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LOCAL RESOURCE MOBILIZATION AND GOVERNMENT INTERVENTION IN HILL IRRIGATION SYSTEMS IN NEPAL

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INTRODUCTION

During the past several decades, many governments and donors have invested heavily in constructing, improving, and rehabilitating irrigation facilities. Accompanying these huge investments in irrigation expansion has been an increase in operation and maintenance costs. Of late, however, a number of donor agencies and their host countries have taken steps to promote local resource mobilization for irrigation development, both for construction as well as operation and maintenance. Several reasons are given for such a strategy or policy on the part of recipient governments: (1) the effect of foreign aid on the developing host countries; (2) a need to reduce direct and recurrent costs to the government of constructing and operating these systems, thus ameliorating the fiscal crises that developing nations face and the necessity of reducing foreign loans and interest; (3) a need to reduce the dependency of the irrigators on the state so as to foster local level planning and self-reliance; and (4) provision of an incentive for taking proper care, control and maintenance of the system by increasing the charges and contributions from the irrigators such that they will have a stake in the system. Nepal is a case in point.

This paper shall focus on both macro and micro issues affecting local resource mobilization in irrigation development

in Nepal. It shall first briefly introduce the present context of irrigation in Nepal, and then the need for proper conceptualization of the term "local resource mobilization." The historical context of local resource mobilization for irrigation financing and implementation in Nepal and contemporary experiences from completed or on-going field research will then be examined. Finally, this paper will attempt to outline crucial elements necessary for any policy whose mandate is to enhance local resource mobilization.

THE CONTEXT FOR NEPAL

Nearly 90 percent of Nepal's population depends on agriculture for its livelihood; the agricultural sector accounts for over 59 percent of the nation's GDP (Ministry of Finance, 1985).[1] Due to the mountainous and hilly topography, only 22 percent of the 141,000 square kilometers of the surface area is cultivable. Though the hill and mountain regions account for over 75 percent of the surface area, they include less than 50 percent of the cultivated area, whereas the terai, the lowland plains, with approximately 25 percent of the surface area accounts for over 50 percent of the cultivated area (ADB, 1982). The potential for increasing production through the expansion of the area cultivated is negligible. Food for the rapidly growing population will have to be supplied by intensifying production on

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[1] Nepal's population according to the census in 1981 was 15 million and is estimated to be escalating at an annual rate of 2.7 percent.

land already being farmed. Thus, the development and effective operation of irrigation systems are vital elements of a strategy for increasing agricultural output in Nepal (Small, Adriano and Martin, 1986).

Tables 1 and 2 show the status of irrigation development in the country. Since the mountain region has very little irrigation, it has been combined with the hills in the table. The estimated potentially irrigable land includes both surface and groundwater sources. A peculiar characteristic of irrigation in Nepal is that nearly three-fourths of the irrigated area is served by farmer-managed irrigation systems. There are thousands of such systems ranging from less than ten hectares to nearly 15,000 hectares. Some have been operative for centuries while others are only ten to twenty years old. To a great extent, wherever it has been possible for the farmers to come together and build a system, they have managed to do so. Within a watershed, one finds several systems drawing water from one or several streams. These systems are perennial or monsoon-seasonal, depending on the nature of the stream. Some have received some government assistance either for construction or for improvement and rehabilitation in the recent past.

Historical Background on Resource Mobilization for Irrigation

Present-day Nepal is a seventeenth century amalgamation of several tens of petty principalities and kingdoms. Several irrigation systems date back to those early times and are still

functioning. Historically, irrigation development falls under several domains: a) religious trust, b) individual initiatives (primarily of the local elites), c) community efforts, d) royal directives, and e) government initiatives. As certain temples were endowed with land by someone influential, irrigation systems were built for their maintenance (e.g., Raj Kulo of Argeli in West Nepal). Local elites have organized and financed irrigation construction in several parts of west Nepal (Martin, 1986; Pradhan 1982; Yoder, 1986). In the Rapti Zone, communities have organized to build systems (P.Pradhan, 1986). In the Kathmandu valley during the Malla dynasty, several irrigation systems were built under royal directives. The names of these systems are prefixed with either Raj or Rani. Since the overthrow of the Rana premiership in 1951, direct government involvement and irrigation development initiatives have increased.

P. Pradhan (1986) notes that the legal tradition and local administrative structures during early unification have over time rendered farmer-managed irrigation systems able to operate without interference from the irrigation agency or other administrative units at the district level. The irrigators or the community have been able to institute their own rules and regulations as well as customary rulings.

In the Kathmandu valley, elaborate arrangements existed for the maintenance and repair of irrigation channels. Rights to utilize irrigation facilities were also carefully regulated. However, in West Nepal, the edict of King Ram Shah of Gorkha

(prior to the unification of Nepal by King Prithvi Narayan Shah) states that water disputes are not to be brought to the courts for adjudication (Regmi 1971).

Traditionally, agricultural lands, mines, and forests have been regarded as the property of the state in Nepal. Regmi (1984) notes that the ownership of these natural resources was an essential attribute of the sovereign authority of the Nepali state and virtual private ownership and usufructuary rights were privileges granted by the state through specific grants.

The Gorkhali rulers who unified Nepal attached considerable importance to land reclamation and settlement. King Prithvi Narayan Shah directed: "In case there are houses on lands which can be converted into fields, these shall be shifted elsewhere: irrigation channels shall be constructed, and the fields shall be cultivated"(Regmi 1971). The primary objective of land reclamation and settlement was to increase revenue in order to finance the growing military expenditure. Prior to the British-Nepali War during 1816, Nepal followed an expansionist policy.[2] Much land had to be reclaimed and cultivated for military expenditures and remuneration for loyal subjects. Geopolitical considerations were also important: local officials were directed

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[2] However, the Gorkhali rulers did not achieve political unification solely through military conquest, and oftem political compromises with various communal groups, as well as with rulers of different principalities were considered more expedient (Regmi, 1984). Post-1951 policies have tended towards the abolition of the various grant systems and uniformity towards granting property rights in land to individuals.

to ensure that people did not vacate areas adjoining the border (Regmi 1971).

During the Rana regime (1846-1951), revenue for loyal subjects, civil servants, and kin was also collected through land reclamation. At that time, there were many types of land grants, land titles and tenure systems. Land would be contracted to certain officials (known as Dittha in some places). These officials were designated caretakers for parcels of land and had the responsibility of seeing that irrigation facilities were provided and repaired. Failure to do so would result in forfeiture of his jagir (land assigned to government employee as remuneration). Orders from Kathmandu substantiate this point (Regmi 1984a :108-109):

> December, 1833
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> Royal order to the Jagirdar (Amali), Dware, Thari, and common people (raiyat) of Arghaun in Kaski District:
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> "The local tenants (mohi) have come here that the Vijaypur irrigation canal (in Kaski district) has been damaged by floods, and that they are not capable of repairing it through their own labour. We therefore hereby order the inhabitants of Arghaun, which consists of 2000 households, to provide labour for the repair and renovation of the Vijaypur irrigation canal as directed by the Dittha Jagirdar Shahi, and grant them exemption from the obligation to provide compulsory and unpaid labour (jhara)services elsewhere. Any person who does not provide labour services accordingly for the repair and renovation of the Vijaypur irrigation canal shall be punished with a heavy fine."
>
> Similarly, on December 1846
>
> "On Thursday, Poush Sudi 4, 1902 (December 1846), Rup Narayan was appointed Dittha of the Vijaypur Canal at Arghau in Kaski District, succeeding Mahabir Thapa. He was granted 380 muris of rice-lands as jagir. The royal order of appointment contained the following instructions:

1. Receive picks, spades, axes and other tools from the outgoing Dittha.

2. Repair and maintain the dam and the irrigation canal through the labour of the tenants cultivating lands in the command area. Let not rice-fields remain uncultivated for lack of water.

3.Reclaim waste lands wherever possible in the command area and register such lands at the Sadar Dafdarkhana (in Kathmandu).

4. You shall be held personally liable if no water is supplied through the canal and rice-fields consequently remain uncultivated, and if jagirdars complain that they are not getting rents. You shall also be dismissed if you cannot repair and maintain the canal and supply water for irrigation."

During this era, tenancy rights were insecure. Land could be used but not owned, since the state (i.e., the military-administrative elite) owned it. Land use and cultivation rights changed hands from one government and military employee or tenant to another. Water was tied to land-use rights. The construction of irrigation systems was also undertaken through forced labour. Most investments were made by the state. State jurisdiction over irrigation was exercised through officials so that effective land revenue could be amassed (Pradhan 1984).

Since 1951, land reforms have been implemented, the practice of assigning Ditthas had been abandoned, and development programs are being carried out. The past three decades have seen an increasing government involvement and intervention in irrigation development. A substantial portion of the finances has been provided through foreign aid.

Government Agencies and Irrigation Development in Nepal

Several government agencies have provided technical and financial input for irrigation development. The approaches and procedures guiding public interventions have varied. Table 2 shows the distribution of irrigation intervention or expansion carried out by different government agencies. Administrative juggling has been a bureaucratic approach to achieving enhanced irrigation involvement. Agencies have been either amalgamated, separated, or fragmented within and between ministries. The approaches and organizational structures of these government agencies are briefly outlined below.

