

The logo for the Asian Development Bank (ADB), consisting of the letters 'ADB' in a white serif font inside a black square.

Technical Assistance Report

Project Number: 39004
March 2006

Kingdom of Nepal: Economic and Social Inclusion of the Disadvantaged Poor through Livelihood Enhancement with Micro-irrigation (Financed by the Poverty Reduction Cooperation Fund)

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 1 March 2006)

Currency Unit	–	Nepalese rupee/s (NRe/NRs)
NRe1.00	=	\$0.01408
\$1.00	=	NRs71.02

ABBREVIATIONS

ADB	–	Asian Development Bank
APP	–	Agriculture Perspective Plan
CBO	–	community-based organizer
CMIASP	–	Community-Managed Irrigated Agriculture Sector Project
DADO	–	district agriculture development office
DDC	–	district development committee
DOA	–	Department of Agriculture
DOI	–	Department of Irrigation
DWD	–	Department of Women Development
DWSS	–	Department of Water Supply and Sanitation
FMIS	–	farmer-managed irrigation system
GIP	–	group implementation plan
HDI	–	human development index
IDD	–	Irrigation Development Division
IDSD	–	Irrigation Development Subdivision
LGI	–	local government institution
MLD	–	Ministry of Local Development
MOAC	–	Ministry of Agriculture and Cooperatives
MOWR	–	Ministry of Water Resources
NGO	–	nongovernment organization
O&M	–	operation and maintenance
PRSP	–	poverty reduction strategy paper
SAPPROS	–	Support Activities for Poor Producers
SARD	–	South Asia Department
TA	–	technical assistance
TL	–	team leader
VDC	–	village development committee

TECHNICAL ASSISTANCE CLASSIFICATION

Targeting Classification	–	Targeted intervention
Sector	–	Agriculture and natural resources
Subsector	–	Agriculture production, agroprocessing, and agribusiness
Themes	–	Sustainable economic growth, gender and development, capacity development
Subthemes	–	Developing rural areas; gender equity in opportunities; client relations, network and partnership development

NOTE

In this report, "\$" refers to US dollars.

Vice President	L. Jin, Operations Group 1
Director General	K. Senga, South Asia Department (SARD)
Director	F. Roche, Agriculture, Environment, and Natural Resources Division, SARD
Team leader	K. Yokoyama, Senior Water Resources Specialist, SARD
Team member	G. Gewali, Project Implementation Officer, SARD

I. INTRODUCTION

1. The Government of Nepal requested the Asian Development Bank (ADB) to provide technical assistance (TA)¹ to establish effective micro-irrigation service delivery systems to the poorest and most disadvantaged groups—including ethnic minorities, *dalits* (low occupational castes), women, marginal farmers, and landless families—to back up the Community-Managed Irrigated Agriculture Sector Project (CMIASP).² Following the endorsement of the concept note by the Poverty Reduction Cooperation Fund in November 2004, ADB fielded a fact-finding mission in January 2005, and consulted with representatives of the Government, external funding agencies, nongovernment organizations (NGOs), and beneficiaries; and agreed with the Government on the TA design, including the design and monitoring framework in Appendix 1.

II. ISSUES

2. Nepal remains one of the poorest countries in the world, with a per capita annual income of \$241 in 2003. Poverty is highly concentrated in rural areas, in particular among disadvantaged ethnic minorities (about 36% of the population) and *dalits* (about 13%). Nepalese society is governed by traditional rules and behavioral norms embedded in ethnic and caste systems, within which upward mobility is limited and women are disadvantaged. Along with social exclusion, these marginalized groups have limited access to natural resources and economic opportunities. They remain as landless or marginal farmers operating on most unproductive land, with little public development service reaching them. The continued socioeconomic inequality is one of the root causes of the recent violent insurgency. Enhancing the capacities and incomes of these poorest excluded groups is one of the most critical challenges for the country.

3. Agriculture remains the most important source of livelihood for the rural poor, providing employment for over 80% of the active workforce and meeting their nutritional needs. The country offers unique opportunities for smallholders to produce a wide range of high-value agriculture products on a commercial basis. However, the sector is still largely dominated by traditional, subsistence-oriented crop farming. Key constraints include difficult terrains; poor infrastructure; low technology base; and limited access to inputs, output markets, and supporting services. The Tenth Plan (FY2003–2007), which is the Government's poverty reduction strategy paper (PRSP), adopted in 2003, has accorded highest priority to agriculture and rural development and provided a comprehensive framework building on the 1995 Agriculture Perspective Plan (APP), with emphases on (i) progressive involvement of the private sector in input and output marketing, (ii) coordinated provision of critical public infrastructure and services, (iii) partnership with private providers (including NGOs), and (iv) devolution of services.

4. Due to the highly uncertain rainfall pattern in Nepal, irrigation is an essential input to a modern production system, and is prioritized in PRSP and APP as a foundation to this end. About 1.13 million hectares (ha) of the country's net cultivated area of 2.64 million ha has access to irrigation, among which farmer managed irrigation systems (FMIS) account for 55%. Despite their community-based sustained maintenance, productivity of FMIS remains low because of fragile diversion and rudimentary distribution structures. Following the priorities set out in the Irrigation Policy (2004),³ the CMIASP was prepared to improve the performance of existing FMIS in the Central and Eastern Development regions, while setting up sound service delivery mechanisms and furthering sector policy and institutional reforms. CMIASP has also included the promotion of innovative unconventional micro-irrigation systems, to support livelihood enhancement in rainfed areas that cannot benefit from FMIS improvement.

¹ The TA first appeared in *ADB Business Opportunities* on 3 March 2005.

² ADB. 2004. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Kingdom of Nepal for the Community-Managed Irrigated Agriculture Sector Project*. Manila.

³ Department of Irrigation. 2004. *Irrigation Policy 2060*. Kathmandu.

