

Government of Nepal  
Ministry of Irrigation  
**Department of Irrigation**



**Brief Project Proposal**

**On**

**Innovative and Climate Resilient Irrigated Agriculture Project (ICRIAP)**

**June 2017**

## 1. Background

Nepal is located in the Himalayan region with harsh mountain topography except for its southern part consisting of a narrow strip of flat land on the northern part of the Indo-Gangetic plains called the Terai region. The nation's total land area is 147,000 sq. km. with a population of 27 million. The per capita GDP is \$ 690 (Dec, 2015) and 21.6 % (NPC-2016) of the population is below the poverty line. The growth of agriculture, the inflow of remittances, and the wider coverage of social protection schemes has resulted in poverty reduction to this level.

After a devastating earthquake in April 25, 2015, the country recorded the weakest economic growth rate of 0.77 % (NPC-2016) in 14 years. According to the government report this national crisis has pushed an estimated one million rural people below poverty line. However, the GDP growth rate reached up to 7.2% in the current fiscal year, which is considered the third highest in the world, which clearly shows a favorable environment for development activities in the field level.

The overall development goal of the Government of Nepal (GoN) is to attain poverty reduction through sustainable, inclusive and equitable growth. In the current (2016/17-2018/19) Three Year Plan ending in July 2019 the GoN stresses employment generation, infrastructure development and agriculture as the engines for development. Nepal is trying to achieve the Sustainable Development Goals (SDGs) by incorporating them in the three-year plans and annual budgets.

Agriculture is the mainstay of the Nepalese economy. It contributes 33% of GDP, provides employment for 66 % of the population, and 50% of export earnings is based on agriculture. The only way to produce more food for the nation's increasing population is by providing better agricultural support. Modern agricultural practices require inputs such as crop diversification, high yielding varieties, fertilizers, mechanization and reliable water supply to agricultural fields, together with extension services, storage, processing, and marketing support.

The Department of Irrigation (DOI) is the prime organization of GoN to plan, develop, maintain, operate, manage and monitor different modes of environmentally sustainable and socially acceptable irrigation and drainage systems. Of the country's total area of 14.72 million hectares only 2.64 million ha is cultivable and 1.77 million ha is irrigable. Realizing the potential opportunity for expanding irrigation service in more areas, the Government of Nepal has fully internalized the concept of year-round irrigation through the Nepal Water Resource Strategy (2002) and National Water Plan (2005). Therefore, a goal of year-round irrigation is set with the aim to boost crop production leading to food self-sufficiency, employment generation and poverty reduction.

There are two approaches adopted by DOI to support agricultural productivity growth of Nepal. One is by bringing rain-fed agricultural land under irrigation through new irrigation systems and, the second, by rehabilitating and modernizing existing irrigation systems. In this context DOI's irrigation development is grouped into four characteristics:

- i. Design and construction of new irrigation schemes.
- ii. Inter-basin water transfers.
- iii. Rehabilitation of existing farmer-managed irrigation systems for sustainable operation and maintenance.

- iv. Rehabilitation and modernization of agency-managed or jointly managed medium and large/major scale irrigation systems and handing over their management to beneficiary farmers' organizations (WUAs) in their entirety or in subunits below the main canal.

The implementing agency, DOI, recognizes the growing impact of climate change in irrigated agriculture through changes in average temperature, rainfall and climate extremes for irrigation system design and changes in pests and disease, atmospheric carbon, and the nutritional quality of foods. DOI's Social, Environmental, and Climate Section is in process of mainstreaming climate change in the policy and guideline reform for the irrigation sector. The objective is to build climate change risk management and sector adaptation planning within the sector. Climate change threats in six districts have been analyzed and vulnerability assessments are being made to study potential impacts and types of assets most threatened by climate change, and how to strengthen those assets in the case of more severe flood events, for example. Among the adaptation measures recommended are afforestation and other protection measures of upstream watersheds, and strengthening water user group involvement in dealing with climate related impacts. The recommendations of DOI's Social, Environmental, and Climate Section will be followed in this proposed project.

