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Economic Rationale, Subsidy and Cost Sharing for Watershed Projects: Imperatives for Institutions and Market Development

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Abstract

Economic rationale underlying a fairly extensive subsidy structure for natural resources (NR-based development) emanates from the inherent divergence between private and social benefits derived from the use of such resources. Generally, subsidy is justified when social benefit from a particular type of resource-use exceeds the private benefits. This often includes incentives for reducing the use (exploitation) of a particular resource. In this case the subsidy takes the form of a compensation for adhering to the norm of sustainable use of a resource, which is likely to help the society, though not all individuals within that, to reap larger benefits in the long run. Similarly, subsidy is offered under a situation where, owing to the financial resource crunch, natural resources remain sub-optimally utilized by the private owners/users. Finally, subsidy is also used as a mechanism to mitigate inter-household differences in capacity to invest in and earn from the use of natural resources. Given these broad contours of economic rationale, subsidies in the NR-based activities like integrated watershed development should qualify for three basic aspects: resource-use efficiency or sustainability, economic viability, and social equity.

Evidence from studies on various NR- based programmes in India indicate that there are many instances when people, even the poor, are willing to pay for the cost of such initiatives, especially when private benefits are sure and substantial. Also there are a number of examples when people have worked out informal mechanisms for cross-subsidisation across resources as well as households. Studies also show a truncated subsidy structure where there are neither financial nor institutional incentives for improving efficiency of the resource-use. Moreover, the experience suggest that participatory mechanisms, if not properly evolved, are often found to be more concerned about distribution of subsidies *per se*; rather than triggering a process of negotiations for achieving equity-inter generational and inter-households-through efficient use of resources. There are of course, a few successful examples of operationalisation of subsidies especially in the context of watershed projects in the country.

The issue of subsidy for watershed projects is particularly tricky because of the multiplicity of activities and goals. As a result investment in watershed projects in India are almost entirely subsidised especially in the case of the government funded projects. This kind of funding is unlikely to sustain in the wake of the increasing pressures on the state's resources. Exploring mechanisms for cost sharing thus becomes essential. Besides the problem of resource crunch, cost-sharing is also being viewed as a critical device for establishing people's stakes hence their effective participation in the project. Moreover, cost sharing is an important mechanism for providing a negotiating platform among the potential beneficiaries of watershed project. The issues of subsidies and cost-sharing therefore, have caused serious concern and policy engagement in India. This paper provides a discussion point in this context.

It seeks to examine the experiences with respect to subsidies and cost-sharing in the light of the various watershed programmes supported by the state as well as donor agencies and other non-government organizations in India.

JEL Classification: ***Q15, Q18, N14***

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1. The Context

Economic rationale underlying a fairly extensive subsidy structure for natural resources (NR-based development) emanates from the divergence inherent between private and social benefits derived from the use of such resources. Generally, subsidy is justified when social benefit from a particular type of resource-use exceeds the private benefits. This often includes incentives for reducing the use (exploitation) of a particular resource. In this case subsidy takes the form of a compensation for adhering to the norm of sustainable use of a resource, which the society, though not all individuals within that, is likely to reap larger benefits in the long run. Similarly, subsidy is offered under a situation where, owing to the resource constraints, natural resources remain sub-optimally utilized by the private owners/users. Finally, subsidy is also used as a mechanism to mitigate inter-household differences in capacity to invest in and earn from the use of natural resources. Given these broad contours of economic rationale, subsidies in the NR-based activities like soil-water conservation, irrigation, waste land development, afforestation, and, an integrated watershed based development of all these resources should qualify for three basic aspects: resource-use efficiency or sustainability, economic viability, and social equity.

To a large extent, budgetary allocation for supporting various natural resources development in India (and in many other developing countries) has been shaped by these three considerations. Increasing emphasis on participatory processes, of late, in these programmes, has brought in special concerns for equitable distribution and effective use of subsidies. Experience from a large number of the NR-based schemes, including the much hyped watershed development programmes however, suggest that the existing subsidy structure is ill-equipped to take care of the sustainability, viability and equity aspects. This is reflected by the fact that in most cases, subsidies are offered for enhancing the resource use rather than the efficiency thereof. Similarly, subsidies invariably become

substitute for a good credit support. And lastly, a uniform structure of subsidy offered to households, with inequal capacity to invest, turns out to be regressive rather than equitable.

Against these, evidence from studies on various NR- based programmes in India indicate that there are many instances when people, even the poor, are willing to pay for the cost of such programmes, especially when private benefits are sure and substantial. Also there are a number of examples when people have worked out informal mechanisms for cross-subsidisation across resources as well as households. The studies also show a truncated subsidy structure where there are neither financial nor institutional incentives for improving efficiency of the resource-use. For, participatory mechanisms, if not properly evolved, are often found to get lost into the natty-pretty of implementation and be more concerned about distribution of subsidies *per se*; rather than triggering a process of negotiations for achieving equity-inter generational and inter-households-through efficient use of resources. There are of course, a few successful examples of administering the subsidies in a more effective manner.

This paper tries to look into these experiences in the light of the watershed development programmes (WDPs) in India. This has a special relevance for understanding the economic rationale of subsidies and to understand the operational constraints thereof. WDPs provide a special case in this context. For (a) the economic benefits from watershed development programmes, unlike irrigation, is often limited and/or uncertain; and (b) subsidy has an important bearing on people's participation in these programmes.