5. In recent years, micro-irrigation has emerged in Nepal as an appropriate solution adapted to small farm size, land fragmentation, and high labor to land ratio. Low cost technologies have also progressively developed. Available micro-irrigation technologies in the hills include drip and micro sprinkler (both through pipes connected to a bucket kit) that are connected to existing community water supply systems or harvesting tanks, whereas those in the *terai* (alluvial plain) include treadle pumps, tubewells, and dug wells. Individual household-based kits and equipment are affordable to and manageable for smallholders, including marginal farmers.⁴ However, their meaningful innovation and adaptation started only in the mid-1990s by NGOs such as the International Development Enterprise; Center for Environment and Agriculture Policy Research, Extension, and Development; and Support Activities for Poor Producers (SAPPROS). In 2003, Winrock International, an international NGO, initiated the Smallholder Irrigation Market Initiative, which aims to promote drip, sprinkler, and treadle pump irrigation to 27,000 farm households through a farmer demand campaign and equipment supply chain development in West and Midwest Development regions.⁵ With inevitable positive impacts on the livelihood of rural smallholders—and using locally accepted NGOs as service providers—these programs are being implemented effectively under the present insurgency conditions.

6. Available experience and lessons of micro-irrigation in Nepal have indicated substantial gains among micro-irrigation adopters, particularly through vegetable growing: (i) gross income gains of NRs3,500–NRs4,500 per year (with just 0.01–0.02 ha of cropping); (ii) improved dietary status from increased intake of vegetables; and (iii) time and energy savings, with an overall internal rate of return of well over 300–500% (in case of adapters having access to water without source development and delivery).⁶ The technology, downsized in scale and cost, suits small and marginal farmers' needs in water scarce areas. It is particularly suited to women farmers as it builds on their existing farming practices in vegetable gardening, given that about 90% of women are engaged in agriculture compared with 64% of men. Drip and sprinkler irrigation has also proven to be environmentally sound, with (i) increased water use efficiency estimated at 90% compared with 20–30% under surface irrigation, and (ii) improved soil fertility through soil loosening and increased moisture with reduced soil erosion. Finally, necessary kits can be delivered with sustained after care services by establishing private sector supply chains.

7. While 70,000 farmers use treadle pumps in the *terai* and 20,000 use drip and sprinkler irrigation in the hills across Nepal, micro-irrigation development is still at a very early stage, which calls for concerted pioneering efforts to deliver a package of necessary services before rapid growth in technology adoption takes place. There are vast opportunities to promote the ready adoption of the technology in areas with existing water supply systems or water sources nearby. On the other hand, it is more challenging in areas that have little access to water, where support for community efforts is needed to set up water acquisition facilities to connect to drip equipment, such as hybrid systems for water supply-cum-micro-irrigation. Most critically, benefits to date have primarily accrued to upper poor groups that were able to purchase the drip system and commensurate agro-seed-fertilizer package, in response to aforementioned program's focus on developing private market mechanisms. This has excluded the poorest and most marginal farmers, especially disadvantaged women, ethnic minorities, and *dalits* in water stress areas, despite the good opportunities now offered by low-cost technologies as an entry point towards social and economic integration. (Lessons learned are shown in Appendix 4).

8. The Government has set a target of developing 10,000 ha under unconventional irrigation systems (including micro-irrigation) in the Tenth Plan, and intends to prepare a

⁴ A standard small bucket-based drip irrigation system (for 250 square meters of land) costs in NRs1,000, with an annual operation and maintenance cost of NRs300. The cost of a treadle pump system is about NRs1,500.

⁵ ADB also undertook a small pilot drip irrigation demonstration in 2003 with the use of the Water Cooperation Fund from the Government of the Netherlands, with a focus on poor women's groups in a western hill district.

⁶ Tushaar, Shah and Jack Keller. 2002. *Micro-irrigation and the Poor: A Marketing Challenge in Small-holder Irrigation Development*. Available: <http://www.siminet.org/images/pdfs/mi-and-the-poor.pdf>.

national policy for micro-irrigation. In this context, there is a need for (i) exploring and documenting available technologies; (ii) defining institutional arrangements and responsibilities of the relevant organizations, including those of local government institutions (LGIs); and (iii) defining suitable financing arrangements. The Government is of the view that the delivery of micro-irrigation kits and support services should be done through private providers, while the public sector should focus on (i) facilitation, coordination, and field level monitoring; and (ii) policy formulation, programming, and technical backstopping at the central level. These need to be clearly stipulated in line with the Government's decentralization policy.

9. There is also a high need to define and operationalize effective mechanisms to deliver the services to the poor—in particular disadvantaged ethnic or caste women's groups, which have not benefited from existing programs—by exploring necessary incentives such as a promotion grant and no-interest revolving fund; and careful beneficiary identification, motivation, and extension. This should also be pursued with strengthening of the capacities of the responsible organizations for effective program delivery, covering (i) farmer awareness and group mobilization, (ii) private sector supply chain of micro-irrigation equipment and spare parts, and (iii) supporting services for agriculture extension and marketing. The TA is needed to meet these immediate needs. Its implementation will also follow the approach proven effective under insurgency conditions, i.e., program delivery through locally accepted NGOs and private agents, along with direct targeting of the most disadvantaged groups. Its successful implementation will pave the way for effective targeting of the poor in implementing the relevant subcomponent of the CMIASP while providing a model for wider program replication across Nepal towards rapid technology adoption by poor smallholders and landless sharecroppers and renters.

III. THE TECHNICAL ASSISTANCE

A. Impact and Outcome

10. The impact of the TA is reduced extreme poverty and marginalization among the most socially and economically deprived households in the TA project areas, which covers five districts in three clusters, comprising two adjacent hill and two adjacent terai districts in the Central Development regions, and one hill district in the Eastern Development region. Its outcome is the development and demonstration of effective delivery mechanisms of micro-irrigation support services to socially and economically excluded ethnic minority and dalit groups, which will be further implemented in CMIASP with a more pro-poor focus. TA outputs include (i) micro-irrigation delivery mechanisms operative in the TA area with at least 2,500 poor households operating micro-irrigation, and (ii) draft policy and implementation guidelines for promoting micro-irrigation for the poorest.

