

**SUSTAINABLE, JUST & PRODUCTIVE  
WATER RESOURCES DEVELOPMENT IN WESTERN NEPAL  
UNDER CURRENT & FUTURE CONDITIONS  
(DIGO JAL BIKAS – DJB)**

# **Basin-Scale Development Scenarios**

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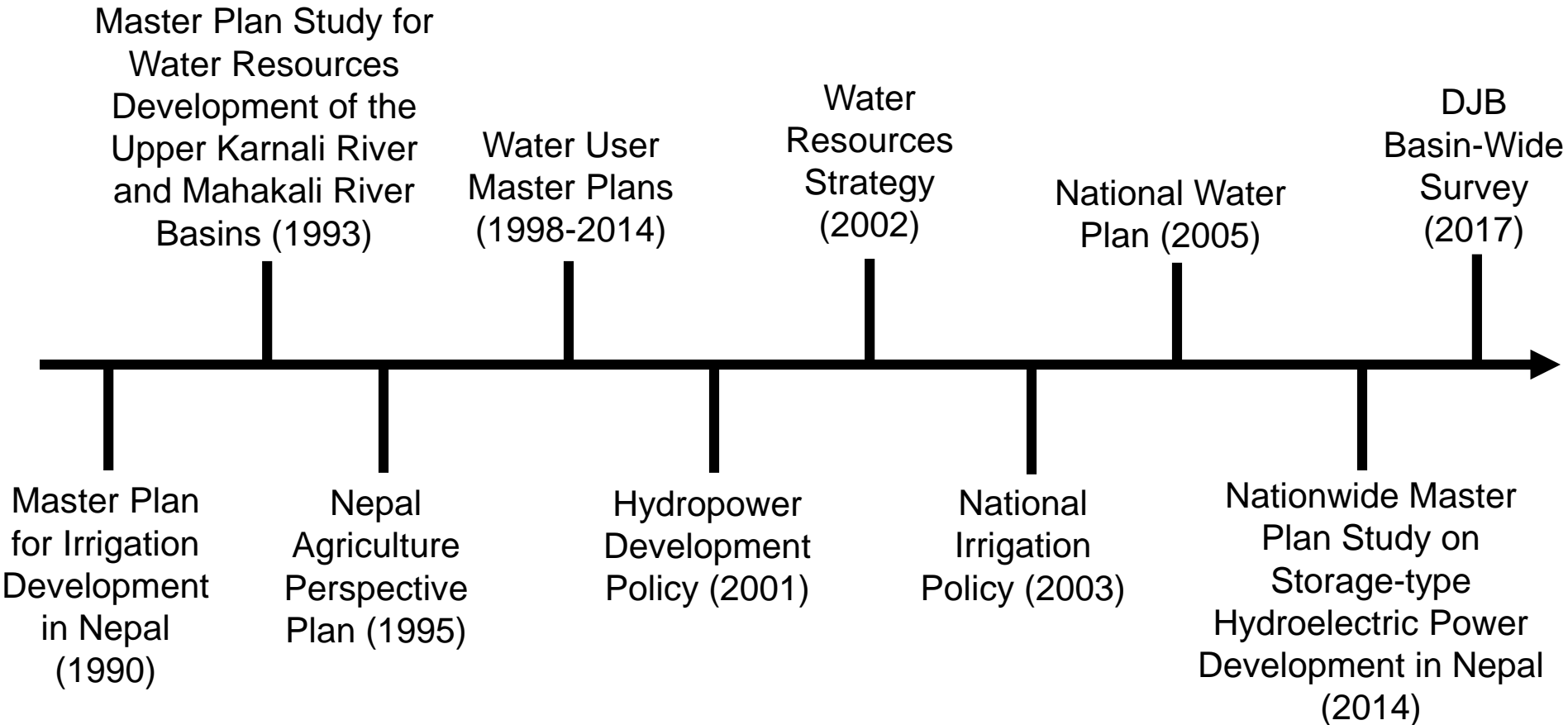


# Development Trends in Western Nepal

- Regional Population Growth
  - Mid-West: 1.74%
  - Far-West: 1.49%
- Projected 2017 GDP Growth: 7.5%
  - Demonstrates significant recovery from earthquake-induced low
  - Agricultural productivity, expanded electricity appear to be mechanisms of this growth
- Migration
  - Annual growth rate of absentee population: 9.2%
  - Remittances make up 30% of GDP
- Electricity demands growing at 12% per year
- Increases in women's empowerment, educational attainment, literacy
- Eco-tourism regains positive growth following earthquake-induced reductions



