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**PROGRAM NAME: SUSTAINABLE, JUST AND  
PRODUCTIVE WATER RESOURCES DEVELOPMENT IN  
WESTERN NEPAL (DIGO JAL BIKAS)**

**Progress Report - MAIN REPORT [DRAFT]**

**Reporting Period – 1 April, 2017 to 30 September, 2017**

**Submission Date: October 6, 2017**

**[Contract/Agreement] Number: AID -367-IO-16-00002**

**Activity Start Date and End Date: 1 April 2016 – 31 March 2019**

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# ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
CIMMYT	International Maize and Wheat Improvement Center
DCC	District Coordination Committee
DEM	Digital Elevation Model
DHM	Department of Hydrology and Meteorology
DJB	Digo Jal Bikas
DoI	Department of Irrigation
DSCO	District Soil Conservation Office
EF	Environmental Flows
FEDWASUM	Federation of Drinking Water and Sanitation User Group
FGD	Focus Group Discussion
GAMS	General Algebraic Modeling System
GESI	Gender Equity and Social Inclusion
GoN	Government of Nepal
INGO	International Non-Governmental Organization
IWMI	International Water Management Institute
KCAP	Knowledge, Capacity, Attitude and Practice
M&E	Monitoring and Evaluation
MoPE	Ministry of Population and Environment
NGO	Non-Governmental Organization
NPC	National Planning Commission
NWCF	Nepal Water Conservation Foundation
PANI	Program for Natural Aquatic Resources Improvement
RVWRMP	Rural Village Water Resources Management Project
USAID	United States Agency for International Development
VDC	Village Development Committee
WECS	Water and Energy Commission Secretariat

WP	Work Package
WUMP	Water Use Master Plan

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# I. PROJECT OVERVIEW/SUMMARY

A quick overview of the project is provided in **Table 1**.

**Table 1:** Salient features of the project

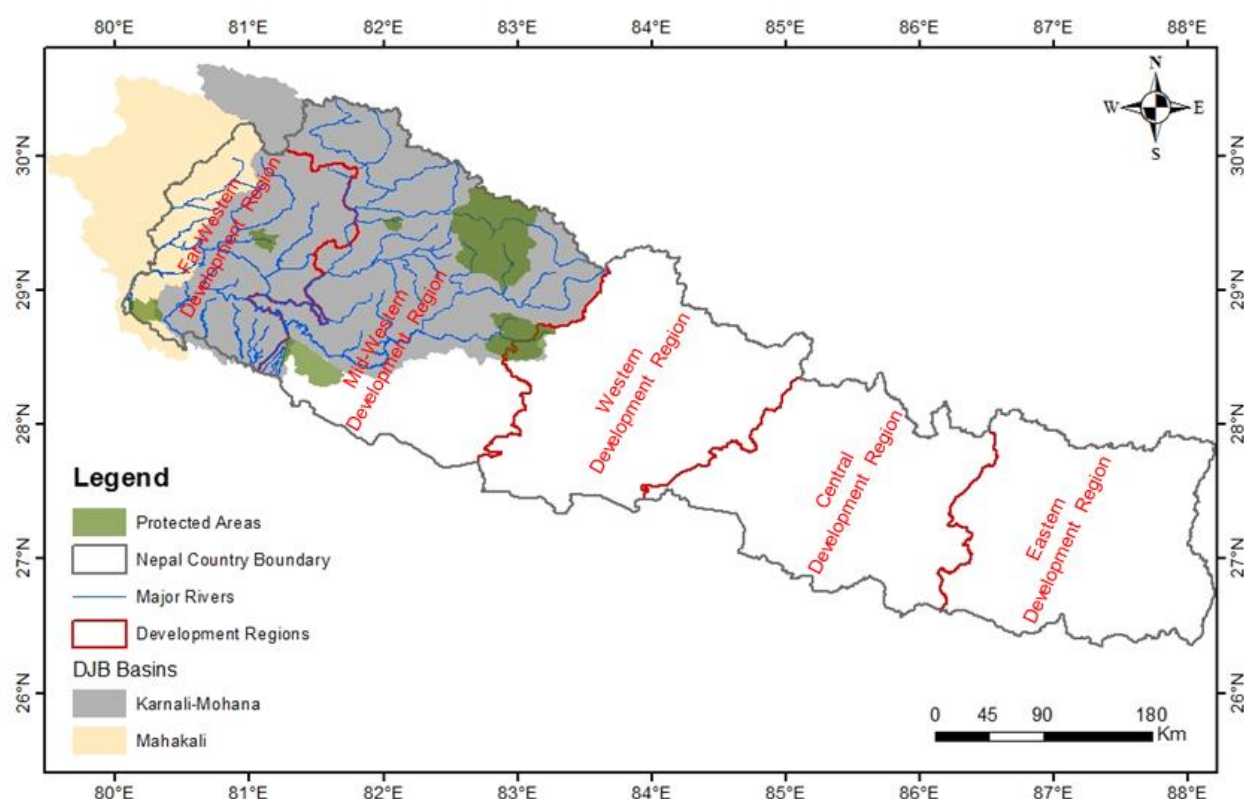
<b>Program Name:</b>	Sustainable, just and productive water resources development in Western Nepal (“Digo Jal Bikas”)
<b>Activity Start Date and End Date:</b>	1 April 2016 – 31 March 2019
<b>Name of Prime Implementing Partner:</b>	International Water Management Institute (IWMI)
<b>[Contract/Agreement] Number:</b>	AID -367-IO-16-00002
<b>Name of Subcontractors/Sub-awardees:</b>	Duke University Kathmandu University Nepal Water Conservation Foundation (NWCF)
<b>Major Counterpart Organizations</b>	Department of Irrigation (DoI) Water and Energy Commission Secretariat (WECS) National Planning Commission (NPC)
<b>Geographic Coverage (landscape, province(s) and countries)</b>	Karnali, Mahakali and Mohana Sub-basins
<b>Reporting Period:</b>	1 April 2017 – 30 September 2017

## I.1 Project Objectives

The overall goal of the “Sustainable, just and productive water resources development in Western Nepal” (hereafter, Digo Jal Bikas or DJB) project, led by the International Water Management Institute (IWMI), is to promote sustainable water resources development in Western Nepal through balancing economic growth, social justice and healthy, resilient ecosystems. The project contributes directly to IR2.3 of the USAID Nepal Country Development Cooperation Strategy (2014-2018), focusing on means to increase the

resilience of targeted natural resources and consequently improve the livelihoods of those who depend on them.

The geographic focus of this project will be the watershed basins and sub-basins within the Mid-western and Far-western Development Regions of Nepal, with a particular focus on the Karnali River Basin, including the Mohana sub-basin in the Terai, and the Mahakali River Basin (**Figure 1**).



