HYDROLOGICAL MONITORING AS A TOOL TO EVALUATE SOIL AND WATER CONSERVATION ACTIVITIES: EXPERIENCES OF THE INDO-GERMAN BILATERAL PROJECT "WATERSHED MANAGEMENT"

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BACKGROUND

The River Valley Projects (RVP) and the Flood Prone Rivers (FPR) are two schemes of the Government of India, Ministry of Agriculture, Soil and Water Conservation Division. Both schemes are implemented nationwide in 39 catchments through nodal State Departments with the objective of reducing siltation of reservoirs and discharge volumes (MoA, 1992a; MoA, 1992b).In the past it was recognized that often enough these schemes did not result in the desired effects, namely reduction of siltation of reservoirs.

In order to assess the impact of these schemes, the construction and operation of Silt Monitoring Stations (SMS) at the outlet of the watersheds (approx. 2000-4000 hectares each)was proposed. These SMS should monitor at regular intervals over long time periods, rainfall, water level, water velocities and sediment concentrations in order to determine the changes in sediment load and discharge volume

In order to assess the impact of these schemes, the construction and operation of Silt Monitoring Stations (SMS) at the outlet of the watersheds (approx. 2000-4000 ha each)was proposed. These SMS should monitor at regular intervals over long time periods, rainfall, water level, water velocities and sediment concentrations in order to determine the changes in sediment load and discharge volume. This would have to be done before, during and after the treatment of the watersheds, using a control watershed to determine the "with" and "without" scenario, (R.Lal, 1992).

For this purpose, three percent of the funds of the above mentioned schemes were earmarked to construct the stations and to install hydrological equipment in every fourth watershed that was being treated with soil and water conservation activities (Shamsher Singh, 1997). Operation and maintenance was to be done through junior engineers and local silt observers of the nodal State Departments.

However, very soon the authorities in charge had to recognize the following challenges:

- lack of suitable and reliable Indian hydrological instruments.
- lack of guidelines and procedures.
- lack of adequate training materials.

With this in mind, the Indo-German Bilateral Project "Watershed Management" was born in 1989.

THE INDO-GERMAN BILATERAL PROJECT "WATERSHED MANAGEMENT"

The Indo-German Bilateral Project "Watershed Management" (IGBP) is a technical cooperation between the Government of India, Ministry of Agriculture, Soil and Water Conservation Division and the Government of Germany, Ministry of Economic Cooperation and Development through the German Agency for Technical Cooperation (GTZ) and RODECO Consulting, Germany. The Project started in 1989 and is now in its third phase, which will last until December 2000. The Project aims at further enhancing erosion control activities carried out under the RVP and FPR schemes of the Ministry of Agriculture by implementing the following activities:

- Hydrological and sediment monitoring (SMS) in 32 selected watersheds in 14 project areas in 11 Indian states.
- Implementing erosion control activities in 9 Representative Watersheds (RWS) jointly through State Departments and local NGOs. This focusses on participatory management of resources, implementation of innovative activities and strengthening of community-based organizations.
- Training of field level staff in hydrological monitoring, soil and water conservation and watershed management in India and Germany.

MAIN ACTIVITIES OF THE PROJECT IN HYDROLOGICAL MONITORING

Operation of Silt Monitoring Stations with German instruments

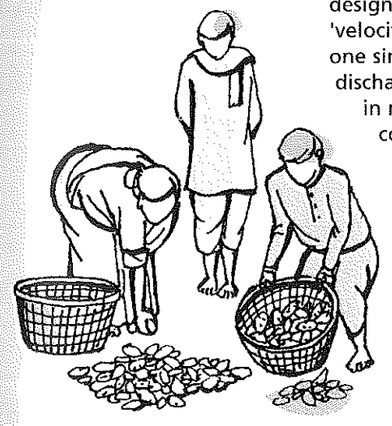
Currently 32 Silt Monitoring Stations (SMS) are operated by the IGBP in 14 Project areas in India.

It has to be understood, however, that this is not a research project. Operation and maintenance of the SMSs is mostly done by local staff. The Project limited its role to advisory services and training of staff

Most SMSs had been constructed earlier using either weirs or the 'velocity-area-method' to determine discharge. The equipment for the SMSs, namely sensors for rainfall, water level, wind speed, temperature, humidity and solar radiation was provided by the German Government. All the sensors are powered by solar energy and linked to a data logger. For flow velocity measurements current meters were supplied. Furthermore, computers and four-wheel vehicles were provided to the State Departments.
Sediment is collected using the standard Punjab bottle sampler (500 ml) and the sample is split into three sizes: coarse (diameter >0.2 mm), medium (diameter between 0.075 and 0.2 mm) and fine (diameter <0.075 mm). One station was equipped with an automatic sediment sampler and another station was equipped with a turbidity sensor.

It has to be understood, however, that this is not a research project. Operation and maintenance of the SMSs is mostly done by local staff. The Project limited its role to advisory services and training of staff. As will be explained later, this 'real world' set up has of course a tremendous impact on data quantity and quality.

Data collection and evaluation



Most SMSs as such were constructed earlier by the State Departments with varying designs. Some SMSs used weirs to determine the discharge, some used instead the 'velocity-area-method' to calculate the discharge. The Ministry had recommended one single formula to compute the discharge, i.e. $Q=1.7\ L\ H^{3/2}$ (Q being the discharge in m^3/s, L being the length of the weir in m and H being the water level in m) under the assumption that only broad crested weirs would be constructed. This was not the case, but unfortunately the same formula is used, so that most discharge data of SMSs with weirs are not correct (A. Singh 1994).

Furthermore, there were no uniform data collection guidelines and formsheets available. The Ministry requests the State Department to evaluate the data (monthly precipitation in mm, average monthly discharge in mm and sediment yield in ha.m/100 km^2). Unfortunately most junior staff did not know how to express discharge in mm or sediment yield in ha.m/100 km^2.

Figure 1: List of Silt Monitoring Stations operated by the IGBP - May 2000

STATE	SMS	INSTALLED IN	STATUS
Himachal Pradesh	(1) Arki - RWS	May, 1992	in operation
D.V.C, Bihar	(1) Nagwan (2) Karso (3) Banikdih (4) Banha - RWS	August, 1990 July, 1991 June, 1992 June, 1993	in operation in operation closed - *a in operation
Rajasthan, Sahibi	(1) Pahel (2) Haripura (3) Dampura (4) Suklawas (5) Bisalwa (6) Karkadi (7) Burhanpura-RWS (8) Lakhawala	July, 1990 June, 1990 May, 1991 July, 1990 July, 1990 July, 1991 May, 1993 June, 1994	closed - *i closed - *i closed - *i closed - *b closed - *c closed - *i in operation in operation
Rajasthan, Banas	(1) Rajawas - RWS	to be installed	to be installed
Tamil Nadu	(1) Mynally (2) Ebbanadu (3) Kattery - RWS	August, 1990 September, 1990 July, 1994	in operation in operation in operation
Uttar Pradesh, Gomti	(1) Satrikh (2) Bhauli (3) Indranagar (4) Manshara (5) Garha (6) Ashiknagar (7) Nawazgarh-RWS	August, 1990 August, 1990 August, 1990 June, 1991 July, 1991 September, 1991 August, 1995	closed - *d closed - *e closed - *f in operation closed - *g closed - *h in operation
Bihar	(1) Nawatand (2) Bandhudih	August, 1993 August, 1993	in operation in operation
Madhya Pradesh	(1) Dondki (2) Sakarra	July, 1993 July, 1993	in operation in operation
Orissa	(1) Kanika (2) Piccal	June, 1994 June, 1996	in operation in operation
Gujarat	(1) Bhoramli (2) Nanidevrupan	September, 1994 September, 1994	in operation in operation
Maharashtra	(1) Harsul (2) Khadakuhal (3) Ozarkhed (4) Chas	June, 1997 June, 1997 June, 1997 June, 1997	in operation in operation in operation in operation
Uttar Pradesh - Hills	(1) Nainbagh (2) Jhangeri - RWS	June, 1998 June, 1998	in operation in operation
Andhra Pradesh	(1) Kinchumanda-RWS (2) Arakku Valley	June, 1998 June, 1999	in operation in operation
Uttar Pradesh Sone	(1) Makkara - RWS	April, 2000	in operation

*a - Station was flooded during the first monsoon, closed in end 1992

*b - Unsuitable site - shifted to Karkadi in July 1991

*c - Unsuitable site - shifted to Lakhawala in June 1994

*d - Saturated watershed - shifted to Nawazgarh in August 1995

*e - Unsuitable site - shifted to Garha in July 1991- instruments stolen later

*f - Unsuitable site - shited to Ashiknagar in September 1991

*g - Instruments stolen in September 1992

*h - Instruments shifted to Garha - stolen later

*i - Sahibi Project closed

Research often limits the modeling process of discharge and erosion to very small watersheds (some acres to a few hectares). This is one of the few projects dealing on an operational level. The size of watersheds varies between 1000 ha – 4000 ha