Department of Irrigation, Hydrology, and Meteorology (DIHM). From 1926 to 1951, an Agriculture Council was responsible for state irrigation activities. In 1952, with technical assistance from India, the Irrigation Department was established. This department has had the extra burden of overseeing drinking water projects since 1955. In 1966 it also assumed responsibility for undertaking minor irrigation projects, and, in 1968, a ground water projects component was added. In 1972, its name was changed to Department of Irrigation and Meteorology under the Ministry of Agriculture and Irrigation. But in 1979, a Ministry of Electricity and Irrigation was created and the Irrigation Department was included in it. In 1980, this Ministry was renamed the Ministry of Water Resources. Until 1987, it was called the Department of Irrigation, Hydrology, and Meteorology under the Ministry of Water Resources. The recent change has separated the

Department of Irrigation from its hydrology and meteorology component and the Farm Irrigation and Water Utilization Division (FIWUD) of the Ministry of Agriculture (MOA) and the irrigation efforts of Ministry of Panchayat and Local Development (MPLD) have been merged with it.[3]

These three agencies had differing approaches to irrigation development prior to their amalgamation. DIHM leads all other agencies involved in irrigation in terms of capital investment. It carries out investigations, design, construction, rehabilitation, operation and maintenance of various irrigation systems. DIHM limits its activities mainly to systems that are more than 500 hectares in the terai and 50 hectares in the hills. Irrigation is financed through foreign loans and grants as well as by the national treasury funds channeled through the Finance Ministry. Project beneficiaries normally receive funding as outright grants, except for the payment of water taxes after the completion of the project. These taxes do not however, replenish irrigation development funds.

DIHM operates through its central office, five regional directorates, and project boards which are semi-autonomous units. On the whole, DIHM's manpower is made up of mainly civil engineers its approach to irrigation has been construction-oriented. So far in its implementation work, there has been minimal involvement of the beneficiaries in all the stages of the

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[3]Norman Uphoff and Bob Yoder, personal communication January 1988.

project cycle. DIHM certainly lacks manpower in the social and agricultural sciences for effective management of the systems. It is thus little wonder that problems regarding timely delivery of water, formation of effective water users groups, and conflicts with irrigators occur.

Irrigation Systems under the Development Board Act. Some large projects, particularly those that are funded through foreign loans, are governed by a project board formed under the Development Board Act of 1956. These boards are made up of representatives from departments of the water resources, finance, National Planning Commission, Department of Agriculture (DOA), and the DIHM. The Regional Directors of DIHM and DOA may also be included. The secretary of the Ministry of Water Resources is the chairman of each of these boards, and the Project Manager who is a DIHM engineer is the member-secretary. A major purpose of the boards is to provide coordination among the various agencies involved in a particular project during the construction and implementation phases. The boards enjoy relative autonomy in personnel selection and financial flexibility. They are also empowered to set their own water charges and to prescribe the mode of collection. However, due to long gestation periods and construction delays, these boards often remain operative even during the operation and maintenance phases of a project.

Ministry of Panchayat and Local Development (MPLD). This ministry looks after small-scale development works at the district and village levels. The MPLD supervises most integrated

rural development projects and also looks after small-scale irrigation systems of under 50 hectares. In 1970, a Department of Minor Irrigation was established. Responsibility for implementing small irrigation projects was given to the chairman of the District Panchayat. However, due to lack of professional manpower, the Department of Minor Irrigation was merged with the Department of Irrigation. Projects under 50 hectares were to be handled by MPLD, but those above by the Irrigation Department. Most of the irrigation projects MPLD handles are part of integrated rural development projects. These are to be implemented by the District Technical Offices under the Local Development Officers of MPLD. MPLD limits its irrigation activities to providing technical and financial assistance to existing farmer-managed irrigation systems or extending them. Beneficiaries are required to provide some voluntary labour if the cost is high. However, the mix of beneficiary and government contributions, as well as levels of beneficiary involvement varies from one project to another. For project implementation, a committee is usually formed that includes Panchayat leaders and beneficiaries. Unlike DIHM, MPLD does not manage irrigation systems after construction is complete. Management is left to local user committees.

Agricultural Development Bank/Nepal (ADB/N). The Agricultural Development Bank has been involved in irrigation through its loan programssince 1968, but most of its intensive irrigation activity began after 1981. In that year, a pump

irrigation program was initiated; an estimated 45,000 hectares have been served by some 11,000 shallow tubewells. More shallow tubewells to cover over 10,000 hectares have been proposed and undertaken during the past few years.

ADB/N also provides loans to individual and groups of farmers for constructing or rehabilitating irrigation systems. It also has institutional linkages with CARE/NEPAL and FIWUD through which farmers with CARE/NEPAL or FIWUD projects can qualify for loans. CARE project farmers have to match the donor's 50 percent subsidy with a 20 percent of labour contribution and 30 percent in loans which can be borrowed from ADB/N. In the FIWUD projects, the farmers concerned are required to form a construction committee and deposit 5 percent of the total estimated cost with the Bank. In turn, FIWUD deposits 70 percent, the remaining 25 percent is to be borne by the farmers through labour contribution or as a loan from the Bank. Upon completion of the project, the maintenance and operation responsibilities are handed to the construction committee.

Farm Irrigation and Water Utilization Division (FIWUD). In 1973, FIWUD was established under the Ministry of Agriculture. It began its work in the terai with pump systems and so far has installed approximately 46 tubewells for some 7000 hectares. Since the recent merger of FIWUD with the Department of Irrigation, the role, scope of work, and approach of FIWUD remains unclear. Prior to its merger, FIWUD installed the tubewell, the pump house, and the water measuring tank.

In addition to these, it constructed a network of field channels for both irrigation and drainage, carried out a land improvement program that was concerned with shaping, leveling, and consolidation. It also introduced programs to increase cropping intensities and yields.

FIWUD expanded its work into the hills with construction and rehabilitation of small-scale irrigation schemes, that were to be turned over to farmers after implementation. Recently, it was involved with on-farm water management programs in some surface irrigation systems of DIHM in the terai.

The present scenario regarding irrigation development by the government is that there are several agencies drawing from different sources and types of funding and a multiplicity of approaches regarding the implementation of the projects. Project financing can be in the form of outright grants, or partial loans with a substantial grant component, or a combination with beneficiaries' contribution usually in the form of labour. Varying input levels - financial or otherwise - are required from the beneficiaries. The degree of beneficiary involvement during the projects differs from one agency to another and even from one project to another. Different agencies approach the issue of maintenance and operation of the systems after completion differently. Some hand it over to the users, while others continue to control with minimal farmer input.

In spite of the irrigation bureaucracy being relatively new, with some thirty years of experience, there has been a steady

increase in government involvement and assistance in irrigation system construction or rehabilitation. Table 3 lists the area irrigated by projects undertaken by the government during the various development plans through 1980. Table 4 shows irrigation development expenditures for the last four five-year plans. There has been a steady increase in government irrigation financing in Nepal.

The targeted development of irrigation coverage for the Sixth Plan was 219,000 hectares. Out of this total target, 70 percent were projects carried over from the fifth five year plan of which over 80 percent were initiated ten or more years ago. The achievement during this plan was approximately 93,000 hectares (Poudel, 1986). During the Seventh Plan (1985-1990), the target has been set to provide additional irrigational facilities to 2,35,493 hectares of land. The Department of Irrigation, Hydrology, and Meteorology (DIHM) of the Ministry of Water Resources (MOWR) is responsible for 1,35,493 hectares; the remaining 100,000 hectares are the responsibility of the Ministry of Agriculture (MOA). Out of this, MOA will have to account for 40,000 hectares and DIHM for 14,437 in the hill and mountain region to alleviate food deficits in those places (NPC, 1985). During the Seventh Plan, MOWR is to complete on-going projects, repair and maintain systems, undertake irrigation projects that help the development of hill areas, and also develop large irrigation projects. Table 5 shows the allocation of development expenditure in the public sector for the current Seventh Plan

(1985-1990); irrigation accounts for 11.4 percent of the total development expenditure with a sum of 3296.3 million rupees.

Nepal's development plans have relied heavily on foreign assistance (Table 6). In the Sixth Plan, Foreign aid contributed to approximately 60 percent of the development expenditures; while in the Seventh Plan, foreign aid has been earmarked to finance nearly 70 percent of the development expenditures. Previously, most aid came in the form of outright grant. Later, with the increasing role of banks, the loan share has steadily increased (Pant 1983). On a sector basis, irrigation and agriculture has received nearly 20 percent of foreign aid in the different development plans from 1956 to 1980 (Dharmadasani 1984). In the case of irrigation, foreign aid is solicited from major donor countries like India, China, and the USA. Small donor countries like West Germany, Switzerland, and Britain have provided indirect aid to irrigation through rural development projects. The International Labour Organization (ILO), CARE, and United Mission to Nepal (UMN) among other non-governmental organizations (NGOs) have also provided aid for irrigation. During the past decade and a half, the banks have stepped in to provide loans. Table 11 shows the World Bank's contribution. Similarly the Asian Development Bank (ADB) has provided roughly $ 50 million in loans to the irrigation sector only (Dharamdasani, 1984). A greater portion of the expenditure in foreign aided irrigation projects is on construction (Pant 1983).

