CHAPTER 6
RETHINKING WATERSHED DEVELOPMENT IN INDIA: STRATEGY FOR THE TWENTY-FIRST CENTURY

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Soil degradation on large tracts of cultivable land is seriously undermining millions of people’s livelihoods. Attempts to overcome this problem have been made through large investments in watershed management throughout Asia, Africa and Latin America (Lal, 2000). In India in the last three decades, watersheds have become the pivotal unit for rural development programmes. In India, about 6.2 million ha of rainfed land in 5 200 micro-watersheds was under treatment in financial year 2001/2002 at an estimated cost of US$175 million. Yet, the coverage is far from complete.

Of India’s total cultivable area of 142 million ha, 89 million ha of unirrigated land needs similar investments. This land grows 45 percent of India’s foodgrains. The irrigated area has reached a production plateau of about 110 million tonnes; so, efforts to increase foodgrain production need to focus on improving the productivity of rainfed agriculture.

THE RECORD SO FAR

India’s guidelines for watershed development programmes have been revised three times since their introduction in 1986. They aim to make investments in watershed management have a long-lasting impact on crop production and rural livelihoods in rainfed cropping areas. They are reviewed periodically, but only to accommodate cost escalations and revise targets. The current guidelines were introduced in November 2000, renamed as the National Watershed Development Programme for Rainfed Areas (NWDPRA) of the Ministry of Agriculture. In addition to setting a framework for watershed development in the country, the guidelines proclaim a blanket investment per unit area for diverse land–water interventions and make special provisions for promoting income generation for landless people. They recommend a budget of US$49 000 for a watershed area of 500 ha on land with a slope of up to 8 percent, and US$65 220 for land of a slope greater than 8 percent, to cover all implementation costs. The investment level was revised from the previous US$87 per hectare to a maximum of US$130 per hectare.

These new guidelines have increased investment levels and promote programmes to benefit landless people; but they do not guarantee that the new programme-based top-down approaches will be successful. People’s participation is largely stuck in the “you will participate in the programme” mode, and project sustainability is questionable even after two decades of experience in watershed management. The resulting lack of community ownership has meant that the investments in rural development and natural resource regeneration have mostly only realized
short-term benefits. India’s large investments in rural development have not produced a matching transformation on the ground. Investment thrusts in recent watershed development programmes are trying to reverse the inefficient use of resources in many integrated rural development programmes.

**TARGETS MISSED**

Watershed management needs to take a multipurpose approach to improving land and increasing water availability for crop growing, livestock and human use through soil and moisture conservation measures. An effective watershed project should aim to drought-proof areas by capturing every falling raindrop. This is technically possible.

An assessment by the Centre for Science and Environment (Agarwal, 2000) estimates that if half of India’s average annual rainfall of 1 170 mm were captured over 1.12 ha of land in each of the country’s 587 226 villages, then the 6.57 million litres of rainwater thus collected would meet the annual cooking and drinking needs for an average village of 1 200 people. Doing this would help both to sustain surface water supplies and to recharge aquifers.

However, the National Sample Survey (NSS, 1994) reported that despite the extensive programmes carried out to provide drinking-water to rural areas, 140 975 villages (24 percent of India’s total) still had a drinking-water problem. Even the watershed development programmes set up to complement the drinking-water programmes in villages did not improve the situation. As a result, much of the 420 billion hectare metres (mham) of average annual available precipitation flowed uninterrupted to the sea without fulfilling its ecological functions of enhancing surface water supplies and recharging groundwater to any appreciable extent.

The experiences of watershed development projects have been quite varied. The few successful projects are outnumbered by the many unsuccessful ones. There are situations where some successful watershed projects have not even provided for the minimum amounts of drinking-water and fodder. Many watershed projects, designed to conserve rainwater to improve irrigation, have tended to ignore communities’ primary need of access to drinking-water. On similar lines, some projects have neglected to develop pastureland and propagate soil-moisture conservation practices.