# Documents and Policies

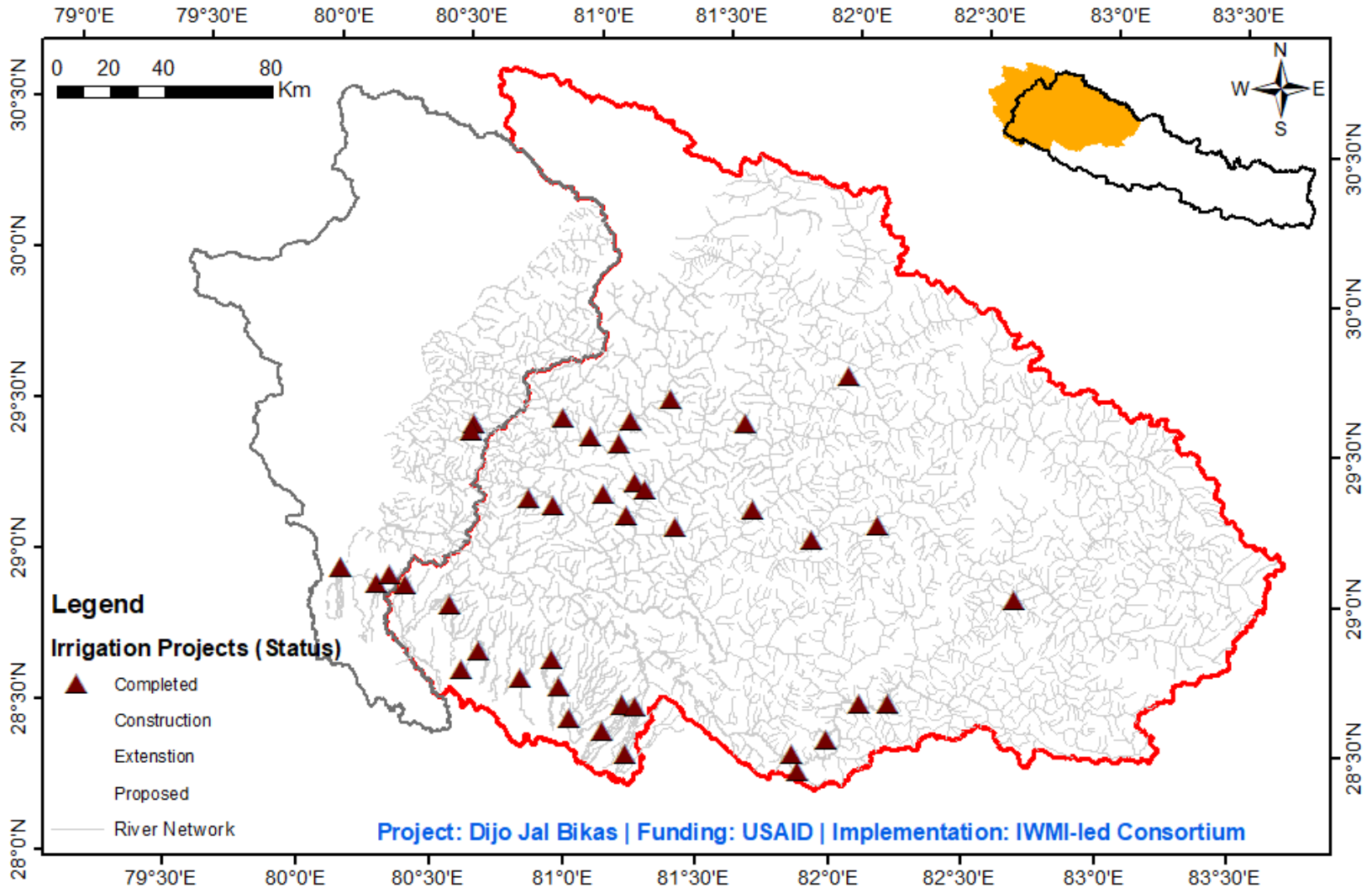


# Visions of Development: Agriculture and Irrigation

- Development plans prioritize:
  - Storage projects to regulate water availability
  - Year round irrigation, water use efficiency, cropping intensity, cropping yields
  - Investments in technology, fertilizer, and improved seeds
  - Water user associations and community participation
- Inclusion criteria for planning documents:
  - Recognition of social justice
  - Minimization of adverse environmental impact
  - Crop diversification
  - Economic development/poverty alleviation

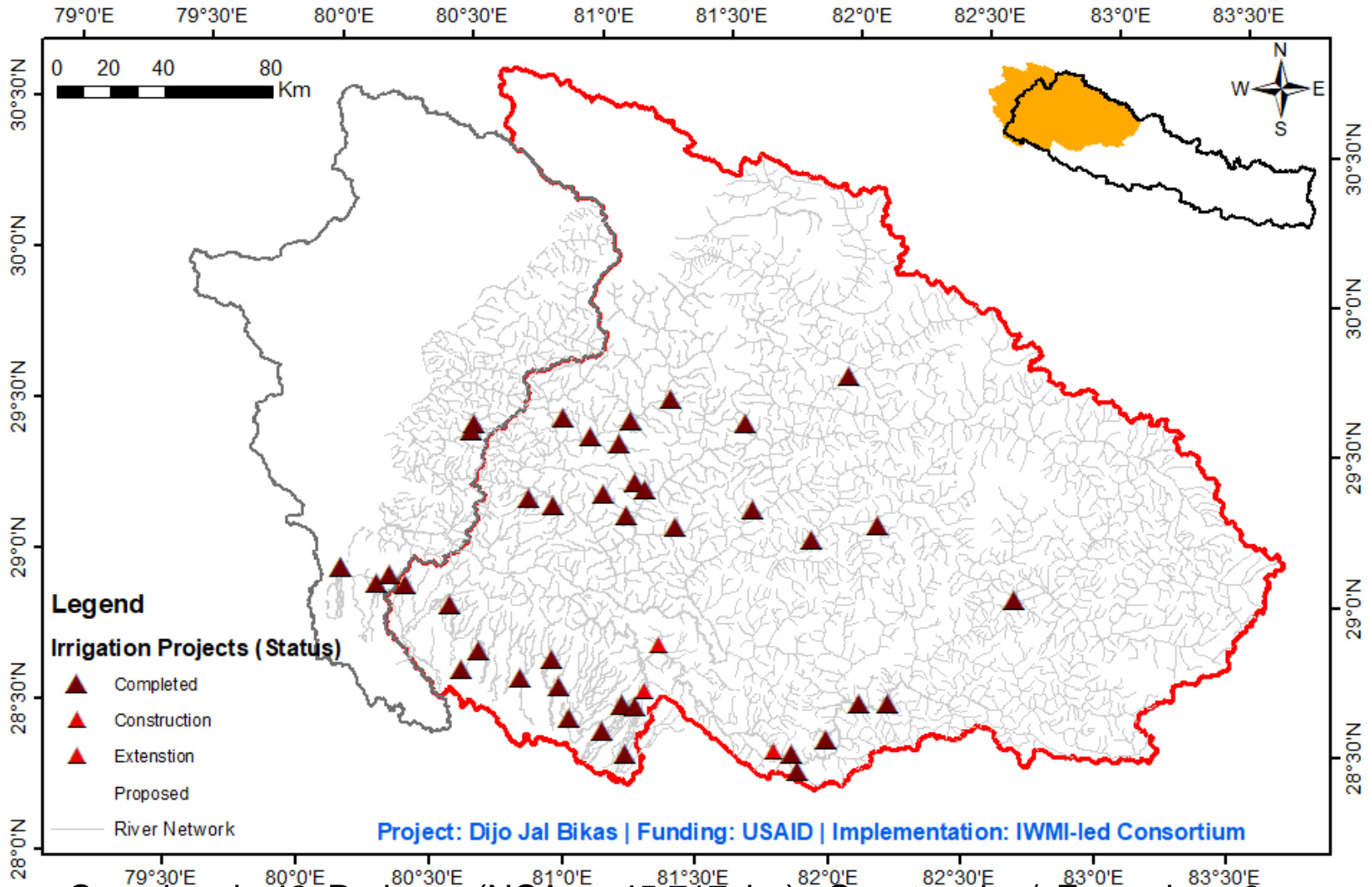


# Existing Irrigation Projects



- Completed: 42 projects (NCA = 45,717 ha)