Therefore our activities concentrated on

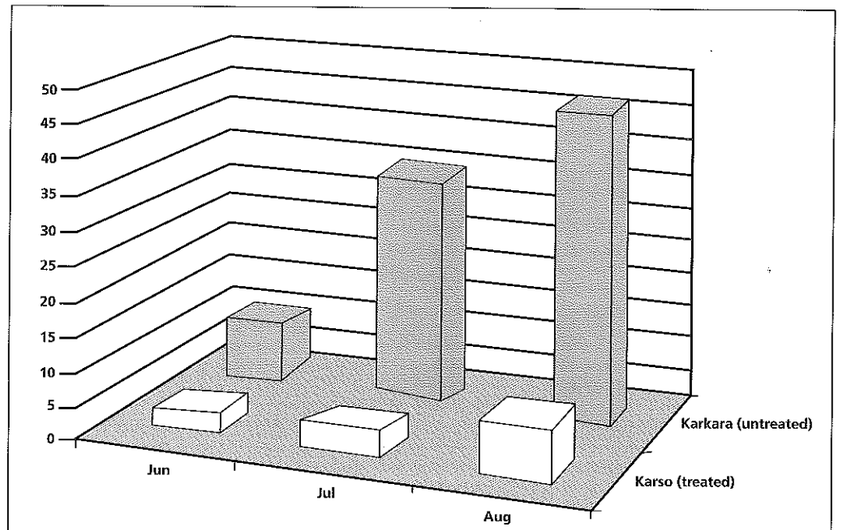
- Training of junior staff.
- Improving the design of the SMSs and the silt laboratories.
- Developing guidelines and formsheets for data collection and evaluation (Lim, 1994).
- Developing a hydrological database (HYDRIS, Hydrological Information System) and watershed database (WISEC, Watershed Information System for Erosion Control).
- Publishing data in an annual Hydrological Yearbook which is made available to the concerned departments and interested research organizations.

For all hydrological monitoring the already mentioned 'before/during/after' and 'with/without' scenarios were followed. Although the Project assisted State Departments in collecting data, in some cases for seven years, often data collection was neither complete nor reliable, so that there are still considerable gaps, which do not allow for a time series analysis. It has to be understood that any kind of hydrological time series should be at least 10 years long, to allow scientific analysis and interpretation of data (U. Bosshardt, 1996).

In our case, most gaps occurred for the sediment concentration data, which was collected manually and which had to rely on local silt observers, mostly farmers from nearby villages.

Therefore, most evaluation had to rely only on precipitation and runoff data, as can be seen from the graphs in Fig 2. In Karso the soil and water conservation activities were completed in 1990, whereas in Karkara they only started in 1996. The precipitation/runoff ratio which was used in this case as a parameter is substantially lower in Karso (treated) than in Karkara (untreated). This of course can be interpreted as an indication of the impact of soil and water conservation activities.

Figure 2: Monthly rainfall/runoff ratios (%) of 1995 for two watersheds in Bihar



	Jun	Jul	Aug
Karso (treated)	3.11	4.53	8.22
Karkara (untreated)	10.28	33.5	46.7

Training in hydrological monitoring

So far approximately 250 junior staff of State Departments have been trained by the Project in hydrological monitoring. For this, various training manuals and video films have been developed. These trainings were held mostly in India. Selected officers were also trained in Germany, with a manufacturer of hydrological instruments and at the German Institute of Hydrology in Koblenz.

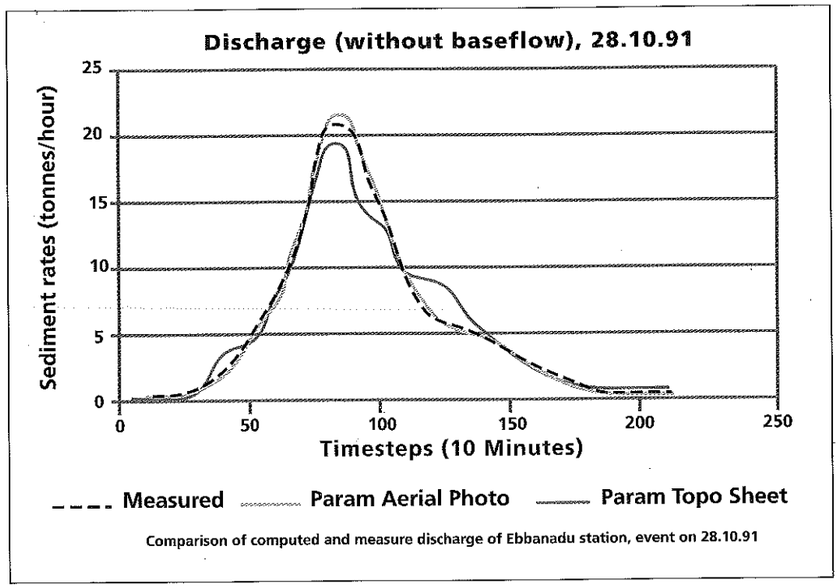
Equally important is the standardization of data collection procedures and formsheets. Too often data is not accurate or incomplete because of improper and incomplete records

Furthermore, recommendations have been made on how to improve the Ministry's own training centre in Hazaribagh, Bihar. This includes providing teaching aids as well as recommendations for the syllabus. The Hazaribagh training centre is currently being rebuilt by the Damodar Valley Corporation.

Modeling runoff and sediment concentration

Research often limits the modeling process of discharge and erosion to very small watersheds (some acres to a few hectares). This is one of the few projects dealing on an operational level. The size of watersheds varies between 1000 ha - 4000 ha, and thus it seemed very challenging to model the runoff/sediment process for this size of watersheds, without detailed surveys of the river channels, landuse, soils etc, which are highly resource intensive. This model was developed based on an Geomorphological Instantaneous Unit Hydrograph (GIUH) (Niekamp O., 1992). Results are very promising as can be seen from Figs. 3 and 4.

Figure 3: runoff and sediment yield prediction model using geomorphological instantaneous unit hydrograph



Comparison of computed and measure discharge of Ebbanadu station, event on 28.10.91

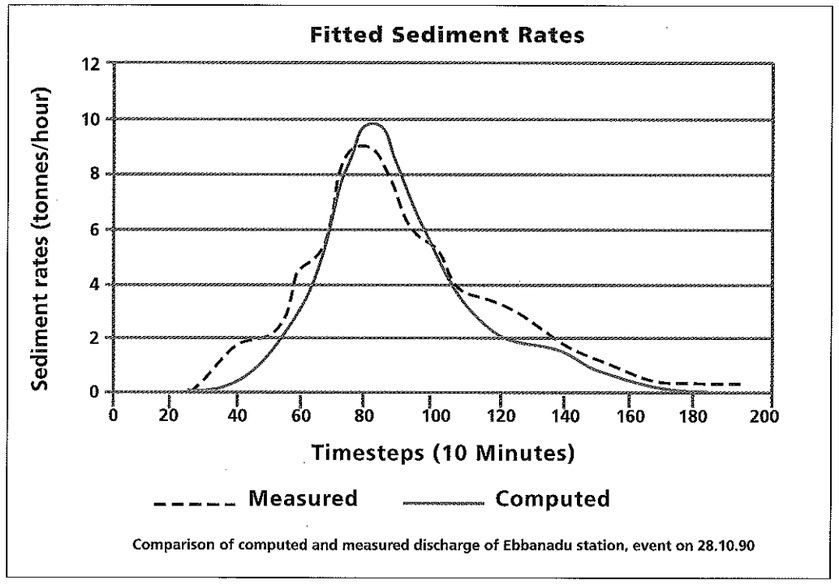
Further development (i.e. verification) was greatly hampered by the time consuming process of procurement of detailed maps and aerial photographs. Currently the project is exploring possibilities of using satellite imageries and public domain GIS (i.e. GRASS).

Development of hydrological instruments

One of the shortcomings in operating imported hydrological equipment is the maintenance and repair of these instruments. Therefore, efforts were made to encourage indigenous production of hydrological instruments. Several workshops

were organized to identify the needs of potential users (departments, research institutions) and manufacturers. On a prototype basis one set of instruments was developed consisting of rainfall sensor, water level sensor, turbidity sensor and electronic data storage unit. The prototype was tested at the hydraulic laboratory of the University of Roorkee and field-tested in Bihar and functions satisfactorily. Unfortunately, the production of this set is hindered by the enormous gap between the perceptions of manufacturers and users. The manufacturers want a minimum purchase guarantee which the users are generally not able to give.

Figure 4: runoff and sediment yield prediction model using geomorphological instantaneous unit hydrograph



Comparison of computed and measured discharge of Ebbanadu station, event on 28.10.90

Analysis of other data

Since this Project started collecting data only some years ago, not enough data is available at this stage to carry out detailed data analysis. Therefore efforts were undertaken to identify SMSs in India that had collected data for sufficiently long periods.