Expenditures for irrigation development have increased both in absolute terms and as a percentage of the development budgets of the five year plans. Costly rehabilitation of systems that have become inoperable due to inadequate maintenance or poor design and construction has resulted in escalating development expenditures. Much of the regular budget is used to cover the salaries of the staff at the central and regional levels. Where systems are operating but incomplete, operation and maintenance expenses and salaries of regular DIHM personnel operating the system tend to be charged as development expenditures. Thus, it has been nearly impossible to break out expenditures by administration, construction, operation and maintenance allocation and actual use from the available secondary data (Small, Adriano, and Martin 1986).

Nevertheless, the trend during the past three decades has been greater state mobilization of resources to finance irrigation administration and projects. A significant amount comes from foreign aid, a source potentially unreliable. Nepal's budget is being squeezed by poor performance in generating internal revenues and by an extremely heavy debt burden. Expenditures can be cut, but this option has been ruled out by political and social realities. It has been suggested that internal mobilization could be pursued, especially since the ratio of taxes to GDP is relatively low at only about 8 percent, but in the short run there are also limits to this alternative (Schroeder and Wozny 1987).

In order to lessen the government's fiscal burden, already exacerbated by higher overhead costs and insufficient and untimely operation and maintenance financing, policy makers and researchers have suggested that other alternatives be sought. Researchers have stressed on examples of better management capabilities within farmer managed irrigation systems to suggest a shared division of labour and financing between the state and the beneficiaries. Researchers and some government officials have suggested the possibility of the farmers themselves maintaining the systems. The government's mechanism of funding from the national treasury under the Ministry of Finance to the individual government departments and then to the individual projects for operation and maintenance has been inadequate and untimely. In cases where a water charge or water tax has been instituted, its collection has been very low compared to operation and maintenance costs, and the collection itself has been very costly. Yet the need for more operation and maintenance funds is rising[4].

The state has enacted a decentralization policy whose objectives are promotion of popular planning of local level public works, intersectoral coordination and balanced development throughout the country, strengthening of local development

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[4] Very little information is available on the cost of irrigation fee collection. For the Narayani irrigation development project, Pradhan (1985) reports that the salaries of the field staff alone amounted to 71 percent of the amount collected and the net contribution of water charges towards the cost of operation and maintenance is very low.

institutions, and the maximization of local resource mobilization to carry out development works. The implementation procedures of irrigation projects would be affected by this act.

One can note several reasons for such a decentralization plan. Local residents will have better knowledge of their own special needs and of the local environment and, thus, will be able to allocate resources in such a way that it reflects those needs. When decisions are made locally, they are more likely to gain the local support and participation conducive to successful project design and implementation. Such involvement would be vital for continued mobilization of local resources (goods, services, labour, information and leadership) for the operation and maintenance of such projects.

Thus, a primary issue is how local resources can be mobilized for irrigation project development with a view to building local institutional capability of sustaining the system through consecutive investments in operation, maintenance, and rehabilitation. A related concern is how local resource mobilization can be enhanced or achieved for continued operation and maintenance of systems already in operation or nearly built.

In summary, the present scenario consists of increasing state intervention in irrigation development, fiscal constraints to achieving national development plans, and a need for planning and mobilizing resources at the local level. The types of policies or processes needed to promote local resource mobilization is a key issue. Having taken a historical approach

regarding local resource mobilization, this paper will address this issue by first defining the concept of "local resource mobilization," then illustrating the contemporary scenario, and finally concluding with a discussion on the necessary elements of processes or policies if they are to foster local resource mobilization.

THE DYNAMICS OF LOCAL RESOURCE MOBILIZATION

Resource mobilization is a process by which an individual or a group is able to secure individual or collective control over the resources needed for individual or collective action. Major concerns would therefore be the resources already controlled prior to the mobilization efforts, the process or mechanism of pooling the resources, and the supplementary resources provided by outsiders. One can think of resources as being tangible or intangible, for example money, physical materials, leadership, or information. For an irrigation system, water, land, money, capital, skilled and unskilled labour, organization, leadership, and information would be necessary. Some of these would be mobilized internally and others externally. Often capital goods or money is sought to be converted into other resources.

In the process of mobilization, the levels of analysis ranging from the micro to the macro would include the individual actors and their definitions of the situation, the institutions and formal organizations in which they act or the institutions created for that purpose, and eventually the overarching social

context.[5] Thus in the case of irrigation, one can focus on the irrigators (the farmers), the civil bureaucracy (the various irrigation agencies), as well as the sociopolitical context to understand the dynamics or the parameters of resource mobilization.

Several researchers have noted the nature and process of resource mobilization in farmer managed irrigation systems in Nepal (Coward and Martin 1986; Martin 1986; P. Pradhan 1984; Pradhan 1982, 1987; Yoder 1986). How and when resource mobilization occurs in these systems has been elaborated by them. Concomitant to the specific individual or sub-system rights over irrigation are specific duties and obligations which get manifested in the resource contribution one has to make or in carrying out certain key roles for the irrigation organization.

Resource mobilization takes a variety of forms both internally and externally. It is frequently labour that is mobilized for irrigation construction and maintenance in farmer-managed irrigation systems. Labour is mobilized for both routine and emergency maintenance. The basis of labour contribution may be the size of landholding, water share, household, status of the farmer as perceived by the community, land tenure, crop planted etc. But some form of equity or fairness is considered and negotiated by the community. This yardstick of fairness

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[5] The body of literature in the study of the resource mobilization approach to the study of social movements also sheds light on the process and dynamics of resource mobilization with an emphasis on matters of strategy (Jenkins 1982; Kitschelt 1986; Zald 1986).

regarding the contribution of labour has been questioned in many systems where there are different ethnic groups accustomed to different equity measures. Many terai systems that have experienced an influx of migrants from the hills face this situation.

Cash is sometimes collected in lieu of labour to hire labourers, both skilled and unskilled, during maintenance and improvement work. Cash is collected on a similar basis to labour contribution. Defaulters who do not conform to the rules set by the irrigation organization and those not providing their due contributions or found stealing water are fined. In some systems, the irrigation organization has a pool of money thus collected which it loans out to needy members at a substantial rate of interest.

Certain materials are also mobilized for annual and emergency maintenance, as well as for major improvement endeavours. Farmer-managed irrigation systems have temporary, yet appropriate structures made out of boulders, shrubs, branches, bamboo, logs, sand, etc. Many face problems in securing these materials as ownership or use of these materials increasingly falls to the regional administration of the government and with increasing land degradation and soil erosion. In some systems, transporting these materials requires long distance travel, and bullock carts become necessary (P. Pradhan et al. 1987). Support services in the form of cooks and water carriers are also needed.

In some cases, economic enterprises have been initiated, (e.g. a water turbine mill), the income or profit from which has been used to finance maintaining the system. Sometimes water is allowed to be used by turbine or traditional mill owners in exchange for maintaining a specified portion of the irrigation system.[6] Water is also sold en bloc by the irrigation organization and the money used to improve and expand the system. Selling water can provide individual incentives to collectively enhance water supply by improving the system for farmers who can sell part of their water share. These systems are expanded as a consequence. But in systems where water is inalienable from the land, even if water supply is increased, the command area remains fixed and members cannot augment the labour supply as they can in other types of systems.

Another important factor is the mobilization of farmer "engineers" and technology experts who know how to repair and maintain the system as well as organize its proper functioning. Many of these people are knowledgeable about the local conditions and environment.

Some resources used in irrigation development have its origin outside the system regardless of whether they are mobilized by the irrigators themselves or from the outside. We have already noted that this sector is increasing with more government involvement in irrigation development.

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[6] Prachanda Pradhan, personal communication December 1987.

Capital goods and money from the village, district, regional, and national levels as well as from voluntary organizations and international agencies have been used for construction, rehabilitation, and maintenance. Local leaders and politicians lobby for monies from different sources for their irrigation systems or systems that lie within their constituencies. Farm Irrigation and Water Utilization Division (FIWUD) of MOA provides 70 percent cash for rehabilitation or construction; farmers supply the remainder. Materials such as gabion wires and cement have also been provided by various agencies. "Food for work" has been provided in several food-deficit areas or where food could be used as in-kind payment for irrigation work instead of cash. The technological knowledge of government technicians and/or expatriates have also been mobilized for irrigation systems. Where money is provided by an external agency, supervision and even the work is usually carried out by contractors external to the system. Leaders of large Terai irrigation systems have solicited for big machines like bulldozers and excavators from government agencies for desilting or repairing the canals. Credit and loans from banks can also be sought by farmers of small or medium scale irrigation systems for irrigation development under the Small Farmers Development Program (SFDP), Agricultural Development Bank/Nepal (ADB/N) shallow tubewell, and ADB-N/CARE programs. CARE provides 50 percent of the cost as grant and the farmers are to mobilize 50 percent from their own resources. Farmers' labour and credit from

the bank could be used to contribute to the 50 percent they need to come up with.

