analysed and communicated to experts and lay readers. It is not enough, however, to simply measure the programme impacts. Local participation is necessary to interpret the results of impact assessments. Local interpretations can verify extractively collected data and help locate causal mechanisms.

In addition and in the spirit of participatory development, extractive data should be combined with community-based reassessment of local problems. Effective natural resource management programmes must work closely with local people to be successful (i.e., only with local knowledge and participation can programmes be a success). Since local problems and preferences change over time, impact assessments should be used as an opportunities to re-establish contact with beneficiaries, asking them to give suggestions as to how programmes could be fine-tuned to accommodate mutating problems arising from changing perceptions.

Local interpretation of assessment findings can be done through PRAs or informal interviews with key informants. Both should be carried out with several different sorts of key informants (selected on the basis of wealth, status, gender and location) so that their responses can be triangulated. In addition, final reports should be shared with beneficiaries at large. This can be done through women's self-help groups, farmers groups etc. During these discussions the investigators should assess how local people interpret findings and how programmes could be modified to improve outputs.

IV

RATING INDICATORS

Given that there could be an almost infinite number of potential indicators to measure the impact of watershed management programmes, evaluators have the luxury of choosing ones that suit their unique needs. Most watershed management programmes, however, face resource constraints. For example, the current level of investment in the IGBP's RWS programme is approximately Rs5000/hectare (about DM229/hectare at the current rate of exchange). As such, the programme must be executable under tight resource constraints.

The following subsections are to be used in conjunction with the Survey of Indicators presented in Chapter V. Each subsection begins with a brief discussion of a particular resource constraint. A scale is then presented with which potential indicators can be scaled *vis á vis* this constraint. This is done so that various indicators can be compared in terms of resource demands.

EQUIPMENT COSTS

Equipment costs can vary greatly from indicator to indicator. An indicator whose use entails only observations or oral surveys requires no tools (apart from writing utensils). A silt monitoring station, on the other hand, requires expensive equipment that is also costly to maintain.

The table below, presents a scale for rating perspective indicators as to their potential equipment costs. These costs are rated against the total programme budget for a particular programme site.

RATING INDICATORS—EQUIPMENT COSTS

Rating	Conditions
++	No special tools required to use the indicator.
+	Tools with minimal costs (< .5% of total programme budget, or < Rs 25/ha). This is less than Rs 50,000 for a 2000 hectare watershed.
-	Tools with high costs (.5% to 3% of budget, or Rs 25/ha to Rs 150/ha). Rs 50,000 - Rs3,00,000 for a 2000-hectare watershed.
- - -	Tools with prohibitive cost (> 3% of budget, or > Rs 150/ha). This is greater than Rs 3,00,000 for a 2000 hectare watershed.

SKILL LEVEL

Regardless of the tools employed, some indicators are more difficult to execute than others. While many factors can make a tool more or less difficult to use, the ease of use is defined here in terms of the amount of training beyond literacy that is necessary to employ an indicator (which is different from the skill level necessary to design the indicator or to analyse the data from the indicator). For example, a literate villager can learn how to read a rain gauge and make data entries onto a table. On the other hand, conducting a Participatory Rural App-raisal requires a great deal of formal education, in addition to specialised training.

The following scale is used in the Survey of Indicators to rate perspective indicators with regards to the skill levels required of those who execute the indicator. Final analysis of the data collected must, however, always be carried out by trained professionals.

RATING INDICATORS—SKILL LEVEL

Rating	Conditions
++	Semi-skilled labour (costing approximately Rs 70 - 100 per day).
+	Skilled labour (costing Rs 100 - 150 per day).
-	College Graduates (Rs 200 - 500 per day).
- - -	Expert Consultant (Rs 1000 - 5000 per day).

MAN HOURS

It is possible for the use of an indicator to require no special tools or training to use, yet its use could still be labour intensive. For example, a relatively unskilled person can measure soil runoff in a stream with very simple tools. However, he must take two samples every hour, each of which must be filtered, dried and labelled. This must continue twenty four hours a day, especially during the monsoon months. Such an indicator is incredibly labour intensive.

The following table presents a scale that is used in the Survey of Indicators to rate perspective indicators as regards their total labour requirements.

RATING INDICATORS—MAN HOURS

Rating	Conditions
++	Use of the indicator requires < 1 man-day per watershed per year.
+	Use of the indicator requires approximately 1 - 2 man-days.
-	Use of the indicator requires 3 - 5 man-day.
- - -	Use of the indicator requires >5 man-days.

THE NUMBER OF FIELD VISITS REQUIRED

Resource requirements are also affected by the number of site visits required to execute an indicator. This is because travel and per diem costs in the field can be expensive. Some indicators can be fully deployed in just one site visit. This is especially true when participatory methods are used. Other, more scientifically-measured indicators require multiple site visits in order to record the changes that have occured over time.

RATING INDICATORS—FIELD VISITS

Rating	Conditions
++	The indicator can be fully executed (including tests for change) in 1 field visit.
+	Use of the indicator requires at least 2 field visits.
-	Use of the indicator requires 3 - 4 field visits.
- - -	Use of the indicator requires more than 5 field visits.

INTERACTIONS BETWEEN COSTS, SKILLS, MAN HOURS AND VISITS

These four factors combine to determine the total resource demands of a particular indicator. Labour costs are the product of the number of man hours required and the necessary skill level of that labour. Total costs are then a sum of this product with equipment costs and the number of field visits:

Total Costs = (Man Hours * Skill Level) + Equipment Costs + Field Visits

All else being equal, indicators with lower total costs are favoured.