It is the contention of this paper that rationalization of subsidies is critical not only for reducing the financial burden of the state but, also for mobilising effective participation of the people and inducing private investment by farmers. Together these would help putting the WDPs on a more sustainable basis-economic, environmental, as well as financial. It is argued that the programme, if supported by a more effective subsidy structure, could unfold new avenues for negotiation among the watershed communities, and thereby strengthen the participatory processes for natural resource development across different activities and schemes. The analysis is divided into five sections. The next section discusses the economic rationale of subsidy for watershed programmes in the light of private as well as social benefits resulting from different treatments for watershed development. This is followed by a brief review of the design as well as

operationalisation of subsidies by some of the major watershed programmes in the country. This leads to identifying issues pertaining to the three major aspects viz; technology (or productivity), credit facility, and institutional mechanism that are critical for redesigning the subsidy structure. The last section presents major conclusions.

2. Subsidies for Watershed Development: Rationale and Constraints

Prima facie, subsidy for watershed programmes can be justified on various grounds as described in Chart 1.

Chart 1: Rationale for Present Structure of Subsidy for Watershed Projects

Factors	Rationale
Historical	Soil water conservation, the precursor of WDPs, have been undertaken as drought relief measures; the same continues at present
Political	Surface irrigation, yielding sure and substantial economic returns, is heavily subsidised. Keeping a parity with that would justify subsidy for unirrigated agriculture
Economic	WDPs often have low and uncertain economic returns, and also have long gestation period
Administrative	Jointness of benefits across farms, households and regions leading to conflicts
Environmental	Environmental benefits outweigh private benefits

Historically, watershed development programme has its origin in various kinds of soil water conservation (SWC) measures undertaken as relief work during drought years. Subsequently, SWC-measures started getting recognized for their critical importance on environmental front. As a result, watershed programme, in its early phase, became more of `conservation' oriented intervention rather than productivity focused investment, barring a few exceptions of the Command Area Development Programme and Integrated Dryland Agriculture Programmes (for details see, Shah, A. 1998). Designing of integrated development programmes thus had a legacy of a strong subsidy component, almost of the order of 80-90 per cent. For, initiated as drought relief work, SWC- measures have continued to

be seen as `employment generation' programmes rather than as investment for productivity enhancement and drought proofing. Thus, in absence of any special focus on increasing productivity (within a reasonable time frame), employment generation or conservation of natural resources became the central thrust of watershed programmes at least in the initial phase. Hence, subsidy continued to have a special place in designing of WDPs since the expected outcomes were more of the nature of social rather than private benefits to individual households.

The above scenario however, has changed at least since the mid-eighties when watershed programmes have increasingly been recognized as a key strategy for developing rural economies especially through evolution of participatory institutions and decentralized power structure. Given this new perspective, watershed programme has to play a central role not only in terms of conservation but also in terms of promoting development of natural resources in a manner that ensures sustainable growth in production, with increased employment and income, strengthening of community organizations. Essentially, this represents an approach rather than merely a scheme for rural development.

Driven by this perspective, the Government of India (GOI) has laid special emphasis on WDPs as reflected by the increasing resource allocation. For instance, a 25- year Perspective Plan has been prepared by the Planning Commission covering 63 million hectares of land under rainfed/dryland region with an estimated outlay of Rs. 76,000 crores. This kind of a huge budgetary allocation is to be achieved by (a) merging of the various employment guarantee schemes especially, in dryland regions; and (b) shifting a part of the allocation from irrigation and water resources schemes (Government of India, 2001). While this is a major break through in terms of setting-up of developmental priorities in favour of dryland/rainfed areas, the actual achievements however, would depend on the effective use of the budgetary resources. This is particularly important because of the two specific aspects of the WDPs viz; limited economic benefits, and need for continued rather than one-time investment in natural resources so as to sustain productivity gains in the long run.

Moreover, the budgetary support though, increasing over time, is fairly small vis-à-vis the actual requirement of the vast land mass especially in dryland region. For instance, the target for WDPs under the Ministry of Agriculture during the Ninth Five Year Plan was to cover 22.5 lakh hectares in dryland region. Alternatively, physical coverage of WDPs can be enhanced either by reducing

the cost of treatment or reducing the rate of subsidy or both. In this context, the experience from a large number of watershed programmes suggest that the average cost-norm is quite realistic; hence reducing it further might affect the quality and/or quantity of work adversely (Government of India, 1994). The other option therefore is to reduce the extent of subsidy from its present high level. While there is a fair amount of agreement on the need for reorganizing the existing subsidy structure, what is however, missing is a framework within which the issue of subsidy could be discussed.

