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Subsidies in Watershed Development Projects in India: Distortions and Opportunities

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Executive Summary

All governments provide public funds to support agriculture and improve human welfare. Subsidies for watershed development programmes in India are intended to serve both of these objectives simultaneously, but combining them can actually undermine watershed projects.

This paper outlines the history of subsidies in India, then goes on to discuss when the use of subsidies is justified and when it is not. Briefly in economic terms, introducing a subsidy is only justified if two broad conditions apply: (1) There must be a market failure; and (2) A subsidy must be the best way to correct the market failure.

Subsidies, used inappropriately, can have many drawbacks. Heavy subsidies guide farmers to accept technologies that they do not want and will not maintain, inhibiting project managers and researchers from gaining feedback on what farmers actually want. Financial subsidies can discriminate against products and practices that are not subsidised, thus impeding scientific progress and stifling indigenous knowledge. Subsidies can also undermine people's incentives to take the initiative, and as a result, rural development agencies promoting self-reliance find it difficult to operate without subsidies because villagers have become accustomed to 'giveaways'. This paper provides numerous examples, from India and elsewhere, to demonstrate these problems.

Several approaches are suggested to promote watershed development with no or low direct subsidies. These include institutional innovations to manage local externalities, support to community organisations, and sequencing projects to reduce financial constraints.

The authors conclude by pointing out how evidence from around the world shows that farmers will invest in conservation practices when it is profitable for them to do so. This suggests that farmers do not need subsidies so much as they need less expensive, more profitable technologies; policies that encourage them to take a long term perspective in caring for their land, greater awareness of the costs of degradation, and support to organise themselves to invest in conservation.

SUBSIDIES IN WATERSHED DEVELOPMENT PROJECTS IN INDIA: DISTORTIONS AND OPPORTUNITIES

Heavy subsidies are a standard component of virtually all agricultural and rural development projects in India. It is difficult to find examples of government or non-government projects that do not include substantial funding from the sponsoring agency. Such funding can take several forms, helping to pay for labour, agricultural inputs, machinery services or technical expertise. Sometimes assistance is provided to help rural people carry out work on their own, and sometimes the work is done for them.

This paper discusses the effects of subsidies on watershed development projects, particularly in India, although the arguments presented are relevant throughout the world. It focuses particularly on heavy subsidies for labour and specific technologies. In this paper we do not argue against government support for agriculture and poverty alleviation. Rather, we aim to show that some unintended, negative consequences of heavy subsidies in watershed management programmes actually undermine watershed development objectives. The cause of the problem is that watershed subsidies are intended simultaneously to support improved land management and rural employment generation. This is a lot to demand of a single policy intervention. We argue that watershed programmes could be more successful if these subsidies were reduced or eliminated, and the objectives of support for agriculture and poverty alleviation were achieved through alternate means. We conclude by suggesting alternate approaches that avoid subsidies or minimise their potentially destructive impacts.

Government Support for Agriculture and Human Welfare

Subsidies and payments to rural people have a long history in India. Employment generation for famine relief, for example, dates back several centuries. These programmes, sometimes funded by government and sometimes by wealthy private individuals, provided needy people the means to survive while strengthening infrastructure or creating scenic beauty.[1] In contemporary times, many state governments sponsor employment programmes that provide important welfare benefits.

Given the success of employment schemes in combatting hunger and stabilising rural incomes, it is not surprising that employment generation became a central component of many

1. Many of India's architectural masterpieces were built as famine relief projects. Jodhpur's Umaid Bhawan palace was built by the Maharajah as a famine relief project. The "painted villages" of Shekavati, northern Rajasthan were funded by private businessmen during famine years.

agricultural and rural development schemes. Whether for constructing irrigation canals or promoting watershed development, employment generation can easily be built into a range of rural development projects and produce tangible benefits. Employment generation is seen as one of several project objectives, and little attention is given to complementarities or contradictions among objectives.

Subsidies also are often seen as a useful way to convince farmers to try something that subsequently they will adopt with their own resources. This faith in the "demonstration effect" *is common among agricultural researchers worldwide who believe that the technologies they* develop will be adopted if farmers are shown their merits. The success of the Green Revolution contributed to this sentiment in India. In the Green Revolution, scientists' discoveries on agricultural research stations led farmers literally to replace traditional farming systems, resulting in spectacular productivity increases.