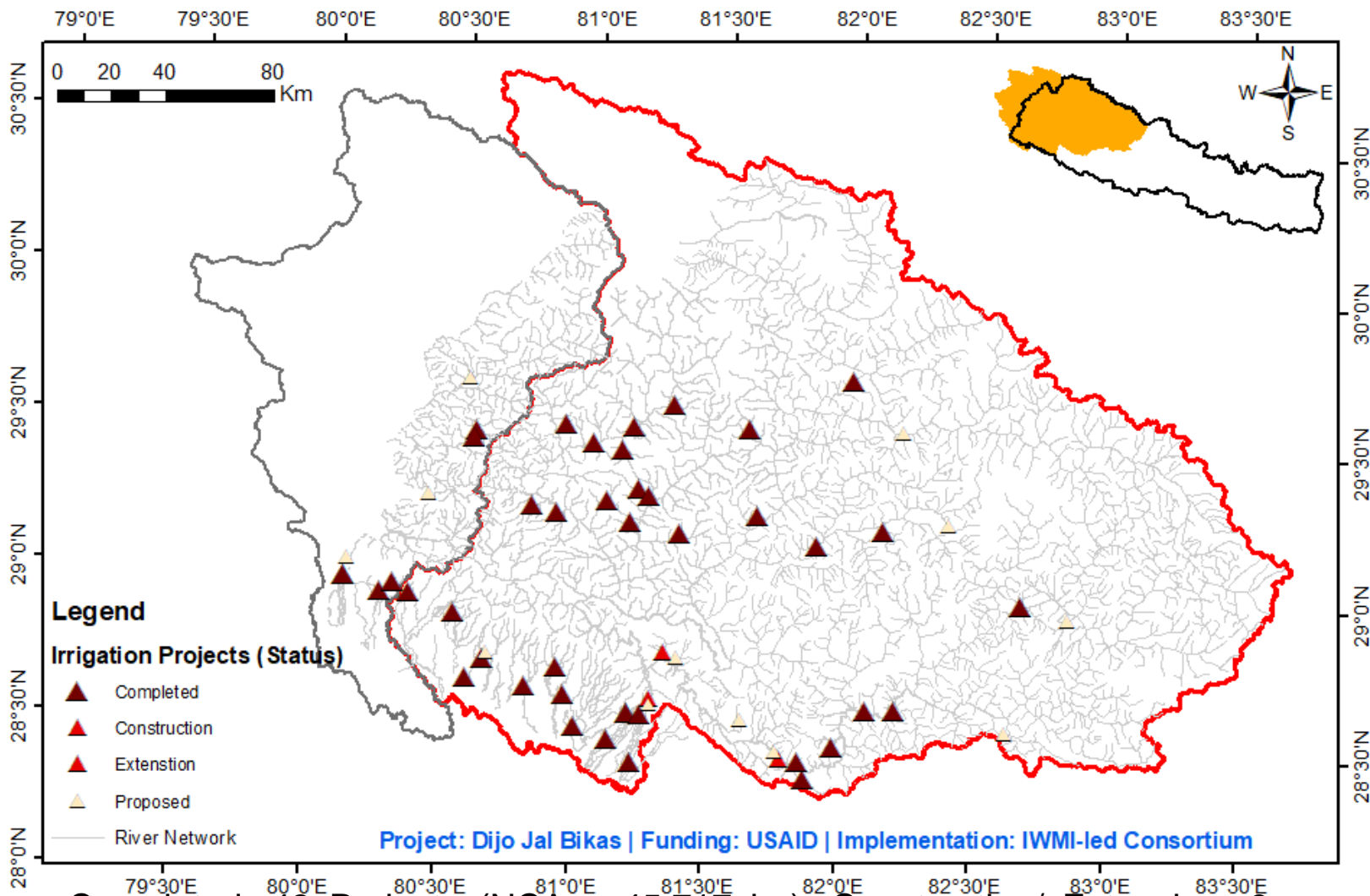
# Construction/Expansion Irrigation Projects



- Completed: 42 Projects (NCA = 45,717 ha); Construction/ Extension: 3 projects (NCA = 71,700 ha)