Other crucial elements in the resource mobilization process are the actors who do the mobilizing and the types of resources mobilized. Certain fugitive, less recognized resources like political linkages, organizational and leadership capabilities, and local information also need to be taken into consideration (Lynch, 1988).

Another element of concern is the interest on whose behalf the resource mobilization takes place. For example, government agencies' officials may want local resource mobilization to ameliorate the fiscal burden or supplement their own resources, but the farmers may want local resource mobilization so that they themselves can control their own system. The basis on which resources are mobilized as well as the place of origin of the resources are other elements in the dynamics of resource mobilization. When the criterion of resource mobilization is perceived to be unfair or unrealistic, farmers may not be willing to contribute and conflicts may ensue. Researchers on farmer-managed sytems have pointed out various agreed, flexible norms and criteria for resource mobilization. Examples of such criteria are based on the composition of households, the availability of male members, the land area, water shares, crops planted, soil structure, senior and junior water rights, etc. The necessary resources for an irrigation system may not be available within the area where the system's Panchayat (local level

politico-administrative geographyical area) has jurisdiction. Thus inter Panchayat or cross regional and cross agency relations become necessary to aquire the right of access to such resources.

Accordingly, the terminology "local resource mobilization" changes its meaning when the origin of the resources, or the actors who are mobilizing the resources is taken into consideration. When local people mobilize state resources and when the state mobilizes local resources, both processes could be generally called "state resource mobilization" or "local resource mobilization". A distinction should be made between mobilization of local or state resources and resource mobilization by the locality or by the state. The former refers to the point of resource origin as the point of reference, while the latter places emphasis on the actors or the organizations doing the mobilizing.

Thus, local resource mobilization refers to activities of local people in mobilizing their internal resources as well as regional or state resources. If local irrigators (through their political linkages) can draw on financial and technical assistance through state intervention, this too would be considered local resource mobilization. But if the government through its agents at the local level mobilizes local resources for the system, this would be considered an extension of state resource mobilization.

The main issue of this paper, however, is the mobilization of local resources by local people, that is, the origin of both

the resources and the authority of those who are mobilizing them are local. Such local resources supplement the resources of the bureaucracy and help to alleviate the fiscal crises of the government.

The 1982 Decentralization Act requires users groups to be organized for all projects. Most agencies are ill prepared to create effective user groups capable of mobilizing their own resources and have resorted instead to setting up token users groups just because the Act demands it. This is not surprising, given the minimal involvement of beneficiaries in each phase of the project cycle. More often than not, beneficiary participation is limited to a voluntary labour contribution and non-hindrance of the "development" project. There is no attempt to use the knowledge, planning, information, and leadership capabilities of the beneficiaries. In some situations, government intervention upsets prior arrangements and fuels in conflicts between communities, or even between the community and the government agencies (Pradhan 1982). A case in point is where intervention results in a change in the users' property rights in an existing irrigation system. The implemenation procedure itself inadequately prepares the users groups to manage their systems and mobilize resources for its reproduction.

TWO CASES OF GOVERNMENT INTERVENTION IN SYSTEMS IN WEST NEPAL

The following cases are examples of government intervention in irrigation rehabilitation and expansion where irrigation systems and their respective organizations already exists. A historical approach to understanding the social principles of the organization of those irrigation systems is outlined to stress the need for knowing the existing social arrangements before intervening. It also illustrates the capabilities of the users to manage their systems and mobilize resources for them. Problems ensued in both cases: in one the government worked with the existing user groups, while in the other the government did not incorporate the existing users involvement. The irrigators in any given system represent differing interests. Unless there is a cohesive force to unite these users, dissension will result in the mismanagement of the system and problems regarding effective local resource mobilization for the system.

Cherlung

The Cherlung irrigation system, known as the Barangdi Tallo Kulo (canal), is comprised of four distinct sub-command areas along the alignment at various places. These four command areas (Taplek, Pokhariya, Cherlung, and Artunga) have come to share water source as a result of extension and amalgamation of two irrigation systems. Another major canal, the Thulo kulo, is situated in this village within Bougha Gumha Panchayat on the

south bank of the Kali Gandaki river in Palpa district of Lumbini Zone.

The first canal tapping water from Barangdi stream served only the Taplek area with a present command area of nearly two hectares. It is said that this canal was built during the Sen period, but the exact date is unknown. In 1928 the Thulo Kulo irrigation system was financed to be built by some 27 villagers under the initiative of two villagers of the elite group. The cost of the construction was Rs 5000 and water was divided into fifty shares, each share representing one hundred rupees. Water shares were allocated in proportion to the individual's investments. Those who had more shares than they needed could sell some to others, thus increasing the number of members in the system.

The original investors had their land and settlement in the lower village. As partial compensation for rights-of-way in the upper village, they agreed to give some water, but not nearly as much as the upper village wanted. This single canal could not irrigate both the upper and the lower villages, so under the leadership of two Magars from the village elite group, one of them the father of the present Mukhiya (leader of the irrigation system), a second canal was financed to be constructed during

1932.[7] They mobilized Rs. 5500 (including loans from Tansen businessmen) for this purpose.

Their intake had to be lower (thus termed as Tallo meaning lower) than the Thulo Kulo because they had built their canal later. Under customary rights, backed by the civil code of Nepal at that time, if intakes were to be constructed upstream they had to be more than a 100 yards away from the preexisting one. The distance between intakes to be placed downstream was less important. The distance between Thulo Kulo intake (placed upstream) and Taplek is 280 meters, while Taplek and Tallo Kulo (placed downstream) was only 42 meters. Customarily, in this area, an upstream intake has the right to dam the whole stream and divert all the water. Multiple water sources downstream have lessened the potential conflicts over acquisition of water from the stream.[8]

Construction began for this Tallo Kulo in 1932 and water was finally delivered in 1938. Traditional tunnel diggers known as Agris from Damukh Khani (a couple of days' walk away) were employed. The contract was undertaken by the construction team leaders (naikes), Bal Bir Sunar and Man Bir Sunar (blacksmiths). The construction work was stopped for nearly three years by the

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[7] The Magars are an ethnic group of Nepal found in the lower Himalayas and the mid-hill range. Their main concentration is in Western Nepal in and around Palpa district. Their main occupations are agriculture and army service.

[8] However in a nearby stream where such multiple water sources do not exist, negotiations regarding water sharing at the stream have taken place several times during the past several decades.

regional administration when Tansen municipality complained that the road to Ranighat, their cremation bank, would be spoilt by the canal work and seepage. The work resumed only after Pratap Singh, one of the two Magars, got permission from the Public Works Department for the hills under the Rana commander-in-chief for clearance on rights-of-way of nearly three yards width. The construction party was to regulate traffic during construction.[9]

The administration considered broadening the Thulo Kulo when conflict with the municipality occurred, but the water supply from this canal could not possibly irrigate both the villages. The villagers had already spent Rs. 3600 for the canal that was already two-thirds complete by then. Land reclamation meant more revenue for the 'national' treasury. So the administration decided that the canal members would be responsible for maintaining and repairing the road if damaged by the canal, and would also have to compensate reclaimed land that falls along the alignment.[10] Permission to continue work was granted along with provisions for rights-of-way. Tansen municipality declined to pay the 3600 rupees in order to have the work stopped. The state played an active role, even then, in deciding the canal's fate.

Initially, the two Magars had requested Taplek to extend their canal to Cherlung upper village. Farmers from the nearer command area, i.e., Pokhariya had objected and demanded that

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[9]The present Mukhiya (leader of the irrigation system) has the document that records this information.

[10] Taplek farmers had thrown away the tools of the Agris and stopped the work because rights-of-way had not been negotiated.

since their land was nearer to Taplek, they should have prior rights to using the canal if it was to be extended. So, in the same year, the canal was extended from Taplek to Pokhariya. By then, the upper villagers knew the futility of negotiating with Taplek, so they began construction on Tallo Kulo.

The mutual agreement between Taplek and Pokhariya regarding sharing and acquisition of new water rights were that Pokhariya farmers would not damage or waste the water that Taplek had been using, and that Pokhariya would broaden the canal and take the excess, or increased water. Pokhariya was not to use force to acquire water and both parties were to clean and maintain the canal. If Pokhariya did not abide by the conditions then Taplek had the right to render this agreement null and void. Pokhariya spent nearly 1400 rupees on the extension and the users divided the water among themselves in proportion to their investments. In time, Pokhariya users have bought some water from Taplek too.

In 1970, flooding along the Barangdi Khola washed away the intakes. In the same year, a landslide occurred near the intake of Tallo Kulo. The canal could not be repaired, and for nearly two years winter irrigation was nearly impossible for the Tallo Kulo area. Due to the flood, the water source had shifted downstream.[11] Water was brought by means of an aqueduct, but that too was destroyed. As a last resort, Tallo Kulo farmers stole water from the other kulos to continue irrigation.