Agricultural demonstrations in India take several forms. Those conducted on farmers' fields normally involve subsidies. Often researchers select a farmer who receives free inputs if he donates a field to be used as a demonstration plot. Researchers then select a technical model to test on the plot. On a larger scale, watershed programmes often supply farmers with partially or fully subsidised inputs in exchange for allowing watershed works to be implemented on their fields, or to demonstrate to farmers the complementary effects of improved inputs and cultivation practices.

Some soil and water conservation (SWC) projects in India operate in areas where agriculture imposes external costs, or externalities, in downstream locations. The classic case is when erosion on farm land leads to siltation of reservoirs or other downstream infrastructure, decreasing their life span at a high cost to the national economy. Several publications of the Central Soil and Water Conservation Research and Training Institute in Dehra Dun display a photograph of a bridge in the Dun Valley that was nearly engulfed by half a century of upstream erosion (CSWCRTI, 1989). Images such as this leave a powerful impression of the need for government to help pay for erosion control measures on farms, even though such externalities are not present in every case.

Subsidies were also built into early SWC programmes because of official perceptions that farmers were ignorant and would only manage their land properly under coercion or persuasion. In some cases officials designed programmes that forced farmers to comply. But farmers resisted compulsory programmes; often destroying measures introduced against their wishes after the soil conservation officials leave (Pretty and Shah, 1993; Fernandez, 1993).

Today, many people view compulsory programmes as unacceptably authoritarian in nature. They seek another way to encourage farmers to adopt soil conservation practices. Paying farmers for work done on their fields offers a more socially acceptable way to try to achieve conservation objectives.

In recent years subsidies have assumed great political importance. This is partly because India,

unlike many other developing countries, is a functioning democracy. The rural vote is always hotly contested in Indian elections, with politicians often resorting to vote-buying schemes such as loan forgiveness and a wide range of subsidies to attract the rural constituency.[2]

The combined result of these efforts to create employment, demonstrate technology, combat externalities, guide 'ignorant' farmers, and gain political influence, is that most people in India do not question subsidies for agricultural development projects. Farmers have learned from experience that they may always expect subsidies, and the rest of society accepts, apparently without question, the idea that it should share the cost of measures intended to help farmers. There is little debate about why these subsidies are justified or what objectives they achieve. Here we argue that subsidies can hinder attempts to increase agricultural productivity and conserve natural resources.

When are Subsidies Appropriate and When are They Not?

Economic policies should be used to accomplish objectives that the free market does not achieve on its own. For example, they are needed when the market sends signals to people to produce, consume or invest in ways that are economically optimal for the individual but not economically optimal for society as a whole. In the language of economics, under these circumstances the private costs and returns of an activity do not equal the social costs and returns. This situation is referred to as a market failure (Box 1). A policy intervention such as a tax, subsidy, or a change in the laws that govern the market, can correct the market failure by realigning private and social returns to the economic activity in question. Direct government intervention can also be used to provide goods and services that the market does not provide.

Policymakers have many possible economic tools for correcting market failures. These include granting subsidies, levying taxes, assigning and specifying property rights, improving credit and insurance markets, and many others. The important point is that subsidies are just one of many policy tools. Depending on the market failure at hand, a subsidy may or may not be the most appropriate policy tool.

In economic terms, introducing a subsidy is justified if two broad conditions apply:

1) There must be a market failure (see Box 1).
2) A subsidy must be the best way to correct the market failure, ie. the one that solves the problem as directly and inexpensively as possible, with minimal side effects.[3]

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2. This situation is similar to that in Europe, North America, and Japan, where subsidies are politically important and often cause major distortions to the economy. In non-democratic societies, subsidies are politically important where leaders fear being forcibly removed from office rather than voted out.

3. There is a large, complex literature on correcting market failures in natural resource economies (Dasgupta, 1982; Randall, 1987; Pearce and Turner, 1990; Dorfman and Dorfman, 1993).

Box 1. Types of Market Failure

Examples of market failure, when market prices signal people to carry out activities that are not in society's economic interests, abound in natural resource management and have a variety of causes.

Gadgil (1992) describes how forest product firms with short term concessionary rights to forest land overharvested forests because they had no stake in their future productivity. Similarly, farmers collectively overexploit groundwater in semi-arid regions because there are no property rights governing access to groundwater, and because electricity price subsidies encourage overuse (Kerr, *et al.*, 1995).

Village irrigation tanks are poorly managed because traditional institutions for collective action have deteriorated. Pender (1993) found that many poor farmers wished to invest in wells but could not due to credit constraints. Farmers in dryland conditions apply less than optimal amounts of fertiliser because of the risk that their investment will be wasted if rainfall is insufficient. In all of these cases of market failure - externalities, short time horizons, unspecified property rights, credit constraints, risk, and others - the market fails to encourage the best pattern of natural resource management, and some policy intervention is needed to make the market work better.