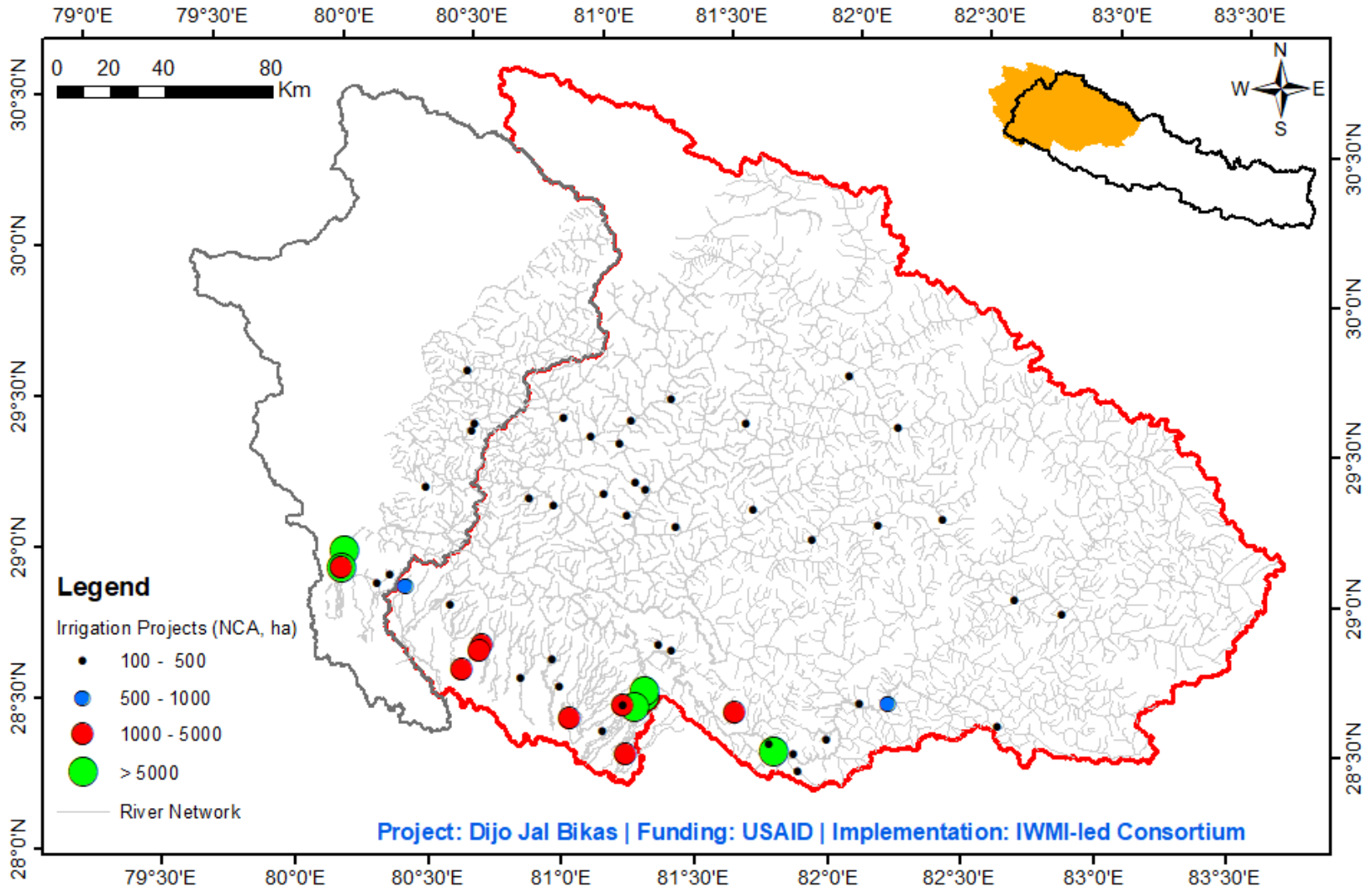


# Proposed Irrigation Projects



- Completed: 42 Projects (NCA = 45,717 ha); Construction/ Extension: 3 projects (NCA = 71,700 ha); Proposed: 12 projects (NCA = 138,583 ha)

# NCA of Irrigation Projects



- Total Projects (NCA > 100 ha): 57 nos with NCA of 256,000 ha
- NCA varies from 100 to 98,026 ha



# Visions of Development: Hydropower and Electricity

## ■ Development Plans Prioritize:

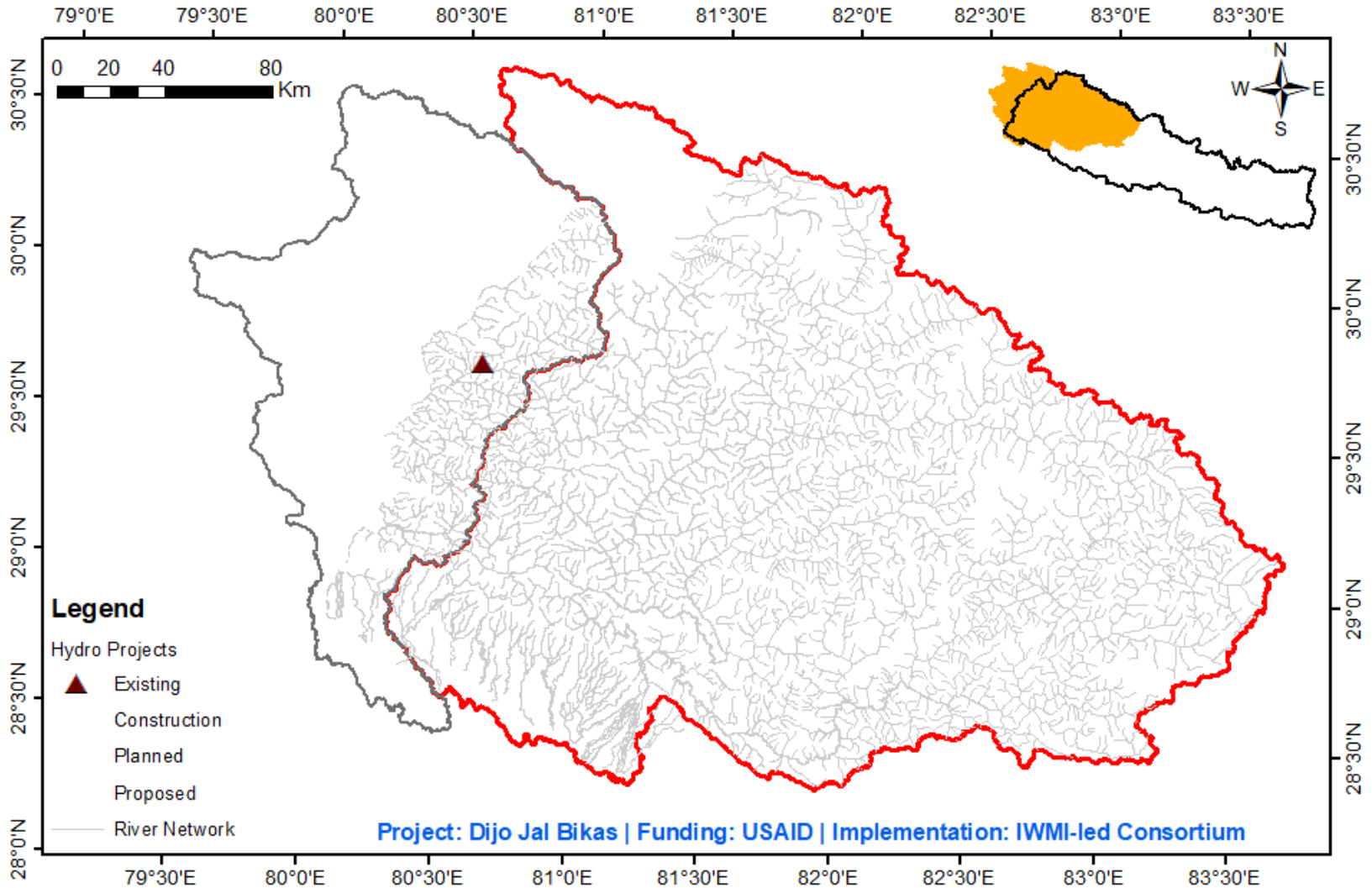
- Storage projects for increased capacity, dry season smoothing, and reduced generation costs, and energy export potential
- Rural electrification to promote development
- Economically viable projects
- Reduced dependence on biomass, energy imports

