SECTOR ASSESSMENT (SUMMARY): IRRIGATION
Nepal: Community Irrigation Project

A. Sector Performance, Problems, and Opportunities

1. Agriculture is Nepal's primary economic sector, with about 80% of the population dependent upon it. Nepal's poverty reduction strategy recognizes that agricultural growth is essential for attaining broad-based growth and improving the livelihoods of most Nepalese. Agriculture in Nepal depends largely on monsoon rains from June to September, when 75% of annual rainfall occurs. Regulated and controlled irrigation is therefore critical to improving agricultural productivity, particularly in the long dry season, but also during dry spells in the wet season that can reduce crop yields.

2. Of the 2.60 million hectares (ha) of land under cultivation, 1.80 million ha is irrigated, of which 1.40 million ha lies on the Terai, or plains. The remaining 0.40 million ha is in river valleys, upland valleys, and terraces on hills and mountains. Typically 70% of the command areas of surface water irrigation infrastructure is actually irrigated, with only 38% of irrigated land irrigated year round. Farmers manage 75% of irrigated areas, and the Department of Irrigation manages the remaining 25%. Groundwater irrigation, mainly through shallow tube wells (STWs), has become important since the late 1970s, primarily on the Terai. Groundwater is underutilized for irrigation, as only an estimated 0.25 million ha is irrigated using groundwater. This is only a quarter of the 1 million hectares of Terai that could be developed for groundwater irrigation. The government's groundwater resources assessment estimates that less than 20% of the annual groundwater reserve is used for irrigation or domestic or industrial purposes.

3. A study in 2005 on irrigation and poverty showed that the incidence of poverty in irrigated areas is half that in rain-fed areas and that access to irrigation water mitigates poverty. Moreover, small irrigation systems are more effective than medium-sized or large systems in helping poor communities because (i) disparities between head and tail reaches are lessened in small systems and (ii) using groundwater allows poor farmers to control water and immediately ensure reliable supply. Small-scale irrigation, defined by the government's irrigation policy as command areas smaller than 25 ha in the hills and mountains and 200 ha on the Terai, has not been a focus of government assistance but is an important subsector for poverty reduction. Targeting smallholder farmers and influencing their land and water management offers the greatest opportunity for reducing poverty quickly.  

4. Sector experience has shown that investing in new systems and rehabilitating existing ones bring only small productivity improvements with modest impact on cropping intensity and diversification toward higher-value crops if no special attention is paid to (i) improving water distribution and efficiency; (ii) strengthening water user associations (WUAs), including gender and disadvantaged group empowerment; and (iii) improving operation and maintenance (O&M), including cost recovery. O&M is often poor, particularly in agency-managed systems. It is widely recognized that deriving the full benefit from irrigation investments requires good design and construction quality combined with post-construction support to WUAs and farmers for O&M and integrating improved agricultural and water-management practices. Based on lessons learned in other irrigation projects, the Community Irrigation Project (the project) will strengthen WUAs to more equitably and efficiency manage scarce water supplies through such measures as

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reducing uncontrolled water off-take by farmers in the head reach, constructing water distribution structures, and introducing or improving rotation of the irrigation supply among farmers, especially during the dry season. Micro-irrigation technologies such as drip and sprinkler systems will be encouraged for more efficient field application. Agricultural extension will emphasize growing fewer crops that have high water needs in periods of water scarcity. The project will match WUA contributions to a fund for non-recurrent maintenance costs.

5. Projects that directly address the special requirements of women and disadvantaged groups strengthen their impact on poverty. While the government encourages women's participation in irrigation and targets having women occupying one-third of the seats on WUA committees, there is still significant gender inequality in irrigation management decision making, and more advantaged farmers still dominate WUAs. Disadvantaged stakeholders need to be identified during subproject design and targeted for coaching and skill development to ensure their meaningful participation.

6. Although irrigation investments have not always achieved the expected impacts, the sector retains its potential to improve the country's agricultural productivity and food security, as well as the incomes of poor rural households. Once irrigation is available, farmers are generally less reluctant to invest in improved production practices and applying required inputs, as the risk of crop failure due to water deficiency is alleviated. For low-income households, higher production will increase household food security and cash incomes through the sale of small quantities of cash crops.

B. Government's Strategy, Policies, and Capacity

7. Agriculture sector strategy. The government's sector strategy comprises of a range of plans to comprehensively address agricultural and rural development issues, as included under its 20-year Agricultural Perspective Plan (APP) of 1995. The APP emphasizes (i) controlled year-round irrigation, (ii) facilitated fertilizer supply, (iii) the expanded provision of modern inputs and need-based research and extension, (iv) potential production pockets linked with markets through rural agricultural roads, and (v) expanded rural electrification. The Ninth Plan, from July 1997 to July 2002, built on the APP and viewed development in terms of economic liberalization, increased investment, and poverty reduction. The Tenth Plan, from July 2002 to July 2010, identified as the main challenge the need to break out of the vicious poverty cycle. The APP and the ninth and tenth plans accorded high priority to developing groundwater irrigation, as it provides year-round irrigation on demand.