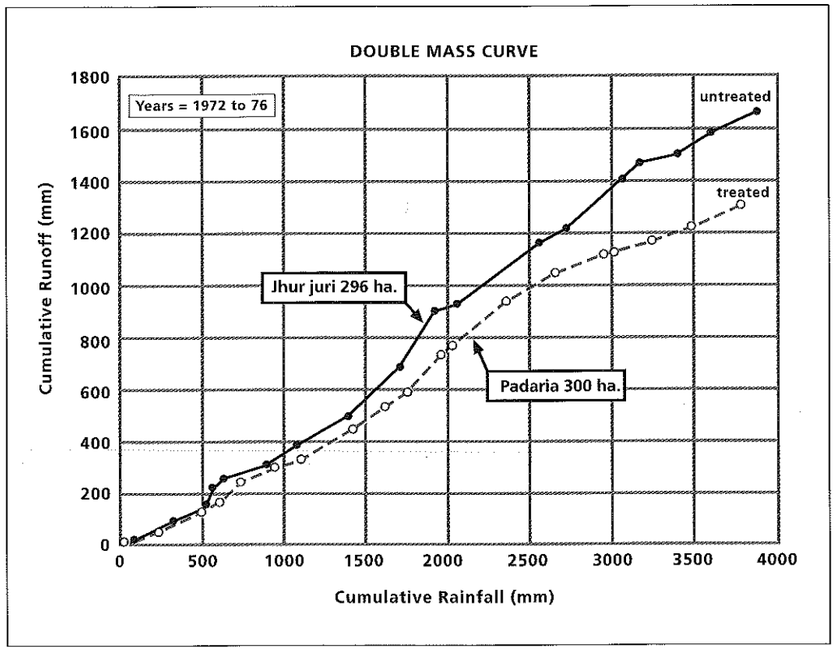
In 1961, DVC Soil Conservation Department had identified near Hazaribagh in Bihar, two adjacent watersheds of the same size (approx. 300 ha) and morphology. In both watersheds V-notch weirs were constructed at the outlet and rainfall, waterlevel and sediment concentration data were collected manually by local school teachers for more than 15 years. Data had been noted down in copy books and had never been evaluated. The Project then computerized the data and evaluated them. Although it was known that one watershed had been treated and the second watershed had been kept as a control, the actual period of soil and water conservation activities is not known any longer.

Unfortunately, as most data was incomplete and sediment data hardly available, data evaluation was limited to rainfall/runoff relationship and only for the years 1972, 1973 and 1976 (altogether 33 discharge events). With not too much other information available, the Project limited its analysis to a double-mass-analysis for both watersheds.

Double-mass curves are used to check data for homogeneity. By plotting accumulated discharge against rainfall, any change in gradient is possibly due to an impact of soil and water conservation measures (U. Bosshardt, 1996). By plotting now for the same sequence of events, double-mass curves for the treated and untreated watershed, different gradients will show the impact of the soil and water conservation measures.

As can be seen from Fig: 5 the treated watershed has a lower gradient than the untreated watershed, which means that for the same rainfall amount the discharge volume will be lower for treated watersheds, which confirms the hypothesis.

Figure 5:
Twin watersheds
DVC, Bihar



CONCLUSIONS

After almost eight years of working on hydrological monitoring in India the following conclusions emerge from our experiences:

- There is a need to monitor efforts and investments undertaken by departments regarding erosion control.
- One way of monitoring the effectiveness of soil and water conservation measures is through hydrological observations of rainfall and discharge, before, during and after treatment. Without control watersheds which remains untreated, no scientific evaluation of impact is possible. This is a very expensive and long-term exercise,

since two SMSs per watershed have to be equipped and operated 24 hours a day during the monsoon for at least 10 years.

- Although computation of sediment load is an important parameter with regard to erosion control, our experience shows that at this stage the observation of sediment concentrations is not recommended. The reasons for this are that currently in India sediment concentrations are measured manually and normally on a one-point-sample basis, which neglects the uneven distribution of sediment in a cross-section. Of all data collected under this Project, sediment concentrations are the most unreliable data with very frequent data gaps. For monitoring of impact of erosion control, it seems accurate enough to compute the reduction of discharge volume and the delay in peak discharge as an indicator. (KISS principle: Keep It Short and Simple!)
- More than one rainfall station per watershed is required to compute with accuracy the aerial rainfall volume under Indian conditions. For this, school teachers, students or interested farmers could be involved.
- This Project recommends the computation of discharge using the so-called 'velocity-area-method' (i.e. measuring the cross-section of the river and the mean flow velocity with floats). Using weirs which need to be calibrated and which need long channels (and are thus expensive) should be discouraged. Often enough the constructions have not been according to the required designs and subsequently the computations of discharge (using a formula with given coefficients) are incorrect.
- One reason for inaccurate data collection is insufficient human resources development:
  - Lack of specialists assigned to this task in particular. Often, hydrological monitoring is given as an additional charge to government officers, who are often already overburdened with their normal tasks.
  - Lack of suitable training for junior level officers. Too often training concentrates only on theoretical aspects of hydrology and too little emphasis is placed on practical on-the-job training.
- Complicated data evaluation using sophisticated computer models should be avoided. These computer models usually need, besides hydrological data, too many other parameters which can only be collected through very resource intensive studies (information on soils, landuse, cross-sections and longitudinal sections of main stream, etc.). This is certainly justified for research projects, but not for this kind of monitoring. Not everything which can be measured and evaluated is of importance for our particular circumstances. Keyword: Optimal ignorance of data!
- Monitoring of erosion control should be extended to other parameters, like groundwater recharge, vegetative cover (using remote sensing techniques), improvement of livelihood of local people (since very often the schemes generate employment and other benefits) (Bollom, M.W. 1998).
- Efforts have to be undertaken to improve Indian hydrological instruments especially the development of recorders of digital data, which makes possible a direct analysis through computers. Caution: Too often computer results are blindly followed. Keyword: Rubbish in, rubbish out!
- Equally important is the standardization of data collection procedures and formsheets. Too often data is not accurate or incomplete because of improper and incomplete records.
- Finally: Do not trust data, which you did not falsify yourself !

One way of monitoring the effectiveness of soil and water conservation measures is through hydrological observations of rainfall and discharge, before, during and after treatment. Without control watersheds which remains untreated, no scientific evaluation of impact is possible

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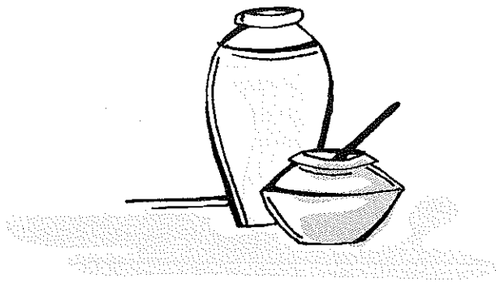


COLLABORATION BETWEEN STATE GOVERNMENT DEPARTMENT AND NGO: A CASE STUDY OF KATTERY WATERSHED, TAMIL NADU

Aparna Kanungo • IGBP • New Delhi

INTRODUCTION

In the realm of watershed management one of the key concerns has been identifying strategies, approaches and mechanisms which would ensure that the interface between the community and the implementing organization (GO, NGO) is managed in a manner which enhances efficiency, effectiveness and accountability of the program. But ensuring participation of the community in any development initiative is often an extremely slow and difficult process. It not only requires involvement of the local community but also close cooperation between different stakeholders vis-a-vis. bilateral agencies, government departments and the local NGO's involved in the project.

In the realm of watershed management one of the key concerns has been identifying strategies, approaches and mechanisms which would ensure that the interface between the community and the implementing organization (GO, NGO) is managed in a manner which enhances efficiency, effectiveness and accountability of the program.

In India, till recently, both government departments and NGOs had been pursuing development activities quite independent of each other. Both have their strengths and limitations. The government has the requisite infrastructure, manpower, technical expertise and financial resources. However, one of the major drawbacks of the government mechanism has been the failure to sensitize and involve the local community in the development process. On the other hand, a large number of NGOs have demonstrated the ability to strengthen people's requirement, needs and create village level institutions. They have been playing a supportive and catalytic role in creating local level organizations which can plan and implement developmental programs at micro-level.

Several attempts have been made in the past to bring these actors (GO, NGO) in close collaboration with each other but often it has been experienced that eliciting cooperation between the government department and NGO working in the same project and also in the same area of operation is a difficult proposition. Experience has by and large shown that many NGOs tend to work more as independent implementers than as catalysts for bridging the gap between local people and the state. This makes it all the more difficult for GOs to assign specific responsibilities to NGOs within a planning framework. Nevertheless, the potential value of NGOs to the mainstream of development planning is such that attempts should be made to foster greater partnership between NGOs and GOs.

The present case study documents one such endeavor made by the project in one of the Representative Watersheds (RWS) in Tamil Nadu. It gives a narrative account of the processes, mechanisms, approaches, problems, and biases that both partners had to face so as to make their partnership effective and successful.

The most pertinent questions which come to one's mind are:

- Who are the main actors and to what extent is this collaboration successful?
- What are the reasons for this success?
- What role is played by the donor agency?
- What has been the reaction of the local people?
- How have the local people perceived this new perceptible change in image of both government department and also the NGO?

THE PROJECT

The Indo-German Bilateral Project endeavours to create a common platform of cooperation and coordination from the initial phase of the programme, where both

GO and NGO work together. The project carries out activities in nine Representative Watersheds (RWS) located in different agroclimatic regions of the country. In each watershed, the project works with a state government department and an NGO. While the Ministry of Agriculture (MoA) has the prerogative to identify the nodal state government department (SGD), the project identifies and selects the partner NGO.

The project basically plays the role of a catalyst, facilitating the development of the watershed and protecting its natural resources. It provides technical advice to both partners as and when the need arises. A set of Guiding Principles (Box 1) have been evolved to enable both SGDs and NGO's to relate their work to the expected end-results and also encourage them to jointly work out an annual action plan and keep each other informed on the progress of their work.