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[11]Rearrangements of the intakes were around the same relative positions after the flood.

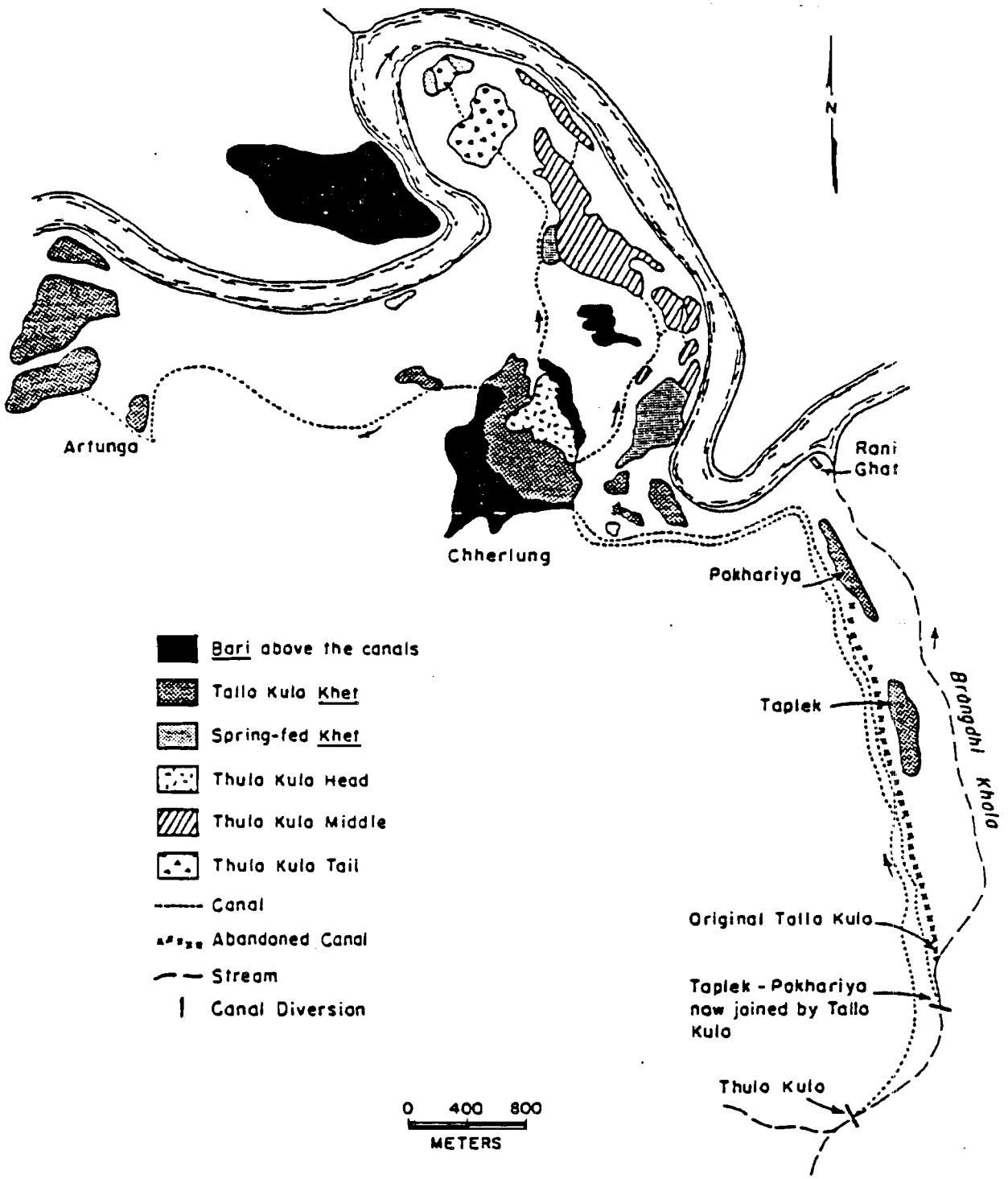

Figure 1. Chherlung Land Use and Irrigation Systems

SOURCE: Yoder, Robert. The Performance of Farmer-Managed Systems in the Hills of Nepal. Dissertation, Cornell University, 1986.

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At times, Tallo Kulo shared water from the Thulo Kulo. Tallo Kulo wanted to negotiate with Taplek-Pokhariya Kulo, but this never materialized. The village Panchayat intervened at one point, but was told to keep away from this debate, because it was an internal matter that the users wanted to settle among themselves. External intervention or pressure was not to be tolerated. Seeing no way out, Cherlung Tallo Kulo people came humbly and gave a feast to the Taplek Pokhariya people; they subsequently reached an understanding about sharing water.[12]

Taplek-Pokhariya irrigators feared that the administration would eventually side with Cherlung and help them construct a canal upstream. This could either lead to more conflicts or reduce Taplek and Pokhariyas' water supply. Irrigators from Taplek, Pokhariya, and Cherlung signed a mutual agreement in 1977 whereby Cherlung people would repair and broaden the Taplek and Pokhariya canal and place a proportioning weir of 40 units (also referred to as "inches" by the farmers) at Taplek, with arrangements for 8 units of water for Taplek and 12 units of water to Pokhariya, and the rest (20 units) to Cherlung. For having given this water to Cherlung, the Taplek and Pokhariya irrigators were to be exempt from routine annual canal maintenance. But all the members of the canal would be summoned if emergency maintenance work was required, and those not attending were to be fined according to canal rules.

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[12]See Figure 1 for the relative positions of the canal.

If water was in excess at Taplek and Pokhariya, it was not to be wasted but redistributed to Cherlung. If found to have wasted water, then Taplek and Pokhariya would be punished according to canal rules. In years of water shortage, the total water supply was to be used by Taplek and Pokhariya during the day, and by Cherlung during the night. During wheat and maize sowing, as well as during seed-bed preparation, if there was water shortage, then the different sub-command areas would rotate turns irrigating with the total amount of water. However, first priority always went to Taplek, then to Pokhariya, and finally to Cherlung. After this agreement, approximately Rs. 18,000 was invested in making the improvement. This Rs. 7250 were raised as cash and the rest as labour contribution. In order to maximize its own scanty supply, the water-short Cherlung organization tightly contols canal water, allowed no one to use it for winter rice, even farmers in Taplek and Pokhariya, places where water is relatively abundant. Thus, despite the fact that Taplek and Pokhariya gave water to Cherlung and enjoy prior rights to water from the canal, Cherlung is able to exercise de facto control over the system.

An extension project for Tallo Kulo was approved by the District Panchayat secretariat in 1978. The Tallo Kulo was to be repaired and extended so that Artunga could be irrigated too. This project was supervised by the Ministry of Panchayat and Local Development.

A meeting of the canal members of Cherlung, future beneficiaries of Artunga, the two Panchayats' members, District Panchayat members, and the engineer who had carried out the survey, was held. The decisions made at this meeting constituted the only agreement made between Cherlung and Artunga. It was decided that a 'Cherlung-Artunga Irrigation Reconstruction Canal Committee' would to be constituted for the work.[13] It was decided that after the reconstruction, land areas in Taplek, Pokhariya, Cherlung, and Artunga could be irrigated 'better', so the contending parties asked the district Panchayat for a "proper, just allocation" of water based on the land areas of the respective places. Both Artunga and Cherlung were to contribute equal labour and inputs from the Panchayat border (i.e. Cherlung and Artunga) to the intake.

So the work began with a total cost of nearly 150,000 rupees. Rs 95,000 in cash was given by the district Panchayat; the rest was in the form of a labour contribution from Cherlung and Artunga. The work was completed in 1981. Once the work was complete, it was time to decide the water allocation to Artunga. Several meetings were held for for this purpose over a two year period and for a while a stalemate ensued. The District Panchayat's adjudication was not conducive to an amicable settlement, because Cherlung felt that it was their system's fate and destiny that was being decided and preferred to settle the

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[13] Surprisingly, some members of this committee were neither members nor future beneficiaries of the irrigation system. The chairman of the committee himself was not a canal member.

debate internally. There was no consensus on how the water was to be allocated. External presence and interference was not wanted. Since no actual water measurements were taken before and after the project, it was anyone's guess as to how much more water was delivered as a result of the project.

Cherlung noted that Artunga could take water only after fulfilling the water demand of Cherlung. Cherlung's interpretation of "just water allocation" according to land was meeting the demand of Cherlung's irrigated land. However, Artunga claimed that the development activity was undertaken for the benefit of all, and that their input also went into the project. They had as much land area as Cherlung, so they believed that they were entitled, to at least one quarter if not a third of the water supply. Taplek and Pokhariya did not want to be included in the dispute. They said that the agreement was between Cherlung and Artunga and that they are to be left alone. Taplek and Pokhariya users were to get the twenty shares and Cherlung is to take the other twenty and settle it with Artunga.