i. Welfare Measures Vs. Productive Investment

As noted earlier, a large part of WDP-related work still continues to be undertaken as relief work programme where generating wage income during the scarcity period is the central objective. This makes it difficult to withdraw or reduce subsidies on similar types of work when undertaken through watershed programmes. For, a long history of perpetual drought relief programmes have created a mind-set among the people (and also among the implementers) that such activities have to be treated welfare schemes rather than as investment in productive assets. As a result, it is not only difficult to make people pay for at least a part of the cost of such treatments especially when there are significant private benefits, their maintenance is also overlooked. In the process it sets a vicious circle of low quality of work – low impact on drought proofing - continued dependence on drought relief programmes – low level of maintenance - higher incidence of subsidy. Breaking this vicious circle therefore would require linking-up these activities with increased productivity at least during normal-rainfall situations and thereby enhancing people's capacity to withstand a drought. Unless this is ensured, withdrawal or reduction of subsidy on a large number of SWC or watershed related activities would meet with strong resistance from people, especially in the dryland region.

ii. Equity and Political Feasibility

The argument often put forward by the supporters of subsidies on WDPs is that of its parity with the subsidy on irrigation. Viewed from the context of political economy of equity, the argument appears to be fairly valid. For, it raises the issue of the lopsided growth and long term neglect of dryland agriculture in the country. While it might make a good economic sense to prioritize investment on irrigation because of its higher benefit - cost ratio than that in WDPs, there is

however, little justification for subsiding the former and neglecting the later. This is particularly true because (a) about 85 per cent of the investment in agriculture has gone into irrigated farming; and (b) investment required for creating irrigation is substantially higher i.e. about Rs. 75,000 – 100,000 vis-à-vis Rs. 4-6000 per hectare in the case of WDPs. The central point of the argument is that `if farmers in irrigated areas continue to receive subsidies despite the higher private returns, there is no justification to cut subsidies received by farmers in dryland region'. Thus, given the equity consideration subsidy on watershed programmes remains justified so long as beneficiaries of irrigation scheme do not pay-up the subsidies received by them.

But, this kind of arguments though, justified in the larger context of political economy, may lead to a kind of `dead-lock' where one set of wrong subsidization leads to its perpetuation on other set of activities. Getting out of this loop thus, requires a clearer understanding of the rationale for subsiding the various NR-based activities like WDPs.

iii. Jointness of Benefits: Private and Social

This brings us to the second set of difficulties for designing the subsidy structure for WDPs. To a large extent, this refers to methodological problems and absence of carefully conducted studies on the benefits and costs of different treatments undertaken through WDPs. The problems arise mainly due to the fact that: (a) large part of the benefits generated through watershed programmes are in the form of environmental regeneration hence difficult to assess as well as value in monetary terms; (b) the impact of watershed development is situation-specific, vulnerable to weather related fluctuations and has long gestation period; (c) benefits often accrue at societal level, hence difficult to isolate benefits accruing to individual households/beneficiaries; and (d) the benefits arising from different treatments are likely to have strong synergy effects thus making it difficult to decompose the effects of individual treatments and the beneficiaries covered by them.

Given these methodological problems, it is generally difficult to assess the benefits and segregate them for individual beneficiaries having different paying capacity hence eligibility for receiving differential subsidies from different treatments. Consequently the approach, generally adopted by government as well as other funding agencies, is to assess economic as well as environmental

benefits, and work out financial benefit: cost ratio considering the impact on productivity and income. In most cases the ratio works out to be in the range of 1:1.2 – 1.5. This is taken as a satisfactory indicator for supporting. Such investment particularly because of the significant environmental benefits expected from investment like this. While this is a fairly practical approach for making investment decisions, it does not provide rationale for identifying the extent, distribution and terms of subsidisation across watershed treatments as well as households within a WDP project. Overall therefore, investment in WDPs is justified on the ground of its multi-faceted environmental benefits (De Graff, 1996) like reduced soil erosion, recharging of ground water, increased vegetative cover, bio-diversity, carbon-sink function etc. An important implication of such an approach is that it does not pay adequate attention to important aspects like private benefits and cost-sharing.

iv. Low Economic Incentives

Together the above discussion tends to justify the high level of subsidies for WDPs, somewhat on the line of the other natural resource development programmes in the country. Besides this, there are certain other justifications for providing subsidies in WDPs in India as well as in other developing countries. For instance out-migration is found to be closely associated with low investment on SWC measures especially in dryland regions. This may happen due to labour constraints arising out of higher opportunity cost among migrant workers and preference for leisure during slack season in agriculture. This phenomenon counters the generally held notion about surplus labour and zero opportunity cost thereof. The fact that farmers in a large number of cases do not choose to work on SWC-measures on their own farm even during the lean period suggests that (a) the returns on such measures are not sure or substantial; and/or (b) there is a high preference for leisure than what is generally thought of in a `surplus' labour situation. In this case, promoting SWC-work would require subsidies which can be justified mainly on the ground of the larger social or environmental benefits (Reardon et. Al 1992; Reij, 1991). Similar arguments have been put forward to justify incentives including subsidies since poor farmers in degraded areas have limited resources (Meiman, 1988), low level of credit worthiness, and almost insignificant access to institutional finance. Finally justification for subsidies on watershed programmes also come from the fact that it is a basic investment in agricultural infrastructure hence, need to be supported through public investment.