The Indo-German Bilateral Project "Watershed Management"

The Indo German Bilateral Project "Watershed Management" (IGBP) is a technical co-operation between the Government of India (Ministry of Agriculture, Soil and Water Conservation Division) and the Government of Germany (Ministry of Economic Co-operation and Development). Established in 1989 with funding from the German Technical Co-operation Agency (GTZ), the IGBP operates under the Government of India, Ministry of Agriculture's Flood Prone Regions/River valley Project (RVP/FPR) schemes. RODECO Consulting GmbH, a German consulting company, executes the project.

IGBP carries out the following activities:

Implementing erosion control activities in Representative Watershed currently in (Rajasthan, Bihar, Himachal Pradesh, Tamil Nadu, Uttar Pradesh and Andhra Pradesh jointly through nodal State Government Departments (SGDs) and Non-Governmental Organizations (NGOs)

The project has been conscious in preventing any overlap of efforts and tries to optimally utilize the strengths and capabilities of both SGDs and NGOs. Further, both have the freedom to plan and implement innovative activities that further the cause of watershed management. Instead of trying to manage all activities by themselves, thereby creating ideal but isolated models, both GOs and NGOs share specific responsibilities and focus on exploring alternative approaches which can cater to people's location specific needs.

The watershed "Kattery"

The Kattery watershed lies at the threshold of Ooty town, in the state of Tamil Nadu. The watershed drains to two reservoirs built across the Kattery river in the Lower Bhawani sub catchment. The geographical area of the watershed is approx 29.76 sq.kms. Parts of two revenue villages namely Ketti and Adigaratty come under this watershed. The total population of the watershed is 21520 of which 2315 members belong to scheduled castes and scheduled tribes.

As per the All India Soil and Land Survey Organization (AISLUS) the extent of soil erosion in this area, particularly in the Lower Bhawani sub catchment was very high. Out of 131 watersheds in the area, the Kattery watershed had been placed at priority number 10. Thus there was an urgent need to bring down the erosion to minimum levels by adopting soil conservation measures. Keeping this in view, the Kattery watershed was selected as a Representative Watershed to be treated under the Indo German Bilateral Project "Watershed Management".

The process

First step– choosing the right partners

Choosing the right partners and getting them together to work with each other is often a difficult and strenuous task. In Kattery watershed, the Agricultural Engineering Department (AED) was identified as the nodal government department to implement selected project activities. It submitted its proposal in 1993, which was approved by IGBP. Finding the counterpart NGO to work in close association with the government was difficult. Initially the government department approached several

Box 1

GUIDING PRINCIPLES FOR WATERSHED MANAGEMENT PROGRAMMES

The following set of guiding principles are prepared to serve the State Government Departments (SGD) and Non-Governmental Organizations (NGO) in developing their plans and proposals and to serve while implementing the watershed management programme:

1. *The SGDs and NGOs will elaborate jointly on an annual basis a plan of action and keep each other informed on the progress of their work on a regular basis.*
2. *The SGDs and NGOs must maintain their focus upon soil and water conservation activities, that are of central concern and importance to this project.*
3. *No activity of SGDs and NGOs must cause harm or damage to the natural environment or cause further natural resource degradation.*
4. *The programmes and activities should also focus on the needs and problems of landless farmers (on a priority basis).*
5. *Development of networking Self Help Groups with strong womens participation is expected to be a main activity of the NGOs.*
6. *Assets and infrastructure created by NGOs should be in the name of local institutions which have a strong women participation.*
7. *The partner organizations should not promote economically unviable activities which focus on improvement of livelyhood conditions and depend thus primarily on subsidies and sponsorship.*
8. *Beneficiaries of the programme are expected to make contributions by way of cash, kind or labour. No activities with immediate direct tangible benefits must reach the beneficiaries totally free of costs.*
9. *State Government Departments and NGOs are expected to work mainly in their field of experience.*
10. *Within a given watershed, the NGO should begin its activities ahead of the SGD, having a lead time for preparing the community, explaining the objectives and mobilizing their participation, preferably 1 year.*
11. *The activities must be based on principles of sustainability, equity and social justice. The partner organization must strike a balance between developing community resources and providing individual benefits. Individual benefits to rich farmers that perpetuate the resource gap between the rich and the poor are to be avoided. Greater emphasis should be laid on developing community infrastructure and resources. Access of poor farmers/ villagers over such facility must be ensured.*
12. *The long term perspective of the State Government Departments and Non-Government Organization should be the development of a watershed committee in which all main socio-economic groups of the watershed will be represented and which will take care of watershed management activities beyond the project period.*

local NGOs in the watershed area but most were apprehensive to work with the department. They were more interested to work independently with IGBP. Finally the responsibility to select the right project NGO partner came upon IGBP.

For IGBP, the most important selection criteria for the partner NGO, was its experience in working at the grassroots level and familiarity with the socio-cultural and economic realities of the watershed. After considerable deliberations and prolonged discussions the Bangalore-based NGO-MYRADA was considered.

Choosing the right partners and getting them together to work with each other is often a difficult and strenuous task

In the beginning there was a hesitant response from MYRADA to be associated with the project. They only agreed to carry out a feasibility study for IGBP. A team of 10 members under the supervision of Mr. Rajkumar conducted an intensive study of the watershed for ten days and gave their suggestions, recommendations and comments. It was found that certain activities which had been proposed by the department with the help of an independent consultant such as mushroom cultivation, strawberry cultivation, etc, were not feasible because local people were not interested to take up these activities. Later on MYARADA accepted to work as the NGO partner in April 1996. Initially they had planned to work in 9 villages but it was later modified and work was initiated in 26 villages.

Division of roles and responsibilities

Although the nature of work was demarcated right from the outset between the GO and NGO but it was also recognized that the two would have to work interactively rather than in isolation.

In order to facilitate NGO involvement, financial support was provided from the project funds. Roles, responsibility and area of operation of each partner were clearly laid down from the beginning. While the SGD works mainly on government land, the NGO works on both private and common land. Further, each works in its own field of expertise i.e. the SGD in the major soil and water conservation works, plantations, etc, and the NGO in raising people's awareness and ensuring their involvement in the management of watershed activities, developing SHGs, etc.

Actual working at the field level

Working in close collaboration with the government department was not new for MYRADA. They had been working quite successfully along with the government in other development projects. But on the other hand, for the AED working closely both with people and the NGO was a new experience.

As a first step, the Program Officer along with a team of three officials from MYRADA met the Superintending Engineer in-charge of the project and discussed various aspects of the project. This was a beginning in the right direction as it gave both partners an opportunity to know and understand each other's style of functioning.

In the beginning of the project, AED had some problems in deciding the mechanism of flow of funds from IGBP, which caused a delay of about six months. This lead-time was used by MYRADA to work with the community and mobilize their participation. They conducted a survey of the whole project area with a view to understand the socio- economic and cultural background of the people. Thereafter, MYRADA decided to focus their attention on implementing those activitiy, which would help to build awareness among local people and organize the community to participate in watershed development activities. It included organizing and providing training to self-help groups, initiating community infrastructure development activities, forming micro-watershed associations, watershed federation, etc.

This lead-time was used by MYRADA to work with the community and mobilize their participation. They conducted a survey of the whole project area with a view to understand the socio-economic and cultural background of the people

With a view to involve local people in individual community based activities, MYRADA initiated community action programs in a few villages. Approach roads were laid down and other public utilities such as community toilets and bridges were constructed. The whole community was asked to participate in laying down the budget, deciding on their contribution, its nature and amount for works that were to be carried out in their villages. The community action program helped the local people to assert their views and also prepared them to participate in other development initiatives.

After executing the community action program, the local people were somewhat ready to plan for themselves. MYRADA informed them about the project in general and the role expected of them. It was made clear that when the AED came to ask for their opinion, they should be ready with a tentative map showing the location of various structures such as check dams, gabions, anicuts etc. to be constructed, and also community's contribution for the purpose.

Participatory rural appraisals (PRA) were carried out, after which people were able to decide where they wanted the structures to be constructed. Thus when the AED came to the watershed, the community was more or less prepared with a tentative map showing where they would like to have the structures.

This village map was later on handed over to the department so that they could check the sites, proposed by the people for technical feasibility. During actual site selection AED staff, MYRADA field staff and the local people went together. Although the department did not accept all suggestions made by the community but

there was requisite flexibility and minor adjustments were not difficult to make as rapport had been built with the community.

As agreed upon in the Memorandum of Understanding (Box 2) with IGBP the officials of the department and NGO met at least once every month. Both the department and the NGO counterpart kept regular contact with each other. They review the progress of ongoing activities and kept each other informed of latest developments. Problems and constraints were discussed and necessary action taken. These meetings are convened alternately by the two parties. If need was felt than informal meetings were held more than once a month.

Close interaction and rapport has been established between MYRADA and AED officials. AED staffs are invited to attend all meetings organized by MYRADA: This has helped the department to have closer interaction with the community.

People's response

The involvement of the people was a new and unique experience for both the government and the people themselves. In the regular programs of the government, local people are informed only after prior approval of the project. Normally few village level meetings are conducted to disseminate information and create awareness among local people about the new program but their views and opinion are generally not taken into consideration. In this particular project, however, there was a slight deviation in program conceptualization as compared to other ongoing programs of the government. Here much emphasis was given on communities' involvement and participation.