## ■ Inclusion criteria for planning documents:

- Environmental impact and land use changes
- Human resettlement and infrastructure destruction
- Fishery degradation

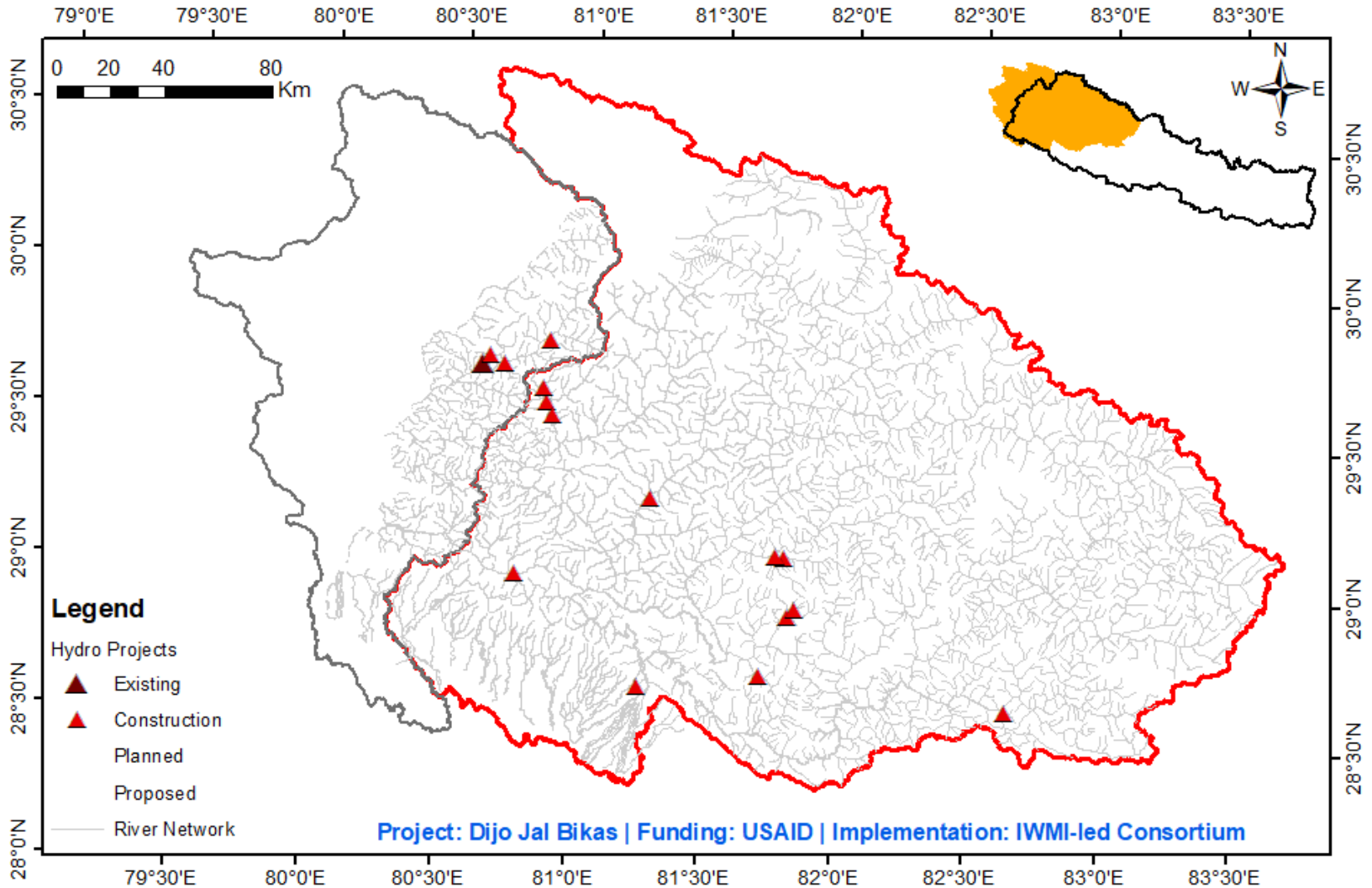


# Existing Hydropower Projects



- Existing: 8.5 MW (Naugadh Khola)

