special equipment and can be carried out with low levels of training. This indicator is not, however, particularly reliable. Attendance on any one day is subject to many factors, including the weather, festivals and cropping patterns. As such, attendance figures gathered even on two successive days might be quite different. For this reason, it is still recommend that the data gathered be discussed with an administrator—he or she will know if the attendance on a particular day is unusual or not. (If a high degree of reliability is required, then enrolment figures should be used instead.) Another weakness of this indicator is that it requires the use of controls.

Indicator 6: Use and maintenance

This indicator (referred to as "Use") is very closely associated with the indicator, "Outsiders." For this reason, many of the comments made here will also apply to "Outsiders." The text will make clear which statements apply to both. "Use" and "Outsiders" are the process indicators in this set.

They do not attempt to measure the impact that a programme's activities have had. Instead, they give some idea of how successfully the activities themselves are functioning. With such information, evaluators can better understand the mechanisms through which programmes have affected the treatment area, and also in some manner predict the future impacts.

TARGET OBJECTIVES

This indicator measures project sustainability. If many of the units that have been installed under some activity are not functioning or improperly maintained while outside support is still coming in, it is likely that even fewer will function after outside support is withdrawn. Such an activity is not sustainable.

MEASUREMENT PROCEDURES

The execution of this indicator is highly time consuming. Determining the extent to which programme activities are being used and maintained requires that members of the evaluation team visit at least a sample of units from every activity in the watershed. During the test evaluation this entailed a lot of travelling, much of it over difficult terrain. If an evaluation must be completed very quickly, investigators may prefer to omit this indicator.

Definitions of impact indicators should be formulated in consultation with the people who have implemented the activities.

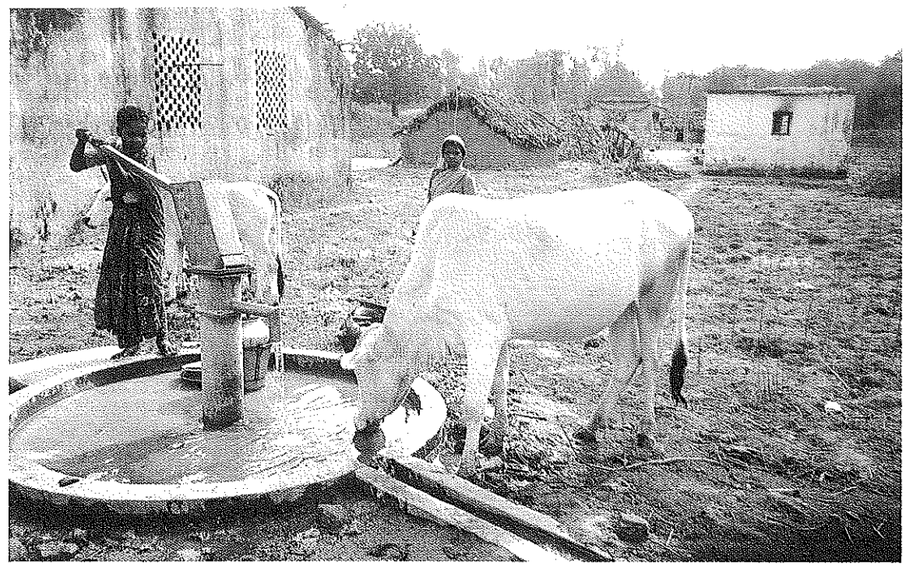
The evaluation team must survey all of a project's activities in order to determine how frequently they are being used and how well they are being maintained. At this point sampling becomes an issue. During the present evaluation, if an activity had only a few units in the watershed, the evaluation team surveyed all of them. If this was not possible, only those units in the selected villages were surveyed. For some activities, so many units existed that even this was not possible. In such cases, random visits were made to the units.

Before going to the field, evaluators must define the terms "heavily used", "lightly used", "well maintained" and "poorly maintained" for each activity. For example, the evaluation team decided that smokeless stoves must be used for cooking everyday to be defined as "heavily used". Explicit definitions prevented qualitative appraisals from becoming too subjective. Developing these definitions can challenge the imagination, especially when it is difficult to determine what it means to "use" or "maintain" units of a particular activity. For example, how does one use a check dam? In such cases, only levels of maintenance can be checked for. Definitions of both use and maintenance should be formulated in consultation with the people who have designed the activity.

OUTLOOK AND RECOMMENDATIONS

This indicator gave the evaluation team a clear understanding of how well the project work is proceeding, on an activity-by-activity basis. While it relates little about the project's impacts, it is essential for understanding the mechanisms through which the project is making an impact.

This indicator is a valid, if only partial, measure of programme sustainability—when units in an activity are being heavily used and highly maintained, it is very likely that the activity is sustainable. While it is not perfect, this indicator is also sufficiently reliable. A single field visit may miss periods of high or low use. To circumvent this the procedures for this indicator combine a field survey with participatory discussions. In addition, this simple indicator requires no special equipment and, because it is a purely participatory indicator, it does not require the use of control groups. For these reasons this indicator is strongly recommended, except in the case of extreme time constraints.



Indicator 7: Dependence of programme activities on outsiders

This is a process indicator that produces information about the sustainability of a activity.