In this case enjoyment of customary ownership rights in the engenders in the irrigators a sense of responsibility for system maintenance. This in turn makes for effective resource mobilization and management. Cherlung residents felt that for nearly half a century, they had given their sweat and toil, life and risks, money and labour for the system. It is a private kulo, not a state owned or state-constructed one. It was thus quite inappropriate for Cherlung to give water to Artunga simply

because of some development program. Cherlung felt that its duty was to be responsible for its system and to take all measures to safe-guard their ownership of it.

The role of the District Panchayat could be seen in light of this dispute. The flexibility of the clause stipulated for water allocation and their inability to judge over this case clearly shows their lack of farsightedness and knowledge of the social dynamics of 'development activities.' To be in a better position, the District Panchayat makes both sides happy and seek solutions elsewhere. Artunga is made happy by letting them know that until other projects materialize , they are entitled to water; and Cherlung is pleased by telling them that certainly, they cannot give much water but some amount should be given. Cherlung, Artunga, as well as the District Panchayat fell into this deadlock. If only an unambiguous formal agreement had been made, these problems could have been avoided.

Finally, in 1983, an agreement was reached. Until then, Artunga irrigators received water only for winter crops and were not allowed to work on the canal during maintenance work days, because that would have given them a greater claim to entitlements to the canal and water rights. The agreement stipulated that it would have no effect or make any changes on the previous agreement made between Taplek, Pokhariya, and Cherlung during their amalgamation process. The grant from the District Panchayat and labour contributions from both Cherlung and Artunga entitled Artunga from that day onward to be canal

co-shareholders. The twenty inches of water for Cherlung which gets converted as 55 units when it enters Cherlung area, was to be increased as 59 "inches" and four "inches" of this was to be given to Artunga. The volume of water remained the same, but the number of units were increased to adjust to the new right holders. Thus after the agreement, the total water share for Cherlung and Artunga was to be 59 units. Artunga was to provide 16 labourers during maintenance work for the four units of water. But Cherlung was to provide only one labourer per unit of water. Artunga was to allocate the 4 units of water amongst themselves and submit their agreement to that effect to the canal committee and obtain individual water rights registration forms. The proportioning weir that was to deliver the four units of water for Artunga was to be installed at Chaptol in Cherlung. If Artunga wanted to increase its share of water, then it could purchase water from Cherlung at the going price. If these conditions were not adhered to, the agreement would become null and void. If Artunga managed to bring or arrange for a separate canal, they would have to unconditionally forego the 4 units of water. The agreement also stipulated that besides agreeing to the conditions laid down in the contract, both parties would abide by the rules and regulations of the canal. An effective organization, controlled and operated mainly by the Cherlung command area members manages the system.[14]

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[14]A general description of the functioning of this organization is made in Pradhan,1982.

Phalebas

Phalebas lies in Parbat district of Dhaulagiri Zone, and is located 40 km. northwest of Pokhara Valley. This area is bounded by the Kali Gandaki river to the west which is more than 130 meters lower, and the south by Lamaya stream. Thus, agricultural land is located on river terraces or Tars. Since the area is higher than the rivers, the intake would have to be constructed considerably farther upstream. The result is a longer canal that skirts steep slopes and passes through tunnels.

Certain portions of the tar are irrigated and have water rights. One notices that in Phalebas some fields are not irrigated even though a neighboring field has irrigation precisely because it has water rights. In the irrigated areas, rice is planted during July and August; harvested during November/December. Wheat is planted next (December/January) and harvested in March/April. Maize is planted last, and harvested during June/July. When wheat is grown in the irrigated areas, certain portions are planted with potatoes and mustard. Where rain-fed agriculture is practiced, maize and millet are grown. Millet is interspersed with maize a couple of months before maize is harvested. Millet is planted during May/June and harvested during November/December. The urgency of having to plant rice in the irrigated land during monsoon demands early harvesting of the maize. Because maize is allowed to stand in the non-irrigated fields longer than in irrigated land, the yield is higher. Unirrigated land remains fallow for a few months after millet is

harvested. In the Phalebas Tar area, early paddy or winter rice is not grown due to lack of surplus water.

There are several farmer-built and managed irrigation systems in Phalebas, some of which were built several decades ago. Most function only during the monsoon season since the sources of these systems dry up during winter. One system that does have irrigation during summer as well as in winter is the Tallo Kulo. The following describes the nature of this farmer managed system prior to the state intervention in terms of rehabilitation and extension. This will be related to how property rights over the system were established, maintained, and are currently being sustained.

In 1930, a wealthy resident of Phalebas invested some money to build a canal from Lamaya Khola (stream) to Phalebas area. Others slowly joined in and invested in the canal. At first, the canal delivered very little water. However, once water reached Phalebas, people were convinced that the water supply could be increased if the canal were improved. Twenty-five years after the canal was first conceived, other villagers pooled resources in cash and in kind to make major improvements in the canal. These people then became the co-shareholders of the irrigation system. Water was allocated to each individual according to his investment. In total, some 15,000 rupees were invested during this major improvement. A committee had been formed to supervise improvements.

At present, the main canal delivers water to the main proportioning weir known as Gahak. Water is then conveyed to secondary canals through the four notches. The canals from the first two notches do not have additional proportioning weirs, but the others do. Water is subsequently divided into eight geographical regions, each receiving a volume of water from a notch whose opening is proportional to the total share-entitlement of its members.

To guarantee water delivery along the conveyance to individual shareholders' land, the tasks of system maintenance and water acquisition are timed to complement agricultural activities.

Preparation for rice transplantation begins in the month of Asadh (June/July). Due to water scarcity, dry seed beds are prepared for germination. At a general meeting called by the committee, all shareholders elect members of the committee if need be, and discuss work schedules, rules regarding fines, wages, etc. Since 1954, the number of Gahaks has increased from five to eight; and fine or wage rates have also changed. In Asadh, all system members work on maintenance and repairs for a few days; the Gahaks clean and de-silt their respective field channels.

During ploughing and planting time, two paid patrol men (Jagire) inform the President about canal work, who then informs, through a messenger (Katuwal), a certain number of Gahaks to go for the repair work. In any given year, there are about thirty

days of maintenance/repair work on the canal, and the number of people working ranges from 50 up to 375 in a single day.

Resources for maintenance/repair work come in the form of labour and cash. Labour is mobilized not in proportion to the number of shares held, but one laborer per shareholder. Those with more shares benefit from this type of arrangement. Others who, for one reason or another, cannot or do not want to provide labour may contribute cash in proportion to their rice yields. This system provides options and choices for the type of resource one could contribute, taking into account the off-farm employment in the form of civil, teaching, or military services in Nepal or abroad. Unlike in some other systems in Nepal, women in Phalebas are allowed to work on the canal. During winter maintenance work, however, labour has to be contributed and if someone defaults, the person is fined Rs. 20, the same as during summer. This does not reflect the present "opportunity cost," and the committee is considering raising it to Rs. 25 next year. Cash that is collected is invested in the system, used to pay the Jagires, or it is loaned to members of the irrigation system at a high interest rate with the water share used as collateral.

Water acquisition for the Phalebas system requires considerable labor inputs. Water is tapped from different streams through multiple intakes at different times in the agricultural cycle. Since certain streams have water only during the monsoon/summer season, these are tapped first. As water becomes scarce and demand more critical, intakes are placed at streams

further away. Currently this system, by virtue of customary rights, prior appropriation, and enforcement by a large number of shareholders, has four intakes for water acquisition. Two nearby monsoon streams are tapped first when farmers are busy transplanting rice. From August to October, an intake is placed to bring in more water from a third stream (Lamaya Khola). As water becomes scarce and the time for winter crops nears, members place yet another intake at a fourth stream, Khalte Khola and build a stream crossing to join the Khalte conveyance with Lamaya's conveyance. This is done during November or December. At this time, there is little, if any water in the first two streams. All four intakes are used for about winter irrigation. This technology provides hardly any water after Baisakh (April/May), so members do not bother maintaining the canal to bring water then. Only in Asadh will they again tap water and repeat the cycle.

This design is flexible and temporary, responsive to the available water supply at the various streams. But it is labour-intensive. During 1986-87, repair work at the intake had to be done at least five times. An effective indigenous organization helped mobilize the necessary resources to get the system working again. The Phalebas irrigation organization has several levels of administration and authority: the committee, the system (i.e., general body of all members who are shareholders), and the individual Gahaks.

The way one Gahak works is different from another, and there is substantial autonomy in water distribution and application, resource mobilization, as well as in conflict management. The system has been effective in guarding the shareholders' rights to the canal and the water, and ensuring that the concomitant obligations are carried out. Defaulters are fined and punished. If non-water right holders along the alignment before the main Gahak steal water from the canal, they are fined or their crops irrigated by canal water are destroyed. A definite geographical area is delimited within which water transactions and irrigation can take place, and even then only upon the consent of other Gahak members. Water can be bought or sold notifying the Gahak member-representative and receiving the consent of the other Gahak-members, as well as through inheritance. Tenants are allowed to use their landlords' watershares.