B. Methodology and Key Activities

11. To establish and put into operation the appropriate delivery and support mechanisms for the poorest, the TA will take a flexible approach of starting with best practices and adapting to lessons learned. Services will be provided through local NGOs with the facilitation and technical backstopping of line departments and LGIs, with the overall capacity strengthened support by the consultants. The activities include (i) establishing operational procedures with training; (ii) program delivery through group formation, water acquisition as necessary, micro-irrigation, and agriculture extension; and (iii) TA project management and institutional support.

12. **Operational Procedures and Training.** The TA will (i) start with documenting existing programs, their impacts, and lessons; and (ii) prepare operational procedures and arrangements, including the roles of parties concerned. This will be followed by training of line agencies, including the Department of Irrigation (DOI), Department of Agriculture (DOA), district agriculture development office (DADO), district technical office, district development committees (DDCs), and village development committees (VDCs), along with NGOs. Local training

institutions will also be trained to impart training as trainers for this purpose. Delivery will envisage (i) private service provision with facilitation and technical backstopping by public organizations, (ii) synergy with ongoing agriculture sector programs assisted by external financiers,⁷ and (iii) progressive devolution of program delivery responsibility to DDCs.

13. Program Delivery Targeted to Most Vulnerable Groups. This component will include (i) an awareness campaign, and formation and training of micro-irrigation groups; (ii) delivery of micro-irrigation; and (iii) agriculture support services. The selected NGOs will implement the activities, targeting disadvantaged people, including ethnic minority, dalits, and women with less than 0.05 ha landholdings. Each group will organize themselves with three main responsibilities under leader farmers, including (i) building technical capability for micro-irrigation agriculture practices and sustainable operation and maintenance; (ii) developing themselves as viable community-based organizations to pursue community interests with a collective approach; and (iii) communicating with local bodies, implementing NGOs, project agencies, and other private parties associated with agriculture input and output marketing.

14. The TA will provide about 2,500 households—organized by groups of a minimum of 10 families willing to develop high-value vegetable or cash crops—with micro-irrigation facilities. The program will focus primarily on areas with some water sources nearby, such as village water supply systems, but a small number of water acquisition facilities will be developed as a pilot project. The cost of micro-irrigation equipment will be supported through a promotion grant and interest-free loans⁸ to facilitate the poorest people's participation. The TA also supports developing supply chains for equipment and spare parts with training of manufacturers, wholesalers, and retailers. Farmer groups will be further provided with agriculture extension and facilitation of output marketing through local NGOs, supported by DADO.⁹

15. TA Management and Institutional Strengthening. The TA will support the program delivery management and capacity strengthening of DOI, DOA, DDCs, VDCs, and NGOs in terms of technical backstopping, coordinated technical service delivery, and facilitation. TA progress and impacts will be monitored regularly using a simple set of outcome, impact, and process indicators. Some core indicators will be selected from the poverty monitoring analysis system linked to the PRSP. These will be properly recorded and documented, along with the lessons learned under the TA, and will be shared among the implementing agencies, key stakeholders, and external funding agencies through a series of workshops and seminars. On the basis of these activities, the TA will support the preparation of a draft policy for micro-irrigation development and guidelines for implementation, including the consultative process towards finalizing the documents, with active stakeholder participation.

C. Cost and Financing

16. The total cost of the TA is estimated at \$550,000 equivalent, of which \$450,000 will be financed on a grant basis by the Poverty Reduction Cooperation Fund administered by ADB. The Government will finance the remaining local currency cost of \$100,000 equivalent by providing office accommodation, two DOI vehicles for the consultants and NGO, counterpart staff, and other expenditures. Details of the cost estimates and financing plan are in Appendix 2.

⁷ Including APP support program assisted by the Department for International Development.

⁸ Up to NRs500 per household and less than 50% of cost as grant, and up to NRs1,000 per household as loans. The recovered fund will be used by the NGO to provide follow-on services to the farmer groups after TA completion, following a separate memorandum of agreement to be signed by the NGO, the Government, and ADB for due fund management. The TA consultants will facilitate the process and arrange for necessary training.

⁹ The resettlement framework, environmental assessment procedures and arrangements, and sample indigenous people's specific action plan for the CMIASP will be followed, as applicable, in implementing this component.

D. Implementation Arrangements

17. DOI will be the Executing Agency responsible for overall TA management, coordination (including policy issues), and technical aspects of water acquisition and delivery. DOA will work as a co-executing agency responsible for on-farm micro-irrigation equipment, crop extension, and marketing facilitation. DOI will assign the head of its unconventional irrigation unit as TA manager, and DOA will assign a managerial staff member in the agriculture extension/engineering directorate as co-manager. A working group headed by the director general of DOI will be formed to guide TA implementation, including the preparation of a draft policy and implementation guidelines, with the participation of line departments concerned, including DOA, DOI, Department of Women Development, Department of Water Supply and Sanitation (DWSS), and key NGOs and research organizations active in micro-irrigation.¹⁰ Field activities will be managed by district-level subproject management units following the CMIASP design and comprising managerial staff of the irrigation development division, DADO, and DDC.

18. The TA will be implemented over 20 months from May 2006 to December 2007. A qualified team of consultants will be engaged in accordance with ADB's *Guidelines on the Use of Consultants*, and other arrangements satisfactory to ADB for engaging domestic consultants and NGOs. Given the demonstration nature of the work that calls for the best qualified staff to develop and operate effective service delivery and supporting mechanisms, the consultants will be engaged individually by ADB. The TA requires a total of 17 person-months of domestic consultants, who will also organize an external advisory group comprising international experts based in Kathmandu, to review and advise on the TA outputs.¹¹ ADB will also engage a qualified national NGO associated with local NGOs through ADB's quality- and cost-based selection and biodata proposal procedure. Specific field services will be provided through associated local NGOs. The outline terms of references of the consultants and national NGO are in Appendix 3. The consultants, in association with the NGO, will prepare inception, quarterly progress, and final reports. The TA will also use an advance payment facility to support the incremental operational cost of the line departments. The advance will be credited to the account number in Nepal Rustra Bank provided by DOI, which will establish and maintain all statements of expenditures. The DOI account will be audited through the Auditor General's Office, and audited financial statements and accounts, together with the report of the auditor, will be submitted to ADB within 6 months of the close of each financial year.