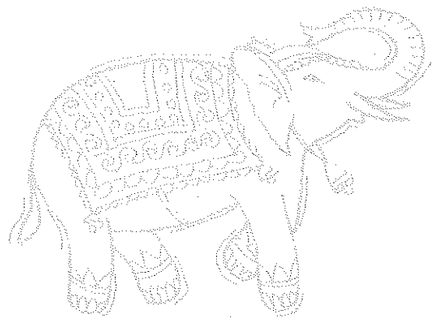
While "Use" presented information regarding use and maintenance of units in an activity, "Outsiders" tells evaluators whether the operation and maintenance of an activity is dependent upon outside expertise, funding, etc. If it is, the activity will probably cease to function after project funds dry up.

TARGET OBJECTIVES

If a project's local programmes are operated and/or managed by outside personnel, then levels of active local participation are lower. In addition, the presence of outsiders is an indicator of project sustainability and replicability. If local people cannot manage and operate an activity by themselves, it will eventually collapse when outside support is withdrawn. In addition, if an activity cannot be run without the help of outsiders, it is also less likely to be widely replicable in other areas.

MEASUREMENT PROCEDURES

In many cases, deciding whether someone is an "outsider" is quite easy. A foreign consultant brought in from abroad is an outsider. In some activities, however, the definition of who is actually an outsider can be difficult. Essentially, an "outsider" is someone who would not be involved with an activity were it not for programme funding. This can even include local people who carry out certain tasks under the employ of the programme. For example, in the project Arki watershed one of the NGO staffers is a young woman who has always lived there. In all the activities analyzed she is an "outsider" in the sense that she will cease to carry out her current responsibilities once the project withdraws funding and the NGO office shuts down.



Gathering the data involved informal discussions with people who use and/or operate units for all NGO and state department activities. The visits for "Use" and "Outsiders" were undertaken simultaneously. While investigating use and maintenance issues, the evaluation team asked questions regarding the people who keep each particular activity in operation. This involved obtaining answers to a series of questions: Who operates the units in this activity on a day-to-day basis (and where do they come from)? Who maintains them? Who supplies the spare parts? Where do the finances for on-going operations come from? If group action is necessary, who organises it? The answers to many of these questions required follow-up interviews with the people named, in order to determine why they are in the watershed and who pays their salaries. Information gathered in the field was verified during the participatory sessions, which took place later.

OUTLOOK AND RECOMMENDATIONS

Participation and sustainability are very difficult concepts to concretise and measure. Like "Use", this is a valid, if partial, measure of both—if the operation and maintenance of a activity is not dependent upon outsiders, then the activity has a much higher potential for survival when the programme funds cease. Given a thorough investigation of who operates and maintains an activity, this indicator should also be fairly reliable. While various evaluators may begin their investigations with different units, their questions should lead them to similar answers regarding those responsible for operation and maintenance of the overall activity.

"Outsiders" is, along with "Use," a time-consuming indicator. On the other hand, no special equipment is required. Time constraints aside, this was a very important indicator for understanding the sustainability of a project's various activities. If, however, time constraints are severe, and if information about processes is significantly less important in comparison to studying impacts, it should be omitted from the indicator set.

Indicator 8: Replication

Replication of successful innovative activities without outside support means that these activities will continue beyond the project's duration.

TARGET OBJECTIVES

This indicator is a measure of replicability. If local people replicate some programme output without support, it implies that there is a local demand for the units, a willingness to pay for them, and the necessary skills to construct, use and probably maintain them. In such a case, the programme is definitely replicable, at least in the surrounding areas. It is also likely to be replicable in other locations with similar geo-climatic conditions and socio-economic resources.

MEASUREMENT PROCEDURES

The methodology for this indicator is rather ad hoc. Evaluators simply need to scan for and inquire after evidence of programme outputs that have been upgraded or replicated without programme support. Inquiry is probably the best starting point, especially for information regarding replication, because copying of programme units may be taking place in remote areas, or areas outside of programme coverage. Any leads should be followed up and personally confirmed by evaluators. While gathering data on replication, evaluators should also inquire about facilities that have been upgraded or modified. All leads should be personally confirmed. Evaluators should also look for evidence of up-gradation and modification when they are conducting surveys for the indicators "Use" and "Outsiders."

OUTLOOK AND RECOMMENDATIONS

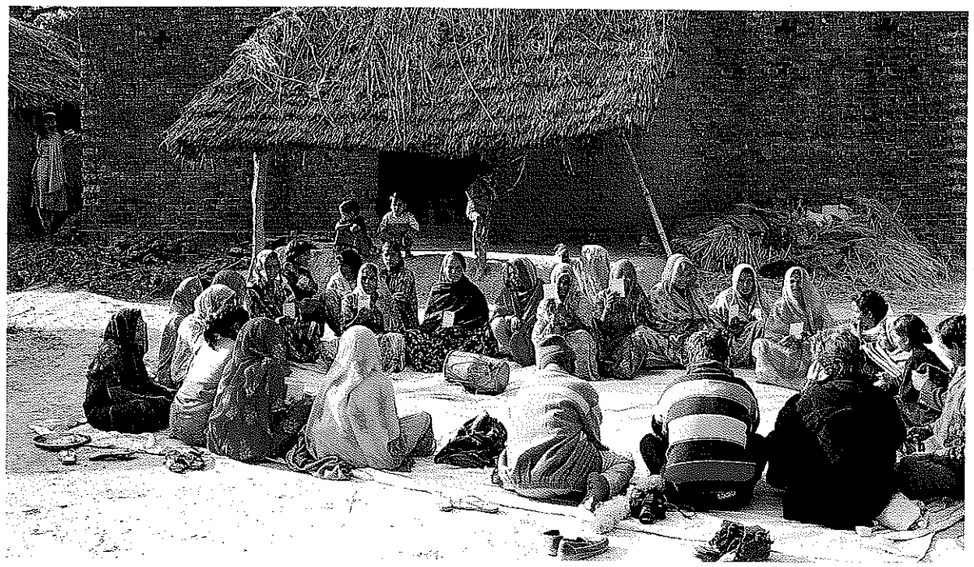
To its credit, this indicator is fast, easy and requires no special tools to execute. Given the nature of what is being investigated, it also makes little sense to use a control group with this indicator (cutting expenses even further). Although it is a valid indicator (at least for smaller activities)—it will be of little use vis à vis resource intensive activities. It is simply not realistic to think that local people will have the capacity to finance