If this comes through in right manner as well as proportions, it may induce private investment by farmers.

v. Inducing Private Investments

Notwithstanding the various justifications, experience from a large number of WDPs indicate that the subsidies provided for the basic investments in SWC-measures by and large, have failed to promote private investment by the beneficiaries covered by the project. The only major exception is preparation of field bunding and field channels where irrigation facility has been created through the project. Barring this response, there are only few instances when farmers have put their own resources after having their land treated under the project. Some of the important activities that ideally could have received private investment include mulching, composting, farm forestry, water saving devices including trenching, and improved agronomic practices through additional investment in labour. What is concerning is the issue of maintenance of the structures created through the project. Poor maintenance of field bunds, terraces, farm ponds, and low survival of plantation etc. are some of the common sights on the areas already treated by the project. The situation is worse when it comes to common property resources (CPRs) such as village tank, drainage lines and check dams etc. (Shah, 2000).

Prima facie, lack of private investment in WDS (except in the case when additional irrigation is made available through the project), is explained through a complex-mix of factors as discussed by Kerr and Sanghi (1996). According to them the crucial factors determining farmers' investment in soil-water conservation or WDPs are:

(a) greater concern about loss of water and soil nutrients rather than for soil erosion per se;

(b) opportunity cost of labour time;

(c) access to financial resources;

(d) tenure agreement;

(e) quality of land and topography;

(f) staggering of costs and efforts over a long period of time; and

(g) hesitation to invest in community based resources.

Together these factors are likely to lead to sub-optimal private investment in WDPs. Given these constraints, it is difficult to induce private investment – initial or supplementary in WDP related activities. This is concerning because watershed development is a continuous process rather than a one-time investment. Unless, the initial treatment carried out by the project is followed by a series of activities for development of land and water resources, the project may yield only limited results. This is what has generally been observed in a large number of watershed projects in India (Kolavalli and Kerr, 2002). The significant positive impact however, has confined mainly to the areas where the WDPs have resulted in increased irrigation facilities as in the case of Andhra Pradesh (Rao, C.H.H, 2000).

What is more concerning is limited environmental benefits in terms of improving vegetation, bio-diversity, ground water table, soil-moisture and afforestation. While it is difficult to ascertain the environmental impact of WDPs (as it takes about 10-15 years to show some tangible results), the observation about the kind of treatments carried out in a large number of watershed projects and the poor maintenance thereof, suggest substantial gap between the expected and the actual environmental benefits rendered by these projects. This, along with the above observations regarding the limited private investment in WDPs, may call for a fresh thinking on the issue of the state's investment in these programmes. It may however, be noted that the issue is not of providing subsidies or not. Rather, it is more in terms of deciding as to subsidy for what, to whom, and how much?

Apparently, these issues have rarely been raised among a large number of the practitioners of the WDPs who might be over-occupied with the task of convincing the village communities to undertake certain activities that might have relatively low/uncertain pay-offs at least in the near future. More recently however, the issue of effective subsidies or cost sharing has been raised by a number of policy makers as well as practitioners. Apart from reducing the budgetary cost of subsidies, the pertinent issues recognised by a number of implementing agencies is that of creating `ownership' of project-activities by the people. It has been widely recognised that unless the recipient communities own-up the project, supplementary private investments and efforts for conservation of natural resources are difficult to come about. In fact, cost-sharing is often being seen as synonymous with people's participation which is at the core of the WDPs, if the project is to work as a developmental approach

(rather than merely as a time-bound project) involving a chain of activities on a continuous basis.

Similarly, questions have been raised about the present structure of subsidies, which often have poor linkages with the expected private benefits, individual's ability to pay, and the evolving markets. Alternatively, a number of innovative mechanisms have been evolved to make subsidies work more effectively towards the larger goals of increasing productivity and thereby private investment, enhancing environmental regeneration, and mobilising people's participation. Prima facie, the idea is to make better use of subsidies rather than merely to reduce the burden of state's subsidies in these programmes. This could be achieved by understanding the interplay between three sets of factors related to (a) technology, productivity and the expected net returns; (b) access to credit and other markets promoting soil-water conservation and land productivity; and (c) institutional mechanism which could help identifying the priorities as well as distribution of subsidies across different activities/watershed treatments and households. The following sections discuss these issues in the light of some of the innovative experiences and identify guidelines for designing an effective structure of subsidies for watershed projects.

3. Evolving an Effective Subsidy Structure: Innovative Experiences

This section discusses the three inter-related aspects having significant bearing on effectiveness of subsidies in watershed projects.

i. Choosing the Technology/Treatments for Improving Productivity and Cost-Sharing

Selecting right kind of technology or watershed treatment is very crucial for improving the effectiveness of subsidies. This is particularly true of the subsidy paid for treating private land and/or water resources. Here, subsidy could be justified only when the private returns are lower than the cost of the treatment, which otherwise, is beneficial from the view point of environmental regeneration. In situations where private returns exceed the cost, there is a significant scope for cost recovery. In turn, this would imply substituting subsidies by a `good credit support'.

However, shifting from subsidy to credit support would require that the economic viability is fairly well established over time and space. In practice many of the watershed treatments on private land do not satisfy these requirements because of the emphasis on `low-cost'. For instance, field bunding on private land is often found inadequate in size and inappropriate in terms of the material used. The primary reason for choosing such `low cost' treatment is to reduce the cost of subsidy. But low-cost treatments, if not supplemented by investment from the private land owners, often turn out to be wasteful and/or counter productive as the treatments are likely to yield less than the expected returns, and also face greater risk of damages etc.