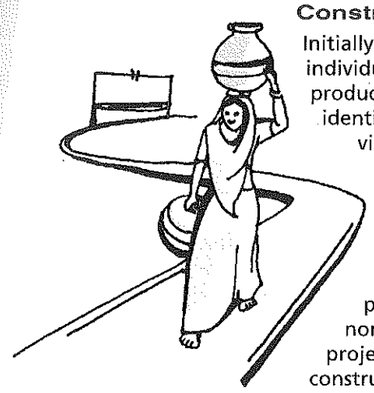
The community was informed about the financial constraints of the department. The response of the community was extremely positive. People understood the constraints and agreed to mobilize their own resources

In the beginning it was difficult for local people to accept this change in attitude of the department. There was a lot of reservation and doubts about the project, they could not believe that in this particular project the department would actually consult and take their opinion into consideration.

Although it cannot be contented that the local people were involved in all aspects of project design, planning, implementation and monitoring, they certainly have played a very positive role in the initial planning phase, monitoring and maintenance of the structures. With the passage of time, it has been realized by local people that their fears were baseless. The project has paid due attention to the views and opinion of the community and their participation were sought. Both the department and the NGO have been able to dissolve their differences and find out modalities to work with the local people.

The close cooperation between the department, the NGO and the people can be understood with the help of few examples.

Construction of community wells in the area



Initially the department had proposed to make community wells in a few individual farmers' lands. This would have helped to increase agricultural production and improve their standard of living. The NGO's help was sought to identify the beneficiaries for these wells. But the NGO did not agree with the view of the department. They felt it was a narrow perception as the benefits of the well would be limited only to a few farmers. They therefore tried to persuade the department to change their view and convinced them to have the wells in the village premises as it would benefit a larger section of the community.

The department agreed to make the requisite change but had a slight problem. Since the budget for the wells had been fixed as per government norms, therefore it was not possible to revise cost estimates. As per the project, an investment of Rs 1.5 Lac was to be made by the department for the construction of the community well. This included construction of the well, the

Box 2 Memorandum of Understanding

It is agreed today on the following by:

1. Indo-German Bilateral Project "Watershed Management" (IGBP)
2. _____ (SGD)
3. _____ (NGO)

The rationale for a cooperation between SGD & NGO'is to combine and utilize the respective experiences and strengths of the partner organizations towards a common objective namely Watershed Management by those living in the watersheds and improvement of their livelihood conditions.

While it is understood that this requires a combined effort of the partners, it is as well understood that a certain division of labour takes place in accordance with the experiences and strength of the cooperating partners.

Furthermore it is understood that any cooperation between different partners will only function in the spirit of mutual respect, understanding and transparency.

1. IGBP will advise and sponsor Watershed Management activities of SGD and of the NGO in the watershed ..... for a period of .....

These activities will be planned and implemented by SGD and NGO under mutual consultation.

The format for project proposal and the Guiding Principles listed in Annex will be the basis of the activities.

2. SGD and NGO will meet on a monthly basis to discuss the progress of the activities. Minutes of these meeting will be send to Indo-German Bilateral Project"Watershed Management" and Ministry of Agriculture, Soil & Water Conservation, New Delhi.

The convenor of these meetings will be alternatively the SGD and NGO.

3. SGD and NGO will attend meetings to discuss the progress of the activities on a half yearly basis. IGBP will be the convenor of these meetings and will issue the minutes of meeting subsequently.
4. SGD and NGO agree to develop a Joint Action Plan for all activities (yearly planning) under the guidance of IGBP by .....
5. This Joint Action Plan will be reviewed yearly and a detailed quarterly project planning will be prepared one year in advance. Indo-
6. SGD and NGO agree to develop the modalities and to organize watershed committees and local institutions in which all main socio-economic groups will be represented.

This watershed committee will be strengthened by all partners, in a such a way that the committee will handle all watershed management activities on its own after the termination of the project.

Place and Date _____

for IGBP: _____

for SGD: _____

for NGO: _____

pump house, and the motor. However there were other requirements such as land, electricity, pipeline, labor, etc for which the department did not have any budgetary provision.

Village level meetings were held with the community. After discussions, it was found that people had difficulty in accessing drinking water. Therefore it was proposed to construct community wells for drinking purposes. The community was informed about the financial constraints of the department. The response of the community was extremely positive. People understood the constraints and agreed to mobilize their own resources. Not only did they contribute land but also contributed 1/3rd of the total cost of investment in the form of either cash or labour.

Changing the design of particular structures

At Mellodyarahatti, the community wanted to have a pipe through the check dam, which had been proposed by the department. This was an extremely difficult proposition for the AED as these structures had been planned with fixed designs and estimates as per government norms and any deviation from it would create problems and delay. After prolonged discussions with higher officials the idea of the community was eventually accepted.

Future: handing it over to the people

From the outset, the project endeavored to strengthen the capacity of the local people so as to enable them to take over the responsibility of maintaining all the assets, which have been created during the project period. Keeping this in mind, various strategies were adopted by the NGO such as organizing self-help groups, forming micro-watershed associations, and organizing a watershed federation.

Self-help groups were formed in all the selected 26 villages of the watershed. Apart from regular credit management activities the groups were also involved in other activities related to the watershed by the department. The project provided each group with working capital support. This was done after observing the capacity of the groups to manage their own funds. Once the groups become self sufficient in handling their own resources, they were linked to the banks for direct financing.

In order to ensure holistic planning of the entire watershed it was felt that there should be a bigger forum of people. Prior to the project there existed farmers' associations, which had been formed and registered in 1993, as part of the River Valley Project (RVP) schemes of the Government of India. But as the RVP program was over, the farmers' associations were more or less defunct. They remained just symbolic entities without any clear understanding of their roles, responsibilities and functions.

The NGO revamped these farmers' associations and made them more representative. New elections were held for the office bearers, books of account were updated, registration was done and regular monthly meetings were held. These associations were later on expanded to form micro watershed associations, which was entrusted with the responsibility to plan watershed related activities for their villages. It was also decided that the interest accrued from the corpus fund (about Rs 1 Lac.) which was with the farmers' associations would be utilized for maintaining assets created under IGBP.

To take over the functioning of all assets created during the project period, the NGO envisaged the creation of a higher-level forum i.e. watershed federation. The members of all the micro watershed associations would be represented in the watershed federation. This body would be responsible to take up major issues related not only to watershed management but also other development activities in the area. The aim of the NGO was to make these associations self sufficient so that they can take the role of the NGO, after project withdrawal. Thus clear roles, responsibilities and purpose

were laid down so that it would carry on the work of the NGO in the future. Furthermore, effort has been made to integrate all line departments and other departments in the watershed activities.

Today micro watershed associations have been formed in each of the 26 villages. The watershed federation has also been constituted. All the farmers represented in the micro watershed associations are part of the federation. The federation has become an important people's forum for interacting with the officials of various institutions and other government departments. It takes up issues and programs with focus on soil and water conservation. The federation is presently playing a major role in convincing farmers to give the land adjacent to the gully for making bunds so as to reduce erosion.

It can be contended that the project has been successful at its endeavor to bring in collaboration between a government department and an NGO. The positive interrelation and interaction has had direct positive impact in the actual implementation of the project. These include:

Thus clear roles, responsibilities and purpose were laid down so that it would carry on the work of the NGO in the future. Furthermore, effort has been made to integrate all line departments and other departments in the watershed activities

- Joint meetings have been organized by the two agencies to discuss project-related problems with the village community. In certain cases, the NGO was even able to convince farmers to adopt certain prescribed treatments on their private land. For example while designing for small plots (about 1 acre or less) bunding could be adopted on the field boundaries rather than on actual contours.
- The community has exerted positive checks on the way the AED functions by creating pressures to fulfill promises made to them.
- Plantations of local varieties of trees, shrubs and grass species was encouraged.
- Locations for loose barriers have been modified in a few cases in response to suggestions from the local people.
- Local people were motivated in creating physical structures for stabilization of drainage lines.
- Village level organizations have been created such as the micro watershed associations, watershed federation etc. The micro watershed associations have taken over the responsibility of maintaining all the assets created under the project.

It was felt imperative to probe a little deeper so as to find out the reasons for this successful partnership. Both partners agreed that a positive attitude, mutual trust and respect for each others' capabilities was quite important for the success of the project. In addition to this, a certain degree of openness with the flexibility to differ and make constructive suggestions was an added advantage. When asked to comment on the acceptance of the NGO's capabilities by the government department, Mr. Rajkumar opined that the NGO's track record played a significant role and leadership also mattered.

Limitations

Despite the above positive aspects there are several limitations in the project, which still need to be worked upon. These include:

- Involvement of people is limited only to planning in watershed activities. They were not involved extensively at every stage i.e. planning, monitoring, implementation and evaluation. The participation of people is only partial i.e. only by way of contribution. The department decides on what kind of work or what kind of participation they want from the public. Therefore it is wrong to expect local people to take over the responsibility once the project withdraws.
- The NGO has only worked on common land and has not done anything on private land. Eliciting people's participation is more forthcoming when work is done on private land. Thus in some ways it is not completely integrated natural resource planning. For instance, the department generally works out the treatment plans alone and the NGO have a limited say in deciding upon technical specifications in the light of farmers' needs.
- NGOs have limited opportunities to alter the project design and to incorporate local concerns about earth works, manuring, drinking water facilities etc.