and execute large investments such as check dams or community wells. These are activities which, at least in the Indian context, can only be implemented by the state or large NGOs.

Another weakness of this indicator is that it is not particularly reliable. It relies too much upon luck—evaluators must be told by some informed party that a case of replication exists, or the evaluators must stumble upon the replicas themselves.

In addition, this is only an incomplete indicator of replicability. Replicability depends upon many factors, including geography, climate, level of development, socio-economic institutions and the structure of the state. Even if an activity is being replicated in the watershed being evaluated, this does not mean it is replicable elsewhere. An evaluation can only conclude that a activity is potentially replicable.

In the end, this indicator is recommended, but only for want of a better alternative. Other monitoring and evaluation specialists would be well served to either expand upon this indicator, to make it more reliable and applicable to a wider range of activities or develop a new one.



Indicator 9: Social capital

Watershed management can only be sustained if prior to any physical or technical activity, social development has taken place.

TARGET OBJECTIVES

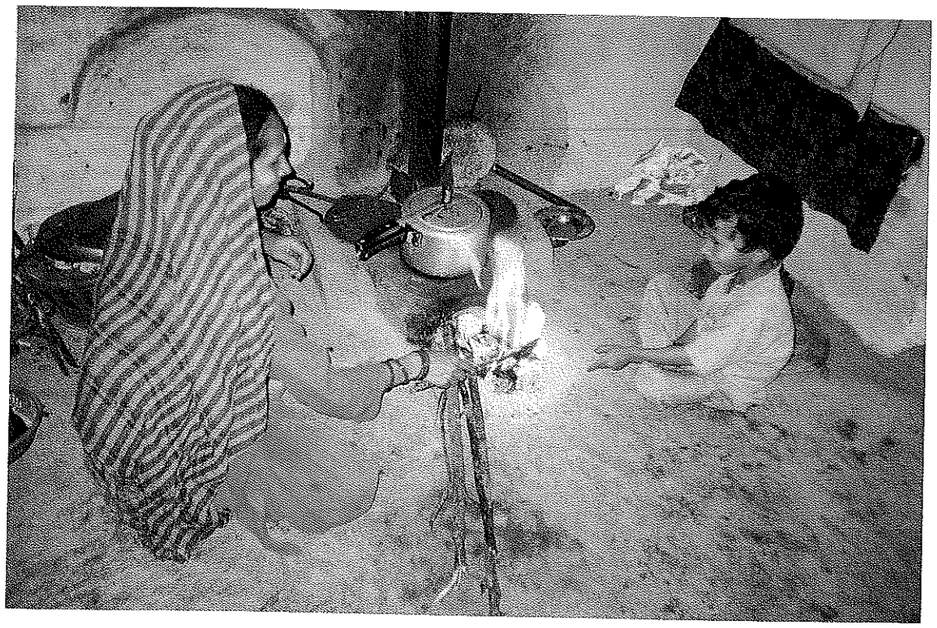
While the indicators "Use" and "Outsiders" produce information that is crucial to the determination of sustainability, they do not address the issue of social organisation and mobilisation. When programme investments are on common land or public land (which is generally the case), then they are, in practice, owned simultaneously by everyone in the watershed and no one. Commonly owned resources are difficult to manage and maintain. In the absence of some norms or institutions, there is no way to prevent over use, ensure maintenance, solve disputes, etc. Solutions to these problems must be found if a resource is to be used sustainably.

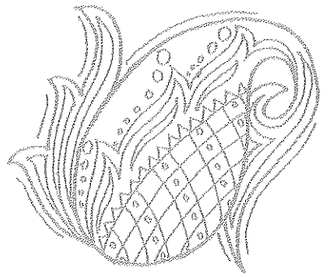
MEASUREMENT PROCEDURES

Post-Independence India has not provided strong, decentralised political institutions to address local soil and water issues. Appropriate government departments generally exist at the state level, but these are largely distant bureaucracies, not local democratic institutions. Under the project's overall plan, partner state departments and NGOs were supposed to co-operate towards the goal of building up the sort of social capital that could locally manage watershed issues.

As defined here, "Social Capital" can be any organisation or institution that facilitates group co-operation towards a social goal. Anything from an interest group or chamber of commerce to a village council or political party can act as a vehicle of social organisation and mobilisation. Even if the indicator "Social Capital" only incorporates such easily identifiable organisations, measuring its strength would be difficult. Should evaluators count the number of such organisations, the attendance at the organisations'

Projects should focus in the beginning on issues, which are concrete and of immediate importance to the people.





meetings, or the number of meetings that they hold? Although this would be difficult, it could be done. But are these even relevant pieces of information? Just because organisations exist and hold meetings, it does not mean that they have any capacity for social mobilisation.