**Figure 1.** The study region - Karnali and Mahakali river basins. The Mohana sub-basin is part of the Karnali River Basin.

Three objectives are proposed to achieve this goal:

1. The construction of a sound knowledge base on the current state and use of ecosystems, their services and the impact of climate change as well as other factors on future change in west Nepal. Doing so will identify key information and knowledge gaps. This includes a comprehensive database on the study area's natural characteristics, encompassing river and lake network and connectivity, groundwater aquifers, wetlands, biodiversity and protected areas, their ecosystem services, as well as all water-related physical infrastructure and modifications. This objective will help establish key



knowledge and information gaps and provide datasets that will be useable for future and diverse analyses and planning purposes.

2. The development and application of tools, models and approaches (including opportunities and risks) for sustainable water resources development under current state and future scenarios at the basin and local community scale. In particular, tools will be developed to identify the water flows necessary to maintain the integrity of ecosystems and their services. This information will then be used for hydro-economical modelling at basin scale to explore water allocation under future scenarios, including climate scenarios, of different water resources development options and the resulting trade-offs. At sub-basin, watershed and local community scale approaches for improved water management and water governance will be explored.
3. Support the development of integrated policy and management guidelines on options and technologies for sustainable water infrastructure development for government and local communities. These guidelines will be designed to promote best practice in water-related infrastructure development (e.g. hydropower, irrigation, managed aquifer recharge, water storage) at different scales, which supports local communities and protects the resilience of ecosystems and their services. The aforementioned knowledge base, tools, models and approaches will underpin these guidelines, which will be developed with input from government and community stakeholders, as well as donors and investors. The policy and practice guidelines will be formulated in collaboration with the PANI<sup>1</sup> program.

To address the project objectives, and guided by the above research questions, six core Work Packages (WP) and two supporting WPs have been developed (**Table 2**).

**Table 2:** Work packages (WPs).

Core Work Packages (WPs)	
WP1	Basin characterization
WP2	Environmental flow assessment and tool development

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<sup>1</sup> Program for Aquatic Natural Resources Improvement (PANI) is the 5-year (2016-2021) program funded by U.S. Agency for International Development (USAID). It works in the same geographical region as DJB does. DJB and PANI are working collaboratively in many fronts by sharing resources.

WP3	Basin-scale development scenarios
WP4	Watershed/village water governance and management
WP5	Gender
WP6	Integrated policy and practice guidelines
<b>Supporting WPs</b>	
WP7	Knowledge management and dissemination
WP8	Project management

The following stakeholders are envisioned as important groups to engage with during this project. They represent both next and end users of the project's products, tools and knowledge.

- Public and private sector agencies and multilateral investors who evaluate, design and implement water resources development projects and investment programs
- National and local level water and energy management agencies, e.g. Ministry/Department of irrigation, Ministry/Department of agriculture, dam/barrage operation agencies, Ministry of Energy, Ministry of Forests and Soil Conservation, Water and Energy Commission Secretariat and the Department of Soil Conservation and Watershed Management Ministry of Science Technology and Environment (MOSTE), Ministry of Federal Affairs and Local Development and Department of Local Infrastructure Development and Agricultural Roads (DOLIDAR), Department of Water Induced Disasters and Prevention (DWIDP), District Coordination Committees (DCCs) and (Rural) Municipalities
- Conservation groups that want to establish environmentally sustainable water resources planning and management
- Women and men in farmer and fisher communities that will be affected by climate change and water management decisions in the basin

## 1.2 Summary of Results for Selected Performance Indicators

A Knowledge, Capacity, Attitude and Practice (KCAP) survey was carried out between December 2016 and April 2017 with key government, non-governmental, research and private sector partners who DJB is targeting for the uptake of its products and services. The survey provides a baseline of values across a range of behavioral outcomes (C-I) in the project's logical framework. A preliminary analysis of the data for these outcome baselines is completed and draft report is provided in *Annex-9*. The aim is to have one

more round of the survey to ascertain changes in knowledge, attitude, practice and capacity in Year 3. Feedback on the draft report is encouraged.

Progress indicators at the output level have been defined and outlined in the project's logical framework. The status of these indicators is reported in the section-2 of this report.



## 2. ACTIVITY IMPLEMENTATION PROGRESS

### 2.1 Progress Summary

The last six months (April 1 – Sep 30, 2017) was very productive in terms of implementing time-bound project activities. The project is on track in terms of overall project progress for the current reporting period. The progress is being tracked through regular monthly project meetings as well as IWMI's internal online monitoring tool called E-Project. A narrative of Work Package (WP)-specific progress is provided hereunder and detailed in Section – 2.2 and various Annexes.

- WP1:
  - Bio-physical database prepared in year-1 is updated and shared internally via share point
  - A fully calibrated hydrological model for Mahakali basin in SWAT environment is completed and that for Karnali-Mohana basin is partially completed
  - A blog post on the politics of river basin planning and state transformation processes in Nepal is published (<http://water-future.org/blog/river-basin-planning/>)
  - Power analysis at a national level is underway
  - A paper titled “The Politics of River Basin Planning and State Transformation Processes in Nepal” by Suhardiman, D., Bastakoti, R., Karki, E., Bharati, L. has been submitted to Geoforum.
- WP2:
  - The sampling of invertebrates for the pre-monsoon season was conducted in the months of April and May, 2017
  - Inventory of invertebrates is underway
  - Along with the International Finance Corporation (IFC) and the Program for Aquatic Natural Resources Improvement (PANI), IWMI co-hosted the Environmental Flows Workshop to explore how to sustain healthy rivers while considering future water development. The workshop was chaired by the Australian Ambassador, Mr. Peter Budd and attended by high government officials and other stakeholders, workers from NGOs, other

research organizations, universities and donor organizations. In presentations, panel discussions, and breakout sessions, participants of the workshop discussed the meaning of environmental flows for Nepal and priorities to consider when making plans for river basin development.

- WP3:
  - Working paper on hydro-economic modeling is being prepared
  - Planning and policy documents are reviewed
  - The Trade-Off Arena Workshop was held in Kathmandu on August 1, 2017 with the objective to bring together stakeholders representing a variety of relevant sectors from both central and local planning perspectives to facilitate discussion on the priorities, visions, and trade-offs of water resources management in the Karnali and Mahakali River Basins
  - Scenario database is under development
- WP4:
  - Socio-economic baseline survey of three pilot sites is completed
  - Potential interventions based on the socio-economic realities are identified and their feasibility analysis is underway
  - Basin-wide survey completed and data analysis and report preparation is underway
- WP5:
  - Gendered analysis of water security and well-being of people in western Nepal is underway
  - Attempts are made to ensure gender equity in recently conducted workshops (e.g., E-flows workshop and Trade-off Arena analysis workshop)
  - Gender mainstreaming in the project activities of all WPs is continuing
- WP6: Expected to start in 2018
- WP7:
  - Baseline draft report of KCAP survey is completed and circulated to project members/leaders for their feedback
- WP8:
  - Timely submission of donor reports is accomplished
  - Regular monthly project meetings are conducted

- Regular follow-ups with partner organizations made to ensure deliverables are submitted on time
- Contract amendments of partner organizations in the budget-cut context is almost completed

## 2.2 Implementation Status

**Work Package (WP) 1 – Basin Characterization:** This Work Package (WP) consists of two components – biophysical characterization of the basin and institutional and policy landscape assessment at the national and/or basin level. The progress in implementation during the last six months is summarized in **Table 3**.