## **2. Irrigation and Water Resources Management Project (IWRMP)**

### **a. Project Description**

The Irrigation and Water Resources Management Project (IWRMP) was initiated with the aim of supporting the national goal of poverty reduction and to develop Nepalese irrigated agriculture through irrigation development and management. It was implemented with financial assistance from the World Bank (WB) as well as financing from the GoN and contributions from Water Users' Associations (WUAs).

In this context, the WB and the GoN signed an agreement for the original scope (OS) of IWRMP on January 31, 2008. The cost of the project was US\$ 65 million, out of which US\$ 50 million was grant assistance from the Bank and the remaining US\$ 10 million and US\$ 5 million were contributed by GoN and WUAs, respectively. This original phase of the project ended on June 30, 2016, by which time the project had achieved 97% disbursement of funds and had completed 96% of its targeted ISPs, serving over 220,000 people and 18,300 ha of irrigated land.

Subsequently, the WB and GoN signed an agreement for the additional financing (AF) IWRMP, starting on March 31, 2014 and ending on June 30, 2018. The total project cost is US\$ 58.1 million, out of which WB share is US\$ 50 (Loan \$ 30 M: Grant \$ 20 M) and the remaining US\$ 5 M and US\$ 3.1 M are contributed by GoN and WUAs respectively. IWRMP-AF has already achieved most of its original targets with the completion of rehabilitation of 65 out of the original 83 irrigation subprojects initially planned. Moreover, the project is on course to complete a further 23 subprojects by June 2018, using savings realized during implementation. The total 106 sub-project will irrigate 18,823 ha of agriculture land by the end June, 2018.

The Project Development Objective (PDO) of both phases of the project is "to improve irrigated agriculture productivity and management of selected irrigation schemes, and enhance institutional capacity for integrated water resource management."

The projects (IWRMP-OS and IWRMP-AF) have four components:

Component A: Irrigation Infrastructure Development and Improvement

- Component B: Irrigation Management Transfer Reform  
 Component C: Institutional and Policy Support for Improved Water Management (Implementing under WECS)  
 Component D: Integrated Crop and Water Management (Implementing under Ministry of Agriculture Development)

The WB's Mid-Term Review Mission in August 2016 concluded that the performance of the project was as follows:

<b>Project Performance Ratings</b>		
<i>Summary Ratings</i>	<i>Last</i>	<i>Now</i>
Achievement of PDO	S	S
Implementation Progress	S	S
Project Management	S	S
Procurement	S	S
Financial Management	MS	MS
Safeguards	MS	MS
Monitoring & Evaluation	MS	MS
Counterpart Funding	S	S

Key: S – satisfactory; MS – moderately satisfactory

#### **b. Issues and Lessons Learned**

<b>Issues</b>	<b>Lessons Learned</b>
Subprojects under IWRMP were geographically scattered creating management problems	Selection of subprojects should be made in a cluster approach with robust selection criteria
IMT can't be effectively implemented in only parts of a large system like SMIS or NIS	AMIS IMT should be undertaken in entire systems with command areas under 10,000 ha
There were management difficulties in Component A because of two different policies for WUA contributions	WUA contributions in all systems should be guided by prevailing irrigation policy of the GoN
Shortage of agriculture labor – male migration, excessive burden on women, youth disinterest	Mechanization needs to be more widespread to reduce costs of production, reduce labor burden, increase rural employment
Inadequate technical support for field level designs and implementation, SEMP reporting, and agriculture development	Engage TA services with responsibilities to support implementing agency technical staff at field level
Agricultural development was constrained by an inadequate range of activity support	Provide a full range of needed agriculture support inputs from on-farm production up through the Value Chain to marketing
Better collaboration between DOI and DOA needed to support WUA farmers with coordinated irrigation and agriculture assistance	Implement the 14th three-year National Plan's new concept of cooperative WUAs which combines the water management functions of WUAs with agriculture service functions of cooperatives

### **3. Innovative and Climate Resilient Irrigated Agriculture Project**

#### **a. Background**

The 14th plan (2016/17-2018/19) of Nepal envisages an expansion of year-round irrigation service in cultivable land and a goal of supporting agricultural yield and production with reliable and sustainable irrigation services. The strategy focuses on the concept of cooperative WUAs in AMISs, FMISs and medium irrigation schemes, and autonomous irrigation boards for large and major irrigation schemes, as a means for providing sustainable irrigation service through efficient irrigation facilities by mobilizing user organizations, government agencies, local bodies, and the private sector.