The Proposed Irrigation Project. Nepal's Fifth Five-Year Development Plan (1975/76-1979/80) accorded high priority to irrigation development in the hill regions of Nepal. The western hill region is characterized by chronic food-deficiency and poor accessibility. Since farm incomes are very low, there is large scale migration to the terai and to India to seek employment. In 1970, His Majesty's Government of Nepal (HMG/N) asked the Asian Development Bank (ADB) to consider Technical Assistance (TA) for the preparation of the Vijaypur Irrigation Project in the Western Development Region. In 1979, HMG/N proposed to include additional hill irrigation projects under this package. Phalebas

was included since the Phalebas farmers who did not have irrigation had petitioned the king for assistance requesting help in irrigating their land.

A Bank fact-finding mission inspected the project area, the irrigable area of which covered approximately 4,500 hectares spread over five areas. Phalebas constituted 300 hectares of this total. The Bank, after discussing with the Nepali Government officials, concluded that technical assistance would be required for project preparation before the project could be considered for financing. Several international consulting agencies were invited to bid for a detailed feasibility study in early 1980. The German firm GITEC, in association with LAHMEYER INTERNATIONAL, was selected by the Bank. The study team visited Nepal from March to June 1980 and submitted its report covering technical, agricultural, economic, socio-economic, and institutional problems.

The project was appraised in September 1980 and was considered well-suited for Bank financing. The project was to contribute to a number of major development objectives embodied in the Sixth Five-Year Development Plan to improve living standards in the hill areas, including (i) increased foodgrain production; (ii) improved employment and farm incomes; (iii) improved access; and (iv) environmental preservation. The Hill Irrigation Project was to provide irrigation facilities and other supporting services essential to achieve these objectives (ADB, 1980).

The study team recommended rehabilitation and extension of the Phalebas canal. The study team had acknowledged that where there were existing irrigation facilities there was also some sort of irrigation organization to deal with water allocation and canal maintenance. However, the procedures and approach for incorporating and integrating the existing irrigation facilities and institutional arrangements into their plan was ignored.

The GITEC Study (1980) reports:

> "The present feeder canal leaks badly throughout its length (80% of the water being lost before the canal emerges onto the upper terrace); another difficulty is the temporary nature of the intake on the Khalte Khola and aqueduct over the Lamaya Khola. Both Structures require rebuilding after the monsoon season, and the canal needs substantial maintenance each year."

The plan for the proposed irrigation system was as follows:

i) Intake on the Khalte Khola, replacing temporary structure at same location.

ii) Tyrolian weir and intake on the Lamaya Khola replacing temporary structure at the same location.

iii) Connecting channel, feeder canal and distribution system.

iv) A sub-area headquarters.

An 80 kilowatt mini-hydropower unit was also to be included, and the existing canal would provide enough height for the drop.

Upon completion of the construction, the operation and maintenance of the irrigation and related facilities were to be under the responsibility of the Western Regional Irrigation Directorate, Department of Irrigation, Hydrology and Meteorology (DIHM) at Pokhara. Water user's associations were to be established with assistance of DIHM at least one year before

completion of the project. These associations were to participate in water management and the proper operation and maintenance of project facilities at the farm level.

Project Implementation and Farmer Response. DIHM was the implementing agency for the project. GITEC's estimate of the water requirement of the crops was 0.62 liters per second per hectare, which according to the experiences in other hill irrigation projects was very low. A more realistic figure according to DIHM was 4.5 liters per second per hectare. A second survey was undertaken for the design and cost-estimates of the structures. Initially, the farmers would not allow the survey to take place. They felt that they should have at least been informed and asked about taking the survey along their canal. Nevertheless, after a process of conflict and negotiations the survey did take place.

When the shareholders in the existing canal learned that an irrigation project was going to be undertaken incorporating their canal, they feared that the source of their livelihood and the benefits from their private property during the construction period of the project would be denied, since no compensation during that period was planned. They also worried that during the implementation period there would be corruption and encroachment upon their personal rights and benefits.

Finding no alternative recourse, the farmers petitioned the King to protect their private property not allowing the project, thereby preventing nationalization of their system. In their

petition, they stressed that this was a private canal in which people had invested labour and cash individually. They reported that through 1978 they had invested about Rs.300,000 in cash, and that every year they had mobilized nearly Rs. 150,000 worth of labour for maintenance. Local labor mobilization for system maintenance and original investments in the system formed the basis of the Phalebas farmers' claims to ownership of their system. Local resource mobilization also lent sufficient legitimacy to their claim to allow them to present their petition.

The idea of using the old canal for extension had to be abandoned by the government because the farmers of the existing canal would not allow it. DIHM decided to construct a new canal <u>above</u> the farmers' canal. They rationalized this since a lower canal would mean less command area and the possibility of less height for the hydro-power plant which might render it infeasible. Since the project had already been funded by the Bank it had to be carried out so as not to risk the loss of the foreign capital.

In 1982 the tender documents with the contractor had to be revised to reflect this change. The components of the new proposed irrigation system were

1) Trench type head works on two rivers (Khalte & Lamaya)
2) River crossing across Lamaya
3) Construction of 7.2-km main canal

4) Construction of 4.0-km branch canal and 3.5 km distribution canals

5) Construction of 80-KW capacity mini-hydropower plant,

6) Project area headquarters

Office buildings and parts of the new canal were constructed in 1982-83. The new canal taps water from two streams. The intake at the Lamaya stream is above the farmers' intake while the intake on the Khalte stream is lower. It is possibile that when the system is completed the government's Khalte intake may not receive adequate water, because in winter the stream flow is low and the farmers' intake is bound to tap nearly all available water. The government's Lamaya intake has adequate water for summer. However, its flood gate opens directly onto the intake of the farmers' canal. The farmers' intake is not a permanent structure and can be relocated. If the government's intake diverts too much water away from the existing canal, the farmers say that they will move their intake higher up the stream, above the government's intake.[15]

The farmers also petitioned the Prime Minister with three demands:

(i) During the monsoon season, water from the nearby brooks was necessary for the command area of the Tallo Kulo; so the project canal should tap water from Khalte Khola

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[15]If conflict ensues, some of the farmers are prepared to take the irrigation agency to court for having built an intake above the intake of their existing, functioning irrigation system.

(ii) From Bhadra (August/September) onwards, water from Khalte would be necessary for the command area of Tallo Kulo; so no water is to be taken by the project's canal; and

(iii) Since the system is nested in a hilly region, and Tallo Kulo is near the project canal, any damage done to Tallo Kulo during the construction period is to be maintained and repaired by the project itself.

The Prime Minister ordered DIHM to accept the farmers' demands. A deputy director general of DIHM was sent to the site to investigate. He held a general meeting of all the farmers and the community to discuss whether they wanted the project. The meeting included non-irrigators, and the majority decided that the project should carry on. However, due to the opposition and pressure from the current irrigators, the following set of conditions was stipulated: (i) Tallo Kulo was to receive its usual amount of water during and after the project, (ii) Tallo Kulo was to receive first priority for water after the project is completed, and (iii) any damage done to Tallo Kulo during and due to construction was to be repaired by the project.

At this meeting, some farmers who had no water rights in the system presented to the DIHM delegation a document dating some fifty years back stating the government's assistance of seven thousand rupees to this canal. This act of having partially assisted in the farmer-built system by investing some money 'legitimized' the government's claim to partial ownership of the system. The irrigators do not however recognize this document. They argue that though the government investment was made, it was made on another system built previously that did not function.

Years later, substantial investment had to be made by the farmers to build the present existing system.

The contractor was then made to sign a contract stipulating that he would not disturb the existing canal system which runs approximately 5.6 meters below the proposed canal alignment. To date, nearly 800,000 rupees has been spent by the contractor to keep the Tallo Kulo cleared and repaired from the damages caused by excavating the new canal. However, in order to force the contractor to carry out this work he had agreed to, the farmers had to go to the project office 76 times to request, force, or threaten the office to repair their canal.[16] This construction period had created much fluctuation and frustration in the smooth operation of the existing canal.

The project plans to fix outlets with gates delivering water on a land basis. The project will provide water for 341 ha, of which nearly 170 ha are now irrigated by the existing canal. The project is nearly complete. During last monsoon of 1987, the government's main canal delivered water to the farmers' main canal near the main Gahak. Farmers resource mobilization for water acquisition decreased markedly as soon as the government acquired and delivered the water. The farmers canal will be redundant and resources for it not mobilized, if the farmers perceive that the government canal will and should provide them with water on a priority basis.

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[16] This figure (as of Spring 1987) was given by the project office and more or less confirmed by the contractor, and the farmers.

These cases help us to unearth the underlying general principles relating to local resource mobilization. The original investment made by the different farmers lent legitimacy to claims on the irrigation system and their respective water shares. For the sustenance of the system, repeated investment in the form of operation and maintenance occurred, but at the same time this process denoted claims or conferred claims to irrigation water. When this individual right is challenged, it is in effect a challenge to the whole collective rights embodied in the system. Thus, conflicts are adjudicated; rights protected; and resources mobilized so as to preserve and enjoy benefits from the rights.