CONCLUSIONS

The experience of implementing the RWS program in the Kattery watershed has taught IGBP a few lessons, which need to be addressed so as to strengthen the collaborative effort between the state government department and the NGO. These are:

- All the three partners viz. the state government department, the NGO and the community should be involved right from the initial phase of the project. It is therefore imperative that the NGO be given lead-time of at least six months so that they can motivate and create awareness within the community about the program.
- For ensuring sustainability, it is important that the community be involved in all stages of project implementation i.e. planning, execution and follow- up management.
- Since the entire community would feel the impact, it is therefore necessary to involve and mobilize different class and caste groups within the community. Special emphasis should be given to the needs of women and particularly the poor and the disadvantaged sections of the society.
- It is desirable that the selected NGO should have some experience in the project area. However, in case that is not possible, then the NGO should take up certain programs which would cater to the felt needs of the people.
- For effective collaboration, it is important that both partners should have mutual respect for each other. Regular meetings should be held between the two partners to review the progress of ongoing activities.

While sustaining partnership can be challenging and sometimes extremely difficult, the experience of the IGBP in the Kattery watershed proves that it is worth the effort. This partnership has not only broadened the capacity of the local people, Department and the NGO but has also extended the impact of the project. It has resulted in greater accountability on the part of project partners towards achieving the aim and objectives of the project.

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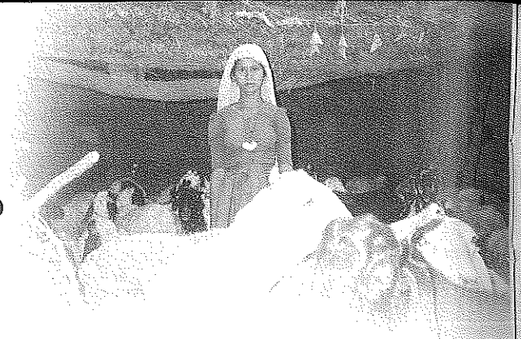


LOCAL INSTITUTIONS IN WATERSHED MANAGEMENT

Sandhya Chatterji • IGBP • New Delhi

COMMUNITY PARTICIPATION IN WATERSHED MANAGEMENT

The role and importance of community participation in ensuring the success and sustainability of watershed management is now widely accepted. Experience has shown that the nature and objectives of integrated watershed management require a participatory approach and the active involvement of communities. A watershed is basically a geographically defined unit; in real terms it is an area covered by one or more villages, in which agrarian communities depends on natural resources for a living. Over exploitation and deterioration of resources leads to a vicious circle of events and increase in poverty. Developmental interventions and watershed programmes must therefore include a realization that coordinated community activities are a major part of the solution to restoring the environment, its natural resources and the consequent economic rebuilding of the community.

In order to maximize the efficiency of exterior aid, the managers and owners of individual and common lands must be involved from the outset. Their first hand knowledge of their environment coupled with their local technologies are indispensable elements in the success of a watershed management project. If farmers decide themselves what type of measures are to be implemented, the activities are likely to be better adapted to local conditions and needs rather than measures imposed on them. In the event that new technologies are introduced, full maintenance and repair methods will also be accepted by the communities.

Participation of divergent community groups in project activities is, therefore, an important tool of conflict prevention and management

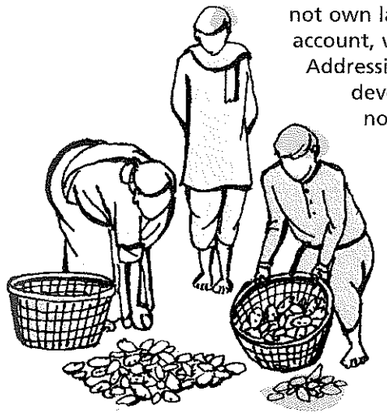
Since the impact of activities are felt by the entire community, it is clearly in the interests of a project that the divergent groups of the community be mobilized and motivated. These groups must include the landless – generally women – and other weaker social groups in order to balance the powerful influence of certain individuals and families on community decisions. And since the effects of projects are sometimes unwelcome for certain individuals and groups, it is imperative that the broadest consensus be made prior to the initiation of a project so that its negative impacts are reduced to a minimum. Participation of divergent community groups in project activities is, therefore, an important tool of conflict prevention and management. A sense of local ownership, identification with interventions and willingness to assume responsibility for management is the main benefit of community participation and therefore in achieving sustainable self-management. Within the possible spectrum of definitions, here community participation is taken to mean that people of the project area are active partners in the process of bringing about and managing change. Community involvement in a development project can be considered to range from active to passive participation. At one end of the spectrum, the community is a mere recipient of externally induced change (e.g. the passive participation of women who work as day wage labor or attend an awareness generation group meeting called by Government/NGO project staff). At the other end of the spectrum are situations where the community is actively participating in the project through representative groups by being in charge of commissioning, designing and executing the project, planning and managing financial transactions, and most important, setting up local self reliant maintenance and management systems (e.g. a self help group which decides to and provides group funds for starting and maintaining a fodder grass nursery).

Active community participation firstly implies that people want the change which is to be introduced and secondly are willing and motivated to contribute to and take responsibility for bringing about and managing the changed circumstances. One of the most important tasks of the implementing agency is to strengthen the self-help capacities of the local people by means of group mobilization and organization, and provide them with support in expressing and implementing their ideas and concepts.

Compared to men, women in India have less access to and control over land, credit and capital. In addition, they are less trained in the use of new rural technologies than men despite their significant contributions to natural resource management and agricultural production. Men and women have different types of rights and responsibilities concerning the use, management and ownership of resources and without understanding this mechanism, even well-intentioned activities could have a negative effect on men or women. The significance of this situation must not be forgotten for a watershed management project to be successful and sustainable. Gender roles cannot be overlooked. Different methods and tools for the assessment of gender roles have been developed, which can be modified and applied accordingly in the respective regions. Through a gender analysis detailed information on the gender roles and the division of labour can be obtained. This information is necessary in order to be able to identify and plan gender-specific solutions to gender-specific problems from the very beginning of a project.

One has to bear in mind that activities which address men exclusively, have in general, a direct or indirect effect on women. For example the introduction of new technologies which facilitate the work of men, might increase the workload of women (e.g. the use of mechanical ploughs, necessarily increases the areas which have to be weeded and this is usually done by women).

Furthermore, the access to decision-making village groups or institutions differs not only between different social and ethnic groups but also between gender. As men in Indian society are more dominant in public life, there is a danger that the interests of women will be overlooked. For example, in a watershed, a small dam for water conservation was built after discussion and agreement by the men but without consulting the women's groups. The dam flooded the path used by women to lead their animals to the grazing grounds and as a result they have to spend more time using a much longer route around. The experience has shown that without the conscious effort to include women in watershed management, the objectives of sustainability and efficiency is threatened. In the watersheds the main activities have to be land based and one has to keep in mind that women do not own land. Special attention has to be paid to take women's views equally into account, which often requires additional training, information and activities. Addressing women and empowering them can change and enhance the entire development process. Moreover, it should not be forgotten that women are not a homogenous group and that their interests vary greatly.



A gender approach, therefore, does not focus exclusively on women but on the relationship between men and women. The different potentials and constraints of men and women have to be considered at all levels and gender aspects have to be incorporated throughout the entire project cycle.

Self Help Groups (SHGs) in the context of watershed management

A number of examples from India demonstrate that activities for watershed development are sustainable only when there is strong community participation with viable local management groups that

represent and include all sections of the community living in the watershed. This is required since watersheds consist of families from diverse socio-economic backgrounds with diverse resource needs. Watershed communities include men and women from large farms with private sources of irrigation, small and marginal farmers with rainfed agriculture and landless families. Each sub group among them has different resource needs from the watershed and different use and management practices. The area to be considered under the watershed covers private, community and government owned land, all of which have different user rights for different community groups. There are thus a number of location-specific conditions in each watershed that will determine the types of user groups formed from among the community and the most appropriate watershed management practices.

Men and women have different types of rights and responsibilities concerning the use, management and ownership of resources, and without understanding this mechanism, even well-intentioned activities could have a negative effect on men or women

From a different perspective, most communities living in degraded watersheds represent the poorest among rural areas, who can certainly benefit from economic empowerment and increased incomes. Starting SHGs for economic empowerment and income generating activities can go a long way towards poverty alleviation among the inhabitants of the watersheds. Similarly starting small user groups can greatly influence the pattern of resource use and conservation and thus the regeneration of the natural environment.

From an institutional point of view, the aim should be to form an apex watershed association which represents a network of smaller groups of people living in the watershed. Each of the smaller user groups or self help groups are composed of members who are generally from the same community with strong links between them. Both types of groups can be brought together under a cluster body and a number of clusters into a federation. The apex bodies of the user groups and SHGs should become a part of the decision making process of the watershed associations and actively participate in watershed management activities.

Self Help Groups (SHGs)

Self help groups can be defined as a voluntary group of people who come together to take up group activities on a self-help basis which are meant for the benefit of the group. This type of group activity is increasingly being understood to mean group activities built around thrift and credit which allow the needy (usually poor women) to avail of micro loans to meet their needs. Forming self-help groups for thrift and credit activities will make it possible for the poorest to generate their own funds and become self reliant in managing their resource base. Establishing SHGs for starting income generation activities that provide alternative methods of earning a livelihood will not only improve the standard of living, but can also be an important method of generating group action for resource management in the watersheds.