IV. THE PRESIDENT'S DECISION

19. The President, acting under the authority delegated by the Board, has approved ADB administering technical assistance not exceeding the equivalent of \$450,000 to the Government of Nepal to be financed on a grant basis by the Poverty Reduction Cooperation Fund for Economic and Social Inclusion of the Disadvantaged Poor through Livelihood Enhancement with Micro-irrigation, and hereby reports this action to the Board.

¹⁰ In this context, DWSS and DOI will jointly prepare a guideline for the hybrid micro-irrigation-cum-water supply systems appropriate for the hill regions. ADB will also join the working group as an observer.

¹¹ Limited international consultant input is justified given the availability of a model to establish a private supply chain of micro-irrigation, and the experience and capacities of NGOs to follow such model and implement group formation, motivation, and services targeting the poorest people.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions And Risks
<p>Impact Reduced extreme poverty and marginalization among the most socially and economically deprived households in five districts of Nepal</p>	<p>Improved livelihood of the disadvantaged population under extreme poverty targeted under the PRCF, measured by (i) improved HDI; (ii) increased level of food security; and (iii) increased financial, capital, and skill assets, by 2008</p>	<ul style="list-style-type: none"> • Impact and outcome monitoring system established at the beginning, based on multilevel indicators from the initial baseline survey • Semiannual ADB review missions • Quarterly progress and TA completion reports by the consultants 	<p>Assumption Similar projects are implemented nationwide following the TA outputs demonstrated.</p>
<p>Outcome Develop and demonstrate effective implementation mechanisms and local capacities to deliver micro-irrigation support services to socially and economically excluded ethnic minority and <i>dalit</i> (low occupational castes) groups</p>	<p>The following results indicators will be achieved by 2008:</p> <ul style="list-style-type: none"> • Incremental annual family income of over NRs3,000 • Household food deficit months are halved • Household financial and skill assets are improving over time in terms of HDIs • Most disadvantaged groups in the lowest-income quintile in the locality participate in the program as a majority of beneficiaries • Level of confidence toward development initiatives is improved <p>The following institutional indicators will be achieved by 2008:</p> <ul style="list-style-type: none"> • Effective delivery mechanisms for the poor are demonstrated • Draft policy and guidelines for micro-irrigation are developed • Mechanism is duly operating CMIASP • Replication will be pursued in other ADB- and donor-assisted projects 	<ul style="list-style-type: none"> • Process, impact, and outcome monitoring system of the TA • External poverty impact assessment • Semiannual ADB review missions • Quarterly progress and TA completion reports <p>(Same as above)</p>	<p>Assumptions Local security conditions are conducive to operate the service delivery mechanism.</p> <p>Implementation arrangement is supportive to the innovative grant mechanism.</p> <p>DOI, DOA, MLD, and DWD at central and district levels are committed to poverty reduction of marginalized groups—including low castes and ethnic groups—with gender consideration.</p> <p>Services and funds are properly and timely delivered to beneficiaries, in accordance with grant principles.</p> <p>Efficient grassroots monitoring and communication/feedback system will guide the process.</p>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions And Risks
<p>Outputs</p> <p>1. Operational Arrangements and Training</p> <p>a. Detailed implementation arrangements are set up.</p> <p>b. Capacity of district agencies, local bodies, and local NGOs is enhanced to develop micro-irrigation.</p> <p>2. Demonstration of Program Delivery</p> <p>a. Micro-irrigation group formation</p> <p>b. Delivery of micro-irrigation kits and facilities</p> <p>c. Agriculture and marketing facilitation support</p> <p>d. Micro-irrigation supply chain development</p> <p>3. TA Management and Institutional Strengthening</p> <p>a. TA Management</p> <ul style="list-style-type: none"> • Effective operation of project institutions including line agencies, 	<ul style="list-style-type: none"> • Implementation manual is established and agreed • Training plan is prepared by consultants and implemented with NGO • 200 groups (of 2,500 households) are formed and function with training • GIP and output targets are established • Over 50% women's participation • Members of 200 groups operate micro-irrigation • Groups bear more than 50% of the cost • Groups bear 10% of costs for water acquisition following irrigation and water supply policies • Groups receive services stipulated in GIP • Groups achieve production targets in GIP • Manufacturer–wholesaler–retailer network is established in TA area • Implementation manual regularly improved and applied 	<ul style="list-style-type: none"> • Implementation manual • Process, impact, and outcome monitoring system of the TA • Progress reports • ADB review missions • External reviewers' reports • Process, impact, and outcome monitoring system of the TA • Progress reports by the consultants, NGO, and the Government • ADB review missions • External reviewers' reports • Implementation manual • Process, impact, and outcome monitoring system of the TA 	<p>Assumptions</p> <p>Positive synergies between IDD/IDSD, DADO, and specialized NGOs in micro-irrigation</p> <p>Clear responsibilities and authorities for TA management</p> <p>Staff quality and commitment</p> <p>Assumptions</p> <p>No security issues that obstruct circulation of goods, cash, spare parts, and investments</p> <p>Most vulnerable households are selected, and willing to participate in the program</p> <p>Government staff are sensitive to equitable development, and give sufficient time, inputs, and effort to the TA</p> <p>Appropriate attitudes and commitment of staff for program delivery are in line with implementation manual</p> <p>Manufacturer and dealers are willing to deliver micro-irrigation kits to the project area</p> <p>Assumptions (Same as component 1)</p> <p>No security issues that make survey and monitoring difficult</p>