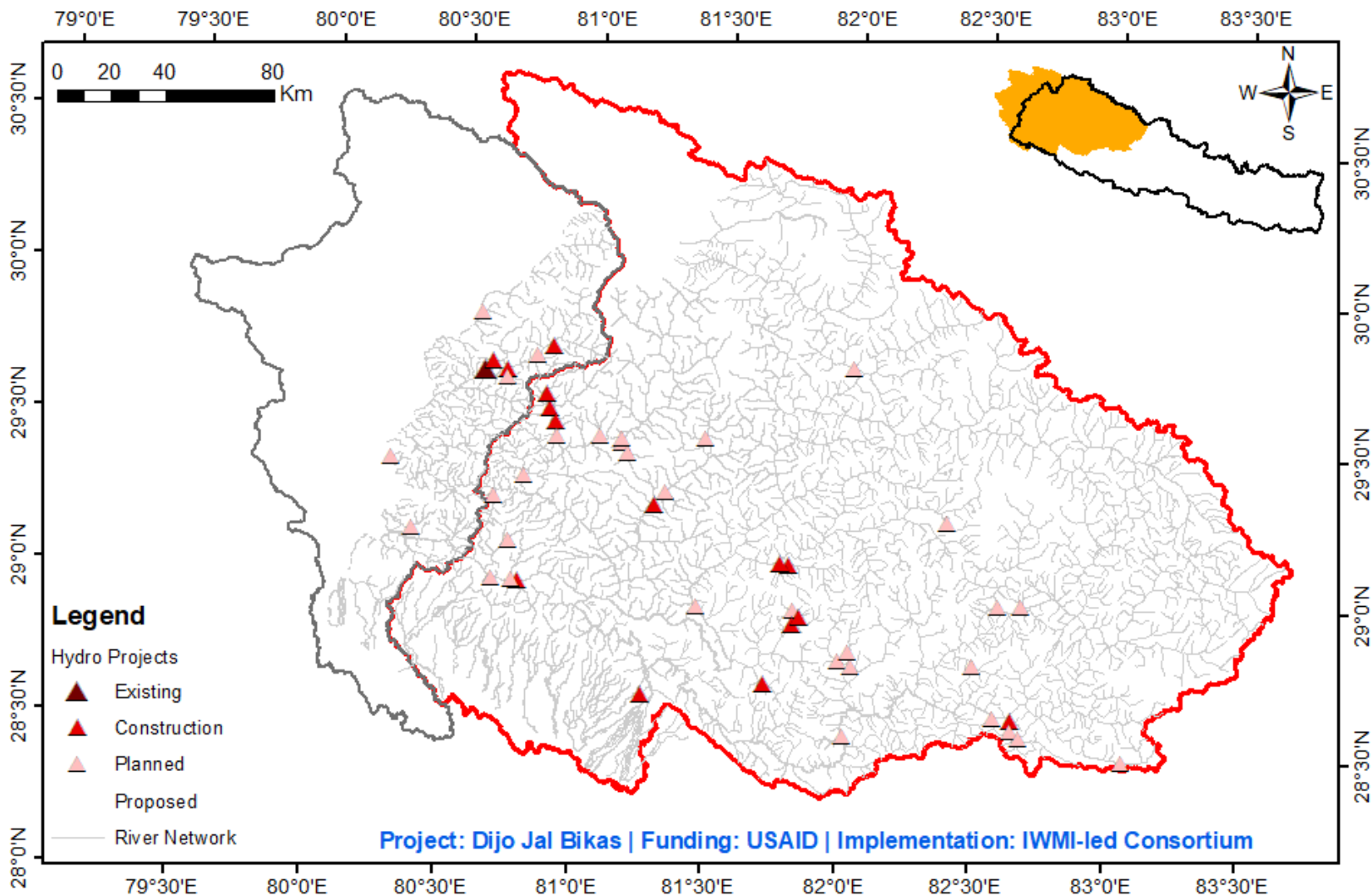
# Construction Hydropower Projects



- Existing: 8.5 MW (Naugadh Khola); Construction: 183.7 MW (15 projects)



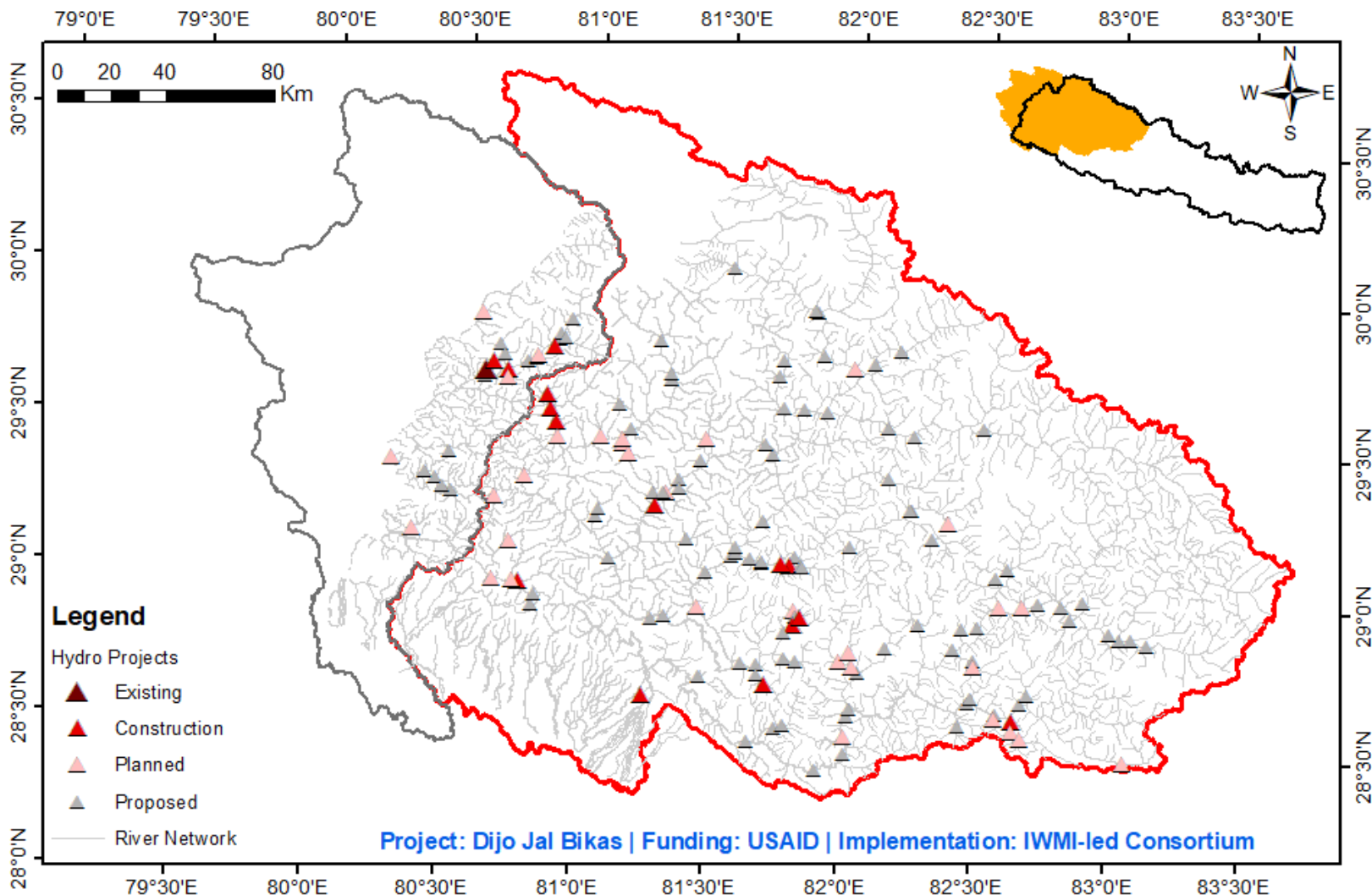
# Planned Hydropower Projects



- Existing: 8.5 MW (Naugadh Khola); Construction: 183.7 MW (15 projects); Planned: 9691.8 MW (32 projects)