Self help groups for thrift and credit can be formed among women and men who are from the watershed but may or may not belong to specific user groups. These groups can be linked to regional and state networks over a period of time, and can take on group contracts for watershed development works as part of their income generating activities. SHG members can also start a range of other income generating activities either as a group enterprise or for self employment.

The concept of organizing community SHGs to take up activities that benefit members of the group is not new. Various government and NGO programmes have been responsible for establishing a range of community groups such as Mahila Mandals, village development societies, cooperatives, etc., for taking up income generation and other developmental activities. However, in context of the number the of projects started, there were relatively few examples of success stories of SHG enterprise.

In the case of support for group activity related to income generation, many NGO and government programmes provided a stipend or other support to the project till

the group members were trained; few projects catered to costs for working capital or purchase of raw material; and generally expected the trained beneficiaries to start self enterprises on their own. Most of these income generation programmes could not be sustained, since the group members did not have access to rural micro-credit. In this context, the approach of generating rural credit through group savings of village women for their own development is proving to be a very successful one.

From an institutional point of view, the aim should be to form an apex watershed association which represents a network of smaller groups of people living in the watershed

Traditional credit delivery system

The traditional credit delivery system in India includes both formal and informal systems. The formal systems include financial institutions such as banks, cooperatives and government agencies/programmes, informal system includes part time money lenders, private chit funds, commission agents and traders.

An analysis of the credit needs of the poor reveals that they require small but regular and urgent loans for consumption, whereas formal government programmes which are meant to provide rural credit, do not cater to such needs. Nor can rural banks realistically take up the intensive work required to identify potential borrowers and follow up on utilization and recovery. The net result is that poor women and other disadvantaged groups such as scheduled castes, landless and small and marginal cultivators do have access to formal financial institutions for credit delivery. On the other hand, money lenders from the informal system are readily available to quickly give small loans for consumption within the village itself (making the credit system easily accessible to women and all groups of people as well). Under these conditions, many of the rural poor take loans at exorbitant rates of interest and fall into an ever escalating debt trap.

Towards alternate credit systems

Experience of projects from the 70s and 80s showed that those which included micro credit and participatory management yielded better impacts and results. However, the formal financial system could not cater to the needs of the rural poor. By the early 80s it had become clear that the existing credit delivery system (banks and cooperatives in rural areas), was unable of coping with the demand. At the same time experiences of credit programmes for agriculture and rural development were increasing. Projects such as the Kenya Cooperative Saving Scheme and Production Credit Scheme; Mutual Credit Programme of Korea; the Small Farmer Development Agency Groups in Nepal and the most famous Grameen Bank example from Bangladesh all went on to demonstrate that over time, huge resources can be generated from the rural poor and mobilized for a range of activities. Based on these experiences, the World Bank and ILO started emphasizing the need for shifting attention to improving access to rural credit and developing people's institutions which could link directly to financial and developmental agencies. This trend was reflected in policy changes of other donors and government programmes and thus the types of projects supported by them.

Against this backdrop, establishing SHGs around thrift and credit emerged as a viable alternate strategy for providing rural credit and involving people in the development process.

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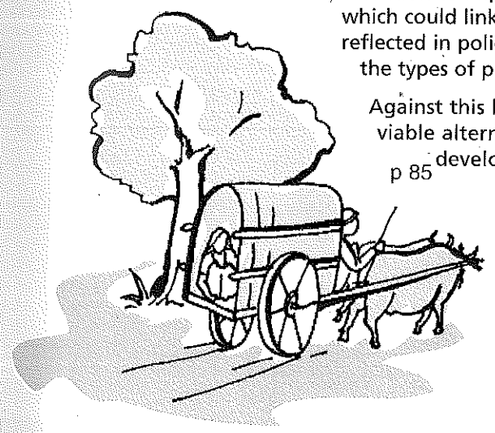


Self Help Groups for thrift and credit

The primary purpose of setting up SHGs around thrift and credit is to provide ready credit at an affordable cost to the rural poor for meeting both their consumption and investment needs. By lending money to individual members from a corpus fund of group savings and loans mobilized from banks, the SHGs give their

members access to credit as and when needed and in the process, give them access to other alternatives for improving livelihoods. Once these groups have matured in loan taking and repayment, and have established links to financial institutions - banks, they become part of the mainstream development process.

As such SHG networks can mobilize funds from financial institutions on a more permanent basis; offer opportunities for growth through economies of scale for group activities; can be easily and widely replicated; and finally lead to increasing the self esteem and self respect of SHG members by providing the support of a group. SHGs for thrift and credit thus combine the flexibility of small informal community groups (generally women) with the formal financial institutions and mainstream development. They provide a collective voice and force for generating other forms of development and for improving the social status of the members, generally women (and sometimes men) from poor families.

LOCAL INSTITUTION BUILDING UNDER THE INDO-GERMAN BILATERAL PROJECT "WATERSHED MANAGEMENT"

The Indo-German Bilateral Project "Watershed Management" (IGBP) was initiated within the Central Government of India sponsored schemes - River Valley Projects and Flood Prone Rivers. The project components included improvements in hydrological/sediment monitoring; aspects of social development and integrated watershed management measures implemented with peoples' participation and various training programmes for the government and NGO staff implementing the IGBP project.

Table 1

RWS	State	Area (ha)	State Dept	NGO
Burhanpura	Rajasthan	1200	Forest Dept	KIGS
Karkara	Bihar	1750	DVC	PRADAN
Arki	H.P.	2460	Forest Dept	SUTRA
Kattery	Tamil Nadu	2976	Dept of Agri Engineering	MYRADA
Nawazgarh	U.P.	2375	DoA, Soil Cons Dept	BSNSS

Five representative watersheds were selected for implementing the IGBP Representative Watershed (RWS) Programme. These micro watersheds have been selected from among the most degraded watersheds in the country as per the AISLUS categorization. They fall between 1000 - 3000 ha., are relatively accessible by road and cover different agro-climatic zones and socio-economic conditions.

Phase I – 1989 to 1992 The first phase of the project started in 1989 with the installation of Silt Monitoring Stations (SMS) as proposed by the Central Government, Ministry of Agriculture. The approach was essentially geared to research, centred around technical issues, namely the collection and evaluation of hydrological data and training of government field level staff in operation and maintenance of hydrological equipment. However, it was soon realized, that these activities were not sufficient to solve the causes and problems of erosion and that the role of the local population had been entirely neglected. The need for additional activities became obvious and the need for involving community participation was addressed in the next project phase.

Phase II – 1992 to 1997 To involve community participation in the project, NGOs were co-opted in community mobilization and location-specific development activities in a pilot programme covering five representative watersheds.

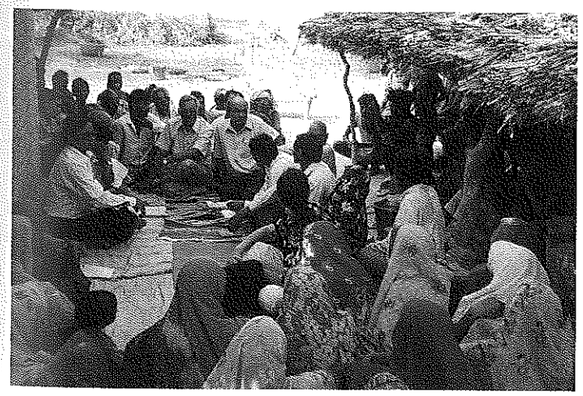
The pilot programme of Representative Watersheds covered five different agro-climatic, socio-economic, cultural and institutional conditions in Himachal Pradesh, Uttar Pradesh, Rajasthan, Bihar and Tamil Nadu. In each RWS a treatment plan was developed in cooperation with the State Government Department and the respective NGO. It was thereby the responsibility of the NGOs to facilitate and encourage the participation of the local communities in the planning process. This was done mainly through dissemination of information, Participatory Rural Appraisal (PRA) and local group formation. In order to ensure programme replicability, low cost investment and intensive use of local technology is essential. It is relatively easy to create a model of watershed management through high investment but impossible to replicate such a programme on a wider scale.

Each NGO planned community-based activities according to their past experience and perception of people's needs and thus followed an independent course of action. Their interventions dealt with activities such as income generation, biogas plants, artificial insemination centres, women's savings and credit groups, training women in veterinary techniques, small irrigation dams, exposure visits, water harvesting structures and tribal development programmes. Following the mid-term project evaluation in 1996, it was decided to give emphasis to local institution building as a major activity. The NGO staff were trained and a framework was developed which gave the local NGOs the necessary freedom to implement their plan of action while at the same time making sure that the fundamental objectives of integrated watershed management were not overlooked.

Two planning workshops were conducted in which the 5 partner NGOs exchanged experiences and identified problem areas and potential solutions. The major findings of the workshops highlighted the following areas for greater coordination and action. The major issues identified were:

Planning

- A treatment plan for the entire watershed should be prepared jointly by the staff of SGD/NGO and discussed with the local communities. The suggested changes should be incorporated where feasible and a detailed action plan agreed upon.
- NGO field staff participate in planning so that their experience is incorporated into the process with adequate attention to seasonality and duration of activities.