Design Summary	Performance Targets/Indicators	Data Sources/Reporting Mechanisms	Assumptions And Risks
LGIs, NGOs, and farmer groups		<ul style="list-style-type: none"> Progress reports by the consultants, NGO, and the Government ADB review missions 	
<ul style="list-style-type: none"> Project process and impacts are monitored <p>b. Policy and Institutional Development</p> <ul style="list-style-type: none"> Lessons learned duly documented and contributing to future programs by ADB and others <ul style="list-style-type: none"> Draft policy and guidelines for micro-irrigation development 	<ul style="list-style-type: none"> List of most marginalized and poor households is set up and updated, using appropriate indicators of poverty and vulnerability Project process is duly monitored with specific set process indicators Project impacts and lessons are monitored against GIP targets Feedback and lessons learned from process and impacts are circulated and discussed Similar programs (for micro-irrigation) are taken up by ADB and other donors Draft policy and guidelines are prepared with TA and CMIASP consultants Progress towards finalizing the policy Institutional responsibilities are clarified for MOWR, MOAC, and MLD 	<p>(Same as above)</p> <ul style="list-style-type: none"> Workshops on lessons learned Draft report is prepared with TA consultants and CMIASP consultants. Workshops on draft documents External reviewers' reports 	<p>Monitoring of poverty dimension is considered by all partners as an important exercise to learn, feedback, and improve the programs</p> <p>Local security condition is conducive to implement the TA</p> <p>ADB, consultants, and NGO are active in ensuring feedback at micro, meso, and macro levels</p> <p>Strong ownership and support by the Government to upscale the programs, prepare policy, and reflect the policy and programs in the strategy documents</p> <p>Effective coordination among line departments and LGIs</p>
<p>Activities with Milestones</p> <p>1. By the Government</p> <p>1.1 Set up TA management office in May 2006.</p> <p>1.2 Operate and strengthen project institutions during TA implementation period (2006–2007).</p> <p>1.3 Mobilize counterpart facilities and staff.</p> <p>2. By TA Consultants</p> <p>2.1 Support preparing implementation manual by July 2006.</p> <p>2.2 Provide training to NGOs and counterpart staff by December 2006.</p> <p>2.3 Support policy and institutional development by December 2007.</p>		<p>Inputs</p> <ul style="list-style-type: none"> Support for incremental operational cost: \$20,000 Vehicle and equipment (for NGO use during the TA): \$15,000 Counterpart facilities, staff, and resources: \$100,000 17 person-months of domestic consultants: \$60,500 Monitoring: \$15,000 Studies, workshop, and seminars: \$9,000 Miscellaneous costs: \$3,200 	

Activities with Milestones	Inputs
2.4 Undertake TA monitoring	
3. By Selected NGO 3.1 Support training of Government staff in 2006 3.2 Identify and form stakeholder groups by October 2007 3.3 Facilitate micro-irrigation equipment delivery up to November 2007 3.4 Facilitate water acquisition works up to November 2007 3.5 Provide and arrange agriculture and marketing training up to November 2007 3.6 Arrange micro-irrigation kit supply chain development training up to November 2007 3.7 Record and report progress in 2006-2007	<ul style="list-style-type: none"> • 39 person-months of NGO staff: \$58,600 • Training and facilitation: \$123,600 • Micro-irrigation pilot (promotion grant): \$16,500 • Micro-irrigation pilot (no interest loan): \$55,000 • Pilot water acquisition: \$5,000 • Miscellaneous cost: \$25,800
4. By Project Beneficiaries 4.1 Participate in programs in 2006-2007 4.2 Purchase micro-irrigation equipment with revolving fund in 2006-2007 4.3 Provide labor and cash for water acquisition works in 2006-2007 4.4 Operate micro-irrigated agriculture starting 2006	<ul style="list-style-type: none"> • Micro-irrigation kits and agriculture inputs: (\$93,500 self financing, of which \$55,000 is provided as no interest loan through the NGO)
Total TA Cost	<ul style="list-style-type: none"> • Contingencies \$42,800 Total \$550,000

ADB = Asian Development Bank, CMIASP = Community-Managed Irrigated Agriculture Sector Project, DADO = District Agriculture Development Office, DOA = Department of Agriculture, DOI = Department of Irrigation, DWD = Department of Women Development, GIP = group implementation plan, HDI = human development index, IDD/IDSD = Irrigation Development Division/Subdivision, LGI = local government institution, MLD = Ministry of Local Development, MOAC = Ministry of Agriculture and Cooperatives, MOWR = Ministry of Water Resources, NGO = nongovernment organization, PRCF = Poverty Reduction Cooperation Fund, TA = technical assistance.

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Foreign Exchange	Local Currency	Total Cost
A. Poverty Reduction Cooperation Fund Financing^a			
1. Consultants and NGO			
a. Remuneration and Per Diem ^b	0.0	110.0	110.0
b. Local Travel	0.0	9.0	9.0
c. Reports	0.0	4.0	4.0
2. Equipment			
a. Vehicle (four-wheel drive for field activities) ^c	13.0	0.0	13.0
b. Office Equipment and Supplies ^d	2.0	1.0	3.0
3. Pilot			
a. Microirrigation Kits (grant and no-interest loan) ^e	0.0	49.0	49.0
b. Agriculture Kits (no-interest loan) ^f	0.0	22.0	22.0
c. Water Acquisition Facilities	0.0	5.0	5.0
4. Training, Seminars, and Conferences			
a. Facilitators	0.0	88.0	88.0
b. Training Program	0.0	42.0	42.0
c. Workshops and Seminars	0.0	2.0	2.0
5. Studies, Surveys, and Monitoring	5.0	15.0	20.0
6. Miscellaneous Administration and Support	0.0	40.0	40.0
7. Contingencies	2.0	41.0	43.0
Subtotal (A)	22.0	428.0	450.0
B. Government of Nepal Financing			
1. Office Accommodation and Transport ^g	0.0	55.0	55.0
2. Counterpart Staff (regular remunerations)	0.0	25.0	25.0
3. Data and Information	0.0	20.0	20.0
Subtotal (B)	0.0	100.0	100.0
Total	22.0	528.0	550.0

NGO = nongovernment organization.

^a Administered by the Asian Development Bank (ADB).

^b Includes \$5,000 remuneration to be provided to two Kathmandu-based international experts to participate in external advisory group of the technical assistance.

^c To be purchased by ADB, used for technical assistance (TA) by nongovernment organization (NGO) (in Central or Eastern region) and handed over to Department of Irrigation after completion.

^d Includes computer and peripherals, software, office furniture, and supplies

^e Rs500 per household as promotion grant, and up to Rs1,000 provided as no-interest loans. After TA completion, the recovered loans will be handed over to the NGO for follow-on support services to be agreed with the Government and ADB.

^f Agro-seed-fertilizer package.