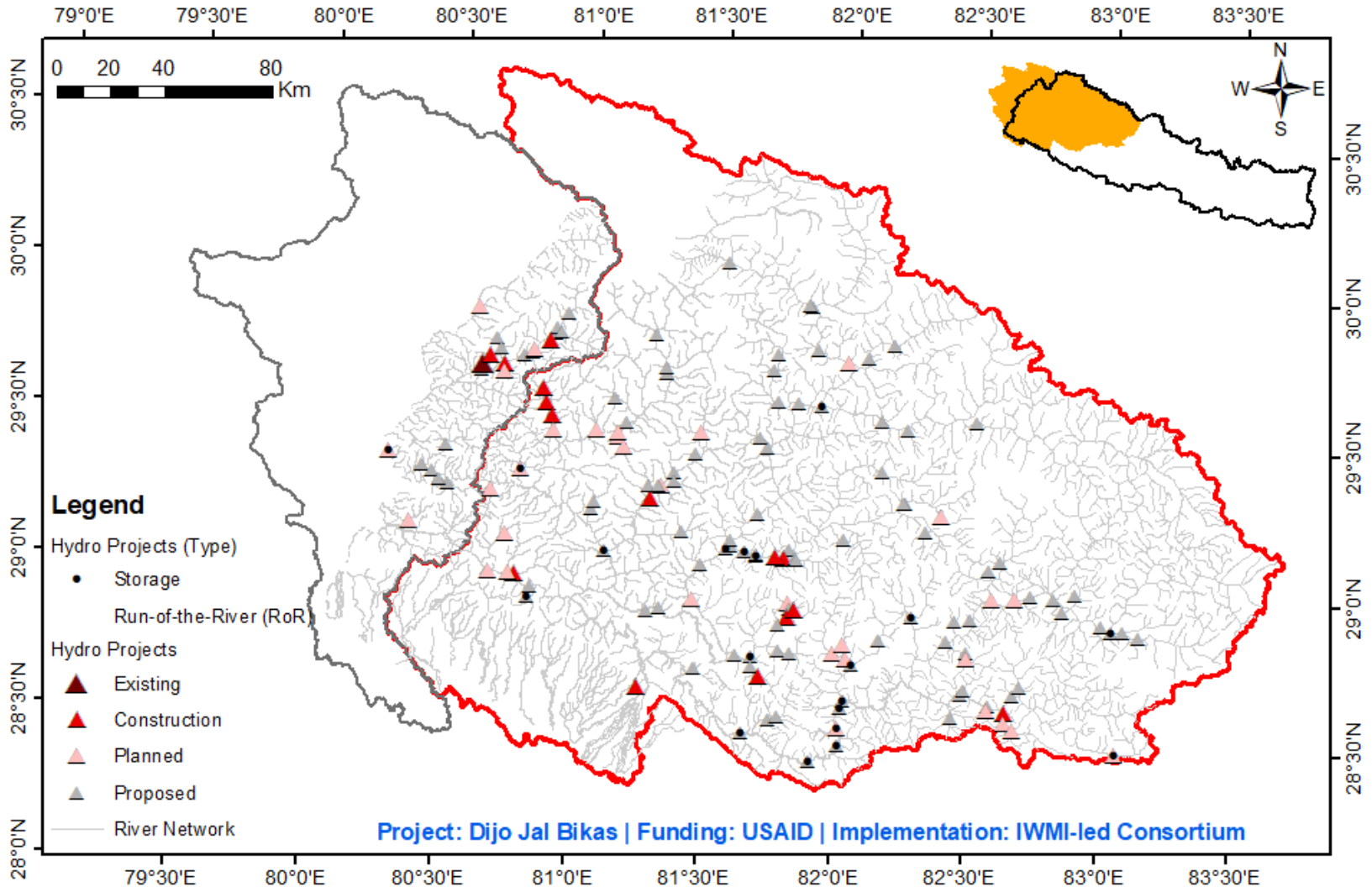


# Proposed Hydropower Projects



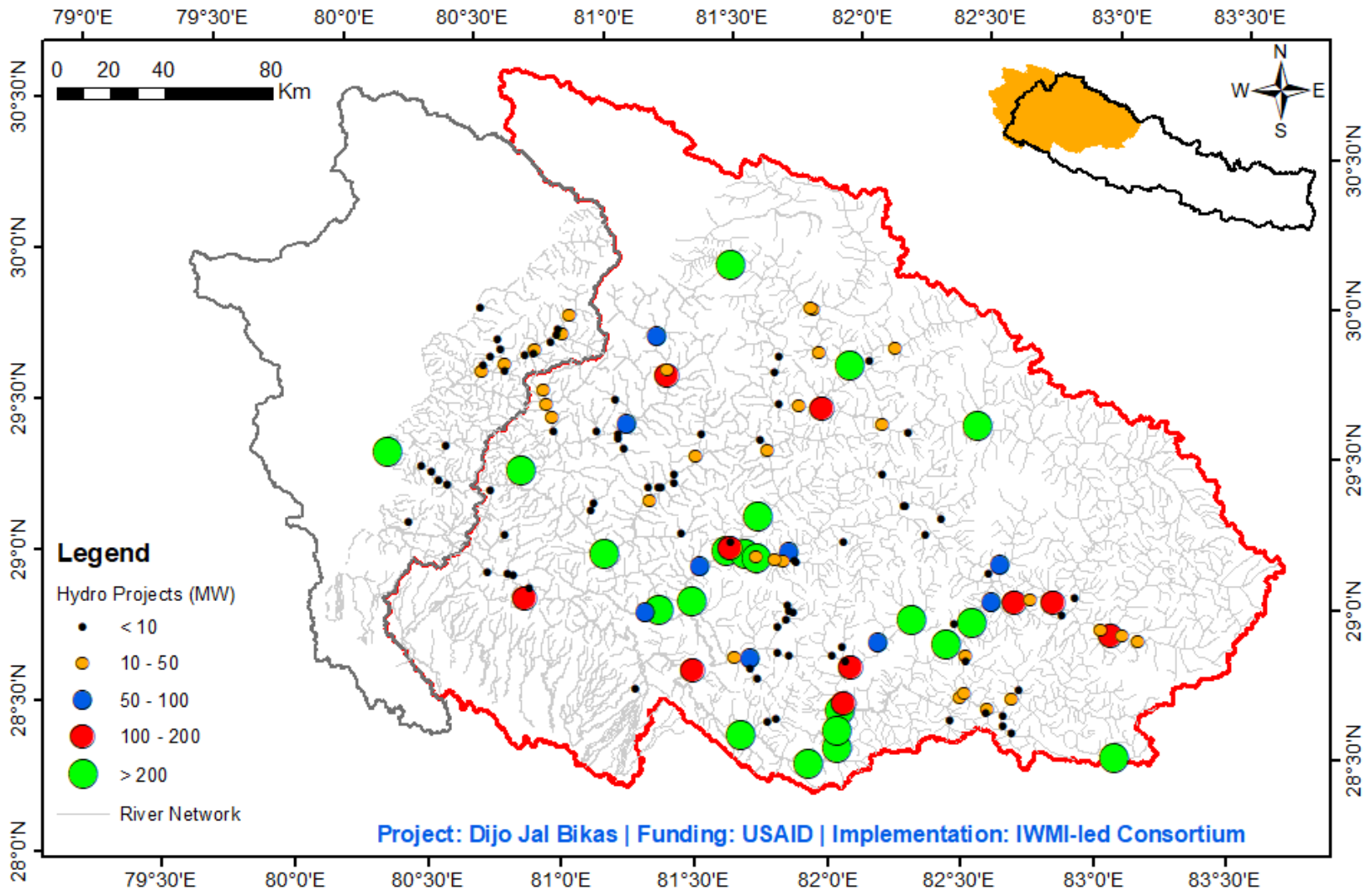
- Existing: 8.5 MW (Naugadh Khola); Construction: 183.7 MW (15 projects); Planned: 9691.8 MW (32 projects); Proposed: 11,122.8 (102 projects)