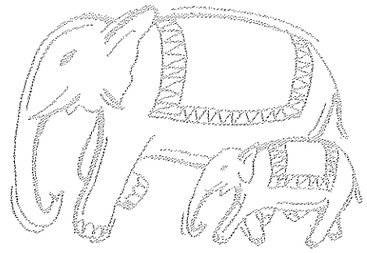
This problem is made even more complex by the nature of Indian politics, where social organisation and mobilisation often occur through what are called "demand groups"—loosely organised pressure groups that spring up around some contentious issue, then quickly disappear after the conflict has subsided. Because demand groups are usually in the dormant stage, it is not possible to measure their strength through a survey of existing social organisations.

With these ideas in mind, the evaluation team began to develop an indicator of social capital while working in Arki RWS. Instead of focusing on processes (i.e., groups, meetings, attendance), the team looked for outcomes. Investigations revolved around the question: Had local citizens recently confronted any watershed related problem? (i.e. had there been any instances where groups of local citizens attempted to solve some soil and/or water conservation problem?) This would be used as evidence that Social Capital exists.

Since many people did not really understand the issue of soil conservation, the team chose to focus on water issues, which are more concrete and of immediate importance to local people. Villagers were asked about problems they may have had with water. When the team uncovered some water problem, they asked how it was dealt with. The team was looking for verifiable stories of groups who had come together and successfully addressed some water problem. Appropriate cases were followed up and noted down in detail.

OUTLOOK AND RECOMMENDATIONS

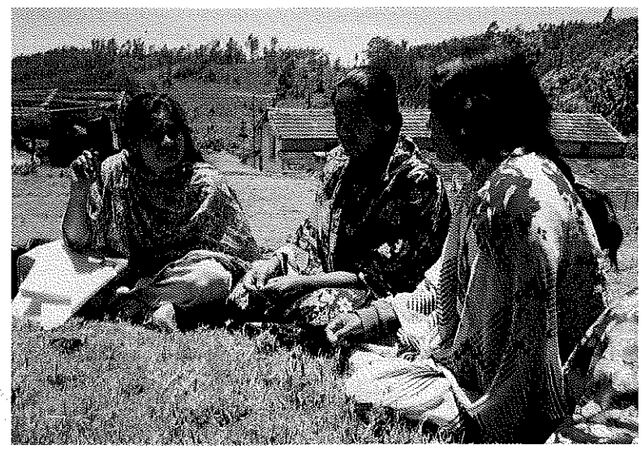
This indicator is a valid measure of social capital—if people have demonstrated the ability to pursue grievances regarding watershed issues, then social capital is present. Unfortunately, this is not a reliable indicator. The questions that the investigators need to ask are necessarily vague, so respondents may not always understand what the evaluation team is looking for. In addition, not everyone in a watershed may even be aware of the "Social Capital" that exists. If evaluators do not interview the right people, they will not obtain the necessary information.



In addition, it may be difficult to determine change with this indicator. If Social Capital was previously non-existent in a baseline survey and then it registers in a subsequent survey, evaluators are safe in assuming that change has occurred. Evaluators can also assume that change has occurred if identical types of social capital are found in the "before" and "after" surveys, but the intensity of the social capital has changed. If, however, one or more forms of social capital were found during a baseline survey, but completely different ones are found in a subsequent survey, evaluators will not be in any position to determine if the level of social capital has increased or decreased. It is very difficult to say whether one type of social capital is stronger than another.

While the indicator is inexpensive to use in terms of equipment (absolutely none is required), it must be executed by someone with a sophisticated understanding of social capital, local society, governmental structures and the programme being evaluated. In addition, this person must be a skilled interviewer, although local language capabilities are not essential for such interviews.

Finally, this indicator cannot be executed with any great speed. It involves a great deal of open-ended interviewing with various types of people—from farmers to local government officials. In addition, many of these interviews require subsequent discussions with additional informants. These interviews can, however, be carried out concurrently with other parts of the evaluation. Since it is a participatory indicator, it does not require the use of control groups.



This indicator is recommended with reservation. It is the best available alternative for measuring the existence of social organisation and mobilisation. It can be abandoned when a more reliable and less time consuming alternative is developed.

SUMMARY OF THE PROJECT'S IMPACT INDICATORS

Indicator	Objectives Measured	Validity[1]	Reliability[2]	Precision[3]	Response[4]	Equip. Costs	Training[5]	Man Hours[6]	# Field Visits?[7]
Soil Loss	Topsoil conservation	++	++	++	++	- - -	++	- - -	- - -
Ground Water (partic-ipatory method)	Ground Water conservation	+	+	- - -	++	++	-	-	++
Ground Water (scientific method)	Ground Water conservation	++	++	++	++	- - -	++	- - -	- - -
Height-for-age	Health, Wealth, Gender parity, Social equity	++	++	++	- - -	+	-	-	+
Consumer Durables	Wealth, Social equity	++	+	++	-	++	-	-	++
School Enrolment	Education, Gender parity	++	-	++	-	++	-	-	++
Use and Maintenance	Sustainability, Replicability	+	+	-	++	++	- - -	-	++
Outsiders	Sustainability, Replicability	+	+	-	++	++	- - -	-	++
Replication	Replicability	+	-	-	-	++	- - -	+	++
Social Capital	Sustainability	+	-	- - -	++	++	- - -	-	++

In this table, the superior rating (whether that means highest validity or lowest equipment costs) is represented by "++". This is followed by "+" and then "-". The most inferior rating is always represented by "- - -".