To implement this vision and strategy of sustainable, efficient and productive irrigation systems through user organization-government partnership, while anticipating the potential impact of climate change, the DOI is proposing to build on the successful elements of IWRMP, combined with the latest best practices for adapting agricultural practices to climate change in a new follow-on project called the **Innovative and Climate Resilient Irrigated Agriculture Project**

The **Innovative and Climate Resilient Irrigated Agriculture Project** envisages an integrated approach to the sustainable development of irrigated agriculture comprising three parts, namely: the watershed protection and landscape management as this has a direct bearing on the irrigation sources; the irrigation system itself; and, profitable agriculture in the command area.

The first part is intended to control degradation as well as promote regeneration of the concerned watershed areas to ensure the continuity of the water source for the irrigation system. This may be in the form of controlling grazing, vegetation plantation awareness programs etc. to name a few of the activities. The second part is the rehabilitation/modernization of the irrigation system itself in order to improve the reliability and responsiveness of irrigation supplies and facilitate the adoption of more innovative irrigation practices at field level. This in turn would feed into the third, and possibly most important part, to optimize the efficient use of irrigation water to generate the maximum agricultural profits for the intended target group. This includes determining the crops most suitable taking account of climate, local soils, water availability and marketing opportunities. Increased returns for the target group should translate into the proper O&M and thereby sustainability of the irrigation system. It will also increase locally held savings which will have a multiplier effect on the local economy.

#### **b. Proposed Project Objectives**

The objective of the proposed **Innovative and Climate Resilient Irrigated Agriculture Project** is to increase and sustain irrigated agriculture productivity through improved irrigation system performance, a full complement of agriculture inputs based on the Value Chain Approach, and a transformed WUA form of effective cooperative or irrigation board for integrated crop water management capable of meeting the challenges posed by climate change on irrigation and agriculture.

### c. Rationale for Bank Involvement

The World Bank’s 2014 Country Assistance Strategy (CAS) is based on two pillars: **Increasing Economic Growth and Competitiveness** and **Increasing Inclusive Growth and Opportunities for Shared Prosperity**. The first of the second pillar’s four outcomes, **Increased Agricultural Productivity and Commercialization**, is the focus of this proposed irrigated agriculture project that will contribute to the Banks’ objectives of economic growth, rural employment, and poverty reduction. The project’s feature of implementing the 14th three-year National Plan’s new concept of farmer led cooperative WUAs to coordinate irrigation and agriculture inputs at the community level meshes with the Bank’s stress on citizen engagement. The Bank has a long-standing role in the development of Nepal’s irrigation and water resource sector. Also, there is strong GON interest in Bank continued engagement. The Bank has experience in Nepal’s irrigation sector through past and previously completed Irrigation Line of Credit (ILC), Nepal Irrigation Sector Project (NISP) and the Irrigation and Water Resource Management Project-Original Scope (IWRMP-OS) and ongoing IWRMP-AF.

## 4. Project Components

The proposed project has three major components in addition to project management: (A) Catchment Management and Landscape Protection, (B) Sustainable Irrigation Development and Management for both FMIS and AMIS systems, and (C) Climate Resilient Agriculture and Value Chain Development. These are summarized in the following table, and explained in more detail below.