# Hydropower Projects by Type



- Storage: 19 projects (67 – 6,720 MW); All are planned/proposed
- Total Projects (> 0.5 MW): 150 nos; 21,006.8 MW

# Capacity of Hydropower Projects (MW)



# Visions of Development: Municipal Water Use

## ■ Development Plans Prioritize:

- Increased coverage, particularly of piped networks
- Municipal water security
- Demand driven development

## ■ WUMPS

- Review of 23 English-language reports (1998-2013)
- Priorities include:
  - Drinking water and sanitation schemes
  - Farmer managed and non-conventional irrigation schemes
  - Connection to electricity grid, potentially facilitated by micro-hydro
  - Recognition of need for environmental schemes to reduce water-induced disasters





# Visions of Development: Environment

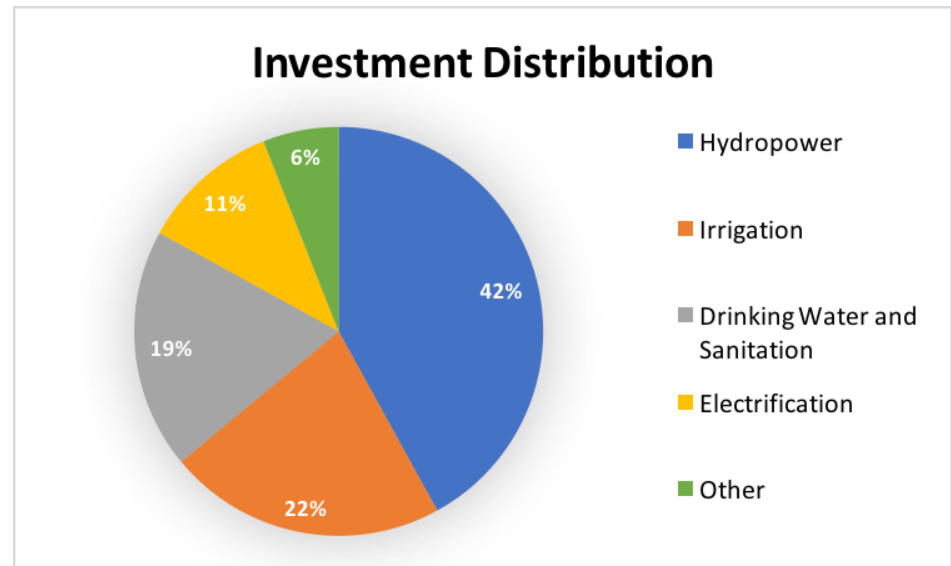
## ■ Development Plans Prioritize:

- Preservation of natural ecosystems for biodiversity
- Sustainable use of natural resources including fodder, timber, firewood, and other forest products
- Protection of existing fisheries and potential for expansion
- Preservation of natural environment for eco-tourism and water tourism



# National Water Plan 2005

- Focus on multi-sector, multi-participant approach to water resource management
- Objectives:
  - Poverty reduction
  - Drinking water access
  - Increased agricultural productivity
  - Energy generation for domestic use
  - Energy generation for export
  - Preparation for water-induced disasters
  - Sustainable use of natural resources
  - Community participation



# DBJ Basin-Wide Survey: Initial Insights

- Implemented to elicit community perspectives in basins
- Preliminary observations:
  - Community management of water and forest resources through user groups and associations
  - Reliance on both ground and surface water for irrigation
  - Primary sources of income: skilled labor, agriculture-related work, remittances
  - Prevalence of shocks including drought, hail, pest damage, and untimely rains



# Emerging Priorities

## ■ Priorities

- Rural electrification
- Expansion of installed capacity and electricity grid
- Year round irrigation
- Increased agricultural productivity
- Drinking water security
- Multi-use projects
- Water storage to meet dry season water and energy demands



# Potential Trade-Offs and Tensions

## ■ Land Use

- Storage hydropower vs. agriculture, homes, forested area, roads/infrastructure, areas of cultural significance

## ■ Water Use

- Upstream vs. downstream water demands

## ■ Energy Generation

- Large-scale/storage plants for export vs. small plants for domestic demand and rural electrification

## ■ Institutional

- Financing demands of different projects
- Central vs. local management and project scale

## ■ Environmental

- Environmental conservation vs. natural resource use
- Environment schemes vs. storage reservoirs to reduce disasters



# Bringing Together Development Plans

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- How to achieve sustainable development through careful resource management?