^g Including one vehicle for the consultants, and one vehicle for NGO (in Eastern or Central region).

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS AND NONGOVERNMENT ORGANIZATION

A. Consultants

1. A team of individually recruited domestic consultants aims to support the Government, local government institutions, and a nongovernment organization (NGO) to develop and implement effective service delivery mechanisms for micro-irrigation and support services (by the private sector); along with the necessary programming, coordination, facilitation, and technical backstopping functions of the public organizations. The consultants will (i) undertake detailed review of the ongoing micro-irrigation programs, (ii) support the preparation of the implementation manual for the technical assistance (TA), (iii) periodically review the performance of the service delivery provided by the selected NGO, and (iv) advise on their implementation. The consultants will also organize (i) an external advisory group comprising two Kathmandu-based international and one local expert to review and advise on the TA;¹ and (ii) external monitoring, including TA impacts, through subcontracted NGOs. They will also prepare a draft policy and implementation guidelines for micro-irrigation. A series of workshops and seminars will be arranged to obtain feedback from local and international experts in Kathmandu. A total of 17 person-months of domestic consultants will be engaged, whose outline terms of reference are shown below.

1. Team Leader and Micro-irrigation Project Management Specialist (domestic, 6 person-months)

2. The consultant will have expertise in project planning, management, and monitoring and evaluation for micro-irrigation and agriculture development. The consultant—as team leader (TL) of the consultant team—will

- (i) Formulate an overall work plan and programs for the TA, together with the NGO.
- (ii) Provide overall direction, coordination, and management of the consultants' team, as well as coordination with the NGO, counterpart staff, and the Asian Development Bank (ADB).
- (iii) Review progress, performance, and issues of the previous and ongoing micro-irrigation and associated agriculture and other programs, and prepare a compact report that synthesizes key issues and lessons reflected in the TA.
- (iv) Guide and advise the NGO in preparing the TA implementation manual, and arranging an inception workshop and an external advisory review.
- (v) Train the NGO staff, local training institutions, line departments, district development committee (DDC) and village development committee (VDC) staff, local NGOs, and other private providers, in micro-irrigation program delivery, including equipment supply chain development and operation and maintenance (O&M).
- (vi) Together with Department of Irrigation (DOI) and Department of Water Supply and Sanitation (DWSS) staff, review the designs of the water acquisition facilities being implemented under ongoing programs, including hybrid water supply-cum-irrigation system, and support preparation of a design manual.
- (vii) Design a framework for performance monitoring indicators and data collection arrangements, and arrange and supervise monitoring by the subcontracted NGO(s).

¹ Four days of inputs will be provided at inception and midterm stages to advise on the implementation approach and performance.

- (viii) Periodically review and report on the TA implementation, in terms of capacity development of the parties concerned, institutional and physical progress, performance of the beneficiary groups, and preliminary impacts.
- (ix) Undertake an in-depth review of the TA performance at the end of the TA period, and prepare a TA completion report, along with the implementation manual for the Community-Managed Irrigated Agriculture Sector Project (CMIASP) micro-irrigation subcomponent.
- (x) Assess the financial management and technical capacity of the NGO to provide follow-on support services for agriculture extension and micro-irrigation O&M, using the recovered non-interest loans; assist the NGO in preparing the work plan to this end, acceptable to ADB and the Government (to be confirmed through a signed memorandum of understanding stipulating procedures, and internal controls in fund administration and management); and provide necessary training.
- (xi) Assist the policy and institutional specialist in preparing a draft policy and implementation guidelines for micro-irrigation agriculture development.
- (xii) Arrange a final workshop to present and discuss the draft TA completion report and draft policy and implementation guidelines, while arranging for an external advisory review, and culminate their outcome as final TA output.

2. Social Mobilization and Gender Specialist (domestic, 4 person-months)

3. The consultant will have experience in beneficiary mobilization of micro-irrigation projects having emphasis on participation of women and other vulnerable groups. The consultant will

- (i) Assist the TL in the draft micro-irrigation review report and draft TA implementation manual, covering the gender development and social mobilization aspects, while ensuring that the program delivery will focus on the most disadvantaged ethnic minority and dalits (low occupational castes).
- (ii) Impart training to the NGO staff, line departments, DDC and VDC staff, and local NGOs—in particular, identification of beneficiaries, group formation and training, organizational management, revolving fund management, and follow-on supports.
- (iii) Assist the TL to set up performance monitoring indicators while ensuring and supervising that the TA establishes gender, ethnicity, and caste disaggregated monitoring.
- (iv) Assist the TL, while covering gender and social mobilization aspects, in (a) reviewing and reporting on the performance of the TA, (b) disseminating the periodical review findings, and (c) undertaking an in-depth TA completion review.
- (v) Assist the policy and institutional specialist in preparing a draft policy and implementation guidelines for micro-irrigation agriculture covering gender and social aspects.

3. Agriculture and Extension Specialist (domestic, 4 person-months)

4. The consultant will have experience in agriculture development support for rural areas to support high value crop promotion. The consultant will

- (i) Assist the TL in the draft micro-irrigation report and draft TA implementation manual, covering agriculture development aspects, while ensuring that the TA will include necessary marketing assessment, critical extension, and marketing facilitation.

- (ii) Impart training to NGO staff, line departments, DDC (including District Agriculture Development Office [DADO] and its field staff) and VDC staff, local NGOs, and agrovets in subjects mentioned in (i) above.
- (iii) Assist the TL to set up performance monitoring indicators while ensuring and supervising that the TA establishes monitoring for necessary agriculture indicators.
- (iv) Assist the TL, while covering agriculture development aspects, in (a) reviewing and reporting on the performance of the TA, (b) disseminating the periodical review findings, and (c) undertaking an in-depth TA completion review.
- (v) Assist the policy and institutional specialist in preparing a draft policy and implementation guidelines for micro-irrigation agriculture development covering agriculture development aspects.