Similar experiences have been observed in the case of treatments on CPRs where efforts to reduce subsidies (and thereby cost) result into lower returns from the treatments. Regenerating pastures, afforestation and construction of water harvesting structures like village tanks often result into low impact of regeneration of natural resources. This not only makes it difficult to convince people for sharing a part of the cost on CPRs, it makes people un-interested in activities that are likely to yield low impact. This would lead to low maintenance and eventual disappearance of the treatment. One of the glaring examples in this context is lack of irrigation for plantation on CPRs. Since water is a scarce and costlier input, most of the plantation activities undertaken by WDPs do not provide for survival irrigation. As a result, survival rate is generally low (i.e. in the range of 20-30 per cent) and consequently its protection is also ineffective. The result is almost total wastage of resources, a large part of which is constituted by subsidies.

These kinds of situations arise because besides reducing the cost (and thereby the amount of subsidies) the underlying rationale for choosing `low cost' technologies is that such technologies/treatments are environmentally more conducive. For instance natural regeneration of pastures or plantation of local species without irrigation, or gradual leveling up of the field are considered to have better environmental impact than using water for planting high-valued species or using machinery for land leveling. While these are ideal prescriptions for regeneration of natural resources, in practice low level of expected returns do not bring the desired result within a reasonable time frame. The time dimension is important here because NR-based institutions also work with a limited effective life span. As a result it help neither saving the financial resources for subsidy nor ensures environmental regeneration. The important lesson therefore is to select

those technologies/treatments where economic benefits are fairly substantial so as to mobilize people's participation as well as contribution towards the subsidy. Of course, these activities should be guarded against environmental damages.
A number of watershed implementing agencies have adopted the above approach where emphasis is on choosing the treatments that bring-in the expected impact, even if the financial cost is somewhat higher. Providing appropriate material in adequate quantity for field bunding, obtaining better quality planting material, arranging for survival irrigation for plantation, including land leveling as a part of the initial menu of treatment, reducing siltation in farm pond or village tanks, using machinery for removal of prosophis julifara from public/private land, preparation of mulching etc. are some of the examples where adequate investment may help enhancing the net returns hence, scope for cost-recovery and better maintenance by the people. Trying to save cost on some of these critical treatments might lead to almost total waste of resources spent for subsidies.

ii. Access to Credit

Access to credit-support is an important pre-condition for increasing cost-recovery and reducing the need for subsidies, especially on the treatments where the expected returns are fairly substantial. One of the important achievements in this regard is the approach initiated by MYRADA and subsequently adopted by KAWAD (Iyengar, et.al, 2002). It has been demonstrated that if farmers are convinced of the economic benefits (in terms of increased net returns) they can be made to share as much as 50-60 per cent of the cost and even borrow money to pay for such costs.

The MYRADA-KAWAD approach provides useful lessons in this context. According to this approach, the most important stage for implementation of WDPs, is convincing people about the economic benefits and sharing a part of the cost of treatment especially on private resources. In order to ensure this, the project lays special emphasis on formation of self-help groups as a pre-cursor to watershed treatment. Hence, if the treatments are properly chosen, farmers can easily adopt the treatment and pay a part of its cost by borrowing from the saving-credit groups, if need be. Their experience in a large number of villages in Karnataka have proved the fact that farmers, even in dryland regions, can pay for watershed treatments provided, they get access to credit support.

Adequate credit-support can also help developing and accessing the services/ inputs from markets. For instance, while land leveling is generally not included as a preferred treatment in a large number of government supported watershed programmes, there are instances where this kind of service is being developed through private initiatives. But, these markets, at least in the initial stages, may not be competitive hence may charge a higher price involving a monopsony profit. Also, these kind of markets may not have been properly developed across all regions especially in backward areas. A well-developed credit market can help providing impetus for this kind of market development. Similarly, there is scope for developing markets for other services such as water saving devices like drip irrigation system, composting, jungle clearing etc. Credit-support, evolved through WDPs can help developing such markets and thereby reduce people's dependence on the project as well as subsidies thereof.

iii. Institutional Mechanism for Cross-Subsidisation and Equitable Distribution

Essentially, credit-system and market development hinge on appropriate institutional support, which in turn, could trigger a process of negotiation between beneficiaries of different treatments within a watershed. Prima facie, there is substantial scope for improving the allocation of subsidies across resources, treatments, and beneficiaries. This is so because different resources (and their owners) receive different benefits. And, also that beneficiaries receiving similar benefits have different ability to pay.

Generally, the broad principles adopted in watershed programmes is to distinguish between private and public resources. Whereas cost on the former is expected to be shared by the individual owners, that in the case of CPRs, is largely borne by the state. It may however be noted here that while this kind of differentiation is useful, it does not take care of the equity considerations under different situations. For, the underlying rationale is that anything done on private resources might be economically viable, whereas treatment on CPRs might be non-viable.

But, reality is often quite different. For instance, water-harvesting structures are often made on drainage lines i.e. on CPRs. But, their direct beneficiaries are individual households whose land and/or wells are covered in the catchment of such structures. In such instances there is a strong case for mobilizing resources

from beneficiary households. While, this practice has been observed in a large number of cases, there are instances where investment on CPRs, like village tank or drainage line treatment benefiting privately owned wells, do not involve sharing of cost by households whose land or ground water status get improved by such investments.