**Table 3:** Progress status of WP1

Output	1.1	<b>Updated database collating all relevant spatial and temporal data on freshwater ecosystems in the study basins, including both natural characteristics and artificial structures and practices, to feed into the online system</b>
Indicator	1.1.1	Database updated and functional
Six-month progress	1.1.1	The database prepared in Year-1 is updated with more data. They are still at DJB SharePoint and available for internal use only

*\*Indicator 1.2.2 - Number and type of users of database – will become active once the database is publically available.*

Output	1.2	<b>Fully calibrated and validated hydrological model of the 3-basins (Karnali, Mohana, Mahakali)</b>
Indicator	1.2.1	Calibrated and validated hydrological model
Six-month progress	1.2.1	Hydrological models of Karnali-Mohana & Mahakali basins are calibrated. Multi-site calibration of Mahakali basin is completed and that of Karnali-Mohana basin is partially completed (Annex-1). The model calibration is expected to take two more weeks.
Implementation challenges		Initially the calibration process was hindered by a couple of technical problems which took quite some time to resolve. Recently, calibration at some stations took longer than expected due to a technical problem in model codes, which has now been addressed.

Output	1.3	<b>Report on hydrological model set-up, model performance, and current and future status of water resources</b>
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Indicator	1.3.1	Report completed
Six-month progress	1.3.1	Writing of background, methodology, and model-set up is completed. Model performance section is partially completed. Please refer to <b>Annex-1</b> for the current status of the report. The entire report is expected to be completed within the next couple of months.
Implementation challenges		None during the period.

Output	1.4	<b>Final report on policy review and institutional analysis at the basin level that incorporates networks analysis of key stakeholders of various categories, captures their perceptions on water resources development, their access to resources (e.g., decision-making structure and processes as well as financial source), and how these (re)shape their strategies;</b>
Indicator	1.4.1	Report prepared
Six-month progress	1.4.1	Policy review and institutional analysis are nearly completion. Based on the analysis from information collected during the first round of key stakeholder interviews in February 2017, a manuscript entitled “The politics of river basin planning and state transformation processes in Nepal” has been submitted to Geoforum Journal and is currently under review. Based on the manuscript, a blog post has been produced on the Sustainable Water Future program ( <a href="http://water-future.org/blog/river-basin-planning/">http://water-future.org/blog/river-basin-planning/</a> ).
Implementation challenges	1.4.1	With the completion of local election and the preparation of upcoming national election, there is a risk that the newly elected government would change the existing policies, which necessitates continuously revisiting the policy stages and possible institutional changes. The latter is important with regard to identifying potential entry points for change and ways forward in our policy recommendations.
Stakeholder involvement in delivery	1.4.1	Key stakeholders' views, perceptions, and strategies on basin water resources management are captured in our key stakeholder analysis.

Output	1.5	<b>Final report on power analysis at the national level that incorporates key stakeholders' view and perceptions of existing power structures and relationships, and how these are shaped and reshaped through policy and institutional landscape. This report will also incorporate private sector actors' role and involvement in water resources development, focusing on hydropower development, in relation to existing Master Plans.</b>
Indicator	1.5.1	Report prepared



Six-month progress	1.5.1	The first round of key stakeholder interviews (on power mapping analysis) has been completed in September 2017. Key stakeholder analysis is underway.
Implementation challenges	1.5.1	With the completion of local elections and the preparation of upcoming national elections, there is a risk that the newly elected government will be comprised of different political parties and result in changing roles and relationships with local governing bodies. This may necessitate revisiting the power mapping analysis after the national election and possibly once again after the new government consolidates its power. This is important with regard to identifying potential entry points for change and ways forward in our policy recommendation.
Stakeholder involvement in delivery		Key stakeholders' views, perceptions, and strategies on basin water resources management are captured in our key stakeholder analysis.

Additional indicators gathered for bi-annual report		
Linkages		Results of this work packages are useful as inputs for WP3 (Hydro-economic modeling) as well as WP2 (E-flows assessment). Some of the outputs of this work packages depend on the inputs from WP4 (local institutional arrangement and local power mapping).
Policy and Governance Support		Based on our key stakeholders analysis, we have provided policy inputs to Water and Energy Commission Secretariat (WECS)'s current effort to formulate national water resources policy while highlighting the need to link it with institutional change in the water sector.

**Work Package 2. – Environmental Flow (EF) Assessment and Tool Development:** Environmental flow (EF) allocations are an integral part of river management that informs future water resource planning and development. This WP aims to develop an improved version of an E-flows tool by incorporating ecological criteria in the existing hydrology-based tool. Current progress in the implementation of WP2 activities are provided in **Table 4**.

**Table 4:** Progress status of WP2

Output	2.1	<b>A report with an inventory of livelihood, cultural/religious benefits from the river inhabitants of the basin as well as recommendation for incorporating various needs in water allocation planning</b>
Indicator	2.1.1	Report / supportive database produced

Six-month Progress	2.1.1	The basin-wide survey was implemented during this reporting period. As the survey was designed to be representative of the river basins, data from this survey provides necessary inputs for this report. Data collection is complete and all surveys have been digitized.
Implementation challenges		Challenges to survey implementation included delayed field work due to necessary IRB approval and prolonged enumerator training due to survey printing delays in Nepalgunj. There were some concerns that local elections and the beginning of the monsoon could impact fieldwork given these delays; however, enumerators were able to complete the required work safely and efficiently.
Stakeholder involvement in delivery		Focus group discussions, interviews, and piloting were used to inform the survey instrument. These qualitative data will also be used in analysis of survey data related to this report.