Comp	Component	Proposed Cost (mil US\$)
A	<b>Catchment Management and Landscape Protection</b>	18
B	<b>Sustainable Irrigation Development and Management</b>	
B-1	Development, Rehabilitation and Modernization of FMIS, Groundwater, and other Nonconventional Irrigation Schemes	77
B-2	Sustainable Irrigation Management for Improved water delivery of AMIS	55
C	<b>Climate Resilient Agriculture and Value Chain Development</b>	35
D	<b>Project Management and Capacity Development</b>	15
<b>Total</b>		<b>200</b>

### Component A: Catchment Management and Landscape Protection (18 million US\$)

The performance of irrigation systems that divert river flows to a canal network is directly related to the catchment areas from which irrigation water supplies originate. Watersheds that are degraded due to over-grazing and deforestation cause erosion with rivers carrying high bed loads that accelerate canal siltation, thus significantly impacting the maintenance costs and, ultimately, the useful life of irrigation infrastructure. The degradation of watersheds also alters the runoff hydrology with rainfall events having shorter duration and higher peak flows, and this can change the water supply characteristics of the irrigation system. Accordingly, the project proposes improved catchment management activities to be promoted through increasing community awareness program with the participation of appropriate

stakeholders within Government of Nepal. This component will basically include the following sub-components.

- Conservation education to the concerned stakeholders/residents
- Vegetation and grazing management
- Source protection and landscape stabilization

### **Component B: Sustainable Irrigation Development and Management (132 million US\$)**

Improvements to irrigation systems by upgrading infrastructure and instituting better system management can increase agriculture productivity and production. These improvements combine to make the use of water more efficient and thus counter the impact of reduced water supplies. By lessening previously wasted water the irrigators can use less water to cover a given command area. Both of sub-components of Component B presented below improve irrigation systems in this way.

#### **Sub-component B-1: Development, Rehabilitation and Modernization of FMIS, Groundwater, and other Nonconventional Irrigation Schemes (77 million US\$)**

The output of this component will be better irrigation service delivery by institutionally and financially capable WUA cooperatives for existing schemes in the western, Mid-Western, and Far-Western development regions both in Mountains, hills and Terai which are or will be managed by farmers (FMIS). The target is to rehabilitate and modernize irrigation systems covering 25,000 ha and will involve:

- (i) Physical rehabilitation and modernization of FMISs in the regions stated above, including permanent head works, main canal improvement for higher efficiency and water control, provision of water control structures in branch canals and possible use of branch pipelines to distribution tanks or hydrants to which farmers can attach hoses for more efficient field application and even for non-conventional systems, such as drip irrigation;
- (ii) Conjunctive use in systems will be investigated where groundwater (particularly deep tube wells) can supplement diminished surface water supplies during low flow periods of the year. The improvement and modernization of Bairahawa Lumbini Ground Water Irrigation Project (BLGWIP) will also be a major task in this component and For groundwater systems the pre-paid smart card system will be explored, as used by the Barindh Multipurpose Development Authority (BMDA) in Bangladesh;
- (iii) Applying other non-conventional technologies to irrigate farmland where conventional approaches are not feasible or appropriate. One example of this is pumping water onto *tars* which, because they lack access to conventional, gravity-fed supplies are farmed by the poorest and most marginalized farmers; and,
- (iv) Transformation of the present WUAs into more effective multifunctional WUA cooperatives which are capable of an integrated approach to the needs of farms, covering watershed

management, irrigation, marketing, input procurement and mobilizing local services (agro vets, agricultural extension, etc).

### **Sub-component B-2: Sustainable Irrigation Management for Improved water delivery of AMIS (55 million US\$)**

The output of this component will be improved performance of irrigation systems in terms of physical, irrigation service and user organization management completing and consolidating irrigation management transfer (full responsibility and management transfer up to 10,000 ha and joint management for larger systems, as per the Agriculture Development Strategy(ADS)) to Water Users Associations which will be transformed into WUA co-operatives or WUA irrigation boards on where applicable. Some of these processes have already been initiated under IWRMP. Approximately seven projects with command area of about 40,000 hectare from Terai and Hills areas under the list of 32 DOI AMIS projects would be selected using effective selection criteria. For all schemes, whether already transferred or to be transferred, this component will involve:

- (i) A program of rehabilitation of canal networks down to tertiary and field canals (down to the lowest unit) and associated irrigation structures;
- (ii) Preparation and implementation of canal operation plans for measured water delivery and scheduled irrigation service along with an asset management plans (pre- and post intervention) which will set priorities for rehabilitation and a plan for future maintenance;
- (iii) Transformation of present WUAs into multifunctional WUA cooperatives or irrigation boards, and;
- (iv) Improving the technical capacity of DOI regional/field offices and users organizations to provide assistance during emergencies to schemes that have been transferred to farmers.