A few community groups have taken the initiative themselves with some external assistance. For example, the villages of Sukhomajri in Haryana and the Chakiya Vikas Pranali scheme in Jharkhand (Box 1) have improved their socio-economic conditions in a relatively short time by linking improved *in situ* moisture conservation with economic activities that build up social capital. These examples show that watershed development is a viable model for the economic development of poverty-stricken rural areas.
The Chakriya Vikas Pranali (CVP) – the cyclic system of development – is a pioneering method for village development. It was developed in Jharkhand, north India and promotes ecological regeneration as a source of economic growth. It offers villagers returns of more than 20 percent on their investments. Its basic strategy is for locals to make a one-time investment in the form of cash, plants and technology, and to convert it into a self-propelling process of production and reinvestment via a common village fund.

Investments in multi-tiered, multi-rooted and multi-layered planting cycles provide year-round employment for village people and provide short-, medium- and longer-term returns from grass, vegetables, fruit trees and timber, respectively. This successful system has spread to more than 600 villages in Palamau district, Jharkhand.

A typical block of 6 to 12 ha of pooled land is divided by water-retaining tie-ridges into smaller quadrants. It is then filled with plants that are intercropped to maximize the symbiotic relationships of nitrogen-fixing and nitrogen-hungry species. Yams and tubers go underground, and pulses, beans, fruits, bamboo and timber spring up from the earth. The different root systems are carefully grown together to prevent overcrowding and to maximize rainwater use.

Harvest returns are shared under a 1:3:3:3 system, so that 10 percent goes to the village welfare fund, 30 percent to the landowner, 30 percent to the workers, and 30 percent to the common village fund for investing in further development. Studies conducted by Delhi’s Institute of Economic Growth indicate that the chief value of CVP lies in retaining and reinvesting surpluses through the village funds. This ensures that land-based activities, biomass production, energy and employment are maintained on a sustainable basis.

CVP makes programme replication a reality. Most other programmes are difficult to replicate owing to lack of leadership or funding, or legal hurdles. CVP is self-financed and, after the initial investments, it generates resources to trigger similar initiative in other villages.

There is a risk that landowners may opt out and drive workers away from tilling the land after it begins to be improved. However, this has not happened in any village, as the new system is giving such good returns from land that was barren until recently.

This form of land development has shown that it is possible to transform the environment, improve economic well-being and reduce social tensions through a participatory approach. Its success and prospects for replication depend on support from central and state governments.

SPREAD ELUDES IMPACT

Between 1994 and 1999, about 10,000 watershed projects went ahead in India. This large number reflects the coverage and the amount of resources being pumped in to watershed development. Although watershed programmes are one of the largest types of investment in integrated rural development, there is no central coordination unit to provide information on the actual number of watershed projects in India at any given time.
Information pooled from various sources indicates that the Government of India has allocated about US$650 million to various watershed and wasteland development programmes over a recent typical five-year period. In addition to central government funding, the World Bank, DANIDA, Sida, SDC, DFID and GTZ are supporting the rehabilitation and development of micro-watersheds (Box 2). Most programmes have been run in the drought-affected areas including parts of Andhra Pradesh and Madhya Pradesh (Table 1).

This list is not exhaustive. Some projects are more than two decades old; others are just starting. However these interventions have not been able to prevent droughts. Madhya Pradesh is seeking additional resources to sustain its ambitious Rajiv Gandhi Mission for Watershed Development. However, the government, seeing the less than satisfactory performance of its watershed programmes, is diverting funds to the new people-centred “paani roko anbhiyan” programme (harvest water campaign).

### Table 1

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<tr>
<th>State</th>
<th>Share of nationwide watershed projects</th>
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<tr>
<td>Andhra Pradesh</td>
<td>24.0 %</td>
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<tr>
<td>Madhya Pradesh</td>
<td>17.0 %</td>
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<tr>
<td>Uttar Pradesh</td>
<td>10.0 %</td>
</tr>
<tr>
<td>Gujarat</td>
<td>8.6 %</td>
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<tr>
<td>Tamil Nadu</td>
<td>7.0 %</td>
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*Source: Hanumantha Rao, 2000*
The two main problems of watershed development programmes have been the lack of any consistent criteria for selecting villages and the process of implementation. This raises several management-related questions.