Output	2.2	<b>An Inventory of the bio-indicator invertebrate taxa to serve as control for different conditions</b>
Indicator	2.2.1	Inventory with relevant recommendations
Six-Month Progress		The sampling of invertebrates for the pre-monsoon season was conducted in the months of April and May, 2017. A total 383 invertebrate samples were taken from 41 sites consisting of natural, dam, and abstracted sites. At each site, screening protocols, site protocols and habitat assessments were carried to document bio-physical properties of the sampled sites. Based on screening protocol, taxa occurred in 3 seasons have been entered in a software for further analysis and the data has also been compiled separately for different site categorization. River ecosystem health of each study site was assessed in screening protocols. Sorting of benthic samples were completed for the base flow season and dry season. Identification of the samples are underway. Preliminary results are provided in <b>Annex-2</b> .
Implementation challenges		Inventory in terms of presence and absence of taxa do not seem to provide differences in various levels of disturbance. Identification of the bio-indicator could provide an easy tool by which the impacts of disturbances level can be assessed cost-effectively.
Indicator	2.2.2	Function of the biotic index tool and evidence of use
Six-Month Progress		One-year sampling of benthic invertebrates and data collection on hydrological and morphological parameters was completed. First round of lab processes have been completed. Identification of the benthic invertebrates is underway.

Output	2.3	<b>A desktop tool to calculate E-flows in Nepal and illustration of its application in west Nepal which will include relationships between water flows and river typologies, indicator species and assemblages, and cultural and livelihood metrics.</b>
Indicator	2.3.1	Desktop tool produced
Six-month Progress		River discharges at each site for the post-monsoon season was calculated. Channel diversion flow was also calculated to estimate flow alteration in disturbed sites compared to natural sites. A preliminary flow alteration classification was formulated.
Implementation challenges		Responses of biotic metrics need to be analyzed with respect to flow alteration classes
Output	2.4	<b>Workshop(s) focused on E-flow tool, its application in Nepalese context, and appropriate institutional set-up to implement E-flows allocations in Nepal</b>
Indicator	2.4.1	Workshop carried out successfully
Six-month Progress		The workshop on E-Flows was held in Kathmandu on 22 August 2017 under the theme "Healthy Rivers for Sustainable Economic Development in Nepal." Over 60 participants from water resources development departments of government of Nepal, relevant INGOs, NGOs, media personnel and University attended the workshop. A full day workshop was divided into four sessions. The workshop on E-flows was the first of its kind, gathering researchers and stakeholders from the public and private sector to discuss e-flows. Participants during the group discussion were prompted to discuss on the existing knowledge and policy gaps in incorporating e-flows into Nepali development. The workshop report is available in <b>Annex-3</b> .
Implementation challenges		The participants of the workshop are aware of the importance of E-flows for the sustainable development of the country. However, there are challenges in implementation of E-flows due to unclear monitoring mechanisms and discrepancy between national and local authorities.
Stakeholder involvement in delivery		The major aim of the E-flows workshop is to interact with relevant stakeholders and document their understanding of E-flows. Stakeholders are briefed about our approach to developing an E-flows assessment tool. Additionally, knowledge on existing methods of e-flows determinations and preliminary outcomes of the e-flows assessment were shared with participated stakeholders.
Output	2.4	<b>Workshop(s) focused on E-flow tool, their application in Nepalese context and appropriate institutional set-up to implement E-flow allocations in Nepal</b>
Indicator	2.4.2	Institution set-up established

Six-month Progress	<p>Concern stakeholders and relevant institutions have been identified for the implementation of E-flows in Nepal.</p> <ul style="list-style-type: none"> <li>• Ministry of Population and Environment (MoPE)</li> <li>• Ministry of Forest Soil and Conservation (Department of Forest and Department of national park and wildlife conservation)</li> <li>• Ministry of Energy</li> <li>• Department of Tourism</li> <li>• Department of Irrigation</li> <li>• Ministry of Water Supply and Sanitation</li> <li>• Ministry of Federal Affairs and Local Development</li> <li>• Ministry of Agricultural Development and Fisheries</li> <li>• Independent Power Producers Association Nepal</li> <li>• Federations – FEDWASUN, etc.</li> <li>• National Planning Commission</li> <li>• Investment Board Nepal</li> <li>• Universities and research organizations</li> </ul>
Implementation challenges	Institutions are in place but a lack of clarity and overlap in monitoring activities

Additional indicators gathered for six-month report	
Linkages	The outcomes of the WP 2 will be integrated into the Hydro-Economic Model of WP1. Holistic Environmental flows including social and cultural aspects will be developed in close coordination with WP5 and WP3.
Changes and Lessons	<p>The E-flows workshop on 22 August, 2017 brought to attention the need for an inclusion of social and cultural aspects in an environmental flows assessment tool</p> <p>We will now conduct social surveys to quantify socio/cultural requirements to the EF assessment and later also incorporate in the EF calculator.</p>
Sustainability	Sustainability of any approach largely depends on the participation of relevant stakeholders. Relevant stakeholders from both government and private sectors were invited to the E-flows workshop in order to understand the E-flows method and identify gaps in existing laws and regulations. Identification and profiling of potential institutions will be proposed for carrying out promotion of E-flows in Nepal.

Environmental Compliance	The environmental flows assessment tool has and will consider the state of aquatic biodiversity and their habitats in terms of flow regimes and river substrates for the categorization of disturbance levels. Socio/cultural requirements will also be added.
Policy and Governance Support	Lack of methods in monitoring the impacts of water resources development has hindered implementation of EF regulation in Nepal. Delegates from the Ministry of Population and Environment (MoPE) and Department of Irrigation (DoI) showed their concern for the development of the E-flows tool and the necessity of its implementation for sustainable economic growth of the country.
Science, Technology and Innovation issues and impacts	Development of the environmental flow assessment tool at the end of the project provides an opportunity for the innovation of new technology. The technology could have a large impact on future planning and execution of water resource development projects.

**Work Package 3 – Basin scale development scenarios:** The goal of this WP is to develop and apply a hydro-economic model of the study basins, develop future development scenarios and evaluate trade-offs of the scenarios. The progress in implementation of WP3 activities are provided in **Table 5**.

**Table 5:** Progress status of WP3.

Output	<b>3.1</b>	<b>Database of development plans</b>
Indicator	3.1.1	Database developed
Six-month Progress	3.1.1	We have amassed and reviewed relevant planning documents for the Mahakali and Karnali River Basins including irrigation, groundwater, and hydropower master plans; water, environmental, forestry, and irrigation national policies; project-specific documentation for some irrigation and hydropower projects; national- and district-level statistical information outlining current conditions (economic, agricultural, planning, etc.) in western Nepal; and WUMP reports documenting VDC-level water resource planning. Data taken from these documents have been used as inputs for the hydro-economic modeling database (see output 3.4.2).
Implement-ation challenges		Many of the documents reviewed are somewhat old and outdated. While still being used for planning purposes, some information from documents written in the 1990s is no longer relevant for resource management today. Additionally, there is limited information regarding many proposed and planned hydropower and irrigation projects. Some projects have

		feasibility and environmental-impact reports, but this level of detail is not accessible for the majority of projects. This makes it difficult to prioritize among projects.
Stakeholder involvement in delivery		Stakeholder interactions provided access to many of the resources discussed in the output indicators above, particularly project-specific documentation of irrigation and hydropower projects.