1 How well does indicator measure the objectives?
2 Results not dependent upon identity of the investigator.
3 How fine grained is the indicator's metric?
4 How quickly does the indicator register changes in the objectives being monitored?
5 The level of training, skill or education necessary to implement the indicator.
6 The total time necessary to implement the indicator.
7 Regardless of the man hours, how many field visits are necessary to fully implement the indicator?

Our first experiences.

The pilot programme of RWSs started in 1994, and five areas were initially chosen from amongst different agro-climatic, and socio-economic regions (Himachal Pradesh, Uttar Pradesh, Rajasthan, Bihar and Tamil Nadu) of the country.

In each of the RWSs, a treatment plan was set up with help from the SGD and the respective NGO. The NGOs then stepped up their efforts 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 1999 four new areas were chosen in Andhra Pradesh, Uttar Pradesh and Rajasthan.

It should be possible to replicate in surrounding watersheds, the soil and water conservation measures as well as the social activities carried out in each RWS. In order to ensure this, low cost investment and intensive use of local technology is essential. It is relatively easy to create a model of watershed management that involves high investment, but one that would be impossible to replicate on a wider scale. The project aims at providing a framework that can be implemented by the MoA, various SGDs and NGOs in the future even without the support of external funds.

The following case studies from the first five watersheds taken up illustrate the different experiences and approaches of the respective partner organizations.

Minor irrigation.

With no form of irrigation for their crops and complete dependence on the rain, which was unreliable at the best of times the productivity of the land in village Bhuiya Toli had fallen drastically.

The amount of corn harvested was just enough to feed the village for two to three months. Water was always a problem — there was either too much of it in exceptionally heavy rains, or too little when the monsoons were light. Too much water meant water-logging and deterioration in fertility of the soil whereas too little meant that a second crop was a dream.

Life was tough for 23-year-old Nandkishore, a cultivator with a wife and two children, as his precarious existence depended entirely on circumstances governed by nature. With the Indo-German Bilateral Project commencing work in the watershed Karkara, Bihar, life took on a different aspect. Within a couple of years new seeds were sown, new techniques in farming were learnt, trees were planted and training was imparted in the making of compost. With technical assistance from the Damodar Valley Corporation (DVC), the villagers of Bhuiya Toli built themselves a dam of which they are proud. With the help of pumps, irrigation was provided to higher level fields where rice instead of corn and arhar dal (pigeon pea) was planted. Sheesham and other timber trees were planted in the barren areas and the villagers were taught to sow in straight lines instead of scattering seeds about, haphazardly.

New techniques, new seeds and the use of compost have increased productivity. Enough rice is now harvested to feed the village for four to six months. In the pool formed by the dam, fish farming was begun in a small way.

Horticulture development.

In the Burhanpura watershed in Rajasthan, the availability of land was never a big issue. While the sizes of landholdings vary considerably, almost every family owns land. Yet, the produce from the land was hardly ever sufficient to take care of the needs of the villagers and many had to look for seasonal employment, often in cities far away from the watershed.

When the region was selected by the IGBP for its watershed development initiatives, even the partner NGO — Kumarappa Institute of Gram Swaraj (KIGS) realised that a major component of its inputs for improvement of livelihood of the people had to be land-based. During the PRA exercises it was observed that cultivation was limited to one Kharif and one Rabi crop in a year and there were long periods when the land lay fallow. Moreover, there was very little variety. The crops widely grown were bajra, jowar, wheat and mustard. Very few vegetables were grown. The yield from the land was chiefly for their own consumption.

The conditions seemed just right for an experiment in horticulture. The soil was fertile, there was enough land and there was an excellent market for the products. The activity was started in 1996 and the first step was crop trials. A few promising farmers were chosen from each village. On their plots demonstrations would be carried out for other villagers to see. The experiment started with onions. At times the NGO functionaries had to approach the horticulture department for know-how about the different varieties that could be grown, their precise requirements etc.

In an area where vegetables were rarely grown, it is today difficult to keep track of the different types and species. Onions, brinjals, radish, tomatoes, cauliflower, gourd, pumpkin, chillies and ladies fingers are the more widely grown varieties. The wonder and enthusiasm of this success has still not subsided. The more enterprising among the farmers are today willing to experiment with any type of crop as they believe that the fertile soil and their hard work can make anything possible. It may not be out of place here to relate the experience of some of the villagers of Mandopura.

According to Ram Niwas Yadav, the villagers of Mandopura were quite keen to grow chillies. A number of them got together and sowed the seeds on sizeable tracts of land.

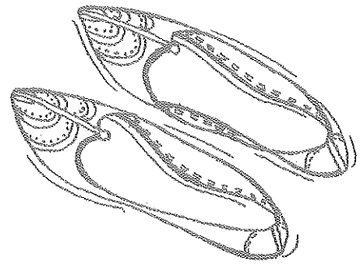
The result was disastrous as the crop failed completely. The seeds which had been procured from the same dealer were bad. It caused considerable financial loss to these farmers as the land that had been put under chillies could not be used for growing any other type of vegetable or cereals that season. Disheartened by the whole venture, most of them swore never to try such a foolhardy thing again. Ram Niwas, however, was one of the very few who were not willing to give up that easily. The following year, he and one of his friends, sowed chilies on one bigha of land and there was a bumper crop. The interest was revived once again and in the third year, one hectare of land was put under chillies. The crop even from such a limited area was sold for Rs 1 lakh, 15 thousand. Next year, the villagers have decided to grow chillies on 2 hectares.

