Monitoring of Watershed Management Programmes in India Experiences of the Indo-German Bilateral Project "Watershed Management"

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Abstract: Watershed Management seems to be perceived by many as the only way to increase agricultural production in rainfed, marginal areas in India. Government of India and international donors are currently investing approximately 1000 millions USD / year into schemes dealing with watershed management. Unfortunately, more often than not, monitoring and evaluation does not get the required attention and therefore is very difficult to quantify or qualify the changes which have happened to natural resources but also to the livelihoods of people due to these programmes and in the long run to justify the need for these schemes.

The Indo-German Bilateral Project "Watershed Management" is implementing since 1989 in 9 watersheds in 5 project regions throughout India participatory watershed programmes jointly through government departments and non-governmental organizations. From the beginning onwards the project focused strongly on monitoring and evaluating it's activities using a mix of participatory tools and scientific methods.

The paper will present and discuss a comparative evaluation of three adjacent watersheds in North India (one treated in a participatory way (1,800 ha), one treated in a classical top-down approach (3,500 ha) and one untreated control watershed (1,800 ha).

1 Introduction

The Indo-German Bilateral Project "Watershed Management" is associated with the schemes of River Valley Projects and Flood Prone Rivers of the Indian Ministry of Agriculture, Soil and Water Conservation Division. The Project was initiated in 1989 in order to improve hydrological monitoring of these schemes. However it was soon realized that collecting and evaluating hydrological data only was not the solution to improve the ongoing schemes (Honore, 1998).

The major challenges of ongoing schemes were then described as:

- Monitoring and evaluation of the schemes was not given enough importance.
- Maintenance of the schemes was often inadequate because people's participation was lacking.
- Capacity building and training of all stakeholders was insufficient.

Subsequently over the following years the project concentrated on these issues and implemented in 9 Representative Watersheds (RWS) innovative watershed management activities in a collaborative way by combining the strengths of different kind of organizations (through various State Departments and different local Non-Governmental Organizations) and by strengthening community based organizations. (This paper will not deal with this component. For further information see also: E.M. Tideman (2000), C.M. Pandey (2000), G.Honore (1999)).

Furthermore, besides continuing the hydrological monitoring in currently 31 Silt Monitoring Stations in 10 Indian States, the project continued developing procedures and protocols for monitoring and evaluation of watershed management schemes. It was observed that too often only physical and financial achievements were monitored, without considering other developmental aspects such as quality of activities, ecological regeneration, livelihood of people, gender parity and sustainability. For that purpose

a set of 9 impact indicators was developed, which are discussed in great detail in Bollom (1998) and therefore will only be summarized here (in parenthesis the objective measured is indicated):

- soil loss (topsoil conservation),
- groundwater recharge (groundwater conservation and vegetative cover),
- height-for-age (health, wealth, gender parity, social equity),
- consumer durables (wealth, social equity),
- school attendance (education, gender parity),
- use and maintenance of assets (sustainability, replicability),
- replication outside project area (replicability),
- outsiders involvement(sustainability, replicability),
- social capital (sustainability).

Also, it is felt that too often monitoring exercises are carried out in an ex-post scenario, which then often leads to biased and not representative findings. This project advocates very strongly that watershed management projects should be evaluated in a "before, during and after- implementation" scenario. This enables to define the impacts before the on-set of the project and thus contributes to a more focused implementation and also allows to take mid-term corrections (if necessary), evaluate in a "with and without-intervention" scenario (using a control watershed or village). This part is very often neglected, and thus evaluations often cannot differentiate between project induced changes and changes induced by other schemes and or national or international developments include beside "project defined indicators" also "people defined indicators". Often in the past indicators are defined by the financing or implementing agencies. Local people, however, perceive changes effecting their lives and environment in a different way. This should be considered, in order to render the evaluation comprehensive and truly participatory. Note, that participatory evaluation often only means that an ex-post evaluation was conducted using participatory tools. Therefore the term "people defined indicators" reflects this new approach in a better way.

2 The indo-german watershed project in jharkhand

The project started implementing watershed activities in the Karkara watershed in the Chhottanagpur Plateau in Southern Jharkhand between 1993 till 1999 over a time period of 6 years.

The approach followed was:

- Capacity building of community based organizations
- Improving livelihood of landless people
- Improving agricultural production
- Regenerating natural resources

For these activities a Government organization, namely the Soil Conservation Department of the Damodar Valley Corporation (DVC) and a Non-Governmental Organisation, namely PRADAN were involved. In a collaborative manner the activities were planned and implemented considering the project's "Guiding Principles for Watershed Management". Furthermore, in order to avoid conflicts, between the partner organizations, division of labour and of areas of intervention were clearly demarcated.