Output	<b>3.2</b>	<b>Trend database (including constraints/limits to those trends) and report</b>
Indicator	3.2.1	<b>Trend database produced</b>
Six-month Progress	3.2.1	We have developed an outline of visions for and trends in development in western Nepal, drawing from planning and policy documents as well as key stakeholder interactions. This has been reported on in the proceedings report from the Trade-off Arena Workshop Report (submitted to IWMI 9/11/2017) ( <b>Annex 4</b> ) but no stand-alone trend report has been written.
Implementation challenges		The information necessary from outputs 3.1, 3.2, and 3.3 will be used in the hydro-economic modeling process. As such, as we begin working on running the hydro-economic model, it will be necessary to revisit these outputs to ensure they align with modeling realities.
Stakeholder involvement in delivery		Stakeholders met in Kathmandu on August 1, 2017 for the Trade-off Arena Workshop. Stakeholders representing diverse sectors (energy, irrigation, health, education, watershed management, environment, forestry, transportation, industry, etc.) and planning perspectives (central and local) were in attendance. Several community leaders, user group representatives, and project or national park managers traveled from western Nepal to attend the workshop. Sessions during this one-day workshop included small group discussions of visions for development in western Nepal, a preference-ranking survey to elicit individual trade-off prioritization, and a panel that provided development planning perspectives ranging from a National Planning Commission member to a representative from WOCAN to an official from WECS, among others. The workshop was designed as a starting point for communication with key stakeholders which will continue as we develop the hydro-economic model. A small group of 10-12 stakeholders was selected from workshop attendees to provide inputs to the modeling process.

Output	<b>3.3</b>	<b>Scenario database</b>
Indicator	3.3.1	Scenario database prepared with 3-4 detailed scenarios outlined
Six-month Progress	3.3.1	As with outputs 3.1 and 3.2, the scenario database will be used as an input to the hydro-economic model. We have submitted a report outlining scenarios that will be developed for the model including a large-scale infrastructure scenario, a community-led development

		scenario, and an environmental-priority scenario. These scenarios will be further developed as part of the modeling process in conjunction with a paper that we are working on outlining visions for development in the Karnali and Mahakali River Basins.
Implement- ation challenges		The scenarios will require some adjustment as we implement the model based on feasibility and data accessibility.
Stakeholder involvement in delivery		Input from stakeholders at the trade-off workshop and during focus groups and individual interviews informed the development scenarios.

Output	<b>3.4</b>	<b>Working paper on hydro-economic modelling framework; Hydro-economic model database</b>
Indicator	3.4.1	Working paper on framework developed
Six-month Progress	3.4.1	The working paper has been submitted to IWMI (08/14/2017) ( <b>Annex 5</b> ). The working paper provides background in hydro-economic modeling and the contributions to the literature of the nexus approach to modeling we will use. It also contains the model that will be applied to the Karnali and Mahakali River Basins.
Implement- ation challenges		The working paper is complete and has been submitted on time. There are not any challenges to report.
Stakeholder involvement in delivery		Stakeholders were not directly involved in the development of the working paper, however, the paper is intended to inform a model that will have direct relevance and value to stakeholders.
Indicator	3.4.2	Hydro-economic database developed
Six-month Progress	3.4.2	The database has been developed and submitted to IWMI (08/14/2017). It contains data that will be used to parameterize the model taken from published documents and reports, internal documents, reports, conversations, irrigation and hydropower project materials.
Implement- ation challenges		The database will continue to be updated during the next six months as we begin working on running the model in GAMS. It is likely that additional work may need to be completed for some parameters during the modeling process. The quality of the modeling output will depend on the availability of such data. In the event that region-specific data is not available, additional steps will be taken to parameterize the model, including terrain and reservoir modeling in GIS and modification of parameters from previous modeling or available datasets.

Stakeholder involvement in delivery		Stakeholders, particularly government officials and project managers, provided some project-specific documents that were used in the development of the database.
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Output	3.5	<b>Proceedings/Report of the workshop</b>
Indicator	3.5.1	Workshop effectively carried-out
Six-month Progress	3.5.1	The Trade-off Arena Workshop was held in Kathmandu on August 1, 2017. Nearly 50 stakeholders were in attendance. The proceedings report of the workshop was submitted on September 11, 2017 ( <b>Annex 4</b> ).
Implementation challenges		Efforts were made to have diverse interests and planning perspectives represented at the workshop. While this was largely successful in terms of sectors represented and attendees from the Karnali and Mahakali River Basins who traveled to Kathmandu for the workshop, we did fall short of our goal of having women represented. While the invitation list contained many women representatives, several were unable to attend, leaving the gender distribution about 79%-21% in favor of men. We will continue to make gender inclusion a priority in planned interactions with stakeholders moving forward.
Stakeholder involvement in delivery		The purpose of this output was stakeholder interaction. We had the opportunity to introduce the hydro-economic model to a diverse representation of stakeholders at the workshop and we will continue to seek stakeholder input as we move forward with the modeling process.

Additional indicators gathered for six-month report		
Linkages		WP3 has worked with WP1 in gathering inputs necessary for the hydro-economic model, including inputs from the SWAT hydrology model. WP3 has worked with WP5 to make gender inclusion a priority in planned stakeholder interactions. WP3 has worked with WP4 (and other work packages) in helping with enumerator training and data collection and entry for the basin-wide survey. WP3 has worked with other project members on data collection from WUMP reports.
Changes and Lessons		Input from stakeholders has helped inform development scenarios and priorities for the hydro-economic model. Initially we were not sure that industry, navigation, and transboundary concerns would enter significantly into the model. But, based on stakeholder input, it is clear that these factors should be included, at least for some of the development scenarios.
Gender		We made gender inclusion a priority in developing an invitation list for the trade-off arena workshop. Additionally, data collection during this reporting period