4. Policy and Institutional Specialist (domestic, 3 person-months)

5. The consultant will have sufficient experience in preparing, reviewing, and/or advising on policies and strategies for the irrigation and agriculture sector. The consultant will

- (i) Review draft micro-irrigation review report prepared by the TL, and help the TL prepare a draft TA implementation manual, in particular in defining the institutional responsibilities of the agents concerned in the TA program delivery.
- (ii) Prepare a report synthesizing key policy and institutional issues for the TA, including immediate, and medium-term issues for inclusion in the micro-irrigation review report.
- (iii) Assist and facilitate the Government in preparing a draft policy and implementation guideline for micro-irrigation, specifying policy objectives, implementation strategy, institutional responsibilities, beneficiary financing arrangements (for water acquisition and on-farm equipment), programming, and monitoring and evaluation.
- (iv) Present and discuss the draft documents at the national workshop and external advisory review, and reflect the outcome in the outputs.

B. NGO Services

6. NGO services are required to operate effective delivery mechanisms for micro-irrigation and associated support services. At the outset, the NGO will prepare, with the support of the consultants, the implementation manual for the micro-irrigation program delivery, which will specify implementation procedures, arrangements, and institutional responsibilities. Based on this, the NGO will support the capacity development of the local partner NGOs and private providers. They will then deliver specific and relevant services to the local beneficiaries, including (i) group identification (with VDCs); (ii) group motivation, formation, and training; (iii) development of supply chain for micro-irrigation equipment; (iv) facilitation of equipment delivery; (v) arrangement and/or delivery of agriculture extension and marketing facilitation services; and (vi) monitoring and support. A cluster coordinator will be assigned in each district cluster of the TA who will arrange for or deliver designated services. The NGO will also establish and operate effective management information systems, based on which a quarterly progress report will be prepared. A total of 39 person-months of national NGO services will be engaged under the TA. The specific activities of the individual NGO staff are explained below.

1. Team Leader/Micro-irrigation Agriculture Specialist (domestic, 18 person-months)

7. The specialist will have expertise in planning, management, and monitoring for micro-irrigation and agriculture development. The specialist—as team leader (TL) of the NGO—will

- (i) Formulate an overall work plan and programs for the TA, and provide overall direction, coordination, and management of the NGO team, as well as coordination with consultants, counterpart staff, and ADB.
- (ii) Prepare the TA implementation manual and finalize it, reflecting the discussions in the inception workshop and an external advisory review.
- (iii) Impart training to field staff of line departments, DDC and VDC staff, local NGOs, and other private providers—in particular, micro-irrigation program delivery, including equipment supply chain development and O&M.
- (iv) With the social development specialist, plan, arrange for, and supervise the process of group identification with an information and awareness campaign; and group motivation, formation, and training, including financial management of revolving fund.
- (v) With the irrigation marketing specialist, arrange for and supervise identification and training of micro-irrigation equipment manufacturers, wholesalers, and retailers.
- (vi) With the water engineering specialist, and in consultation with DOI and DWSS, design, arrange for, and supervise the installation of the water acquisition facilities.
- (vii) With the agriculture development specialist, plan, arrange for, and supervise (a) villager information campaign about the marketing opportunities; (b) farmer training of micro-irrigation equipment installation and O&M; (c) agriculture extension training; (d) training of agro-vets on micro-irrigation practices and needs; and (e) agriculture marketing facilitation with local dealers.
- (viii) Establish and operate management information system encompassing baseline data, implementation-related issues, and impact monitoring, based on which quarterly progress reports are prepared, including performance review and lessons.
- (ix) Prepare a program completion report covering physical and institutional progress, baseline and impact survey data, effectiveness in process and management (including performance of individual institutions), and lessons.
- (x) Provide feedback to the consultants' reports, including the micro-irrigation review report, periodical review reports, TA final report, draft policy and implementation guidelines for micro-irrigation, and implementation manual for CMIASP micro-irrigation subcomponent.

2. Gender and Social Mobilization Specialist (domestic, 7 person-months)

8. The specialist will have sufficient experience in beneficiary mobilization of micro-irrigation projects that promote participation of women and other vulnerable groups. The specialist will

- (i) Assist the TL to prepare draft TA implementation manual covering the gender development and social mobilization aspects while ensuring that the TA program delivery will focus on the most disadvantaged ethnic minority and dalits.
- (ii) Impart training to the field staff of line departments, DDC and VDC staff, local NGOs, in particular gender and social development-related activities.
- (iii) Coordinate effectively with staff of district women development section and DDC and VDC staff concerned, and arrange for their monitoring and/or participation for the TA program activities.
- (iv) Assist the local NGO field workers to plan, arrange for, and supervise information campaign; group identification, motivation, and formation including identification and training of community facilitator; and training including organizational management and financial management of revolving fund, and follow-on support activities.

- (v) Support the local NGO works for such follow-on support as (a) strengthening willing groups to form cooperatives, and (b) identifying and networking with possible micro-finance institutions that can deliver micro-credit facilities to the groups.
- (vi) Support other relevant activities of the TL.

3. Agriculture Development Specialist (domestic, 7 person-months)

9. The specialist will have substantial experience in agriculture development support for rural areas (in marketing assessment, extension support in plant protection, soil and fertilizer management, integrated pest management, etc.) The specialist will

- (i) Assist the TL to prepare draft TA implementation manual covering agriculture development aspects while the TA program ensures inclusion of necessary marketing opportunity assessment, critical extension services, networking with local agriculture service centers and agro-vets, and marketing facilitation services.
- (ii) Impart training to the field staff of line departments, DDC and VDC staff, and local NGOs, in particular agriculture and related activities.
- (iii) Coordinate effectively with staff of DADO and DDC and VDC staff concerned, and arrange for their monitoring and/or participation for the TA activities, including the mobilization of incremental operational budget.
- (iv) Assist local NGO staff to plan, arrange for, and supervise the activities for (a) villager information campaign about the marketing opportunities; (b) farmer training of micro-irrigation equipment installation and O&M (with micro-irrigation marketing staff); and (c) agriculture extension in plant protection, soil and fertilizer management, integrated pest management, etc.
- (v) Support local NGOs for establishing effective linkages between the beneficiary groups, DADO and field extension staff, local agro-vets, and output marketing agents.
- (vi) Assess and identify marketing opportunities of high-value crops and support local NGOs to inform and promote beneficiary groups for their adoption, and link up with local product dealers.
- (vii) Support other relevant activities of the TL.