A policy tool that is not directly targeted to the cause of a problem might fail to solve it or even worsen it (Box 2).

A subsidy should address the causes of problems, not their symptoms. A subsidy is an appropriate tool, for example, if the problem is that farmers do not invest in watershed development because the benefits go to the national economy but not the investing farmer. In this case a subsidy can raise private returns to match social returns. On the other hand, if the problem is that a farmer cannot invest in planting trees or digging a well because he lacks access to credit, the policy should be to provide credit. A subsidy might encourage the investment in trees or wells, but it is wasteful because a less expensive policy could have achieved the same objective.

In other words, in some cases subsidies are the best policy tool, but in other cases they are not. And they have four major drawbacks:

(1) They cannot be extended to everyone, because funds are limited.
(2) They are wasteful in cases where another policy could be used to accomplish the desired objectives.
(3) They may be difficult to remove once put in place.
(4) They may cause unwanted side effects.

Box 2. The Consequences of Poorly Targeted Policy

In India and several other countries, policymakers alarmed by the loss of tree cover introduced laws against cutting and marketing trees, both on public and private land. On private land this legislation had a serious side effect: farmers planted fewer trees because they feared that they would not be able to sell them (Chambers, *et al.*, 1989a; Murray, 1994). The policy that was chosen was not direct enough in addressing the problem of deforestation on public land. It also had the side effect of discouraging farmers from increasing tree cover on private land. A better policy would have helped farmers plant trees and market tree products while controlling the problem of logging in public forests.

How Subsidies Affect Incentives

As stated above, a subsidy is a payment or service that raises the net private returns to an activity. An incentive is something that motivates or stimulates a person to act[4]. Financial subsidies are intended to increase financial incentives, but other types of incentives can be social, moral, psychological or political. There are different types of subsidies and these have different impacts on a range of incentives or motivations.

Financial Subsidies and Financial Incentives

Most people think of finance when they think of subsidies. The intention of a financial subsidy is to raise the incentive for people to pursue the subsidised activity. Subsidising production of oilseeds encourages farmers to plant more of them, and subsidising construction of contour bunds encourages farmers to build them. The economics of subsidies appear to be very simple: by making the subsidised item less expensive or more remunerative, more people will be willing to pay for more of it.

Paradoxically, financial subsidies can reduce financial incentives for people to invest their resources in subsidised activities. This becomes clear when we consider subsidies and incentives over space and time. If a soil conservation programme subsidises construction of conservation ditches in one village, for example, then farmers in a neighbouring village who are considering investing in conservation ditches have an incentive to postpone the investment in the hope that the programme will soon operate in their village as well. Over time, the farmer whose conservation ditch was subsidised this year has an incentive to postpone repairing or rebuilding it in the hope that a future conservation programme will pay for it. Numerous SWC programmes throughout the world have faced this experience.

Subsidies also discriminate against products and practices that are not subsidised. If a subsidy reduces the cost of a commodity or technology or a certain way of doing things, it creates a

4. Sometimes subsidy and incentive are used synonymously, but not here.

disincentive to use substitute products or technologies. Electricity subsidies, for example, can reduce the incentive to search for alternatives such as solar powered pumps. Over time, this can impede scientific progress and stifle indigenous knowledge because it reduces payoffs for innovating and finding less expensive, more efficient ways to do things. In the case of watershed management, subsidies for certain conservation techniques reduce incentives to try other, less expensive ones.

Financial subsidies also create opportunities for corruption because they put officials and influential beneficiaries in a position to mismanage funds and other programme benefits. In a worldwide review of food-for-work programmes, corruption occurred more often than not (Jackson, 1982).

Financial Subsidies and Psychological and Moral Disincentives

Financial subsidies risk causing even more damage to psychological, social or moral incentives than to financial incentives. The experiences of innumerable agricultural development projects around the world demonstrate the psychological effects of cash and kind subsidies. Too often, villagers who receive free machines, irrigation wells or other items do not maintain or manage them properly. They value the services of free items, but they do not treat them as they would treat something they paid for themselves. These free items, or giveaways, never seem to last as long as comparable items purchased by farmers with their own money. If the machine breaks, they look to the agency that provided it to repair or replace it.