8. The integrated approach combining irrigation development with agricultural support and market development remains the key for successful sector investments. Because a single agency is unable to offer the whole range of services required by farmers, the Nepal Agricultural Extension Strategy of 2007 envisages public sector extension services working hand in hand with the private sector, nongovernment organizations (NGOs), and community-based organizations.

9. Policy and capacity for small-scale irrigation. Nepal's Irrigation Policy of 2003 has the following broad objectives: (i) year-round irrigation; (ii) strengthened WUAs for the sustainable management of existing systems; and (iii) enhanced knowledge, skills, and institutional capability for all working in the subsector, including government staff, WUAs, and NGOs. The policy clearly states that the development of large and medium-sized projects is the responsibility of the Department of Irrigation. Both the Irrigation Policy and the Local Infrastructure Development Policy of 2004 call for small irrigation systems to be implemented by WUAs and “local bodies,” which are defined as district and village development committees.
(DDCs and VDCs). DDCs and VDCs are considered to be autonomous, and the policies do not specify which line agencies should assist them in irrigation development. The Local Infrastructure Development Policy specifies that DDCs should each establish seven technical units, including one for irrigation and flood control. Until such time, district technical offices (DTOs) staffed by engineers on deputation from the Ministry of Local Development (MLD) and the Department of Local Infrastructure Development and Agricultural Roads (DOLIDAR) will perform technical functions for DDCs. However, the government has taken no concrete measures to collaborate with or enable DDCs to undertake small-scale irrigation development, and DTOs have little or no experience in irrigation development. Small, farmer-managed irrigation systems have received minimal public support.

10. The Asian Development Bank (ADB) has supported the government in determining institutional arrangements for small-scale irrigation development. In support of the government’s decentralization policies, either DOI or DOLIDAR could serve as the executing agency to support DDCs and VDCs in implementing the project. During project preparatory technical assistance for the project, a decentralization working group with representatives of government ministries and agencies and the national associations of DDCs and VDCs debated all issues and recommended the approach for the project in particular and small irrigation projects in general. They determined that (i) VDCs will manage the selection of subprojects; (ii) DDCs will choose the project areas, endorse subproject selection, manage subproject funds, and coordinate subproject implementation; and (iii) one new district irrigation engineer should be employed in the DTO to approve subproject designs, supervise construction, and oversee expenditures on subproject civil works. On 26 April 2010, the project steering committee endorsed these implementation arrangements and named the MLD as the executing agency for the project.

11. **Policy on groundwater development.** In 2000, through the ADB-supported Second Agriculture Program, the government eliminated the capital cost subsidy for STW development, noting that subsidies (i) constrained its budgetary resources, (ii) restricted the growth of private traders and contractors that provide irrigation equipment, (iii) were used to a significant extent to pay customs duties and taxes on imported engines and pump sets, and (iv) benefited better-off farmers rather than the poor. The Irrigation Regulation of 2006 includes the statement that the costs borne by WUAs shall not be more than 15% or less than 3% and a footnote that states that the cost of STW construction shall be borne by WUAs.

12. The ADB-supported Community Groundwater Irrigation Sector Project (CGISP)\(^3\) from 1999 to 2007 operationalized the policy of not subsidizing capital costs by requiring farmers to cover the costs of STW installation, including drilling and buying piping materials and pump sets. The CGISP provided indirect subsidies to STW clusters in the form of social mobilization and WUA institutional strengthening, technical support for STW construction, agricultural extension services, road improvements, and microfinance services. Both the government and its development partners concluded that the CGISP approach achieved better results than subsidized programs when combined with packages of appropriate support services. Farmers were able to repay their loans within 1–2 years. The government's own APP shallow tube well development program provides a farmer-support program if farmers agree to install STWs at their own cost, up to a ceiling of NRs830,000 per 50 ha cluster. The cluster of farmers may choose what project resources to cover: electrification, pump sheds, community cold store, and/or the improvement of roads or cross-drainage infrastructure.

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\(^3\) ADB. 1998. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the Kingdom of Nepal for the Community Ground Water Irrigation Sector Project.* Manila.
13. Since 2006, however, several projects providing minor STW development have provided some direct assistance to farmers for STW construction. Two of these projects may be classified as relief programs for which direct support can be justified. However, ADB’s policy dialogue with the government and other development partners indicates that there is a general lack of ownership for the policy of no subsidies, particularly regarding assistance programs for poor farmers, and this causes inconsistency in policy application. Nonetheless, the project will continue to adhere to the no-subsidy policy for STW installation while providing full indirect support for electrification, microfinance services, social mobilization, and agricultural extension. STWs have proven to be high-return investments, and it has been demonstrated that poor farmers are able to make that investment, if they are provided with microcredit and group mobilization support, and to pay back loans. These will be focal areas of the project.