	(specifically the basin-wide survey and priorities trade-off survey) was completed in a way to allow for gender-disaggregated analysis.
Sustainability	Sustainable development and policy-relevant research were two guiding principles in the planning for the trade-off workshop. Representatives with backgrounds in environmental conservation and sustainable development were invited to the workshop to ensure this perspective was included in the workshop discussion. Additionally, components of sustainability will be included in the development scenarios for the hydro-economic model based on from the workshop.
Environmental Compliance	The environmental module of the hydro-economic model incorporates environmental services and other environmental components into the optimization problem.
Policy and Governance Support	The development of the databases of hydro-economic model inputs was completed in a way to prioritize modeling scenarios that will be applicable and informative for central and local policy makers. Communications with relevant government offices have provided data necessary for the hydro-economic model. Such communications will continue to shape the design of the development pathways in the hydro-economic model, which will assist with the government stakeholders taking ownership of the process and results. Support back to government and policy will be provided from the hydro-economic model and water information systems as analyses are completed throughout the project. By itself, the process of discussing options and development plans provides policy support through dialog on the issues.
Local Capacity Development	Local representatives attended the trade-off workshop. They will also be included in stakeholder interactions moving forward to ensure local interests are represented in the hydro-economic model. WP3 was also involved in enumerator training for the basin-wide survey during this reporting period; local enumerators were hired to complete the fieldwork for the survey. Focus group discussions were also conducted during this reporting period to include additional local perspectives into our research process.
Science, Technology and Innovation issues and impacts	The hydro-economic model presents opportunity for innovation and advancement of tools for scientific evidence-based options analysis. This model will be tested and verified once data collection has been completed. Water Information Systems apply technology to fill information gaps that restrain decision making. By making information more visible and transparent, knowledge and capacity is built around sustainable resource planning.

**Work Package 4 – Watershed / village water governance and management:** Local communities in the project study area adopt practical technologies and land/water management approaches that improve water productivity, protect ecosystems and achieve more equitable water governance, which enable them to cope with and adapt to future climatic and socioeconomic pressures. Please refer **Table 6** for current status of progress in implementation of WP4 activities.

**Table 6:** Progress status of WP4.

Output	<b>4.1</b>	<b>Comprehensive report on the facilitating as well as constraining factors on access/use of different water resources within the community</b>
Indicator	4.1.1	Report assessing biophysical, and socio-cultural challenges to access water
Six-month Progress	4.1.1	A detailed report on water resource mapping titled 'Water availability and access mapping for irrigation in the proposed local intervention sites' is completed.
Implementation challenges		High level of community expectations regarding the potential interventions to be piloted in the sites.
Stakeholder involvement in delivery		Meetings were held with district and VDC officials of intervention sites, and they were informed about the nature of potential interventions. A national NGO is engaged in a baseline survey. The project team had interactions with INGOs and district agencies involved in similar type of activities such as DSCO, CIMMYT, RVWRMP and USAID-funded PANI for possible synergies.

Output	<b>4.2</b>	<b>A report on political economy analysis at local level</b>
Indicator	4.2.1	Report produced
Six-month Progress		A review of relevant documents related to changes in local planning and governance under federalization.
Implementation challenges		Challenges are related to rapid changes in governance. The analysis will provide a snapshot since the roles and responsibilities are likely to change in the next months.
Stakeholder involvement in delivery		Output 2 will be based on interviews with local actors in newly elected Gaunpalikas (rural municipalities) and at the district level.

Output	<b>4.3</b>	<b>A status report on right systems within a wider context of agrarian structure</b>
Indicator	4.3.1	Report assessing the different rights systems in relation to decision making system/processes in WR management
Six-month Progress		Fieldwork in villages explored various rights related to access to water. A review of relevant documents related to changes in local planning and governance under federalization was conducted.
Implementation challenges		Challenges are related to rapid changes in governance. The analysis will provide a snapshot since roles and responsibilities are likely to change in the next months.
Stakeholder involvement in delivery		Output 3 will be based on interviews with farmers, local actors in newly elected Gaunpalikas, and at the district level.

Output	<b>4.4</b>	<b>A report with mapping of existing institutional (formal/informal) arrangements and their power relationship at different scales</b>
Indicator	4.4.1	Comprehensive assessment of (water) governance structure and processes at DDC and VDC level
Six-month Progress		A review of relevant documents related to changes in local planning and governance under federalization is underway.
Implementation challenges		Challenges are related to rapid changes in governance. The analysis will provide a snapshot since roles and responsibilities are likely to change in the next months.
Stakeholder involvement in delivery		Output 2 will be based on interviews with local actors in newly elected Gaunpalikas and at the district level.

*\*Output 4.5- A summary report detailing those dialogues and variation in understanding of different stakeholders of the different values, framing and trade-offs related to WR development and subsequent impacts on ecosystem and their livelihoods - will be initiated in 2018*

Output	<b>4.6</b>	<b>Situation analysis / baseline report of three case study villages</b>
Indicator	4.6.1	Report of baseline in three target villages
Six-month Progress		A detailed report on situation analysis titled 'Situation analysis report of the pilot intervention villages' is completed. Baseline survey of three target villages is completed and a draft report has been received from NWCF, a partner organization for the DJB project. The basin wide

		survey has been completed, data entry has been finished and analysis is in progress. The current status of progress is provided in <b>Annex 6</b> .
Implement- ation challenges		The baseline survey took more time than expected. There was a high level of community expectation regarding potential interventions. In the case of the basin wide survey, local elections and the monsoon season caused delays in field work.
Stakeholder involvement in delivery		A national NGO is engaged in the baseline and basin wide survey. The project team had interactions with INGOs and district agencies involved in similar types of activities such as DSCO, CIMMYT, RVWRMP and USAID-funded PANI for possible synergies.

Output	<b>4.7</b>	<b>Feasibility analysis report of identified interventions for improving water productivity</b>
Indicator	4.7.1	Report of feasibility analysis of existing water sources for maximizing water availability
	4.7.2	Report of feasibility analysis of various form of distribution system to minimize loss
Six-month Progress		Potential interventions were identified for improving water productivity at local level ( <b>Annex 7</b> ). Feasibility analysis of potential interventions is on-going.
Implement- ation challenges		A high level of community expectations regarding the potential interventions are to be piloted in the sites.
Stakeholder involvement in delivery		Meetings were held with district and VDC officials of intervention sites and they were informed about the nature of potential interventions. A national NGO is engaged in the baseline survey. The project team had interactions with INGOs and district agencies involved in similar type of activities such as DSCO, CIMMYT, RVWRMP and USAID-funded PANI for possible synergies.

Output	<b>4.8</b>	<b>Evaluation report with a clear model of improved land/water governance for upscaling and its dissemination</b>
Indicator	4.8.1	Evaluation report
Six-month Progress		Initial pilot interventions package (physical) has been prepared. Preliminary analysis on the social feasibility of the physical interventions were identified. Detailed feasibility analysis of potential interventions is on-going.
Implement- ation challenges		There is a high level of community expectations regarding the potential interventions to be piloted in the sites. There is also a need for securing cooperation of newly elected local bodies.