Loan forgiveness is conceptually similar to a subsidy because it enables people to accept funds without repaying them. It creates incentives for borrowers not to repay loans in the future, undermining the entire credit system and retarding rural development. Pender (1993) found that bankers reported a sharp drop in repayment rates following a debt forgiveness programme in 1990.

Cash and kind subsidies in rural development programmes can have the same effect on moral incentives. Rural development agencies everywhere find it difficult to operate without subsidies because villagers accustomed to giveaways act as though they are morally entitled to handouts, but not morally responsible for trying to solve their own problems. In this sense financial subsidies create *disincentives* that retard development. As Bunch (1982) put it:

> *Development is increasingly understood to be a process whereby people learn to take charge of their own lives and solve their own problems. Helping people solve their problems by giving them things and doing things for them makes them more dependent and less willing to solve their own problems. This cannot be called development; on the contrary, it is the very opposite of development.*

Subsidised Services and Psychological Incentives and Disincentives: Doing Things for People

Development projects that provide services rather than funds offer another form of subsidy. Some subsidised services play a critical, positive role in the economic development and well-being of any country, and their potential benefits should not be discounted. Education is the best example. In rural development efforts, assistance that enables people to do things they could not (or believe they could not) do, can have a powerful, beneficial impact.

Not surprisingly, however, subsidised services that are not carefully designed can have the same negative effects on incentives as financial subsidies. For example, if a project relies on outside technical experts to perform such activities as maintaining accounts, managing marketing efforts, or organising and mobilising people to perform some work that benefits the community, these activities are likely to cease once the project has ended. Instead of working for themselves, villagers wait for outsiders to do things for them as they have become accustomed to relying on someone else to do the work, and hence have not developed the necessary skills. In the extreme case, external agencies even discourage villagers from thinking for themselves, suggesting solutions to villagers' problems and offering to subsidise them. This leads villagers to say, "*Tell us what we need,*" instead of, "*We need this. What do we need to do to achieve it?*" (Barbara Adolph, ICRISAT, pers. comm.).

The key principle here, then, is that subsidised technical assistance should be targeted as much as possible towards helping people do things for themselves as opposed to doing things for them. This is an obvious and often-quoted principle, but it is easy to forget. Sometimes the line between the two is fine, and to avoid crossing it requires great effort. This is because usually it is easier to do something for people than to teach them to do it themselves.

How Subsidies Can Undermine Watershed Management Projects

As mentioned above, early efforts to conserve soil and water in India and elsewhere relied on compulsory programmes. Farmers had no say in whether SWC measures were taken on their fields nor what kinds of practices should be used. These projects were not only unpopular but also ineffective, as farmers often promptly destroyed structures that were introduced (Pretty and Shah, 1993; Fernandez, 1993; personal communication with farmers).

In recent years Indian government SWC programmes have shifted to optional but heavily subsidised SWC packages. In many modern programmes, farmers have little say in the choice of technologies to be used on their fields, but they receive benefits ranging from several days of employment to free fertiliser, seeds and other inputs. The people responsible for implementing the work have little or no say in the project design, and they are evaluated by

government auditors on the basis of the level of expenditure and the area covered by the physical structures they construct (government watershed officials, pers. comm.).[5]

This approach and its results are very similar to those of the compulsory programmes of old. Many farmers adopt the technology not because they like it but to obtain free inputs or employment. Sometimes the implementing agency, under pressure to achieve quantitative targets, convinces any resisting farmers to accept the work by increasing the subsidy payment (government watershed official, pers. comm.). In this way all parties are satisfied: farmers receive substantial benefits and officials achieve their quotas. The drawback is that farmers' fields are littered with mechanical structures or vegetative barriers that they do not necessarily want. The structures are removed or left to deteriorate once the project staff departs.

Subsidised Technology

Scientists and project managers who are confident in the technologies they develop often design top-down projects with minimal input from farmers. But even if a technology is scientifically sound, it may not suit the needs of farmers, who often have multiple objectives and constraints that cause their preferences to differ from those of scientists (Kerr and Sanghi, 1992; Chambers, *et al.*, 1989b; Pimbert, 1991).[6] But if subsidies are high enough — often in India they reach 75%, 90%, or even 100% — then farmers might accept them for reasons unrelated to the characteristics of the technology.

Experience shows that farmers are very particular when it comes to accepting new agricultural technology, particularly in unproductive, risky dryland environments. Achieving progress in agricultural development in these areas means understanding the subtle factors that contribute to farmers' decisions. Scientists and project managers should encourage farmers to test new technologies and consider how to adapt them to suit their needs. Clearly, the complicated task of sorting out the many determinants of farmers' acceptance of new technologies becomes even more difficult when large subsidies tilt the balance in favor of adoption (Box 3). Of course the decision to adopt under these circumstances is likely to be reversed once subsidies are removed, and farmers' suspicions that scientists and programme managers don't understand their needs will be reinforced.