The main activities were:

- Construction of 3 surface water irrigation schemes with a command area of 450 ha.
- Establishing Nurseries.
- Creation of a Farmer's Center (including artificial insemination and seed distribution centre).
- Creation of a watershed federation.
- Developing water harvesting ponds to sustain paddy cultures and develop pisciculture in 85 ha.
- Reclaiming 15 ha wastelands.
- Creation of 40 savings and credit groups.
- Developing income generating activities.
- Developing self-managed community centre.
- Tribal development.

3 Comparative evaluation of watershed projects

In 1999, the Project commissioned an independent organization, namely Land Use Consultants International (LUCI), New Delhi to carry out an evaluation of three adjacent watersheds:

- Karkara (Area 1,751 ha, high intensity/low costs-treatment through IGBP approach)
- Karma (Area 3,456 ha, low intensity/low costs-treatment through RVP approach)
- Mahesha (Area 1,792 ha, untreated control watershed)

The main findings are shown in the following graphs:

3.1 Reduction of soil erosion

Erosion control activities started in 1993. Through the projects silt monitoring station rainfall, water level and sediment concentration were monitored in 10 minutes interval.

As shown in Figure 1 was the annual sediment yield reduced more than fourfold because of the projects interventions.

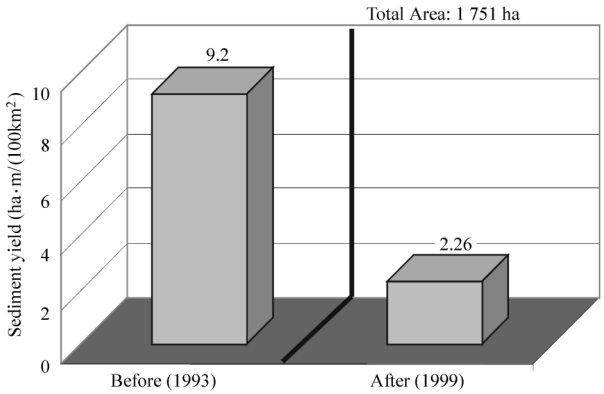

Fig.1 Sediment yield in karkara watershed, jharkhand

3.2 Increase in biomass

Figure 2 shows the change in total biomass for the three watersheds. The control watershed Mahesha over a period of 6 years (1993—1999) lost an additional 10% of it's biomass, whereas Karma Watershed (treated under RVP) increased it's biomass by 34% and Karkara Watershed by 62%, which can be explained by the intensive focus of increasing agricultural production.

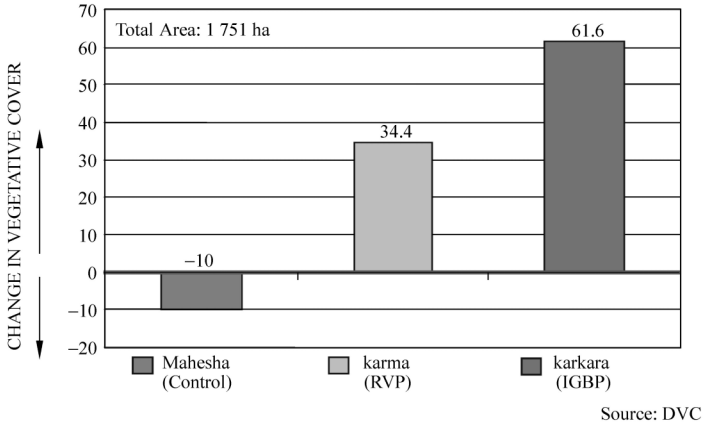

Fig.2 Change in vegetative cover

3.3 Groundwater recharge

Groundwater depletion will be the main challenge for India's agricultural and rural development in the coming decades, and therefore the impact of watershed management activities on groundwater recharge is monitored carefully through extractive and participatory means. Figure 3 shows the results of monsoon 1995, i.e. two year into the project's implementation. Karkara being the watershed treated under IGBP, shows very high rainfall retention (95%, 90%, 85%), i.e. most rainfall is allowed to infiltrate because of soil and water conservation works, whereas the nearby control watershed Karso has substantialy lower infiltration (90%, 65%, 50%).

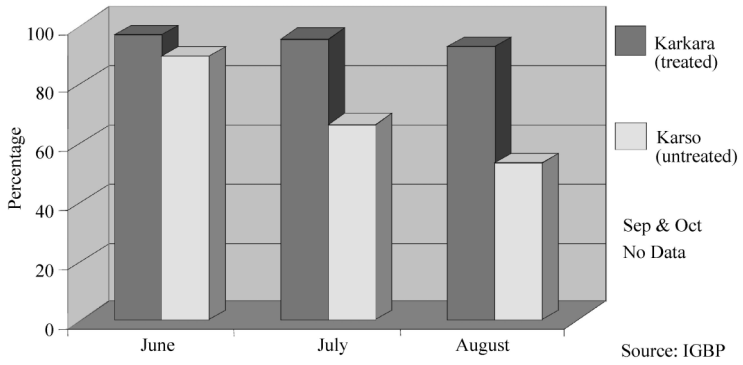

Fig.3 Monthly rainfall retention (%) for two neighbouring watersheds in jharkhand (monsoon 1995)

Since the project focuses on rainwater harvesting, the area irrigated by wells dropped substantially in Karkara (IGBP) watershed (decrease from 30 ha to 14 ha) (Fig.4), while just the contrary happened in the Karma (RVP) watershed.(increase from 22 ha to 47 ha). This implies that use of groundwater has decreased, since farmers have now means to cheaper surface water and groundwater is thus allowed to regenerate in the Karkara watershed.