To make available, good quality saplings easily, KIGS came up with the concept of Kisan Nurseries. Some farmers were chosen who undertake to grow saplings from seeds of different varieties of vegetables in small plots. The survival rate was about 60%. Others from the village could take these and they are even sold in the markets nearby. More and more farmers are going in for their own private nurseries these days. It ensures good quality saplings and is lucrative too.

If vegetables have already made a significant impact on the lives of the people and the economy of the region, plantations too have made deep inroads. Yet the acceptance of fruit trees was not that easy. Most of the farmers felt that having fruit trees would curtail the availability of arable land. It took a while to convince them that fruit trees and other crops could co-exist. This was possible only after a number of visits to other plantations. Now nearly 107 families have taken saplings of guavas, papayas, lime, pomegranate, gooseberry, etc. Climatically, mango growing is alien to this region, but the villagers are so excited with what they have achieved that they believe with the right effort even this will be possible.In all about 19,000 saplings have been planted throughout the watershed. The farmers we spoke to were quite optimistic and there is an evergrowing demand.

While the success of this activity must be attributed to the enthusiasm and the perseverence of the farmers, the Project provided the knowhow through exposure visits and demonstrations, made them aware of the demand, and provided necessary inputs such as seeds and saplings in the initial stages. Associated inputs such as better methods of composting was demonstrated to the farmers and the NGO was involved in the construction of more than 400 compost pits in the watershed.

Now that the benefits from the activity has permeated to even the smallest farmers and they are themselves willing to experiment and take chances, we believe that this activity is sustainable.

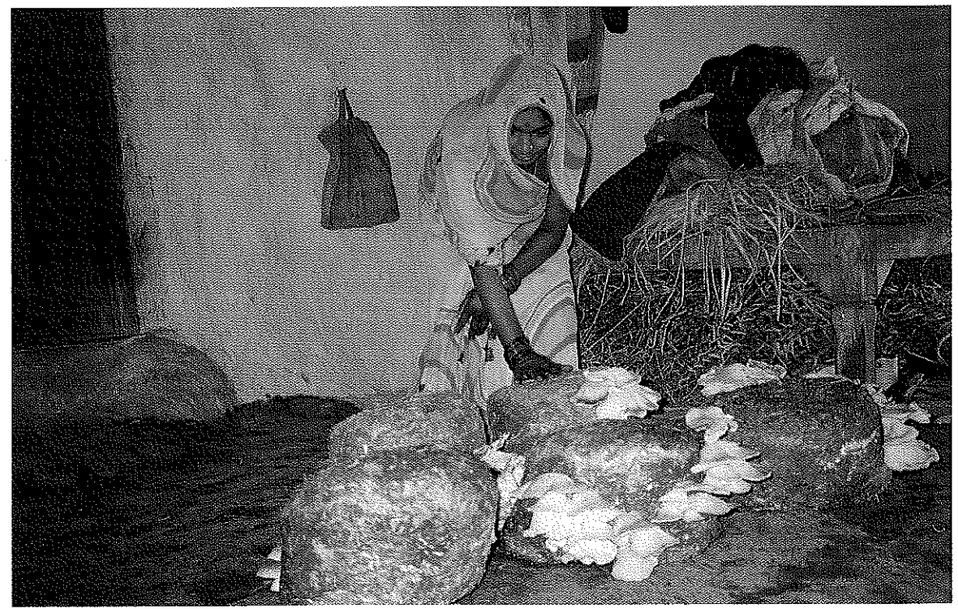


Mushroom cultivation.

This activity was taken up in Representative Watershed Nawazgarh as an income generating activity. In this watershed there are a large number of land-less and poor and most of them work as wage labour in other people's fields.

When field workers of Baba Srinath Siksha Sansthan, the Project's partner NGO in this watershed approached the people, they received a rather cold response. Mushroom for them was something that grew on damp and rotting surfaces generally after the rains. Some of them had heard that these were poisonous. That these could be grown for consumption or sold for a profit seemed more like a fairy tale and if they turned out to be poisonous, the beginnings of a nightmare. It is least surprising that they were quite reluctant to even experiment with an activity that seemed so destined to fail.

It is not unusual that in the given circumstances, the initial efforts of the NGO staff met with a cold response. After a lot of persuasion, a few people could be tempted to



visit an exhibition cum demonstration of the activity that was being held in nearby Kalikaganj. The first seeds of interest had been sown. In the winter of 1996, the whole process was demonstrated in villages where volunteers could be found. At present there are about 55 beneficiaries who are actively involved in this activity.

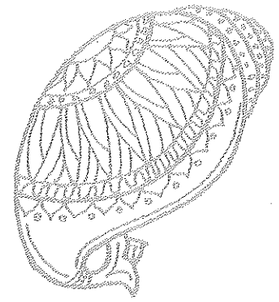
Mushroom cultivation as an activity is not very complicated or capital intensive, consumes very little time and labour and gives rich returns. The season generally begins in late October and continues till early March. The raw materials required are spawn, polythene bags and straw. Spawn is available at the BSNSS office in Sultanpur. The spawn comes in bottles of Rs 10 each. Straw is locally available.