### **Component C: Climate Resilient Agriculture and Value Chain Development (US\$ 35 million)**

Building on the pilot initiative of the On-Farm Water Management program of IWRMP, and guided by the Agricultural Development Strategy (2015), this sub- component will focus on enhancing the efficiency of irrigation water use and crop management with integrated approach for increased and sustained agricultural yield. It would seek to enhance productivity, profitability, commercialization, application of climate smart agricultural technology and farm mechanization of agriculture by promoting improved water management and agro economic practices (establishment of service center at each WUA cooperatives, provision of agriculture extension program, and value chain promotion of agricultural outputs) better linkages with input and output markets. The key activities planned for implementation under this component would be as follows:

- (i) Climate smart approach to agriculture to reduce the vulnerability of production systems in the command area and make cropping patterns and management practices more climate resilient. It includes introducing farmers to drought and flood-resilient technologies, conservation agriculture techniques and greenery promotion with modern agricultural cultivation techniques;

- (ii) Institutional capacity building of WUA cooperatives and CBOs. The capacity of the local government will be developed for post-project support and sustainability of agriculture development interventions;
- (iii) Pilot effort of land leveling, shaping and consolidation for improved water use efficiency and improvement of on-farm water management;
- (iv) Introduction of small and medium scale farm mechanization as per the requirement of command area;
- (v) Provision of infrastructure support for cooperatives and private sector for storage houses, cold storage facilities, seed production and processing facilities, resource center establishment, nursery establishment, output processing facilities, market center establishment and transportation;
- (vi) Improved extension services in the command area. Current extension services will be upgraded with better infrastructure, equipment, research and technical capacity.

Activities under this sub-component are likely to benefit from, and support, the recently launched GON 14<sup>th</sup> Plan Agricultural sector goals and objectives. The sub-components under this component are:

- Improved technology for production and productivity enhancement
- Postharvest, market and value chain (VC) development support
- Farm mechanization and on-farm water management
- Institutional capacity development and ICT

#### **Component D: Project Management and Capacity Development (US\$ 15 Million)**

The overall project will be managed by this component. As a central level project, the project will be guided by a central level project steering committee chaired by the Secretary of Ministry of Irrigation. Office of Project Director (OPD) will be a central level coordinating office for the Donor, Ministry of Irrigation, Ministry of Agriculture, Ministry of Finance and implementing central and state government agencies. After a full devolution to state governments is realized, a Project Coordination Office (PCO) will be set up in each state which will have the role of monitoring and supervision of the sub-projects and further to coordinate between OPD in central and state government. The sub-projects in the field level will be implemented by and as per the state government project implementation modalities or institutions when these are in operation.

Sub-Com 1: Institutional Strengthening

Sub-Com 2: Technical Assistance Support

Sub-Com 3: Monitoring and Evaluation

Sub-Com 4: Logistics, Administration and Management

## 5. Work Plan

S.No.	Activities	2017		2018				2019				2020				2021				2022	
		Jul-Sept	Oct-Dec	Jan-Mar	Apr-Jun																
1	Submission of Proposal to the WB	■																			
2	Review by IDA and Necessary Revision	■																			
3	Preparation of PAD, ISMF and other necessary Documents		■	■																	
4	Preparation of Procurement Plan (18 months)			■																	
5	Grant/Loan Negotiation and Financial Agreement				■																
6	Project Implementation					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
7	Monitoring and Evaluation																				