C. ADB Experience and Assistance Program

14. ADB and the World Bank have been Nepal’s principal international partners for irrigation development. ADB has approved nine investment projects totaling $160 million, and the World Bank has approved since the 1970s 13 projects totaling $355 million for irrigation. In addition, both institutions have provided credit for small-scale irrigation as components of integrated rural development projects. ADB’s Community-Managed Irrigated Agriculture Sector Project (CMIASP) and the World Bank’s Irrigation and Water Resources Management Project are the major ongoing projects in the irrigation subsector. Since 2006, the Government of Switzerland has emphasized assistance to small-scale surface water irrigation, approving CHF1.7 million in grant support.

15. Between 2002 and 2009, five ADB-supported projects in the agriculture sector were completed, including three in irrigation. Project completion reports rated three as successful and two as partly successful. Project performance evaluation reports prepared by the Independent Evaluation Department were produced for three of these projects, all with successful ratings (including one that had previously been deemed only partly successful). The experience gained by ADB and other partners in the sector demonstrates that (i) meaningful participation requires substantial capacity building, (ii) integrating agriculture and water-management interventions increases benefits, and (iii) a more comprehensive approach is required to maximize benefits from improved agricultural water management. Water is only one input among many; institution development and capacity building are equally important, as are agricultural inputs and marketing. NGOs are generally better at working with farmers to increase the productivity of farmer-managed irrigation systems. Farmers are willing to contribute cash or labor as needed for both capital expenditure and group-managed O&M.

16. ADB’s approach to the irrigation sector continues to be multipronged. It aims to (i) empower government agencies to play facilitative roles, (ii) incorporate participatory subproject planning to empower WUAs and communities, (iii) provide complementary support for agricultural extension, and (iv) support effective and sustainable on-farm water-management and O&M. ADB-supported initiatives harness the services of the private sector and NGOs to strengthen WUAs and provide agricultural livelihood development services. Through the CMIASP, ADB continues to assist the government in rehabilitating and extending medium-sized, farmer-managed surface water irrigation systems. The project will support the institutional strengthening action plan of MLD and DOLIDAR by building country capacity for small-scale irrigation development in accordance with the government’s decentralization mandate.

4 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.
Problem Tree for Small-Scale Irrigation

Small and marginal farmers cannot achieve productivity and livelihoods commensurate with agricultural potential...

Unreliable or no access to irrigation water and improved agricultural techniques

Deferred maintenance and/or damaged irrigation infrastructure
- Eroded social cohesion
- Natural Disasters
- Out migration of labor

No cash to build new or repair damaged irrigation infrastructure
- No collective savings
- No public programs for small irrigation

Inadequate access to agricultural productivity knowledge, skills, and inputs
- Inadequate sources for production loans
- Agencies not structured to work with poor, marginal, and remote farmers
- Unreliable or no irrigation

Government policy restrictions
- District development committees do not have financial and technical resources for small irrigation
## Agriculture and Natural Resources Sector Results Framework, 2010–2012

### Country Sector Outcome

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<th>Outcomes with ADB Contributions</th>
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<td>Increased agricultural income and employment opportunities with an emphasis on poor and socially excluded groups</td>
<td>Area under year-round irrigation increased from 41% in 2009 to 42% in 2012</td>
<td>Higher agricultural productivity</td>
<td>Cropping intensity increased by 12% from baseline of 193%</td>
<td>(i) Planned Key Activity Areas</td>
<td>30,700 hectares of new and improved irrigation command area</td>
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<td>Diversified and commercialized agricultural production</td>
<td>Agricultural GDP per capita increased by 11% by 2012 from current NRs8,505</td>
<td>Sustainable rural infrastructure in place</td>
<td>50% of irrigation subprojects pass post-construction technical audit</td>
<td>Increased agricultural productivity, crop diversification, and commercialization</td>
<td>Establishment of HVC agribusiness value chains in 22 districts</td>
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<td>Social, political, and economic empowerment of women and other socially excluded groups</td>
<td>Expansion of area under commercial crops increased by 11% by 2012 from the current 771,481 hectares</td>
<td>Stronger enabling environment and institutional framework to deliver services with accountability</td>
<td>At least 25% of farmers with direct access to extension services and agricultural inputs are women or members of socially excluded groups by 2012</td>
<td>Improved access to agricultural inputs and markets through investments to expand irrigation systems</td>
<td>Incomes of beneficiaries increased by at least 20%</td>
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### ADB Sector Operations

- **(i) Planned Key Activity Areas**
  - Community Irrigation Project ($36.8 million)
  - Highland Mountain Agribusiness and Livelihood Improvement Project ($90.3 million)
  - Decentralized Rural Infrastructure and Livelihood Project ($25 million)

- **(ii) Projects**
  - Raising Small and Medium-Sized Farmer Incomes Project ($33.7 million)
  - Export of HVC increased by 16%

- **(iii) Ongoing Projects**
  - 13,700 hectares of improved irrigation command area

### Notes

- ADB = Asian Development Bank, GDP = gross domestic product, HVC = high value crop.