RESPONSIVENESS—OBTAINING RESULTS AS QUICKLY AS POSSIBLE

While this is not really a monetary resource constraint, the issue of responsiveness is related to the efficient use of time. As such, perspective indicators are also rated concerning their responsiveness in the Survey of Indicators . Less responsive indicators register changes in the target objectives more slowly than do responsive ones. For example, while the effects of an erosion control programme will register almost immediately in terms of decreased soil loss, the effects of an poverty alleviation programme may take years to show up as it is measured anthropometrically.

RATING INDICATORS—RESPONSIVENESS

Rating	Conditions
++	The indicator registers change in the target objective almost immediately.
+	Change is registered within 6 months.
-	Change is registered within 1 year.
- - -	Change takes 3 years or more to register.

The table on the previous page presents a scale used to rate perspective indicators concerning their responsiveness.

MONITORING AND EVALUATING PILOT PROJECTS VS. PROJECTS AT THE DEMONSTRATION OR REPLICATION STAGES

Evaluating the impact of a pilot project is necessarily much more resource intensive than monitoring well established schemes. In the case of pilot projects, much more care must be taken to study its complex effects. With projects in the replication stage, project managers should already have a good idea of project impacts. At this stage managers should be more concerned with efficient implementation. This can be measured with far fewer resources and in less time. The tables in this book have been constructed with pilot projects in mind.

V

COMMONLY USED INDICATORS: A SURVEY

LITERATURE SURVEY

Given the objectives of watershed management, there are possibly an infinite number of indicators that could be used, some much more effectively than others, to evaluate programme impacts. The Survey of Indicators presents a collection of indicators that could be employed to measure changes concerning the objectives discussed in Chapter II. These indicators have been gathered from the available literature on impact assessment (see the Recommended Readings), from consultations with informed parties, as well as being created by the author. As per the discussions in Chapter IV, all indicators have been rated with regards to their equipment costs, training needs, total man-hours required, the number of necessary field visits as well as responcivness. These ratings are based only on the author's estimations.

This table was constructed so that other organizations could benefit from the results of IGBP-funded research. Given that indicator sets are programme-specific, it is unlikely that another organization, even one focusing on issues of watershed management, would be able to use the exact same indicator set proposed in this report. Other organizations should, however, be able to construct their own indicator sets by drawing from this table.

SURVEY OF INDICATORS

Objective	Criteria	Indicator	Sub Indicator	Equipment [1]	Skill [2]	Man Hours [3]	Field Visits [4]	Responsive [5]	Method [6]
Natural Resource Management and Environmental Protection — **Soil**	Quantity	soil runoff in local streams		- - -	++	- - -	- - -	++	S
		depth of top soil		+	-	-	+	++	S
	Physical quality	water infiltration rates		+	-	-	- - -	++	S
		water-holding capacity		+	-	-	- - -	++	S
	Chemical quality	fertility		+	-	- - -	- - -	- - -	S
		salinity	salinity of sampled fields	+	-	-	+	++	S
			hectares of land too saline to farm	++	-	-	++	- - -	P*

*As discussed in Chapter III, participant indicators can be fully executed in just one field visit. It is nevertheless true that results are generally better with multiple field visits.

1. Indicates the cost of the equipment needed to implement the Indicator. Measured on a scale of "++" to "- - -", with "++" signifying no special equipment needed. See Chapter IV for details.
2. An indicator is easy to use if it requires no special training on the part of the field staff. Measured on a scale of "++" to "- - -", with "++" signifying no special training needed. See Chapter IV for details.
3. An indicator requires little labour if the data collection can occur in one man day. Measured on a scale of "++" to "- - -", with "++" signifying very rapid data collection (inside of one day). See Chapter IV for details.
4. The number of field visits required to fully execute the indicator. "++" signifies that only one field visit is necessary, while "- - -" means at least five visits are required. See Chapter IV for details.
5. Indicates, on a scale of "++" to "- - -", how quickly the indicator registers changes in the target objective, with "++" signifying almost immediate results. See Chapter IV for details.
6. Indicates the data gathering method to be used, "S" for scientific/extractive methods, "P" for participatory methods. "E" signifies that either can be used. In the case that E is present, the scores in the other columns are for scientific methods. See Chapter IV for details.

SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equipment	Skill	Man hours	Field Visits	Responsive	Method
Soil (Cont.)	Chemical quality (Cont.)	alkalinity	alkalinity of sampled fields	+	-	-	+	- - -	S
			hectares of land too alkaline to farm	++	-	+	++	- - -	S
		local fertiliser purchases		++	-	+	+	-	S
	Biological quality	presence of beneficial soil micro-organisms		+	-	-	+	++	S
		rate of organic matter composition		+	-	-	+	-	S

SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equip-ment	Skill	Man Hours	Field Visits	Resp-onsive	Method
Natural Resource Management and Environmental Protection — **Water**	Quantity	ground water level		+	++	+	- - -	++	S
		water consumption per capita		++	-	-	++	-	P
		land area under irrigation		++	-	-	+	-	E
		flow patterns in local streams		+	++	- - -	- - -	- - -	S
	Quality	pH		+	-	-	+	++	S
		coliform		+	-	+	+	++	S
		dissolved oxygen		+	-	-	+	++	S
		waste water treatment coverage		++	-	-	+	++	S
		use of pesticides		++	-	-	++	++	P
		toxins in soil		+	-	-	+	++	S
		dissolved solids in soil		+	-	-	+	++	S

SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equip-ment	Skill	Man Hours	Field Visits	Resp-onsive	Method
Natural Resource Management and Environmental Protection — **Flaura and Fauna**	Quantity	crop yields	produce volumes in local markets	++	-	++	+	-	S
			yields measurements	+	-	- - -	- - -	- - -	P
			land prices	++	-	+	+	- - -	E
			farmer production forecasts	++	-	- - -	++	++	P
			trader estimates of supply	++	-	-	+	-	S
			local wholesale prices of agric. commodities	++	+	++	+	- - -	S
		# animals kept		++	-	++	++	- - -	P
		animal productivity	e.g. # eggs produced	++	-	-	++	-	P
		land under irrigation		++	-	-	++	- - -	P
	Bio-diversity	species comp. & distrib.	presence of an indicator species	++	- - -	- - -	++	- - -	S
	Sustainable management of forest resources	tree cover		++	- - -	- - -	+	- - -	S
		wood harvesting intensity		++	- - -	-	++	- - -	P

SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equip-ment	Skill	Man Hours	Field Visits	Resp-onsive	Method
Wealth	Income/wealth/ employment	ownership rates of various consumer durables		++	-	-	++	-	P
		consumption rates of specified non-durables	e.g., alcohol consumption *	++	-	-	++	+	P
		local daily wage rates (actually paid)		++	-	+	++	++	P
		size of land holding		++	-	-	+	- - -	E
		family without milk buffaloes or cows		++	+	-	+	+	E
		months of food sufficiency		++	- - -	-	++	++	P
		migration rates		++	- - -	-	++	- - -	P
		fertiliser consumption		++	-	-	++	-	P
		unemployment and under employment rates		++	-	-	++	++	P

*Inferior to measures of consumer durables because consumption of non-durables is easily forgotten or concealed.

SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equip-ment	Skill	Man Hours	Field Visits	Resp-onsive	Method
Wealth (Cont.)	Income/wealth/ employment (Cont.)	loans taken from money lenders or banks — number and amount		++	-	-	++	-	P
		hours worked as wage labourer		++	-	-	++	++	P
		savings		++	-	-	++	++	P
	Housing	quality and size of residences		++	-	-	++	- - -	P
		floor area per person		++	-	-	+	- - -	S
		households with minimal shelter		++	-	-	++	- - -	P
	Physical plant and infrastructure	improved infrastructure in project area *		++	- - -	+	+	++	S
		investments in physical plant		++	-	++	+	++	S
	Misc.	family size >6		++	-	-	++	- - -	P

*It is important to only count investments for which the program is responsible.

A SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equip-ment	Skill	Man Hours	Field Visits	Resp-onsive	Method
Gender Parity	Females are not in poorer health than males	height-for-age analysed along gender lines		+	-	-	+	- - -	S
		male-to-female population		++	-	-	+	- - -	E
		male-to-female life expectancy		++	- - -	-	+	- - -	E
	Equity in education	male-to-female school attendance (enrolment) ratio		++	-	+	+	-	E
		male-to-female highest grade in school attended		++	-	-	++	- - -	P
		male-to-female literacy rates		++	-	-	+	- - -	S
	Equity in wages	male-to-female wage rates		++	-	++	+	- - -	S
	Women in public life	women present at planning/ monitoring/evaluation meetings		++	+	-	++	++	P
	Equity in the home	increased share of household income goes to women		++	-	-	++	++	P
		increased decision making power for women in the household		++	-	-	++	++	P
Economic Equity	Distribution of income/wealth amongst beneficiaries	distribution of anthropometric measures	height-for-age	+	-	-	+	- - -	S
			height for weight	+	-	-	+	- - -	S
			arm circumference	+	-	-	+	- - -	S
		distribution of cons. durables		++	-	-	+	- - -	P
		distribution of land		++	-	-	++	- - -	S
		distribution of children enrolled in school		++	-	+	+	-	E

SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equip-ment	Skill	Man Hours	Field Visits	Resp-onsive	Method
Health	Improved levels of nutrition	anthropometric measures	height-for-age	+	-	-	+	- - -	S
			height per weight	+	-	-	+*	- - -	S
			arm circumference	+	-	-	+	- - -	S
		household nutritional survey		++	-	-	+	++	E
		pregnant women with anaemia		+	-	+	+	+	S
		age when breast feeding ceases		++	-	+	+	- - -	E
		households with no cash crop for sale		++	-	-	+	-	E
	Medical care	percentage of children having received measles, TB and DPT inoculations		++	-	-	+	- - -	S
		access to health care		++	-	-	++	- - -	P
		patient to doctor/nurse/ paramedical ratio		++	-	++	+	- - -	S

SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equip-ment	Skill	Man Hours	Field Visits	Resp-onsive	Method
Health (Cont.)	Hygiene	access to sanitation facilities		++	-	-	++	++	P
		access to safe drinking water		++	-	-	++	+	P
		time lost from work or school due to illness		++	-	-	++	++	P
	Fertility and mortality	fertility rates		++	-	-	++	- - -	P
		life expectancy		++	-	-	++	- - -	P
		infant mortality rates		++	-	-	++	- - -	P
		below five years mortality rates		++	-	-	++	- - -	P
		contraceptive use rates		++	-	-	++	- - -	P
		maternal mortality rates		++	-	-	++	- - -	P

SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equip-ment	Skill	Man Hours	Field Visits	Resp-onsive	Method
Education	Literacy	literacy rates		++	-	- - -	+	- - -	S
		grade 5 graduates		++	-	-	+	- - -	P
		land area under irrigation		++	-	++	+	-	S
		school attendance rates		++	-	+	+	-	E
	Infrastructure exists for education	teacher to student ratios		++	+	++	+	-	S
		quality of school building		++	-	++	+	-	S
Participation	Beneficiaries help decide how project resources will be used	was original project planning done with PRA?		++	-	-	++	++	P
		have subsequent PRAs been conducted ?		++	-	-	++	++	P
		number of beneficiaries attending planning meetings		++	+	-	++	++	P
		frequency of planning meetings where beneficiaries are present		++	-	-	++	++	P
		do "expert" staff consult regularly with beneficiaries?		++	-	-	++	++	P
	Beneficiaries operate and manage project	presence of "outside" personnel/beneficiaries in project operations		++	- - -	-	++	++	P
		presence of "outside" personnel/beneficiaries in project management		++	- - -	-	++	++	P

SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equip-ment	Skill	Man Hours	Field Visits	Resp-onsive	Method
Sustainability	Beneficiaries demonstrate demand for the project (s)	unit use rates		++	- - -	-	+	++	E
	Reliability of units	number of units in working order		++	- - -	-	+	++	S
	Cost sharing	percentage of beneficiary contribution to unit construction and maintenance		++	- - -	++	+	++	E
	Human capacity development	Do local people administer/manage the projects ?		++	- - -	+	+	++	E
		Is maintenance expertise locally available in the market ?		++	-	+	+	++	E

SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equip-ment	Skill	Man Hours	Field Visits	Resp-onsive	Method
Sustainability (Cont.)	Institutional capacity	vitality of local NGOs	density of NGOs	++	- - -	-	++	++	P
			attendance rates at NGO meetings	++	-	-	++	++-	P
			average # of meetings per year	++	-	-	++	++	P
		Are local-level representative bodies functioning?	How often do panchayat bodies meet?	++	-	-	++	++	P
			attendance rates	++	-	-	++	++	P
		density of linkages between NGOs, bureaucracy and political organisations		++	- - -	-	++	++	P
		Are there regular meetings between NGOs, bureaucrats and/or political figures?		++	- - -	-	++	++	P
		How autonomous (administratively, financially) are project units?		++	- - -	-	++	++	P
		Is there a mechanism though which beneficiaries can modify the project (should conditions change and resolve disputes?)		++	- - -	-	++	++	P
		Are local project personnel familiar with and do they work with other local groups (NGOs, the state private firms and/or research institutes)?		++	- - -	-	++	++	P

SURVEY OF INDICATORS (Cont.)

Objective	Criteria	Indicator	Sub Indicator	Equip-ment	Skill	Man Hours	Field Visits	Resp-onsive	Method
Replicability	Community ability to independently expand services	facilities upgraded (without project support)		++	-	-	++	++	P
		additional facilities built (without project support)		++	-	-	++	++	P
	Transferability of agency strategies (Is the program at a pilot, demonstration or replicability stage?)	presence of specialised personnel		++	-	-	++	++	P
		Does the programme exist within local administrative framework, or is it autonomous?		++	---	-	++	++	P
		Does the programme have a specially provided and/or protected budget?		++	---	-	++	++-	P
		Does the program have a specially provided and/or protected budget?		++	---	-	++	++	P

VI

METHODOLOGY AND LOGISTICS

After spending close to six weeks testing and refining the Programme Evaluation Protocol (PEP) under field conditions, it was clear that it can be used to quickly, cheaply and easily measure physical and socio-economic realities in rural watersheds. In less than twenty working days an assessment team was able to execute the PEP in two representative watersheds. Of course, the field visits required substantial preparation. This chapter discusses in detail the methodological and logistical preparation necessary to execute the PEP.

SELECTION OF THE RESEARCH SITES

In order to give the PEP a thorough testing, the IGBP decided that it would be tested in two Representative Watersheds. Kattery RWS in Tamil Nadu and Arki RWS in Himachal Pradesh were selected.[3] Given the size of the watersheds (both in terms of area and number of residents) and the number of investments made by both the NGOs and the state departments, a comprehensive survey of the watersheds was not possible.

The question then arose, as to how the watersheds could be sampled such that the impact of RWS programmes could be evaluated? The common, scientific approach would have been to randomly select for evaluation a sample of villages within each watershed. A random sampling of villages would not have been meaningful, however, because the state departments and the NGOs have not spread their investments evenly within the watersheds. For example, to maximise effectiveness, MYRADA has chosen to focus its efforts on select villages of the Kattery Watershed. The purpose of the evaluation was not to determine the percentage of the watershed that has been treated, but to determine how successful the treatment has been.

The decision was, thus, made to survey only those areas where work had been done. NGOs and state departments were each asked to choose a village that they thought represented their best efforts in the RWS programme. The logic behind this decision was that each organisation would be keen to show off its best work.

[3] These RWSs were selected based on two criteria. First, since the ultimate goal of the Protocol is to measure physical and socio-economic change, watersheds that have achieved the most progress were selected. Second, given that executing the Protocol requires the assistance of the partner NGOs and state departments, it was important that the evaluation team work in the watersheds where those organisations have shown the most competence. The consensus at the IGBP was that the Kattery Watershed in Tamil Nadu and the Karkara Watershed in Bihar topped the list in both categories so they were selected. Due to some last minute administrative problems, the Karkara Watershed had to be dropped. The Arki Watershed in Himachal Pradesh was chosen instead.

KATTERY RWS

The Kattery Watershed has a Government of India Erosion Priority Status of "Very High". It is located high on the upper reaches of the Nilgiri Hills of Tamil Nadu (2400 meters is the maximum elevation). The watershed is the

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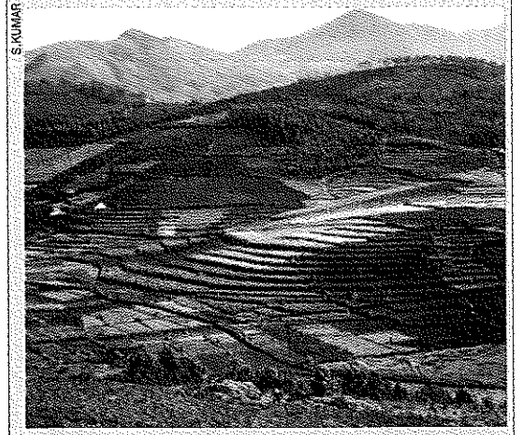

largest of the IGBP's five RWSs, with an area of just under 3000 hectares. Most of the watershed's inhabitants earn their living through the commercial production of green leaf tea and "winter" vegetables such as potatoes, carrots, cabbage and beets. Data from an earlier socio-economic survey (funded by the IGBP) indicates that twenty percent of the inhabitants own more than five acres of land or work in towns. Forty percent own from two to one half acre of land (such people must also engage in wage labour to survive). The remaining forty percent own less than one half acre of land, or are totally landless. In the realm of caste, sixty percent belong to the ibackward classesî category, while thirty percent fall in the category of "scheduled castes"