Stakeholder involvement in delivery	Meetings were held with district and VDC officials of intervention sites and they were informed about the nature of potential interventions. A national NGO is engaged in the baseline survey. The project team had interactions with INGOs, and district agencies involved in similar type of activities such as DSCO, CIMMYT, RVWRMP and USAID-funded PANI for possible synergies.
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Additional indicators gathered for six-month report	
Linkages	Interaction occurred across all WPs to design a FGD checklist, conduct FGDs and provide inputs for the large basin wide survey questionnaire, including the ecosystem valuation. WP5 provided inputs to assess potential interventions from a social and gender equity perspective.
Changes and Lessons	There are no major changes. There is a need of securing cooperation of newly elected local bodies.
Gender	FGDs and KIIs included both men and women and had separate FGDs with men and women. The baseline survey report provides gender disaggregated findings. In addition, gender mainstreaming and social inclusion will be a key focus while finalizing the interventions. In coordination with WP5, potential interventions are assessed from a social and gender equity perspective.
Sustainability	Interventions are not started yet, and relevant details will emerge only after the interventions are rolled out in the pilot sites.
Policy and Governance Support	We have been communicating with relevant government (eg VDC and DDC) and non-governmental agencies which will provide inputs for finalizing interventions in pilot sites.
Local Capacity Development	Local field assistants will be involved in facilitating the project interventions in pilot sites.

**Work Package 5 – Gender:** Greater awareness and capacity of key stakeholders in the water sector is needed to consider and address unequal capabilities in benefitting from and influencing water resources planning and management across gender, caste, class and ethnicity at local and basin levels. Current status of progress in implementing WP5 activities are provided in **Table 7**.

**Table 7:** Progress status of WP5

Output	<b>5.1 &amp; 5.2</b>	<b>In basin-level report of political economy analysis in WP1: Elucidate gender/caste/ethnicity differences in perceptions of WR development and access to resources of stakeholders</b>
Indicator	5.1.1	Political economy analysis report
Six-month Progress		The political economy analysis will rely on data collected through the preference ranking survey conducted with stakeholders at multiple levels and on the basin-wide survey that included a valuation component. Both surveys have been completed and we are waiting for the dataset to conduct the analysis. The sample for the preference ranking survey, however, needs to be increased to be able to elucidate gender differences in perceptions. We are in the process of identifying additional participants who could respond to the survey.
Implementation challenges		In respect to the preference ranking survey, given the dominance of men in senior positions in the water sector, it will be a challenge to find suitable women respondents with similar age, education and position backgrounds that compare with the men respondents. In addition, the preference ranking survey is slightly complex and quite lengthy and it will be a challenge to dedicate the necessary human resources to sit with all respondents while they fill in the survey.
Stakeholder involvement in delivery		This output relies on stakeholders' perceptions and stakeholders include a wide range of individuals across decision-making levels, sectors and with different backgrounds, gender, caste and ethnicity.

Output	<b>5.3</b>	<b>Policy recommendations to address identified gaps in current policy and institutional set up in terms of gender issues such as male out-migration and feminization of agriculture, etc.</b>
Indicator	5.3.1	Set of policy recommendations
Six-month Progress		We have conducted interviews with national level stakeholders and farmers. We now need to conduct interviews with district level stakeholders and newly elected Gaunpalika officials to draft the set of recommendations.
Implementation challenges		The main challenges include the transition towards federalism that is significantly changing the institutional set-up. Once finalized, we will need to review and possibly revise the set of policy recommendations later on next year to ensure they are still relevant.
Stakeholder involvement in delivery		As indicated above, the recommendations rely on interviews with stakeholders at different decision-making levels.

Output	5.7	<b>In a comprehensive report on facilitating as well as constraining factors on access/use of different water resources within the community in WP4: Implications of current gender and caste relationships on access and use of different water resources</b>
Indicator	5.7.1	Reported produced
Six-month Progress		Fieldwork was completed in May 2017 and data analysis in August 2017. A first draft report was reviewed by the WP leader in September and has been finalized by Oct 1st so it is on track as per the deadline of Dec. 2017. Please refer <b>Annex 8</b> for the latest draft of the report.
Implementation challenges		No major risks and challenges identified - this is on track.
Stakeholder involvement in delivery		The report was based on interviews and focus group discussions with 54 male and 107 female farmers of different ages and from different castes across the three pilot sites.

Output	5.9	<b>Research report and peer-reviewed paper</b>
Indicator	5.7.1	Report on a selected topic on gender (to be decided after initial focus group discussions in April 2017 and analysis of the basin wide survey data)
Six-month Progress		Following initial exploratory fieldwork completed in May 2017, we have identified research questions which we will investigate in depth in Oct/Nov 2017 and next year: 1) Interlinkages between migration, gender relationships and social capital: how is this affecting trust and collective action around water management?; 2) Women's empowerment: how do formal initiatives (land titles, WUAs) fit with local perceptions and values and more organic processes of empowerment; 3) Gendered water materialities
Implementation challenges		None noted
Stakeholder involvement in delivery		The output will be based on in-depth household interviews conducted with men and women farmers in two of the three pilot sites in Kailali and Doti districts.

\*Other outputs not reported here (5.4, 5.5, 5.6, 5.8) relate to activities due to start in the second half of the year.

#### **Additional Indicators gathered for annual report**

Linkages	WP5 provided inputs for WP1. Per the FGD checklist, FGDs were conducted and inputs were contributed to the large basin wide survey questionnaire, including the ecosystem valuation. We also contributed to WP3 to identify relevant stakeholders (notably women) to participate to the scenario visioning. We provided inputs to WP4 for assessing potential interventions from a social and gender equity perspective.
Policy and Governance Support	Several outputs (5.8 and 5.3) will contribute to support policy and governance by providing policy recommendations.
Local Capacity Development	The organization of dialogues in districts will contribute to increased local capacity development in terms of a greater awareness of gendered roles and responsibilities and of gender as a social construct.

**Work Package 6. – Integrated Policy and Practice Guidelines:** Improve the knowledge base to develop integrated policy and management guidelines. Work on this result will begin later in 2017.

**Work Package 7 – Knowledge management and dissemination:** This component is expected to ensure scientific results and findings are translated into various media and disseminated widely via website, social media, workshops/seminar etc. The progress in implementing WP7 activities are provided in **Table 8**.

**Table 8:** Progress status of WP7

Output	7	KCAP Survey, project meetings/workshop, updating of project website
Indicator	7.1	Completion of identified outputs highlighted above
Six-month Progress	7.1.	<p>-Successfully completed following workshops/meetings: i) Trade-off arena workshop on August 1, 2017; ii) Internal project meeting on August 17, 2017; iii) E-flows workshop on August 22, 2017</p> <p>-Website is regularly updated</p> <p>-Participated and presented in following national conference(s) – i) National Irrigation Seminar, June 1-2, 2017: Vishnu Pandey presented a paper titled “Sustainable Irrigation Development: Knowledge Generation for Karnalia-Mohana Basin”; ii) One abstract has been accepted for presentation at American Geophysical Union (AGU) to be held in New Orleans during December 11-15, 2017.</p>



-The progress toward this milestone: KCAP survey –

Summary: Data has been gathered and analyzed and a draft report has been prepared. The report is currently under internal review and analysis of relevant data points for use as baseline data for project outcomes is underway.