The straw is cut into small pieces and either boiled in water or soaked for 24 hours. It is then strained and most of the remaining water squeezed out between the palms before being spread out in the shade. A polythene bag which can accommodate 4 times by volume the amount of straw is taken. The spawn from a bottle is divided into 3 parts. Each part is further subdivided into 3 more portions. A layer of straw is spread out in the bag, followed by a layer of spawn. This pattern is followed for 3 layers. A layer of straw seals the lower layers and the neck of the bag is tightly secured with a piece of thread. A few holes are pierced in the polythene bag. Care should be taken to see that the bag is not exposed to sunlight. In about 7-10 days the contents of the bag rise and occupy all the remaining space and acquire a shape. This mass of straw needs to be sprinkled with water 2-3 times a day. Soon the mushroom starts coming. There are about 3-4 yields.

A bottle contains about 250 grams of weight by spawn. From this the yield is approximately 2 to 3 kilograms of fresh mushrooms. Locally these can be sold for about Rs 40 a kilogram and can go as high as Rs. 60 a kilogram. People from their own village and neighbouring villages come to buy these. At times, one amongst them collects the produce, sell sit in town and and after adjusting his travel expenses and keeping a small share, hands over the remaining money to the mushroom cultivators. The produce must be marketed as fresh as possible, atleast within a day or two to avoid moisture loss as this makes it less profitable.

Many of those who were growing mushrooms tasted these only after they actually saw people buying their produce. Now they love its taste and the money it brings in. The nutritional value of their diets has also gone up. It is generally women who are responsible for this activity.

The initial apprehension has given way to enthusiasm. Since there is no major hurdle in the whole process, sustainability of this activity is to a great extent, assured.

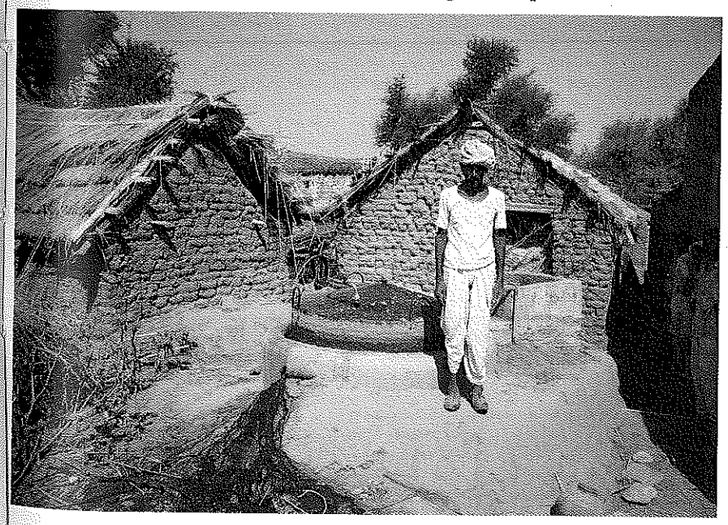


Promoting biogas.

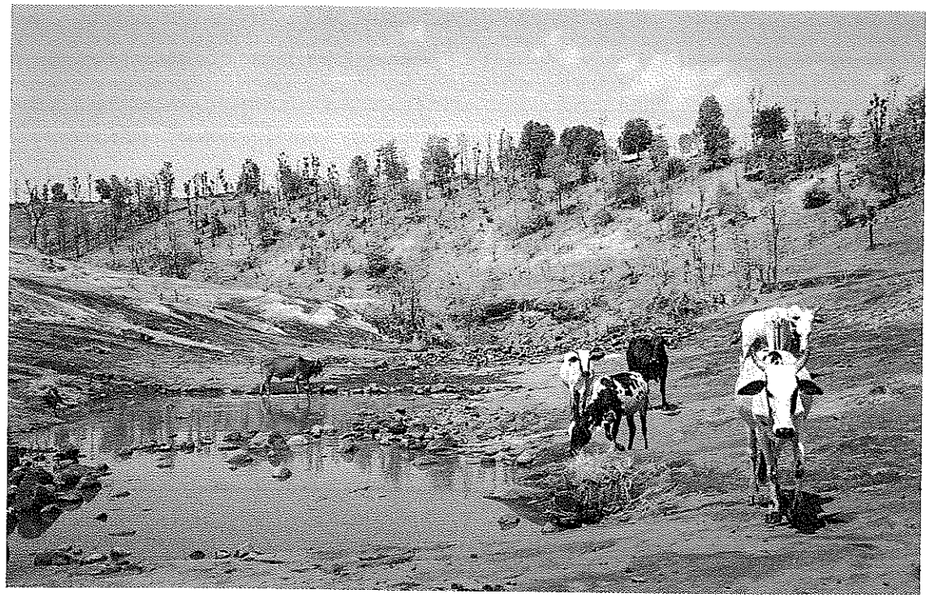
The project believes in propagating technologies most appropriate for rural areas. One such endeavor has been the biogas programme. We believe that biogas is one of the most effective and alternative option for meeting the growing needs of fuel in the rural areas.