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In addition, it was felt that they would be more co-operative with the evaluation if their "best", not their "worst" work, were scrutinised. This is a methodologically sound strategy that could be used elsewhere when organisations need quick, inexpensive evaluations. The goal of an evaluation is to determine the effects that investments have had. It is safe to assume that the NGOs and state departments will accurately pinpoint where their best work has taken place. The evaluation team can then conclude that all other investments have been less effective than the ones that are seen. The weakness of this approach is that the evaluation team will not be able to determine whether the conditions they have seen are representative of the other treatments that have been executed.

In practice the selection process proceeded somewhat other than planned. In Arki, the Forest Department did not comply with the request that they select a village. The NGO staff, therefore, was left to select the villages. The NGO staff, however, was unable to come to a decision (they appeared to lack leadership). As a result, the IGBP professional responsible for the Arki RWS "helped" them make the decision. With their approval, he selected three villages: Senj, Thamogi and Kolka. When the Forest Department officers were informed of this choice of villages, they showed no objections.

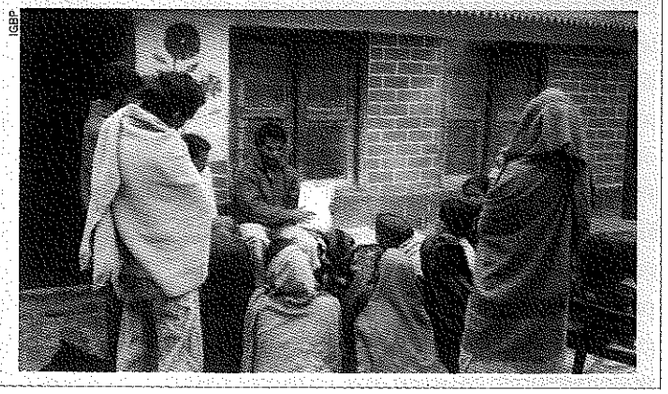
Officials from the Tamil Nadu Agriculture Engineering Department (AED) and MYRADA requested that the Evaluation Team change its survey criteria to suit

ARKI RWS

Like Kattery, the Arki Watershed has a Government of India Erosion Priority Status of "Very High". The Arki Watershed is located in the Himalayan foothills of Himachal Pradesh (elevation ranging from 800 - 1200 meters). It is the second largest watershed (2460 hectares) and the most difficult to traverse due to difficult terrain and a lack of roads. There is no socio-economic survey available on Arki. It is, however, widely agreed that most of Arki's inhabitants receive at least a part (if not much) of their income from family members who work for the state government, generally outside the watershed. Those remaining in the villages (mostly women, children and the aged) work the fields—which are more subsistence-oriented than commercialised—growing maize, wheat and some vegetables.

S.K. YADAV

IGBP



their situation. These two organisations are proud of the fact that they have worked together successfully. They suggested that surveys be conducted in one village where only MYRADA has worked, in a second where only the AED has worked, and in a third village where the two organisations have worked together. The evaluation team agreed and asked them to select villages in each category where they had done their best work. MYRADA gave the team a tour of its works in the watershed and asked it to choose. After some discussions, the team chose the sister villages of Salamoor-Dodanni as the example of MYRADA's solo efforts, and Mellodyarahatti as the village where MYRADA had worked with the AED. AED staff, however, gave the team little input (they were almost entirely uninvolved with the PI's reconnaissance visit). In the end, MYRADA also helped the team choose a village, Michael's Colony, where only the AED had worked. The AED did not object. In retrospect, however, Michael's Colony was probably not a village that the AED would have chosen as a showcase of their work had they given it some thought.

While the selection of sites within each RWS did not go as planned, this methodology is still recommended. In the future, evaluators simply need to be more adamant that the partner organisations choose the areas which represent their best work. The selection can be done much in advance, before the actual evalu-

ation process begins. Perhaps the partners can be prompted to make this choice with a preliminary letter.

SELECTING THE ASSESSMENT TEAM MEMBERS

In order to speed up the process of collecting data while in the field, an evaluation team should be assembled. The amount of data that needs to be collected has to be weighted against the burden of personnel management. Since the field tests discussed were only a trial evaluation, and many procedures were still uncertain, the decision was made to take only two other team members so that the PI could be closely involved at all steps. In retrospect, an evaluation team comprising three members was appropriate for the IGBP's watersheds. Data collection of the sort proposed is often a very personal process (i.e., sitting with people and asking them questions). For such a task, a large team would not have been appropriate.

IGBP

The evaluation team with members of SUTRA (Arki, Himachal Pradesh)

Team members were selected with an eye to certain skills, including language. Large amounts of the data needed to be collected through group discussions. Leading such discussions requires excellent oral language capabilities. Using translators during such discussions often destroys the natural flow and feeling of the exchange. Without an informal, conversational dynamic, informants are less willing to share their knowledge.

Keeping this in mind, the PI selected team members such that each was a native speaker of one of the local languages—Hindi in Arki and Tamil in Kattery. These language skills proved to be essential, especially when interacting with villagers who spoke minor dialects of the said languages (native speakers are best able to deal with such difficulties). It is highly recommend that evaluations relying upon informal interview techniques, especially group work, employ team members who are native speakers of the local language.