4. Water Engineering Specialist (domestic, 7 person-months)

10. The specialist will have expertise in designing and implementing rural small-scale water supply and irrigation systems. The specialist will

- (i) Impart training to DDC and VDC staff, and local NGOs as to the planning, design, implementation, and O&M of water acquisition facilities.
- (ii) Support local NGO staff in participatory design, beneficiary mobilization and implementation, and O&M training of water acquisition facilities, through local NGOs and/or private providers, following the design guidelines provided by the consultants.
- (iii) Coordinate effectively with field staff in charge of water supply and irrigation systems in DOI, DWSS, and DDC, and arrange for their monitoring and/or participation for the TA program activities, including mobilization of incremental operational budget while facilitating the design coordination between relevant staff.
- (iv) Support other relevant activities of the TL.

LESSONS LEARNED FROM MICRO-IRRIGATION IN NEPAL

1. Specific lessons learned through earlier micro-irrigation interventions are as follows:¹
 - (i) Micro-irrigation technologies are adapted to the increasing fragmentation of farm holdings of Nepal and to the low level of financial and technical assets of poor farmers, to improve both capital (land and crop) and labor (profit) productivity, and to save time (compared with manual watering), water (increase water use efficiency), topsoil (less run-off and more progressive percolation) and fertilizer (crop specific application and better controlled destination).
 - (ii) Micro-irrigation technologies can benefit marginalized and very poor groups, including ethnic groups, low castes, and women-headed households.
 - (iii) With micro-irrigation, farmers tend to adopt more inputs such as fertilizer, improved varieties, and pesticides, and are able to increase the value of their production through *bari* land (traditional rainfed upland) intensification (from 100% to 250%), yield increase (+ 25–35%), and crop diversification.
 - (iv) When landholding size is below 0.05–0.08 hectares (ha) per household member, micro-irrigation may not bring notable change in the economic status of the household, but will improve the family's food security (food quality and security of harvest), and capital and labor productivity.
 - (v) When landholding size is above 0.1 ha per family member, adopters of micro-irrigation develop a high-value cropping system with the sale of the surplus to local markets, and some are able to switch from a survival strategy to an accumulation strategy (poverty reduction).
 - (vi) For marginalized rural groups living in chronic poverty, financial assistance, in terms of collateral-free low interest loan or subsidy, is needed to meet their upfront contribution.
 - (vii) To promote micro-irrigation for poverty reduction on a wider scale, four factors have to come together: (a) national policy for the promotion of micro-irrigation technologies (for small landholders and marginal farmers); (b) identification, adaptation, and application of appropriate micro-irrigation technologies (research and development approach with Government, institutes, and nongovernment organizations [NGOs]); (c) financing for the implementation of these technologies; and (d) institutional arrangement for the implementation of these technologies.
 - (viii) In rural areas, development practices should target robust mobilization of the people.

¹ These are extracted from (i) Human Resource Development Center. 1999. *Impact Assessment of Drip Irrigation System*. International Development Center (IDE) Nepal: Kathmandu; and International Water Management Institute. 2003. *Improving Water Productivity: How do we get more crop per drop?* Water Policy Briefing. India; (ii) Gurung, J.B. and C.R. Gurung. 1999. *Socio-economic profiles, situation of high value crops (vegetables) and baseline information of IDE's proposed sites for research of low-cost water storage tanks*. IDE Nepal: Kathmandu; (iii) Gurung, J.B. 2000. *Preliminary impact assessment of low-cost water storage structures in Tanahum and Kaski districts*. IDE Nepal: Kathmandu; (iv) Support Activities for Poor Producers (SAPPROS)/World Bank. 2000. *Delivery of rural development services: a comparative assessment of alternative institutional arrangements with a focus on the Terai*. Kathmandu; (v) SAPPROS/International Fund for Agriculture Development, 2002. *Delivery of rural development services: a comparative assessment of alternative institutional arrangements with a focus on the Hills and Mountains*. Kathmandu; (vi) RITI Consultancy. 2002. *Household Survey and Analysis on Poverty Focused Small Holder Management Technologies: An Assessment of IDE Nepal's Low Cost Drip Irrigation Technology*. International Water Management Institute; and (vii) Shrestha, R.B. 1992. *Adoption and Diffusion of Drip Irrigation Technology: An Econometric Analysis. Economic Development and Cultural Change*. Volume 41, Number 2. The University of Chicago, USA.

- (ix) Strong organization of the beneficiaries is a prerequisite for the efficiency and sustainability of any program.
- (x) Programs addressing the real felt needs of communities, and performed with their active participation, are effective and sustainable.
- (xi) Two studies undertaken by Support Activities for Poor Producers (SAPPROS), with the support of the World Bank in Terai and International Fund for Agriculture Development in the hills, show that models using NGOs or community-based organizers (CBOs) are usually the most efficient and sustainable due to the continuous involvement of the users.
- (xii) The capital cost and operating cost of locally adapted technologies (drip, micro-sprinklers, and harvesting tanks) are usually affordable by farmers, but the availability of spare parts and attached operation and maintenance and cash crop training are not always sufficient or appropriate.
- (xiii) Short land to house distance and short distance to water source are important dimensions of motivation, monitoring, and sustainability for micro-irrigation use.
- (xiv) Availability of labor for intensive cultivation, farmer awareness about vegetable farming, and availability/accessibility of local markets are important conditions of success.
- (xv) To build district level capacity to support micro-irrigation projects in a sustainable manner, the District Agriculture Development Office would need to establish a coordination unit in collaboration with the Irrigation Development Division/Subdivision of the Department of Irrigation and Women Development Section of district development committees, and work through the network of NGOs experienced in micro-irrigation and through inputs providers interested in collaborating (such as agro-vets).
- (xvi) Based on these lessons learned, the following priority actions may be recommended to develop micro-irrigations:
 - (a) Promote NGO/CBO model of implementation.
 - (b) Create micro-irrigation development fund.
 - (c) Allocate supplementary budget for micro-irrigation.
 - (d) Establish research grant for small-scale irrigation.
 - (e) Change irrigation policy in favor of the poor.