The poor performance of many watershed projects has not reduced the number of new projects. Andhra Pradesh has taken up an additional 2,090 projects to treat 1 million ha since the November 2000 revised guidelines were issued. Typically, each watershed project is restricted to an area of 500 ha. Bilateral- and multilateral-funded projects usually cover many such sub-projects. For instance, the World Bank’s Kandi Watershed Area Development Project in Haryana covers 619 separate watershed projects.

One of the most intractable problems in watershed development has been the lack of project sustainability. Many projects have failed to build in strategies to maintain their assets once project support ends. Feedback from several projects indicates (Joy, 2003) that many farmers only benefit from watershed projects by getting short-term paid labouring work. Because communities see few long-term benefits emanating from these projects, they have little interest in operating and maintaining project assets. This issue is being confronted by some donors in their projects.

Many watershed projects have failed in their primary objective of arresting land degradation. One study indicates that the rate of land degradation in rainfed areas in the 1990s is likely to have been more than twice the rate in the 1980s, largely because of increased soil erosion (Reddy, 2000). At the other extreme, many projects have failed because the guidelines provided a pattern of uniform treatments across diverse agro-ecological conditions, leading to a less than desired impact.

The continued lack of drinking- and irrigation water in several Indian states shows that drought-proofing interventions have failed to stop land degradation in rural areas and have failed to improve rainfed agriculture and the availability of drinking-water.

INEQUITABLE SHARING

The National Sample Survey (NSS, 1994) reported that 80 percent of rural households had landed property and earned more than 50 percent of their incomes from farm labour. This is owing to the typically small average size of landholdings (less than 0.1 ha), unfavourable moisture regimes and lack of technological inputs.

Watershed development is a rational technical concept based on the need to regenerate natural resources. However, property regimes exist that are in contradiction to the requirements of watershed management. Land is inequitably distributed and, as rights over groundwater are bundled with landownership, the landless do not benefit from any appreciable gain in groundwater recharge. With common property resources having degenerated into open access resources, the concerns of landless villagers often go unaddressed in watershed projects. Landless people’s concerns rarely get addressed, as these projects are based on government guidelines that emphasize per hectare cost of land treatment.

The guidelines’ fixed budgeting often fails to account for wide biophysical and socio-economic variability. Consequently, the design of most projects fails to account for local variability, and a fixation on following the guidelines rules out learning from other projects’ experiences.
Watershed projects channel their limited investments into a range of on- and off-farm activities, often involving trade-offs among the interests of different stakeholders. The wide range of works now being carried out by watershed development projects means that impacts are often slow to materialize and often intangible.

These projects have gone well beyond the scientifically determined methods of soil and water conservation. This has increased the per hectare cost of conservation by taking on a new range of strategies, and has made them more complex to implement.

One study of a watershed project in Chhattisgarh showed the implementing agency’s predicament in trying to complete the diverse range of activities on time (Sharma, 2001). Subsidies were made available to all households, irrespective of their economic status. Those with larger areas of land benefited most. This inequitable spread of benefits had a negative impact on local people’s sense of ownership of the project and on the project’s sustainability.

The long-term impact and sustainability of watershed projects is threatened by the lack of well-defined institutional spaces for the landless, only partial responses to the concerns of small landholders and inequity in benefit sharing.

The successes of the innovative project in the village of Sukhomajri, Haryana, which was completed in the early 1980s, shows how landless people can also benefit. In this project, the community designed a system that paid equal attention to the needs of landed and landless people. The rights to impounded water in the three local check dams were equally shared between the landed and the landless, and the benefits of rainwater harvesting were equally shared out by ensuring that a portion of the incremental gain (from improved crop harvests) was ploughed back into creating a fund (social capital) for community development. This held the key to sustaining project benefits. The landless in Sukhomajri village benefited by selling their share of water to the landowners.