The gender of the team members was also an important consideration. Given the very wide division in gender roles in India, it is often difficult for male evaluators to work effectively with female beneficiaries in the watershed, and vice versa. Without female team members, any open discussions with local women would have been more difficult. In fact, a team of only male evaluators may not even be allowed to speak with female villagers alone. When conducting the stunting study, which requires the team members to work closely with children and their mothers, female team members were again preferred. On the other hand, some of the informal conversations which the PI needed to have with senior NGO and state department officials occurred in situations totally inappro-priate for women in India. In the light of these experiences, it is recommended that all evaluation teams have both male and female professionals.

The PI looked for team members with several other professional capabilities. Again, given the nature of the PEP, team members needed to have prior experience doing participatory assessments. On-the-spot acquisition and refinement of skills is better avoided. Also, much of the interviewing to be done was open-ended and concerned technical aspects of rural development. For this reason, team members needed to have some background in rural development issues.

Finally, the PI had mistakenly believed that in order to successfully carry out the stunting study, which requires the use of some medical equipment, team members needed to have some paramedical experience. This proved to be untrue. With a basic amount of training, stunting measurements can be taken by anyone with an eye for detail. Thus, paramedical experience is not necessary.

Taking into consideration language problems and the costs of travelling with a team, it is possible that a principal investigator may wish to find research assistants on site. This may be the best option if only one site is to be visited. If the evaluation is to be carried out at more than one site, this approach will necessitate multiple training sessions. Moreover, if multiple sets of research assistants are used, the PI will not be able to benefit from the comparative insights that team members offer. Finally, if the PI hopes to assemble an evaluation team locally, he should first make inquires into the local availability of qualified candidates.

RECONNAISSANCE VISITS

As recommended in the preliminary PEP, the PI visited each watershed prior to the actual evaluation. These reconnaissance visits served several purposes. First, since each RWS is unique, the PI needed an overall tour to get a feel of the RWS, especially as regards the individual activities that were being implemented there. The PI also needed to sit with the state department and NGO personnel to select the villages to be surveyed. These villages were then individually visited. This was done both to familiarise the PI with research sites and to gain the trust of the villagers. Finally, the PI arranged acceptable dates and a timetable for the actual evaluation with the NGO and state department. Once the basic framework and tentative schedule were in place, the PI prepared detailed questionnaires to be used during the evaluation.

In retrospect, the reconnaissance visits were not a worthwhile use of resources.

Multiple trips to each watershed, even if only by the PI, proved expensive. During this preliminary evaluation, travel accounted for a significant part of the total expenses. Yet, the benefits were not commensurate. At times the reconnaissance trips were even counter productive. Approaching this exercise as an operation that could be planned and executed in a highly structured fashion alienated a large number of people in the watersheds. A less structured approach would have been a more appropriate means to deal with issues like local holidays, bad weather, officials taking unexpected leave, etc.

In the end, all of the preliminary work could have been done during the first few days of the actual evaluation. In fact, the preliminary work would be an excellent way to familiarise the entire evaluation team (not just the PI) with the RWS. In the future, the entire evaluation team should simply make one, slightly longer visit to the watershed being surveyed. All necessary tasks can be accomplished during one visit.

WORKING WITH PARTNER STATE DEPARTMENTS AND NGOS

For the sake of objectivity, it is recommended that the PEP be executed by outside evaluators. Carrying out the evaluation will, nevertheless, require close collaboration with partner state departments and NGOs. For example, the evaluation team will have great difficulty commencing its research unless members from either the state department or the NGO provide local contacts. Without an appropriate introduction from someone known to them, local villagers as well as professionals and even government officials may be suspicious of the evaluators. Only after an introduction can information begin to flow freely.

Partner NGOs and state departments are also invaluable as sources of information about programme activities in the watershed. They are the actual executors of all activities, so they know exactly what and where the programme investments are, when they were made, with whose help, and so forth. The team must get this information from the partners themselves, especially if programme reports are inaccessible, incomplete or out of date. In addition, individual members of the partner organisations, who have a thorough knowledge of the activities, should be used as key informants regarding such complex issues as uncovering the emergence of new social capital. It is likely that members of the partner organisations will be called on to actually help in the evaluation process. In the interest of keeping the team small, the PEP specifies that certain assistants should be located in the watershed itself. For example, the "stunting" study requires the help of at least two assistants to manage the children being measured. Junior members of the partner organisations seem to be the most feasible candidates (they are educated, available, and often know the local children) for such work.

Working with partner organisations creates special problems, however. These organisations are concerned that evaluations show their work in a positive light.

THE FOREST DEPARTMENT AND SUTRA: PARTNER ORGANIZATIONS IN ARKI RWS

In the Arki Watershed, the Forest Department is the partner state department and SUTRA is the partner NGO. Arki RWS actually falls within the jurisdiction of two separate Forest Officers, one stationed in Arki and the other in Dharlaghat (the latter being responsible for the upper reaches of the watershed). Until now the IGBP has only worked with the Arki officer, although in 1998 work will begin in Dharlaghat. Each office is staffed by a Forest Officer and four or five Forest Guards.

The Forest Department has focused its efforts on forestry programmes and in the construction of erosion control structures. To speed up work on the forestry front, the Department has developed a nursery for saplings. This has been carried out on departmental land, and the saplings are also distributed among the inhabitants of the watershed. Newly planted lands are protected from overgrazing by the planting of "live fences"(rows of cacti-like plants). Some of the lands had to be cleared of a pest plant called "lantana" before the planting of saplings. Finally, the Forest Department has built a large number of loose boulder dams (called "check dams" by the Forest Department) to decrease stream velocity and capture silt.