The problem becomes more damaging once farmers become accustomed to heavily subsidised projects that deliver unsuitable technology. In this case farmers anticipate the benefits of subsidies but do not expect anything else of value. In India, many farmers do not take government projects seriously, and they are upset if they do not receive giveaways (Sanghi, 1987). Under these circumstances, heavily subsidised projects are doomed before they begin. Moreover, new projects that attempt to operate without financial subsidies are not welcome: farmers evaluate them in advance on the basis of what giveaways they offer rather than on their merits (Bunch, 1982; Valdes, 1994).

5. Most of the watershed projects referred to in this paper are deliberately left unnamed.

6. Kerr and Sanghi (1992) explain in detail how differences in Indian farmers' and scientists' priorities cause them to prefer very different approaches to soil and water conservation.

Box 3. Subsidised Technology In Indian Soil and Water Conservation

Many soil and water conservation programmes in India subsidise certain pre-approved technologies such as earthen bunds or vegetative barriers. These subsidies make farmers more likely to accept subsidised techniques and less likely to search for less expensive alternative conservation measures. In this way, subsidies inhibit farmers' creativity and slow the development of indigenous knowledge.

An extreme example of this problem is found in hilly, rocky parts of India where the soil is very shallow. One watershed programme operating in such an area subsidised the use of vegetative bunds but not stone bunds; another programme in a similar agroclimatic region subsidised earthen bunds but not stone bunds. In the former case the vegetative barriers could not grow because the stony soil prevented the roots from penetrating. In the latter case, the soil was so shallow that removing it to build earthen bunds would have seriously damaged agricultural productivity.

In both of these areas there was a rich tradition of farmers' own investments in indigenous SWC measures, particularly stone bunds and enclosure walls. In the former area, the project subsidised labour for planting cactus hedges so heavily that it became a highly profitable activity. Farmers responded by planting cactuses next to their existing stone walls. The cactuses served as no more than decoration, but they met the farmers' primary objective of earning subsidy payments.

Subsidised Inputs

In some watershed projects and on-farm research demonstrations, farmers who adopt SWC practices receive free inputs such as seeds and fertiliser. The idea behind these giveaways is to demonstrate that improved inputs in combination with SWC measures will result in high yields. Some farmers, however, accept the inputs but then sell them or use them on their irrigated plots rather than on dryland watershed plots (Y. Mohan Rao, ICRISAT, pers. comm.). As a result, the project fails to achieve the desired demonstration effect, and project officials and scientists obtain no information about farmers' reactions to the technology that might suggest ways to make it more acceptable to them.

Subsidised Labour

Some projects subsidise labour devoted to watershed works. In both government and NGO projects, 90% or 100% labour subsidies are common. In reality these subsidies exceed 100%, because they use the legal minimum daily wage of Rs 22, whereas the market wage in the dry season falls to below Rs 20 in many rural areas. Therefore 90% of the legal minimum wage actually can be more than the market wage. Not surprisingly, many people eagerly participate in these programmes regardless of what they think of the technology. Formal and informal surveys (Box 4) of farmers in various watersheds find that they perceive employment to be the most important project benefit (ICRISAT data, 1994, unpublished).

Box 4. Do Rural People Want Conservation Measures or Employment?

A group of researchers carried out an informal survey of soil conservation practices in a village in Maharashtra. One of the researchers was from the government and the rest were from elsewhere. When the villagers met the government researcher, they uniformly praised the large government soil conservation programme undertaken 15 years earlier and expressed satisfaction with the contour bunds that it introduced. On the second day of the survey the government official was not present, and the villagers admitted that they did not like the contour bunds but would happily accept them as a means of gaining lean season employment. Once again, subsidies obstructed officials and researchers from gaining information that could help them to improve technologies and project design.

Source: Personal communication with farmers

Subsidies and Replicability

Development agencies often list replicability to non-project areas among the objectives of their work. Replication is important in any development assistance programme because it multiplies the benefits that accrue from funds spent on the work, increasing the overall returns. Official documents for large Indian watershed development projects, for example, cite replicability as an important objective (World Bank, 1990; Government of India, 1991). The same documents go on to explain that the projects cover 50% to 100% of the cost of technologies that they introduce, with farmers contributing whatever is left. These documents contain little or no discussion of the relationship between subsidies and replicability. They justify subsidies as supporting the demonstration effect, but there is no serious discussion of how subsidies will be phased out. For true replicability, however, phasing out subsidies is critical because funds are not available to provide them except in a limited area and for a limited period.