The KCAP survey covering 32 respondents was initiated in early February 2017 to assess and monitor the key research users' needs at the beginning of the project. The aim of this survey is to cover a range of stakeholders (government-local level institutions, state agencies, private sector, donors, research organizations and INGOs) perspectives on water management related components that cover the project requirements. The survey is aimed at gaining an understanding of the requirements in the region based on available knowledge, access to resources and gaps identified. It is also to understand the perceptions of stakeholders, attitudes and practices that are implemented by them in the region to initiate development outcomes. What role do stakeholders play and how can they best contribute to the planning processes?

The survey also aims to generate information around policy and institutional gaps. The analysis will help WP leaders to develop their outputs accordingly based on the desired information needed for the region. The KCAP survey findings will support the outputs that will be generated based on the requirements in the region so that at the end of the project, it is utilized by the end users for planning purposes. The KCAP survey will also help us monitor the progress of changes during the course of a two-year project timeframe. The team aims at achieving the following:

- Generating data to assess the changes in ecosystems knowledge and practice by key stakeholders
- How best EF can be integrated into water resource planning and development
- How governments and other key stakeholders demonstrate knowledge of model strengths, limitations and capacity to apply and interpret models to assess trade-offs at local and basin levels

Key activities completed under KCAP Survey-

1. Questionnaires were prepared in consultation with all project work package leaders.
2. A list of crucial stakeholders was mapped and identified in consultation with the project team.
3. The survey was piloted with a small group within IWMI to test the responses.

	<ol style="list-style-type: none"> <li>4. A Survey Monkey was distributed in the month of April to generate information from the list of identified key stakeholders.</li> <li>5. Survey Monkey responses have been generated and analysis is being incorporated into the annual report.</li> <li>6. A few direct face-to-face interviews have been conducted with government officials to generate their perspectives.</li> </ol> <p>Please refer <b>Annex-8</b> for baseline report on KCAP survey.</p>
Implement- ation challenges	<ul style="list-style-type: none"> <li>-Availability of important government officials for conducting interviews for the KAP Survey</li> <li>-Collection of survey responses required constant follow-up</li> <li>-We could only generate slightly more than 50% of the survey responses since there was a low response from the private sector</li> <li>-Timing of the survey clashed with public holidays which was a constraint in collecting responses</li> </ul>
Stakeholder involvement in delivery	All categories of stakeholders were consulted – government ministries (state, local and national), international NGOs, private sector, national research organizations and universities

Additional indicators gathered for annual report	
Linkages	Collaboration with other work packages in developing knowledge and communications material
Changes and Lessons	Not applicable
Gender	Gender components were included into the KCAP survey to ensure the questions were focused around assessing gender equity and perceptions from all stakeholders
Sustainability	The communication and outreach activities will support and promote integrated and holistic planning in Western Nepal
Environmental Compliance	Not applicable
Policy and Governance Support	The main purpose of the outputs from this work package are relevant for policy and governance support. The KCAP survey will monitor the effectiveness
Local Capacity Development	The KCAP survey will monitor the effectiveness
Public Private Partnerships or Global Development Alliance	Not yet applicable

(GDA) partnerships and impacts	
Science, Technology and Innovation issues and impacts	The knowledge generation from the project will contribute to furthering the knowledge base of the study basins and support future planning of these basins.

## WP8 - Project Management

Output	<b>8.1</b>	<b>Donor reporting</b>
Indicator	8.1.1	Donor reports submitted and approved
Six-month Progress	8.1.1	The annual work plans, GESI plan, M&E plan, the semi-annual and annual project reports and financial reports have been submitted to USAID.
Implementation challenges		There was delay in submitting some financial reports as we had to wait for information from our headquarters in Sri Lanka
Stakeholder involvement in delivery		Not applicable

Output	<b>8.2</b>	<b>Coordinate and manage project personnel and operations and strengthen partnerships with external partners</b>
Indicator	8.2.1	The project runs smoothly, thus facilitating the outputs and outcomes from WP1 to WP6
Six-month Progress		<ul style="list-style-type: none"> <li>-Hired 1 research officer (50%) to support for hydrological modeling/analysis</li> <li>-Finalized contract amendments for 3 partner organizations i.e. Duke University, Kathmandu University, Nepal Water Conservation Foundation (NWCF) in the context of budget cuts from USAID.</li> <li>-Planned and conducted regular monthly project meetings</li> <li>-Attended meetings organized by USAID and the PANI team</li> </ul>
Implementation challenges		Project staff are spread throughout 5 countries, so coordinating project meetings when everyone can be present has been a challenge.
Stakeholder involvement in delivery		Meetings are ongoing with relevant stakeholders.

Additional Indicators gathered for annual report	
Linkages	Coordination of activities between different work packages
Changes and Lessons	Physical meetings in Kathmandu are being planned once in a year. The latest one was held on August 17, 2017 in Kathmandu.
Gender	There is gender balance in the project team.
Sustainability	Not applicable
Environmental Compliance	Not applicable
Policy and Governance Support	Not applicable
Local Capacity Development	Not applicable
Public Private Partnerships or Global Development Alliance (GDA) partnerships and impacts	Not applicable
Science, Technology and Innovation issues and impacts	Not applicable

## 2.3 M&E Update

The primary focus of monitoring and evaluation actions during the reporting period were twofold. The first focus was the completion of the design, data collection, analysis and report writing of the knowledge, capacity, attitude and practice baseline survey. The purpose of the survey was to identify the current state of thinking and practice amongst the key target users of the DJB outputs. The concept is that by understanding and ‘measuring’ the state of play near the start of the project will allow for a further assessment following the project’s implementation to assess what changes in practices, capacities and behaviors have taken place, and of those – what are attributable to the project. This focuses primarily, therefore, on the uptake of relevant and useful tools, practices, and techniques which have been produced and disseminated by the project. The draft report is under internal review and shared for review with USAID. The team is also currently identifying which data points can be used to provide a baseline for specific behavioral outcomes in the logical framework.

The second focus is the adaptation and utilization of the online project results tracking system. The project management team, led by the M&E adviser, has designed the system and worked with the WP leaders to establish a streamlined template ([here](#)). Evidence from the output and outcome tracking (alongside information on evidence behind the assumptions), the gender tracker, risk assessments (including special event auditing), and other related projects and components under the activities have fed into a learning and reflection process built into our planning and reporting. This has allowed the project to refine its work and also increase alignment and provide evidence to USAID and other stakeholders to facilitate overall understanding of the theory of change.