S.K. YADAV

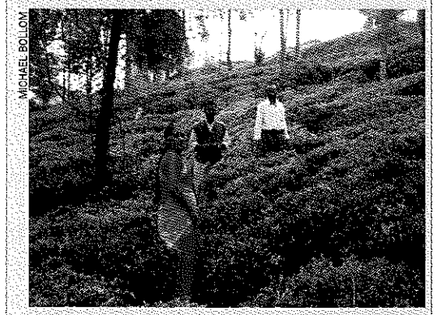
SUTRA is a regional NGO based in Jagjit Nagar, H.P. It began as a field office of the Rajasthan-based Social Work Research Centre, which was a leader in NGO-centred approaches to grassroots development in the 1970s. SUTRA has over time become autonomous and is now registered as a separate NGO. Most of its efforts are focused on organising and empowering women. SUTRA currently has four full-time staff stationed in Arki. SUTRA's efforts in Arki have been very wide-ranging (one might say, unfocused). It has made efforts to build up social institutions through self-help groups (in this case, only for women). It has also tried to set up a Watershed Federation. In addition to institution building, the NGO has implemented a series of activities, including training para-vets, constructing "smokeless" stoves in private homes, constructing compost pits and solar cookers. SUTRA has also done some work in the realm of social forestry, setting up sapling and nappier grass nurseries. They have also encouraged local villages to set up tree and fodder plantations on common lands.

If they are relied upon too heavily, they may (even if only unconsciously) bias the data collection in their favour. For example, during one of the participatory evaluations, NGO staff began to slide into the discussion when the intended participants (the villagers themselves) were not giving what NGO staff thought the villagers' answers should be. While this is a natural thing for them to do, as they have dedicated themselves to helping local people voice their desires and complaints, it biases the evaluation.

Thus, partner organisations should be worked with sparingly and with caution. The evaluation team may request their help (especially during the early stages), but should gradually distance them during sensitive phases of the data collection process. Such a strategy, followed too rigorously, is likely to create suspicion amongst all but the most self-confident partners. This is difficult to avoid. To deal with this problem, the PI worked out a two-fold strategy. First, he offered to include the partner organisations in some

THE AGRICULTURE ENGINEERING DEPARTMENT AND MYRADA: PARTNER ORGANIZATIONS IN KATTERY RWS

In Kattery, the IGBP works with the State of Tamil Nadu's Agriculture Engineering Department (AED) and an NGO called MYRADA. The AED has focused its efforts on physical, erosion control structures. It has also built check dams (structures designed to hold water), gabions (loose bolder construction to slow the flow of water and capture silt), and landslide control structures (in the form of stream retaining walls). It has also built community wells.



MICHAEL POLLOM

MYRADA is a nationally recognised NGO, based in Bangalore. While it began as an organisation dedicated to help resettle Tibetan refugees, it has since diversified. It is now well known as a pioneer in PRA techniques, which it now trains people to use. Four field staff currently staff the MYRADA office in Kattery. This MYRADA office has focused its efforts on building social institutions (they have also assisted with the building of physical structures such as community wells, paths and roads). MYRADA's institution-building efforts began with the formation of "self-help" groups of ten to twenty people from a single village. In an effort to empower women, MYRADA encouraged the formation of separate groups for women. Women's groups focus their efforts on savings, while the men's groups are oriented towards agricultural issues. Separate Village Infrastructure Development Committees (whose members are drawn from the self-help groups) are now being set up to deal with village infrastructure issues. Finally, a "Watershed Federation", with representatives from each self-help group, is now in place. This Federation is expected to manage all activities within the watershed, even after programme support is withdrawn.

of the evaluation work. For this, the PI carefully chose more objective measures less closely associated with the NGO's work. For example, NGO staff helped gather school attendance statistics. They also helped conduct the stunting studies.

When the partner's work was being directly evaluated, the PI tried to keep them busy with some other task, like gathering the enrolment data or simply helping elsewhere in the village. When this sidetracking was not possible, the PI simply explained to the partners that the evaluation team wished to gather some particular data by its own devices. It was not enough to let partners stand by silently; the PI had to insist that they leave the site when the team engaged in activities like participatory discussions. Just the physical presence of staff from the partner organisations affected what people said. In the context of working closely together, asking them to comply was difficult, embarrassing, and at times created ill will; yet it was necessary to do this.

At the same time, the evaluation team needs to keep in mind that its relationship with the partner organisations is not adversarial. Evaluators and partner organisations should all have the same goal—seeing that activities are being effectively implemented in the interest of beneficiaries. Operational separation is maintained for the sake of objectivity and professional integrity.

RECOMMENDED RESEARCH ITINERARY

Nine days each were allotted for the evaluations in Arki and Kattery (exclusive of travel time). This was enough time to complete all the required tasks. Recall, however, that nine days was exclusive of a reconnaissance trip, which the PI undertook earlier (and in the future should be omitted). Thus, a new timetable has been worked out to include the tasks that were accomplished during the preliminary visits. According to the PI's estimations, a baseline visit should take no more than ten days per watershed (exclusive of travel time). The table below shows one way of organising a research schedule.

The first three days (referred to in the rest of the text as "Gearing Up") have been left unscheduled. This allows plenty of time to get acquainted with people and places before actually beginning to gather data. Scheduling of site visits and finding the necessary research assistants should take place during these days. After this comes the "Field Visits", when data for *Ground Water, Height-for-age, Consumer Durables, School Attendance,* and *Social Capital* are collected. The "Stunting Study" can be carried out during or after the Field Visits, depending on how many people there are on the evaluation team. Once these two phases are complete, the "Participatory Sessions" can begin.

It needs to be kept in mind that these time estimates are liberal, so there is room for bad weather, unpredicted holidays, etc.