Because subsidies cannot be made available to everyone - certainly not to all of India's hundreds of millions of farmers - it is probably better not to introduce them in the first place. A watershed project initiated without subsidies obviously faces a more accurate test of replicability than any project supported by subsidies.

Paying for Participation

Participatory watershed projects are intended to overcome the problems faced by top-down projects. Participatory planning between farmers and watershed officials is expected to ensure that the technologies selected are both technically sound and acceptable to farmers. Experience shows that this approach is very sound, but if it includes high subsidies, especially subsidies for labour, participation actually can worsen the problem of encouraging farmers to accept useless technology. Two examples illustrate this point (Box 5).

Box 5. The Consequences of Subsidised Participation

A programme in Andhra Pradesh aimed to encourage farmers to build bunds on their land. The project paid the farmers to carry out the work on their own land and allowed them to choose their own technology. Two soil scientists visiting the project in 1993 noticed that on some fields earthen bunds were far larger than necessary, and that they actually did more harm than good by taking scarce topsoil from the field. They also noticed that a large stone structure on the boundary of one field served no apparent purpose. Further investigation suggested that the lure of guaranteed employment led the farmers to build large bunds regardless of their purpose.

The second case concerns a participatory watershed planning exercise held in a drought prone area of Andhra Pradesh. Under the project, villagers were to be hired to carry out work jointly planned by villagers and project officials. When the villagers were asked to present their plan, they said that enlarging the massive irrigation tank bund was their top priority, even though the tank had filled only three times in the previous ten years. Subsequent investigation revealed that the farmers did not really think that the bund needed to be raised, but they knew that such a large project would employ them throughout the dry season, relieving them from having to migrate to Hyderabad or Madras.

Source: Personal observation

These two examples probably are replicated on a daily basis in heavily subsidised, participatory projects in India. The essence of the problem is that subsidies distort incentives so that farmers select the technology made most attractive by the giveaway rather than the one they think is best on its own merits. Project officials too trusting of farmers' wisdom are likely to be fooled in such cases.

True participation means working together toward a common objective. This will not be possible if the very design of projects creates incentives to mislead and deceive. Subsidies can create such incentives.

Promoting Watershed Development Without an Over-reliance on Subsidies

If subsidies, particularly high subsidies that create employment or target specific inputs or technologies, can create so many problems in watershed development projects, what should be done? First, subsidies should be avoided where there is no obvious justification. Second, where subsidies are justified they should be designed and implemented in such a way as to minimise distortions to incentives.

Designing Subsidies with Minimal Distortions to Incentives

In India, high subsidies in watershed programmes are a fact of life, and it will be difficult to remove or greatly reduce them immediately. This is partly because of a 'culture' of high subsidies where no-one questions their usefulness, but also because high subsidies are written into national legislation that will not be changed overnight. This means that it is very important to devise ways to reduce the harmful impact of subsidies on watershed programmes.

One way to reduce the harmful impact of subsidies is to require matching labour contributions by landowners on whose land conservation structures are built. The idea is as follows. Farmers may choose their own conservation technology and must build half of a given structure with their own labour (either family or hired). They may then request the conservation programme to construct the second half, according to the design specified by the farmer. The conservation programme would hire the workers under the programme to do so; these workers would be paid only after the farmer certifies that the work is acceptable to him. This approach has several advantages. First, it helps ensure that the technology suits the farmer's wishes and is built according to standards that satisfy him. Second, the farmer never receives any payment, reducing the chances that he will participate in the programme for unexpected reasons.

This approach also offers an important side benefit of helping organise landless workers and teaching them skills that will increase their self-sufficiency. In particular, labourers may form an association to provide conservation construction services. Payments from the watershed project would be made directly to the association and distributed to its members. Assistance could be provided to the association to develop their business skills and perhaps develop spin-off activities such as revolving credit programmes. More generally, this idea follows the principle of using rural development programmes as leverage to create benefits for disadvantaged groups such as the poor, lower castes and women.