In the same project, a sound land care system, based on the principle of social fencing (local agreements not to exploit certain areas such as no-grazing areas), helped to regenerate biotic resources and promoted a range of farm and non-farm activities that were not in the original project design. It was then for the community to make informed choices about using the rejuvenated natural resources for their benefit.

**TECHNOLOGY BENEFITS FEW**

Many project implementing agencies know that rainwater harvesting needs to be a priority in low-rainfall regions. However, *in situ* conservation does not help much if rainfall is scanty and erratic. Consequently, most watershed projects mainly concentrate on installing water harvesting structures such as check dams. The literature shows that the success rate of technology-based projects is no more than 25 percent (Shah, 2001; Reddy, 2000).

A recent study in Gujarat found that check dams – the favoured technology for watershed projects – directly benefited only 15 percent of target households (Shah, 2001). While the benefits of check dams can easily be computed, benefits to individual farmers from structures
such as nala plugs (gully plugs) and contour bunds may not be so immediate and substantial. Consequently, a significant portion of project costs are invested in structures such as check dams, whose costs are high and that benefit only a few – in contrast to and at the cost of structures such as gully plugs that are less expensive and benefit more people.

A typical check dam may account for 50 percent of a project’s costs. The remaining budget is thinly distributed over other project components. The social activities, including self-help groups and income-generating activities, often benefit only a few families. Households and communities that have not benefited from a project should not be expected to contribute towards sustaining project initiatives.

The package of measures taken by watershed projects, from building check dams to promoting income-generating activities, has become too large and difficult to manage. Reducing the number of activities in favour of those that provide most benefits would bring down the per hectare cost of land treatment. Activities should be selected according to the relation between their costs and their benefits. Ironically, long-term environmental benefits are rarely computed in the benefits that might accrue from project interventions.

Most donors require that communities contribute about 10 percent of project costs. Choosing activities that provide the most financial benefits encourages local people to contribute, as they know that they will get a return on their investment. Once a return is attached to each activity, the community can be asked to plough back a portion of the incremental gain. This is what happened in the Chakriya Vikas Pranali scheme, and was a main reason for its success (Box 1).

The design of watershed development projects should not ignore traditional water harvesting structures. Projects can gain a lot from supporting the rehabilitation of traditional water harvesting structures. This is less costly than building new structures and gives a focus for communities’ contributions and participation. Reviving community structures can lead to the rebirth of community spirit and community management, things that are crucial to sustaining the achievements of watershed projects.

Watershed development has been associated more with a technological approach. Communities and local institutions have yet to come to terms with the philosophy of watershed development. The technological approach has not realized the expected benefits and the need to integrate local wisdom and traditional systems.

**CONCLUSION**

The continuing drought problems in India suggest that the country’s two decades of drought-proofing efforts through the watershed approach have not worked. The central and state governments are still allocating large budgets to rehabilitating and developing micro-watersheds. There needs to be fresh thinking about the watershed approach to drought proofing.

Many watershed projects have basic design flaws and implementation problems. Despite frequent reviews of the government’s guidelines, watershed projects still fail to deliver. Many initiatives have only benefited a limited number of households, and rely on technological fixes that often lead to lack of community ownership.
Better-performing projects have been based on promoting communities’ traditional water harvesting and conservation practices. These have had good community participation and low implementation costs. They have benefited a larger number of people and are usually based on promoting equity and ecological principles. In contrast, most watershed development programmes have a clear hierarchy of benefits and beneficiaries. Farm households benefit most from improved irrigation, followed by those farmers who get on-farm treatments such as field bunds. The landless and those who do not own livestock benefit the least. These issues are treated as more or less inevitable and have not been placed at the centre of a participatory process. The need is to initiate negotiations among different beneficiaries and stakeholders.

A review of watershed projects in Karnataka and Maharashtra concluded that watershed development is of crucial importance in India (Joy, 2003). The progress of globalization and privatization means that local natural resources, synonymous with watershed ecosystem resources, are often the last productive resources that the rural poor have access to.

REFERENCES


Sharma, S. 2001. Where every drop of rain counts: Case study on natural resources regeneration and management in Surguja district of Cbhattisgarh. New Delhi, The Ecological Foundation