CONCLUSIONS AND POLICY IMPLICATIONS

Farmers have adopted various strategies for mobilizing both local and state resources. The state too has mobilized resources and has adopted several approaches to irrigation. These have different implications for effective mobilization of local resources by the beneficiaries after the project. Foreign aid and the state's own resources have been pooled to finance irrigation development. If the procedure adopted for implementation is not conducive to mobilization of local resources by the beneficiaries later, then continued financial support will be needed. Donors and government should be aware of these implications in their project financing and introduce a approach that brings about mobilization of local resources later.

Further research on the impact of these different approaches of the agencies on resource mobilization is needed. But it is safe to say that certain farmers in many systems are less motivated to mobilize their own resources when irrigation agencies are willing to maintain the irrigation systems.

Some policies may also affect irrigation indirectly. Access to local resources and resources needed for irrigation systems' operation and maintenance need to be preserved and permit for use should be made available. Examples of such policies are soil and land conservation, forest protection, access to forest products for dam construction and river training, etc. Soil erosion in the hills have affected many terai systems like the Chattis Mauja where rapid silting is a problem. Deforestation has been a problem in many systems where logs and branches are necessary for the construction of the intakes, weirs, and aquaducts. If the procedure for access to forest products is long and time consuming, then conflicts with the rangers may occur and the system may not be managed and maintained on time.

The cases presented here are not intended to focus criticism or blame any one agency, official, donor, set of advisors or consultants, or group of farmers. Rather, its intention is to present a scenario which calls for alternative planning processes that might facilitate rehabilitation and extension of irrigation system, especially taking into consideration the property and resource mobilization aspects. The Phalebas case study pointed out how a number of design alterations had to be made precisely

due to property rights issues. The case studies also calls for effective ways of enlisting the involvement of farmers, with and without water rights, from the very beginning to avoid misunderstandings, or apprehensions. As with a case described by Siy (1986) in the Philippines, there is the danger in Nepal that "so-called improvements in existing physical facilities may undermine existing and sometimes quite effective, local organizational arrangements, while imposing demands for new arrangements alien to the experience of the local people" (Siy 1986). In the Cherlung case, inadequate knowledge of the social organization of the existing system and the lack of a formal agreement regarding water allocation resulted in conflict and dissension even when the project was carried out with users involvement. The two cases reveal an intimate relationship between rights and resource mobilization. Rights in water and/or system infrastructure entail certain obligations towards system upkeep and management. Only those who are guaranteed these rights (rights that are forfeited only when associated obligations are not fulfilled) will participate in the decision-making process that governs the fate of the system.

Farmers will invest in the hydraulic system only when rights in hydraulic property are guaranteed. In some irrigation systems, effective organizations exist for the preservation of these rights. Implementing agencies would do well to recognize this and develop a planning and implementing approach such that these rights are not jeopardized. Communication, dialogue, and

negotiation are prerequisites for cooperation among existing members and for the incorporation of new members into local irrigation organizations.

Since existing systems have some form of organization capable of innovating and improving institutional arrangements over time, agencies planning interventions should analyze these organizations; the institutional arrangements that these organizations have generated for local resource mobilization; property relations involving rights, duties, and sanctions; and constraints and potentials of local resources. Such analyses should be site-specific and precede the proposed intervention. A methodology for assessing such arrangements and constraints needs to be developed. This may require that the agencies themselves be reoriented to appreciate the need and utility of such an approach. Organizational capacity of users will have to be built during implementation by involving the users in a collaborative and participatory manner. The agency and the users should jointly implement the project. Where an irrigation organization already exists, project implementation should be undertaken with their collaboration. During such efforts, local information and leadership can be tapped and enhanced. Accountability on the part of the agency and the users can be developed. In many farmer-managed systems, accountability to the co-shareholders is very important.

In order to form effective water users associations, membership criteria should be laid out from the very beginning in consultation with the existing users or the community of future beneficiaries. Realistic boundaries of the command area should be calculated. This is not to suggest that members of the user committee have to have water rights in the system. The Decentralization Act makes the formation of such user groups before project implementation mandatory, but the power structure of the organization should be such that the authority to make key decisions and the leadership roles should be vested in the actual beneficiaries, rather than other ex-officio members.

When systems are provided with external resource, they may forfeit control of their system. Where before conflicts were resolved internally, adjudication takes place outside the system in courts or irrigation agencies. When design of the project is undertaken without farmers' involvement, the structures may not be considered in terms of future recurrent costs in maintenance work and the ability to do so by the beneficiaries. This process would have virtually taken away the management and maintenance activities from them, then the system would be perpetually depended on external resources. We would have in effect taken away leadership roles and the future resiliency of the organization to adapt to changing circumstances.

Table 1. Land Use and Irrigation
(Thousand Hectares)

	Hill	Terai	Total
Land Area	10,750	3,400	14,150
Cultivated Land	1,500	1,600	3,100
Irrigation Status			
1. Land Area Irrigated			
a. Govt.-managed Systems	18	168	186
b. Farmer-managed Systems	160[a]	298[b]	458
(Of which groundwater)	(-)	(77)[c]	(70)
2. Total Potentially Irrigable Land	300	1,600	1,900
(Of which groundwater)	(-)	(428)	(428)

[a] Includes an estimated 8,000 ha developed by FIWUD and 2,000 ha by MPLD.

[b] Includes 48,000 ha irrigated by ADB/N-financed tubewells.

[c] Includes 22,000 ha covered by Groundwater Development Board; 48,000 ha irrigated by ADB/N-financed tubewells, and 7,000 ha under FIWUD tubewells.

Source: Adapted from Small et. al (1986).

Table 2. Irrigation Development According to Institution

Institution	Area Irrigated (ha)	Percentage of Irrigated area
DIHM	179,000	27.8
FIWUD	15,000	2.3
MPLD	2,000	0.3
ADB/N	48,000	7.5
Farmer-managed	400,000	62.1
Totals	644,000	100.0

Source: Adapted from Small et. al. (1986).

Table 3. Government Developed Irrigation
(cultivable command area in hectares)

	Targeted[a] Development	Completed[b] Command	1980 Command	1980 Command
Prior to 1st Plan 1956				
Specific projects	13515	16645	11800	6500
1st Plan 1956-61				
Specific projects	18625*	11508*	3222*	1685
Other Small Schemes	2160	2160	1330	800*
	20785	13668	4552	2485
2nd Plan 1962-65				
Specific projects	28544	17927	4822	3141
Channel Renovation	4000	4000	2000	1200*
	32544	21927	6822	4341
3rd Plan 1965-70				
Specific projects	12010	8340*	8025*	5926
Minor Schemes	38644*	35130	19770*	14004*
	50654	43470	27795	19930
4th Plan 1970-75				
Specific projects	251460	97093	2860	2482
Minor Schemes	2271*	1282	1042*	1022*
	253731	98375	3902	3504
5th Plan 1975-80				
Specific projects	222349	43464	115224	58383
Small Schemes	2471	1394	1140	1140
Channel Renovation	5400	0	2210	2210
	230220	44858	148574	61733
Totals up to 1980				
Total Terai (T)	563308	216443	185680	84427
Total Hills (H)	26581	16340	12225	9856
Undesignable (T&H)	11560	6160	5540	4210
Grand Totals	601449	238943	203445	98493

Source: Adapted from WEC (1981).

(a) These figures include considerable double counting due to redevelopment of existing schemes and double entry of behind schedule development into successive plan period targets. (b) These figures are often much larger than potentially irrigable areas due to design overestimates.

(*) Asterisked figures are estimates made in the absence of better information.

Table 4. Irrigation Development Expenditure
(in millions of rupees)

	Irrigation Development Expenditure	Percent of Development Expenditure
Sixth[a]	3130	14.4
Fifth	864	9.8
Fourth	265	4.9
Third	61	2.4

(a) Data for Sixth Plan are budget figures. The others represent expenditures.

Source: Nepal. WEC. 1981. "Irrigation Sector Review".

Table 5
Allocation of Development Expenditure in the Public Sector for the Seventh Plan (1985-1990)
(at 1984/85 constant price)

Title	Amount	Percent
Agriculture, Irrigation & Forest	**8875.9**	**30.6**
a) Agriculture	3983.0	13.7
b) Irrigation	3296.3	11.4
c) Land Reform	27.2	0.0
d) Co-operative	17.7	0.0
e) Cadastral Survey	202.4	0.8
f) Forest	1257.0	4.3
g) Resettlement	41.0	0.2
h) Meteorology	52.3	0.2
Industry, Mining and Power	**7546.5**	**26.0**
Transportation and Communication	**5132.5**	**17.7**
Social Services	**7329.7**	**25.3**
Miscellaneous	**115.4**	**0.4**
Total	29000.0	100.0

Source: Adapted from Nepal. National Planning Commission (1985).

Table 6. Foreign Aid Contribution to Nepal's Development Plan Expenditures (millions of rupees)

Plan	Total Expenditure (TE)	Foreign aid Contribution to TE	Percent Foreign Aid
1st	214.4	382.9	100.0
2nd	596.7	476.0	76.0
3rd	1779.0	967.8	54.4
4th	3315.5	1508.9	45.5
5th	8870.6	4240.8	47.8
6th	21750.0	13920.0	60.0

Source: Adapted from Dharamdasani (1984).

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