Contributing an input or a technology to a group of families instead of an individual family is an important step in this direction, particularly if one family's receipt of benefits depends on other families' adherence to agreements made under the programme. This is a well-known principle that contributes to the success of Bangladesh's Grameen Bank, where loans are made to groups of five people, and if one of them does not repay, all five lose access to further credit. Another variation on this principle is known in India as rotational credit, in which loans are provided in sequence to different people in a group. Under this system, the second loan is made only after the first is repaid, and so on. Such schemes could be devised under subsidised watershed programmes in India.

However, it is preferable to avoid subsidies entirely where they are not justified economically, rather than try to cope with strategic behavior by those who receive subsidies. The rest of this section suggests ways to promote watershed development with no subsidies at all.

Institutional Innovation to Manage Local Externalities

As stated above, subsidies for watershed management are justified when its private and social returns diverge. Recent evidence from numerous tropical countries, however, suggests that in most cases the benefits of soil and water conservation practices accrue mainly to the farmer who adopts them. The externalities that do exist usually are highly localised: soil erosion in most places does not deposit silt in downstream hydroelectric dams, but rather neighbouring farms or ponds within the same microwatershed. Similarly, the low application rates of pesticides and fertiliser mean that runoff of poisonous chemicals is not a major problem. If there are no externalities then there is no argument in favor of subsidies; if externalities are small then only small subsidies are justified. In this case, if anyone should pay upstream farmers to adopt soil conservation it is their downstream neighbours, not taxpayers at large.

The idea of 'payments' by one group of farmers to another is not as revolutionary as it first sounds. In fact, it is an old and well known idea among economists (Coase, 1960). 'Payment' need not mean cash or even kind transactions, but rather some kind of formal or informal compensation mechanism from one group to another (Box 6). Such arrangements sometimes are found in common property resource management systems, whereby a group that benefits from a collective management arrangement secures cooperation from a group that does not.

Box 6. Spreading the Benefits of Natural Resource Management

A classic example from India is the famous Sukhomajri watershed project, in which landless families received rights to irrigation water in exchange for protecting the irrigation tank catchment area. These families could then sell their water share or use it on leased land (Patel-Weynand, 1995). More recently, the National Tree Growers' Cooperative has adopted a similar approach, giving all households a share in the returns to protecting trees in common forests. Another example from India concerns current efforts in Andhra Pradesh to convert irrigation tanks to percolation tanks (Gangi Reddy *et al.*, 1994). Under certain circumstances there can be substantial benefits from tank conversion, but they are not evenly distributed, so possibly some people who stand to lose have an incentive to sabotage the effort. Success in tank conversion projects therefore requires organising all the people affected by the tank to ensure that the benefits are distributed in a way that satisfies all of them. No external finance is needed.

If watershed externalities tend to be small and localised, two principles emerge. First, watershed managers should begin by assuming that there is no need for financial subsidies, rather than *vice versa*. If subsidies are justified they may be offered, but justification should not be assumed. Second, external assistance should focus on helping people organise themselves to solve their own problems, and to facilitate access to credit, secure tenure, and other factors needed to guide private incentives toward socially productive activities.

Supporting Community Organisations Instead of Subsidising Technology

Informal village groups potentially can serve as a focal point for efforts to resolve local disputes and mobilise farmers into action. Experience in India suggests that participation in local groups can build villagers' confidence to work collectively, to establish thrift funds to generate capital, to consider new investment opportunities, and to generally become more active (James Mascarenhas, OUTREACH, pers. comm.; Parthasarathy, 1994). Active local groups can stimulate psychological incentives that previously were stifled by cultural or political constraints. These potential strengths of local groups have nothing to do with external finance. In fact, they present an alternative, more sustainable way to improve the welfare of rural people (Box 7).

Box 7. Landcare: Successful Watershed Development with Minimal Subsidies

Australia's Landcare movement is an example of institutional innovation based on informal community organisations. Under Landcare, more than 2000 voluntary groups around Australia work together to promote more sustainable land management. Every group is different, depending on the circumstances, needs and wishes of its members. Among other activities, the groups organise education and awareness campaigns, coordinate links between researchers and farmers, and plan watershed development in a way that considers the objectives of individual farms within the overall watershed context (Campbell, 1994).

Landcare groups receive a small amount of funding from the government to meet administrative costs. These funds are defended on the grounds that better land care yields benefits beyond those captured by the farmer (Campbell, 1994). But the subsidies are small; individual Landcare groups and farmers raise funds to meet most of their own costs.[7] Also, the small subsidies are to be used for administrative expenses and awareness campaigns, not particular technologies or watershed development programmes. This enables farmers to invest in technologies and participate in activities that they truly want.