Similarly, there is scope for applying differential rate of subsidy among those who receive additional irrigation vis-à-vis those whose major gain is only in terms of improved soil-moisture status (in the long run) through field bunding. Moreover, plantation on CPR, if supported by survival irrigation and fencing, may yield substantial economic benefits to be shared by individual households. The community could pay a part of this cost provided adequate investment has been made in such activities to receive significant increase in income and employment.

Also, there is often a wide difference in ability to pay across households having differential income as well as asset base. Providing uniform rate of subsidy to all, may lead to inequitable distribution of the state's resources. A well developed institutional structure ought to correct this basic anomaly in the present structure of subsidies.

Finally, from the view point of watershed development, certain resources and regions deserve greater priority over other. For instance degraded pastures or forests, crop-land on the upper ridge with sloppy terrain and drainage line treatment should deserve greater support vis-à-vis plain crop land, that too, with irrigation.

Thus, rationalization of subsidies across ownership pattern (i.e. private-public), households' ability to pay, and level of degradation of natural resources need proper calibration while allocating the stipulated amount of subsidies among households. Failing to do this might lead to wasteful expenditure, limited benefits, negative demonstration effect and thereby low participation and limited cost-sharing by the people. *A priori*, two types of trajectories can be visualized with respect to the subsidy-structure and the outcome thereof. These have been presented in Chart 2.

Chart 2: Alternative Trajectories for Watershed Development Programmes

Steps	Trajectory I	Trajectory II
Choice of treatments	Wide ranging activities with moderate-high cost and leading to substantial economic benefits	Emphasis on the basic treatment with emphasis on cost-sharing rather than surplus generation
Cost-sharing	Substantial sharing of cost by the beneficiaries in the range of 20-60% because of the higher expected returns	Difficulties in mobilising people's contribution due to low expected returns
Maintenance	People will put their own resources as they have direct stakes in terms of losing a part of the potential benefits	Indifference to the activities and limited time frame for the survival of the treatment
Induced private investment	Moderate – high in terms of field bunding on irrigated fields, additional inputs, improved agronomic practices, land leveling, mulching, composting etc.	Only when additional irrigation is obtained through the project
Credit support	Willingness to share cost may lead to higher demand for credit	Borrowing appears to be a risky proposition due to low expected returns
Market development	Credit support can strengthen development of market for various services	Depend mainly on the project and subsidies
Institutional mechanism	More interactive with negotiations	Operates as a post-office to disburse subsidy

The above description, though simplistic, brings home the critical point that there is a substantial scope for improving effectiveness of subsidies in WDPs. And that, doing this does not only help reducing the incidence of subsidy but also, and perhaps more importantly, improves the functioning of markets as well as institutions. In that sense better use of subsidy (and not necessarily reduction or withdrawal) can work as a catalyst for developmental processes in the project region. What could be done to achieve this goal? The following section provides certain practical tips based on the experiences from various watershed projects in the country.

4. Subsidy Structure and Cost Sharing: Some Experiences

i. Limited Cost Sharing

At present there are two major watershed development programmes, supported by the Ministry of Rural Areas and Employment (MoRAE) and Ministry of Agriculture (MOA), Government of India. Together they cover almost all districts in the major states of the country. Besides these, there are a number of watershed projects funded by various several donor agencies as well as charitable trust. To a large extent, the state supported watershed projects are funded fully by the government. However, it is mandatory to mobilize people's contribution towards the cost of the treatment so as to ensure their ownership or participation in the project. According to the WDP-guidelines of MoRAE people's contribution is mandatory. While there is not strictly stipulated norm for sharing of cost, it is expected that people will contribute about 5-10 per cent of the cost for treatments on CPRs and about 20-25 per cent cost for treatments on private land. The revise guidelines (GOI, 2000) anticipate contribution up to 50 per cent in the case of selected treatments on private land. The resources mobilized through people's contribution are taken out from the project fund and put as a common fund to take care of repair and maintenance.

In actual practice, people's contribution is found to be almost nil in the case of CPRs and about 10-15 per cent in the case of private land (for details see, Table 1). The extent of contribution is often linked with the nature of the implementing agencies and their approach as well as experience in terms of participatory processes (Shah and Memon, 1999). Invariably the Non-Government Organisations (NGOs) with professional approach and skills manage to mobilize contribution at higher rates than others. Similarly, WDPs focusing mainly on water harvesting structures and irrigation also find it relatively easy to achieve higher rate of people's contribution. Compared to this, a number of donor-funded projects have an impressive record in terms of mobilizing people's contribution of the tune of 10-20 per cent on public land and almost 50 per cent in the case of private land. Evidently, this achievement can be seen as an outcome of a number of factors such as: (i) participatory approach which lays special emphasis on sharing of cost as an `acid test' (Shah, Anil, 1999); (ii) long draw experience in the field of participatory development; (iii) realistic assessment of people's ability to pay; (iv) special skills in supporting self-help groups; and (v) pressure from the funding agency as a conditionality. Over time, their approaches have provided

good models for cost-sharing mechanisms, resulting into more effective utilization of subsidies.