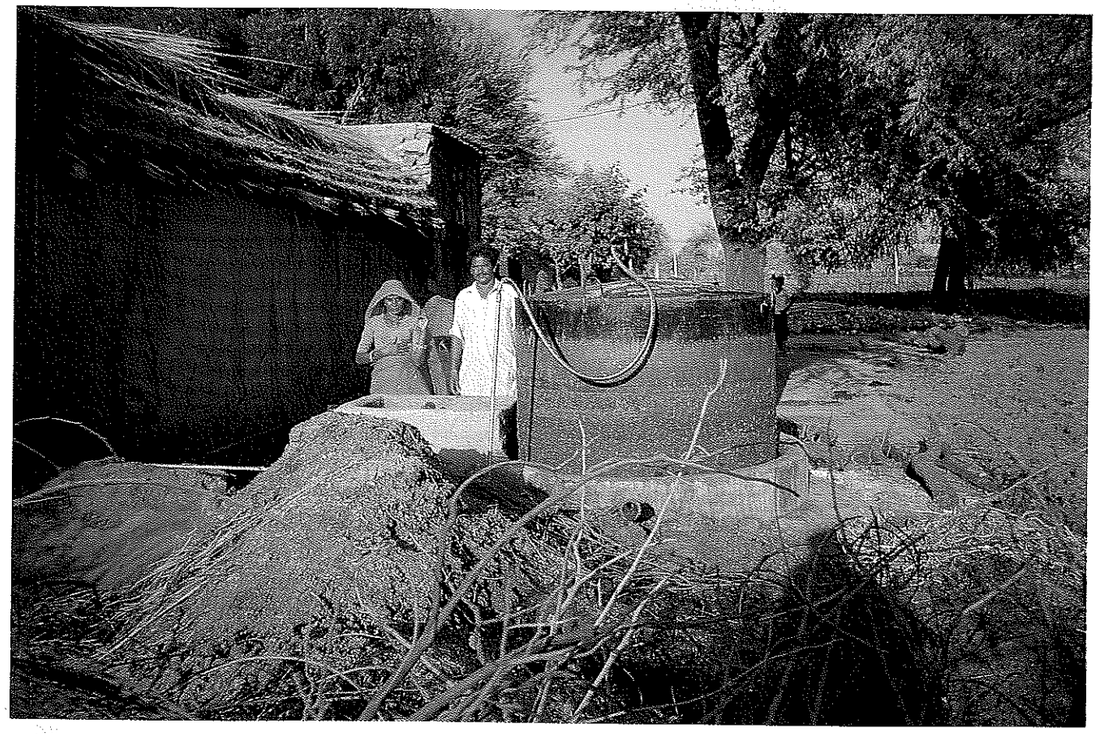
The technology is simple, easy to handle, cost effective, and also helps to reduce the work burden of local women. Most importantly, it makes use of a locally available resource i.e. cow dung, which is available in plenty in the rural areas in an environmentally benign and economically viable manner.

The mechanism of operating the biogas is very simple and anyone can handle it. In this, equal amounts of cow dung and water are mixed. Straw, grass and other waste material must be removed from the dung before putting it into the inlet tank. Such waste material floats on the surface and reduces gas formation in the plant. Occasionally the dung in the plant is stirred through the outlet tank with the help of a long bamboo or wooden rod. This prevents scum formation and settlement of waste material. Care should be taken to see that there is no leakage either from the pipeline, gate valve or joints. Sometimes water also gets accumulated in the gas pipeline. This is indicated by a red flame. It needs to be removed occasionally through the water remover valve provided between plant and kitchen.



In the project area Burhanpura, in Rajasthan seven biogas plants were constructed in the beginning on demonstration basis. It was assumed that successful demonstration of these would act as a stimulant in motivating others to adopt the new technology. It would also enable local people to assess both the positive and negative aspects of biogas. The demand for biogas plants has been





increasing steadily in the watershed. The farmers, who have sufficient quantities of cow dung, have been encouraged to adopt the biogas. The NGO has already installed 13 more units. The farmers are enthusiastic and are even willing to invest up to RS 3,700 of their own towards installation costs.

After an initial survey made by the local NGO-KIGS, it was found that the most widely propagated "fixed dome" Deenbandhu model of biogas was not suitable. It not only required high level of masonry skills but also suffered from various structural defects like damages in the foundation, crack in the dome and digester wall etc. On the other hand, the KVIC model apparently had less construction related problems. Therefore the KVIC model was propagated. It has been almost four years but till date very few plants have suffered from construction related problems.

Regular training programmes have been conducted for both the masons and the beneficiaries particularly about construction, operation, maintenance and repair of biogas plants. Priority has been given to providing accurate and timely information to people. Beneficiaries have also been provided with instruction manuals, phamplets, handouts, etc listing all the possible problems associated with the biogas plant and its solutions.

To keep a check on the quality, the biogas plants are constructed under the supervision of NGO field level staff. Further the masons are paid directly by the beneficiaries. This ensures involvement of the beneficiaries in the project as they keep close supervision on the quality of work and make sure that the masons do not use sub standard material for construction purposes.

Today the benefit of the biogas technology is well understood by the villagers. It provides clean and convenient fuel at a low cost.

The use of biogas as a cooking fuel has brought about an improvement in the overall quality of life in many ways for the user families and particularly for women. Previously they had to travel to far off places for collecting fuelwood. But now the drudgery of transporting fuel wood to the homestead, processing them into smaller pieces, and storing for later use has been reduced. Women also attach considerable importance to the smoke free environment in the kitchen and other associated health benefits followed by fuel saving and cleanliness (clean kitchen walls, ease in cleaning vessels etc.).