Farmer-to-farmer extension is an offshoot of community organisation. Once villagers organise, skilled farmers can serve as extension agents to spread information to their neighbours. They may have more credibility than traditional extension workers because they face the same circumstances as the people they serve. Farmer-to-farmer extension has had favorable results in many countries.

Two principles from these experiences are worth highlighting. First, every community is different, so there can be no blueprint for designing community organisations. Second, external funds donated to community organisations should be forthcoming only to groups that have already established themselves and demonstrated that they are serious. The funds should

7. Campbell (pers. comm.) argues that externalities are in fact quite large, justifying much larger public expenditure than is actually forthcoming.

be small and should support costs of organising, gathering information and spreading awareness; they should not finance giveaways.

Sequencing Projects to Reduce Financial Constraints

Several successful development assistance agencies have found that villagers are more receptive to watershed development and soil conservation if the agency first addresses other needs that are more urgent and that create conditions favorable to successful watershed development (Fernandez, 1993).

Small thrift groups are a successful intervention that people in many villages are very enthusiastic about (Parthasarathy, 1994; Fernandez, 1991). Developing and strengthening thrift groups prior to intervening in watershed development can create conditions that encourage villagers to accept watershed development without subsidies. Successful thrift groups serve this purpose in at least three ways. First, they help villagers save money to improve their living standards. By starting with thrift groups, a development agency can demonstrate to villagers that it is concerned about their welfare rather than just its own agenda. Second, managing thrift groups helps villagers build organisational and conflict resolution skills that are important in watershed management (Fernandez, 1993; Parthasarathy, 1994). These groups also can serve as a focal point for spreading awareness about the benefits of watershed development, as in the Australia case (Campbell, 1994). Third, thrift groups can help villagers save enough money to be able to invest in watershed management. One common experience in thrift group projects is that within a relatively short period of time (as little as a year) participants find that their greatest challenge is to figure out how to spend their savings. In an environment where cash is not an important constraint, it might be possible to overcome the subsidy mentality and encourage farmers to invest their own funds on watershed management.

Conclusions

In summary, there are good reasons to believe that subsidies are undermining Indian watershed development efforts. This is especially so where subsidies are very high and are tied to employment or to specific technologies that require subsequent maintenance to be useful. In many watershed programmes, subsidies lead farmers to adopt SWC techniques with no intention of maintaining them, and they make it difficult for researchers and project managers to learn what practices farmers accept or do not accept.

Many people in India believe that watershed development should be subsidised simply because so many Indian farmers are very poor and need assistance. However, projects in many countries with similarly poor farmers have removed or substantially reduced subsidies, with favourable results. These countries include Kenya, Lesotho, Niger, Haiti, Cape Verde, the

Dominican Republic, and the Philippines, to name a few (Lutz, *et al.*, 1994; IFAD, 1992; Critchley, 1991; Fujisaka, 1989). In some cases they found that removing subsidies made no difference; in others they found that it improved efforts to encourage conservation. Programmes under SPEECH in Tamil Nadu, Oxfam in Andhra Pradesh, and others have shown that this approach can work in India as well.

Evidence from around the world suggests that farmers will invest in conservation practices when it is profitable for them to do so (Lutz, *et al.*, 1994; Tiffen, *et al.*, 1994). This suggests that farmers do not need subsidies so much as they need less expensive, more profitable technologies; policies that encourage them to take a long term perspective in caring for their land, greater awareness of the costs of degradation, and encouragement to organise themselves to invest in conservation (Pretty, 1995).

Even if these enabling conditions are created, there will remain poor people who need assistance to improve their livelihoods. But poor people can be helped in other ways that waste less money and do not distort incentives to invest in conserving natural resources. There is no need to tie poverty relief measures to natural resource conservation efforts.

Likewise, there are alternate ways for the government to support rainfed agriculture. Gulati (1990) found that Indian agriculture is subject to net taxation even though many inputs are heavily subsidised. This is because price and trade policies reduce output prices and inhibit demand by more than enough to overcome the benefits to farmers of input subsidies. One obvious way to promote investment in more productive agriculture, therefore, is to alter price policies to raise farmers' profits.

Reducing subsidies substantially will be difficult in India. Farmers are accustomed to high subsidies and will oppose efforts to remove them. Also, projects that try to reduce subsidies unilaterally will face difficulties if nearby projects continue to offer large giveaways. For these reasons, removing or substantially reducing subsidies will be very challenging. A concerted effort is needed to eliminate the giveaway mentality if conservation efforts are to have long-lasting and widespread success.

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