Follow-up evaluations will take longer, approximately fourteen days per watershed. This is because the indicators *Use* and *Outsiders* are time consuming. The table below shows one way of organising a research schedule. As in the previous table, the first three days are left open for orientation and organisation. Again, time estimates are liberal.

Note that the order in which some of the

POSSIBLE TIMETABLE FOR FIELD VISITS—BASELINE

Indicator	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10
Soil Loss*	Get acquainted with partners	General tour of watershed	Consultation with partners							Wrapping up loose ends
Ground Water				▬						
Consumer Durables								▬	▬	
Height-for-Age					▬	▬				
School Attendance					▬	▬				
Prepare Participatory Discussion							▬			
Social Captial					▬	▬	▬	▬	▬	
Particapatory Discussions of Extractively Obtained Data								▬	▬	
	GEARING UP			FIELD VISITS				PARTICIPATORY SESSIONS		WRAP UP

*Data should be supplied by project engineer before going to the field.

indicators are executed is important. While this method is an imperfect substitute for using controls, the PEP often suggests that causality be explored through participatory discussions of findings with beneficiaries. For example, villagers are likely to be able to tell evaluators why recorded levels of water in local wells is changing. But in order to use this method, all the necessary data must be gathered and tabulated before any participatory discussions take place. This means that the data for *Soil Runoff, Ground Water, Height-for-age, School Attendance* must be collected and analysed before the participatory discussions can take place.

Finally, all the time estimates given here do not include the extra time that will be required to use control groups.Controls help specify the causal mechanisms of change (i.e.,"Is our programme responsible for these improvements?"). Controls are less important for indicators like *Durables, Enrolment, Use, Outsiders* and *Social Capital,* where people themselves can tell evaluators the reasons that there has or has not been change. But when dealing with phenomena like soil erosion, which are less immediate to people's lives, controls are essential. Evaluators must decide for themselves how heavily they wish to rely on controls. Itineraries must then be adjusted accordingly.

POSSIBLE TIMETABLE FOR FIELD VISITS —FOLLOW-UP

Indicator	Day 1	2	3	4	5	6	7	8	9	10	11	12	13	14
Soil Loss*														
Ground Water														
Consumer Durables														
Height-for-Age														
School Attendance														
Prepare Participatory Discussion														
Use														
Outsiders														
Social Captial														
Particapatory Discussions of Extractively Obtained Data														
	Get acquainted with partners	General tour of watershed	Consultation with partners											Wrapping up loose ends
	GEARING UP			FIELD VISITS							PARTICIPATORY SESSIONS			WRAP UP

*Data should be supplied by project engineer before going to the field.

VII

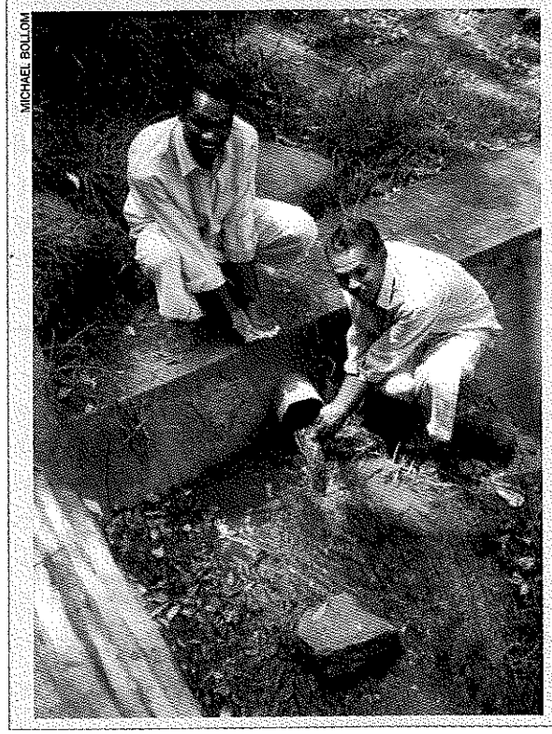
THE SELECTED INDICATOR SET

Nine indicators were chosen from the Survey of Indicators to create an indicator set for evaluating watershed management programmes. This chapter examines these nine indicators in detail. Each indicator is discussed in terms of the objectives towards which it measures progress and how it should be implemented in the field. Side boxes present the findings of the IGBP-sponsored evaluations that used these indicators.

THE FINDINGS: THE INDICATORS WORK!

In most cases, the evaluation team was able use the indicators to gather baseline data on the two watersheds. The findings generally show Kattery RWS to be more advanced than the Arki Watershed. In Kattery, the ground water levels were less erratic, the children here were taller and attended school longer. IGBP activities enjoyed generally higher levels of use and maintenance in Kattery, despite being less dependent on help from outsiders. In addition, institutions that can manage watershed issues are emerging in Kattery while they appear to have been stillborn in Arki.

Findings with regard to the measurement of change are, not surprisingly, inconclusive. Most of the indicators in the protocol were not designed to measure change in a single site visit. Multiple evaluations over time are required. In order to look for conclusive evidence of change, another evaluation will have to be conducted several years hence.



MICHAEL BOLLOM

In a few cases, the evaluation team was able to gather data that tentatively document change, or the lack of it. For example, the team was able to obtain time series information on school attendance rates from school masters. This data actually demonstrates little change in school attendance rates over the last five years.

Even where actual changes were recorded, they generally could not be directly linked to IGBP activities. This is not surprising given that the RWS Programme has been in operation for less than two years. There are exceptions to this, however. In Kattery the increased wealth (more consumer durables) in one village was linked to MYRADA's efforts to develop a micro-finance activity. In Kattery there is also some evidence that the Watershed Federation (another MYRADA activity) has begun to serve as an institution which promotes and facilitates collective action *vis á vis* certain water-related issues.