There is however, another side of these success stories. That is, the approach involves substantial amount of investment in terms of time, skills, and financial cost for undertaking the spade work, institution-building, and organizational support over a longer period of time. As a result, the reach of such programmes do not generally go beyond 200-300 villages (or micro watersheds), and at the same the average cost (all inclusive) of treatment often works out to be 1.5 – 2 times that of the state-supported programmes.

ii. Issues to be Addressed

While these are valid concerns from the view point of the state policies for watershed programmes, the pertinent point is that proper rationalization and effective use of subsidies can help enhancing not only the financial returns on the investment but also ensuring better results in terms of productivity increase, environmental regeneration, and social equity. It is in this context it would be useful to understand major limitations of the present structure of subsidy (or cost-sharing) mechanism in the state-supported watershed projects. These are:

(a) The norms for cost-sharing is fixed on ad-hoc basis rather than by working out the expected benefits from each treatment.

(b) The project guidelines make a distinction between public and private resources but, not between treatments on the two sets of resources. In fact, treatment wise impact is rarely assessed by the implementing agency or watershed committees. Similarly location of treatment on different alleviation on the ridge is also not taken into consideration.

(c) Choice of treatment is guided more by the initial cost rather than considering the resultant net returns. As a result, many of the treatments preferred by the communities, are not included in the treatment plans.

(d) The sequence of treatment/activities is not properly laid out. For instance, it is better to start with certain interventions that help improve the productivity and also provide incentives for adoption of certain measures that have low economic returns. It should ideally, be possible to invest the project funds on certain more remunerative activities and link that up with adoption of the other SWC-measures.

(e) Cross-subsidisation across resource/treatments as well as households is generally absent. This can be worked out through a process of intra-community negotiations.

(f) In most cases, the cost-sharing is more a notional rather than real phenomenon. This happens because the cost-norms are based on the stipulated `schedule of rates' (SOR) for different activities. These are often higher than the actual cost incurred by watershed committees. Hence the difference between the two, at times, is treated as contribution by the people. In fact, saving of cost in this manner should ideally provide an opportunity to pass on part of the fund for providing subsidies to the activities where economic returns are low; or to those households whose ability to pay is limited.

(g) Finally, there are a number of activities, which can help improving the efficiency in use of natural resources. Irrigation is the most important input in this context. At present, subsidy is given for using more water rather than using it equitably and efficiently. The need therefore is to shift the subsidy to the later.

The above issues can be addressed more sharply in the light of the realized benefits from the various watershed treatments in different WDPs in India. This has been discussed below.

iii. Rationalising Subsidy: Some Suggestions

As noted earlier, subsidy for watershed projects should be justified mainly because the social (environmental) benefits are generally larger than the private benefits; and that the social and private benefits accrue as joint product of the same investment. Thus subsidy should be higher when the gap between private and social benefits are larger but at the same time both having positive values (Jhunjunwala, 1999). Putting it differently, there is a need for subsidizing investment in WDPs when the overall benefit cost is greater than 1 and private benefit: cost ranges between 0 and 1. If the private benefits are negative subsidy may not work, as an effective instrument similarly, if the social benefits are negative there is no justification for subsidy. The effort therefore should be to create a balance between social and private benefits by re-organizing the subsidy structure in a manner that, increased private benefits may induce cost-sharing (or private investment) and thereby leave a larger proportion of subsidies for enhancing social (or environmental) benefits. Observations in Chart 3 based

on the actual impact of the various watershed treatments/activities might be useful.

Chart 3: Economic Returns and Scope for Cost-Sharing

Watershed Teatment	Cost Rs./Ha	Benefits Rs./Ha	Remarks
Field bunding on private land	2500-3000 on land with moderate slope	15-20% increase in yield during normal rainfall	In most cases field bunds exist. They need to be strengthened and improved in terms of size and material. In absence of any other incentives like irrigation, FYM or farm forestry, field bunds alone will not provide sufficient incentives even for proper maintenance. Hence, this treatment should become a part of a larger package of increasing land productivity
Farm forestry/ plantation and private and public land	5000-6000	15,000-20,000 with about 60% survival rate	Need to be accompanied by provision for survival irrigation, good quality of planting material and fencing Farm ponds, ground water on purchase, vegetative fencing should be included in the cost. The case stands for credit-support if irrigation is made available. In fact subsidy should shift from material+ labour cost to water saving devices like drip irrigation
Regeneration of pastures on CPRs	4000-5000	1500-2000 for fodder+ fuelwood	Need to treat a part of the gaucher through proper protection. The other part should be kept open for free grazing Provision of fodder pool in the first five years of regeneration

			measure might help protection. Similarly, deep ploughing, manuring, seedling might also help expediting the process of regeneration. The cost-norm should include all these. The increased cost could be cross-subsidised through contribution obtained from treatments like water harvesting structures having high returns.
Water harvesting structures like check dams on public land	20000-100000	7500-10000 through additional water for irrigation	People have very high preference hence willingness to pay. The additional availability of water is to shared with treatments on CPRs and also with landless in terms of water rights subsidy can be shifted to water saving devices
Farm ponds on private land	10000-15000	2000-3000 during normal year	Provide credit-support to make basic investment in the structures. Subsidies farm forestry or plantation on performance (survival) basis.
Land leveling	4000-7000	NA	High preference in the regions having moderate-high slopes and small holdings Need to link-up with market for this service by providing credit support
Mulching, composting and other agronomic practices	NA	NA	Farmer recognise the importance of such measures. But these need proper extension as well as organizational support, shift a part of the subsidies received by farmers with irrigation to the rest

Of course, these observations are based on the experiences of a number of watershed projects especially in dryland regions, in different parts of the country. Hence, they should be treated only as indicative. The need therefore is to work out these details in the case of specific treatment in specific regions/ locations. This, in fact, should be treated as a critical pre-condition for starting a process of negotiation, which in turn, could shape up the structure of subsidy in a given situation.