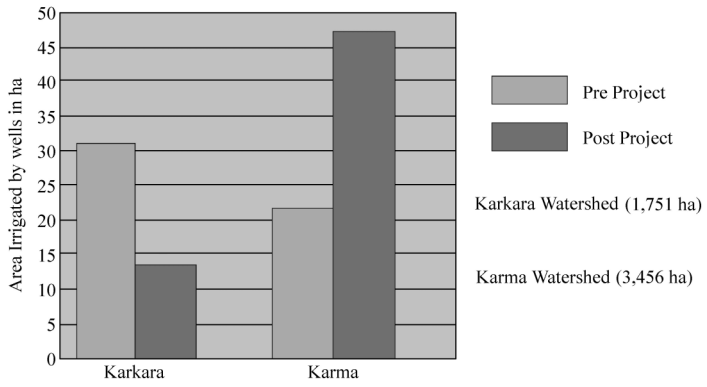

Fig.4 Change of groundwater usage as a result of rainwater harvesting

3.4 Agricultural production

Figure 5 shows that agricultural production increased in Karkara watershed by more than 400%, due to surface water irrigation and rainwater harvesting, while in the same period agricultural production increased 'only' by 80% in Karma watershed due to RVP activities.

3.5 Livelihood improvement

While a major focus of the project's activities is on land-based activities, livelihood issues and self-

help promotion was given due emphasis. Over 6 years a total of 40 Self-Help Groups in 24 villages with 550 members were developed and strengthened, with total savings of 1,8 lakhs INR (3,830, USD) (Fig.6), credit generated of 8 lakhs INR (17,022, USD). All this in a very poor, backward area in Jharkhand.

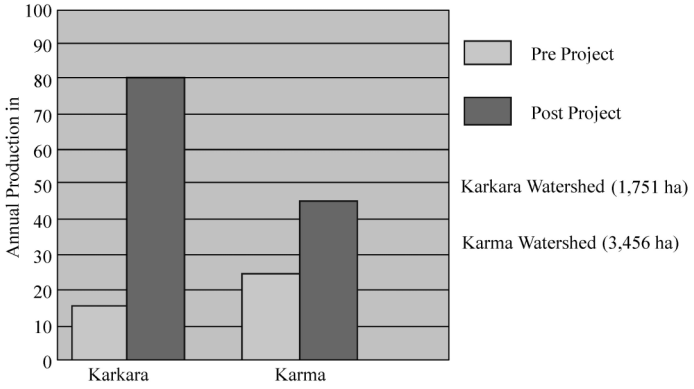

Fig.5 Change in agricultural production as a result of rainwater harvesting

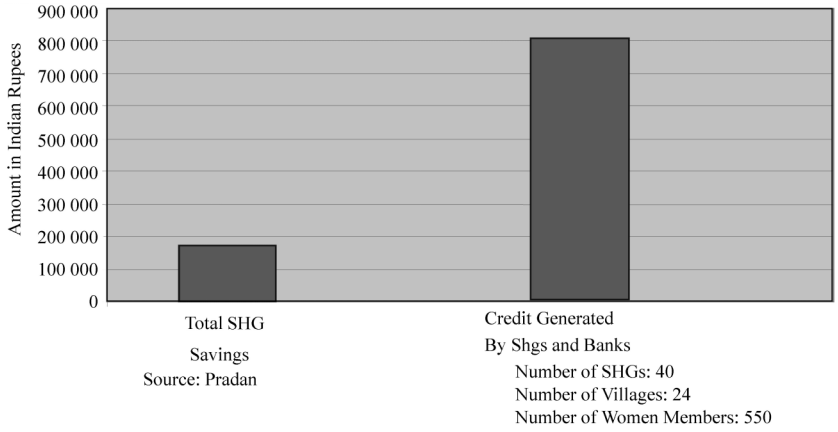

Fig.6 Micro credit activities

4 Conclusions

As can be seen from the graphs above, with investments in the range of the government guidelines, a considerable improvement of biomass availability, groundwater protection, increase of crop production, improvement of livelihood can be achieved as long as the project has right from the beginning the end of it's intervention in mind and concentrates on strengthening community based organizations. It also shows that the new guidelines of the Ministry of Agriculture are feasible and will deliver desired results.

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