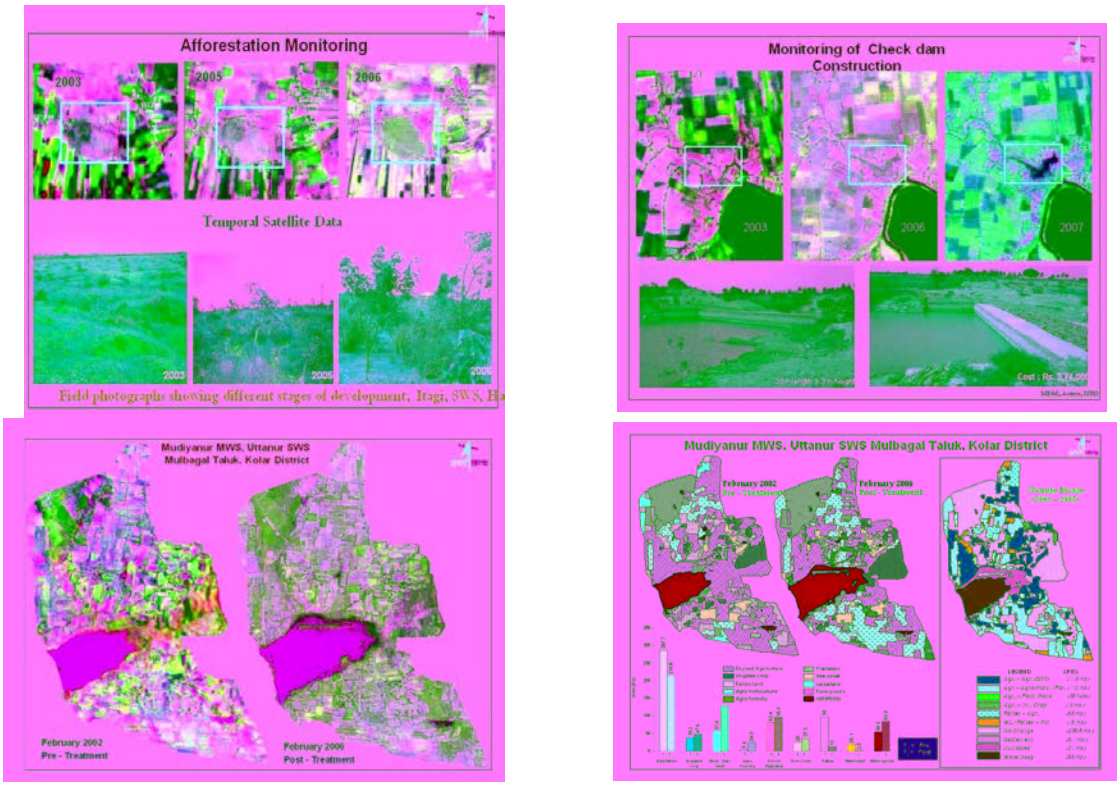

Figure 5: Satellite images of pre & post treatment period & Analyzed outputs with change image

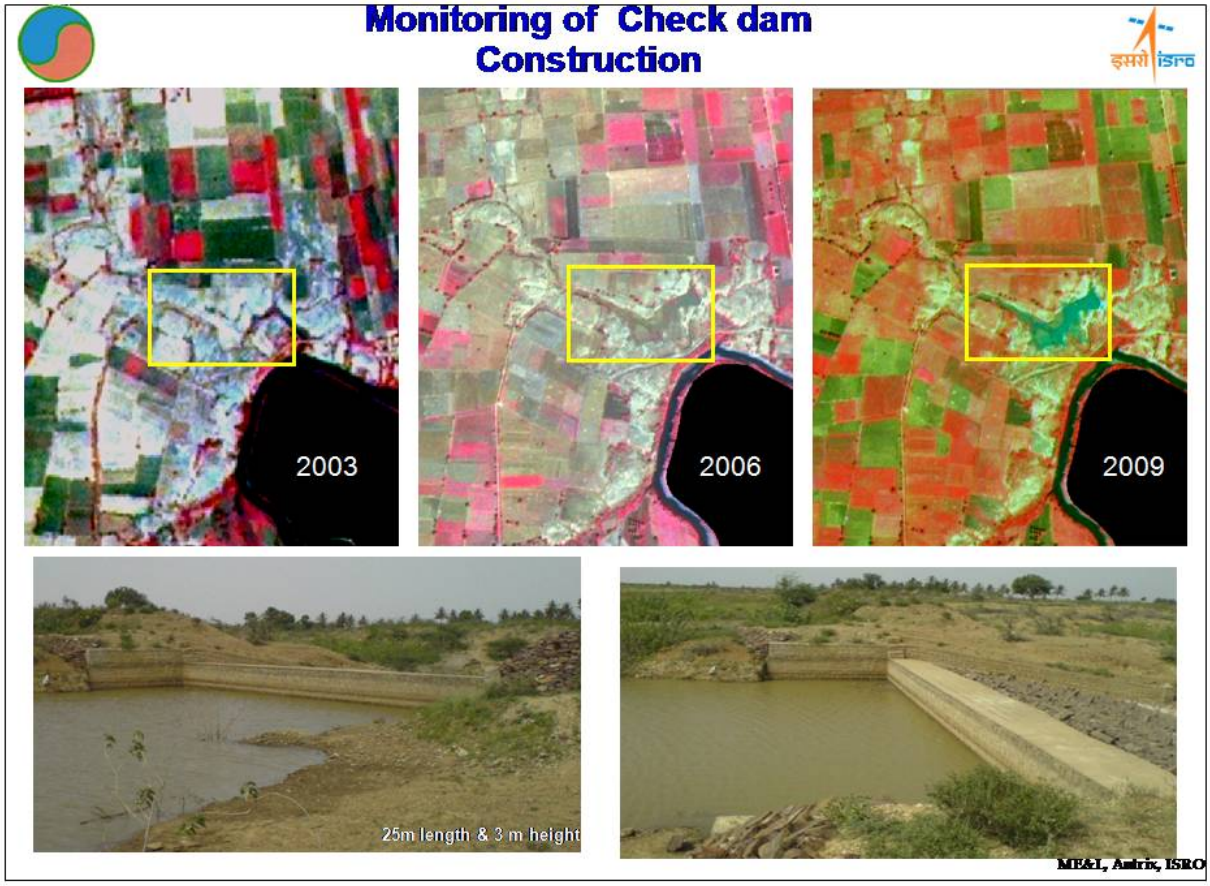

Figure 6: Monitoring of Check dam Construction

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