5. Concluding Remarks

The foregoing analysis examined the economic rationale for subsidies in watershed projects and highlighted the critical importance of three inter-related aspects viz, choice of technology/ treatment, link-up with credit support and markets, and institutional mechanism for more effective allocation as well as use of subsidies. Subsequently, it looked into the existing policies and the scope for improvement in terms of cost-sharing and cross-subsidisation so as to ensure better impact in terms of economic returns, environmental regeneration, and social equity. Finally, it provided some useful tips, based on the actual experiences from various watershed projects, for setting-up the priorities and re-allocation of subsidies across resources/treatments as well as households. Three important implications emerge from the analysis.

(i) While the basic rationale for subsidy in watershed projects lies in the larger social (environmental) benefits, there are also other justifications based on the considerations of inter-regional and inter-household equity.

(ii) A number of watershed projects, mainly in the realm of NGOs, have demonstrated that people can be made to pay for a large part, (more than 50 per cent) of the cost provided, right kind of watershed treatments have been selected and implemented in proper sequence with appropriate institutional support. Bringing credit-support prior to watershed activities can go a long way in achieving a more effective mechanism for cost-sharing and reallocation (rather than withdrawal) of subsidies. The long-term goal should be to promote private investment in a manner that enhances productivity of land in a manner that is economically viable and environmentally sustainable. Subsidies, combined with credit-support can facilitate this process.

(iii) Finally, there is a need to de-compose the summary estimate of cost: benefit ratio at the level of different treatment and activities undertaken by a watershed project. Once this is done, it gives a fairly good basic to map out the extent and nature of benefits and beneficiaries. This in turn could help starting a process of negotiation among households benefiting from different treatments. It appears that there is a good case, and also scope for shifting subsidies from (a) private to public resources; (b) from water intensive to water saving devices; and (c) from better off farmers (with irrigation) to landless and farmers without irrigation.

Given these broad contours, there is a need to work out a detailed structure of incentives and cost-sharing mechanisms such that the flow of subsidy keeps revolving across resources, treatments (or activities) and households to take care of the larger concerns of livelihood and development. Eventually, this would help realizing the long term objective, where watershed development becomes a continuous process rather than a one-shot investment supported mainly through state's subsidies.

Table 1: Joint Decision-Making and Cost Sharing

Project and Location	Cost-Sharing	Decision-Making Rule
Andhra Pradesh		
NWDPRA, Vikarabad	Low	Few or no local decisions
NWDPRA, Medak	Low	Few or no local decisions
NWDPRA, Nalla Mada	Low	Few or no local decisions
MYRADA, Kadiri	High	Consensus
Chaitanya, Hindupur	High	Consensus
YFA, Kota Kota	Low	Local decision
Karnataka		
WSDPRA, Madhugiri	Low	Few or no local decisions
DANIDA, Dharwad	Moderate	Few or no local decisions
SDC, Bidar	Moderate	Local decisions
MYRADA, Kollegal	High	Local decisions
Maharashtra		
JS, Sangamner	Low	Sarpanch decides after village meeting
JS, Pamer	Low	Sarpanch decides after village meeting
NWDPRA, Shirur	Low	Few or no local decisions
NWDPRA, Akole	Low	Few or no local decisions
AGY. Sangamner	Low	70 per cent majority rule
AGY, Shirur	Low	70 per cent majority rule
IGWDP, Sangamner	Low	70 per cent majority rule
NGO-BAIF, Akole	Low	Majority rule
NGO-Bosco, Ahmednagar	Low	Majority rule
NGO-Gramayan, Shirur	Low	Majority rule
Orissa		
MORD/EAS, Keonjher	Low	Few or no local decisions
NWDPRA, Keonjher	Low	Few or no local decisions
NWDPRA, Kalahandi	Low	Few or no local decisions
NWDB, Kalahandi	Low	Few or no local decisions
World Bank, Khorda	Low	Few or no local decisions
DANIDA, Koraput	Low	Local decisions
Parivartan, Kalhandi	Low	Local decisions
Rajasthan		
NWDPRA, Ajmer	Low	Few or no local decisions
MORD/EAS, Pratapgarh	Low	Few or no local decisions
DPAP, Dungerpur	Low	Few or no local decisions
NWDB, Udaipur	Low	Few or no local decisions
ICEF, Ajmer	Low	Few or no local decisions
World Bank, Bilwara	Low	Few or no local decisions
World Bank, Udaipur	Low	Few or no local decisions
SDC, Pratapgarh	Low	Few or no local decisions
SIDA, Dungerpur	Low	Few or no local decisions

Source: Table 6; Kolavalli and Kerr (2002),

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