- Guidelines should be prepared for the NGO and SGD extension staff, for methods of local group formation/functioning and for implementing soil and water conservation measures which include technical specifications.
- An information package should be developed with materials generated from the project. This should include visual information on watersheds, local groups, etc. meant for the local villagers and include graphics/printed training materials in Hindi to be used by NGO staff and village level workers.
- There should be a memorandum of understanding between the NGO and SGD,

clearly stating roles and responsibilities and a monitoring system to ensure that final treatment plans are followed by both.

Coordination between SGD/NGO

- A formal forum for discussion should be created and the SGD/NGO workers should meet every month to discuss issues related to progress and send minutes of these meetings to the IGBP.
- Regular meetings with village groups should be fixed and attended by SGD/NGO staff jointly to give information, take decisions and increase transparency of project.
- Decision makers of both agencies meet periodically to discuss progress and enforce what is decided in the action plan. IGBP staff participate in these meetings if required.
- Decision makers from both SGD/NGO and key field staff in project do not change, to provide continuity of direction and ensure that training given under the project is used for making project activities more effective.

NGO institution building

- Each NGO appoints a project manager who is located in the project area and does not change for the duration of the project to provide the required continuity.
- Women extension workers are selected/given required training and other support.
- Monitoring and evaluation systems are introduced; staff is trained in these methods.
- As required, training is provided on management, PRA, gender, technical issues, etc.
- Exposure visits and workshops/seminars are organized at periodic intervals.

Local institution building

- People's organizations are formed and strengthened before any other type of activity is taken up, so that local groups can participate in future development.
- Considering the poor economic status of people in every watershed, income generation schemes should be started to strengthen the local groups.
- Through local groups, information should be given to all village inhabitants on project activities, to increase transparency and reduce confusion.
- Where needed, technical training should be given to enable people to grasp concepts, monitor the progress of activities and participate in decision making.
- Local groups meet SGD/NGO staff regularly to review progress, some key meetings should be attended by SGD/NGO decision makers on a quarterly basis.
- On an experimental basis, once the SHGs are strong decision making bodies, financial control over selected project activities can be handed over to the group to increase that sense of ownership and ensure long term sustainability. IGBP will first approve the selection of groups and the amounts to be transferred to the local group's account.

Phase III - 1997 to March 1999 On the basis of the deliberations in the workshops, the main activity involved in local institution building in Phase III was identified as the strengthening and consolidation of the self-help groups for thrift and credit. In each watershed, a withdrawal strategy was worked out and the NGOs concentrated on ensuring that the groups formed were linked to financial institutions and could function independently after the project was over.

SHG formation in each RWS

The five NGOs involved in implementing the IGBP project varied considerably in their approach to local institution building for watershed management. The NGOs PRADAN and MYRADA represent national level organizations with branches in a number of states and thus are part of national and state level networks. In comparison, BSNSS, SUTRA and KIGS are grassroot organizations with a limited scope of operations in terms of area/villages covered. An overview of the SHG activities is given here:

PRADAN

The project component for mobilizing participation in project activities implemented by PRADAN was basically through the formation of women's self help groups for thrift and credit. Under IGBP, 35 SHGs were formed with a membership of over 700 women who regularly save and take loans. So far most group members have taken and repaid loans. Under the PRADAN model, groups of approximately 20 women from a single village form a SHG. The members meet once a week and the women deposit Rs 5 to the group fund, the amount decided by the group on the basis of their individual financial capacity. By pooling their money and receiving a matching grant from IGBP (via the federation of SHGs – DAMODAR), the SHGs have been able to increase availability of funds at a low interest rate. These loans have been used for both productive and consumptive purposes; medical treatment, marriage ceremonies, farming assets, seeds, fertilizer, etc. With enhanced availability of financial resources, the villagers have been able to negotiate for better labour wages during the annual lean season. The women's groups have become a strong presence in the village and due to their solidarity and strength, are able to help resolve village problems such as alcohol abuse and associated violence. So far three clusters of 35 SHGs have been formed under IGBP. Formalizing the SHGs has been done under the banner of the DAMODAR Federation, a registered body to manage the functioning of the SHGs after the withdrawal of PRADAN.

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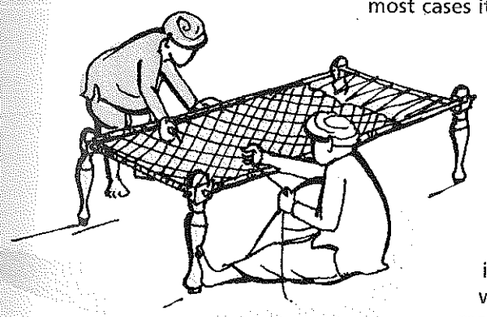
In general, motivation levels are high and women are interested in making the SHG activities a success. There is relative flexibility in the rules and regulations governing the functioning of the groups and women have taken loans for health needs, purchase of livestock and agricultural implements and other activities. Interest is charged for the loans and the rate is fixed by common consensus. In most cases it is quite high (12-24%, but this is still much less than the local moneylender, and thus very acceptable to the group members). Three groups have matured to the stage of taking loans from local banks under the refinance scheme of NABARD and are repaying the loan at an annual interest of 12%. The SHGs are emerging as pressure groups for contacting the district administration for implementing development schemes.



MYRADA

MYRADA is the second national level organization to be involved in the project. MYRADA's approach to watershed development begins with the PRA exercises, where people's needs emerge and plans are made to solve or manage them. MYRADA helps in enabling the local groups to mobilize support for these solutions through the formation of

SHGs. The SHGs identify local common issues and often have easily identified solutions to them. This helps in preparing a common action plan and in forming watershed management associations. The main focus of MYRADA's support to the SHGs is training to become self reliant in management, accounting, marketing, etc. and for managing the natural resource base. The key of the success of the local watershed association was that it is a local body which interacted directly with government departments for various development activities. MYRADA's approach includes a withdrawal process which leaves the watershed management associations in real control of decision making.

SUTRA

SUTRA falls among the medium sized grassroot NGOs in the country and is well known within the region. SUTRA like PRADAN has its network of smaller NGOs, though it functions as a regional rather than a national resource centre. SUTRA implements most projects through village women's groups and its strengths lie in its capacity to motivate and mobilize women. Most of its village level extension workers and functionaries are women. SUTRA began work on local group building and strengthening exclusively with women from these groups, which though inactive, provided an existing structure which could be revived and strengthened. The mahila mandals formed/strengthened under IGBP are strong local groups, which have demonstrated the capacity for group decision making and implementing watershed related activities. Plantation and protection of fuel, fruit, fodder and small timber trees on common land has been promoted to meet increasing needs of people and to reduce the pressure on reserved forests. It was the responsibility of the women's groups to decide on the species and numbers of trees to be planted: the necessary seedlings were provided by SUTRA from its own and Forest Department nurseries. The mahila mandals have also been able to motivate the local community to adopt "social fencing", to keep animals out of common lands and allow for natural regeneration and survival of saplings planted.

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Savings and Credit activities have been started in the SHGs formed from the women from mahila mandals. So far 17 SHGs have been formed representing women of all 39 hamlets. All 17 groups are carrying out savings and credit activities and are in the process of being linked to banks. All the groups have office bearers and regularly conduct meetings and document proceedings. The savings amount varies between Rs 5 to Rs 20 per month in the SHGs.

KIGS

The fourth NGO is the Kumarappa Institute of Gram Swaraj (KIGS). The approach followed to generate community involvement in the project has mainly been through contact farmers and demonstrations of improved agriculture and the installation of energy saving devices. Initiating people's action in watershed management was by organizing Village Development Committees (VDC) which consist of 15-20 men elected by the village community. Each VDC in turn elects a representative. These representatives meet once a month to exchange experiences and discuss their problems with the KIGS field workers.

Women's self help groups have been formed for thrift and credit and for income generation activities. Eight SHGs have been formed. Six of these are women's groups and 2 are men's groups. Two of the women's groups which were formed in the initial stages had 32 and 40 members each and have since been sub divided. All the other groups have less than 20 members. The major activities of the SHGs is savings and credit. Loans have been taken by members of all groups and the repayment is good with no defaulters. Four SHGs have been linked to banks and 2 groups have taken loans from banks as well. Meetings are regularly conducted and all accounts are maintained.

BSNSS

The fifth NGO to be associated with the IGBP is BSNSS. The NGO has progressed from a focus on education to agriculture and appropriate technologies for environmental conservation. While BSNSS has previously formed local groups for various purposes, they were introduced to the concept of thrift and credit societies and self-help groups, as a result of their involvement in the project. The NGO thus was able to form SHGs and create viable local community-based organisations for self management of the watershed they live in.

Twenty three SHGs were formed and are functioning well. They conduct regular meetings and keep minutes and every member contributes regularly. Each member gives Rs 10 per month as agreed by the members. Loans have been taken and repaid. The interest charged is between Rs 3 and Rs 5 in different groups, as decided by the women themselves. In some SHGs the office bearers are illiterate and local persons/NGO staff assist in book keeping. Seven of the SHGs have already been linked to banks.

CONCLUSIONS

One of the ultimate outcomes of the IGBP's RWS programme has been the formation of SHGs and watershed management committees which will manage watershed development activities and handle the co-ordination of developmental activities in the field of rural development and community organisation.

The project has assisted the Ministry and state departments in establishing technical guidelines based on the lessons learnt in the IGBP project. These guidelines will enable the Ministry to implement and replicate similar integrated watershed management on a national scale.