

Non Traditional Security Digest

India-Nepal Water Agreements
& Hydro-Energy Cooperation

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मनोहर पर्रिकर रक्षा अध्ययन एवं विश्लेषण संस्थान

India-Nepal Water Agreements & Hydro-Energy Cooperation

Introduction

One of the most high-potential fields of cooperation between India and Nepal is in the area of water resources and river training. [Approximately 250 small and major rivers](#) are thought to flow from Nepal to India and make up a significant portion of the Ganga river basin. The basis of their relationship is

thought to be water resources. Both nations have enormous hydro resources. First, India is endowed with tremendous hydropower potential and [ranks fifth globally in terms of usable hydro-potential](#). According to the Central Electricity Authority's (CEA) assessment, India has 1,48,700 MW of installed capacity worth of economically exploitable hydropower potential. The basin-wise assessed potential is as under (See **Table 1**):-

Table 1: Hydro-Potential of India

Basin/Rivers	Probable Installed Capacity (MW)
Indus Basin	33,832
Ganga Basins	20,711
Central Indian River system	4,152
Western Flowing Rivers of southern India	9,430
Eastern Flowing Rivers of southern India	14,511
Brahmaputra Basin	66,065
Total	1,48,701

Source: [National Hydro Electric Power Corporation Ltd.](#), India

Moreover, 56 pumped storage projects with a potential installed capacity of 94,000 MW have been identified. In addition, the projected hydro-potential from small, mini, and micro schemes at 1,512 sites is 6,782 MW. Consequently, [India has a hydro-potential of roughly 2,50,000 MW](#).

Second, the hydropower potential of Nepal's river systems is about 83,280 MW (See

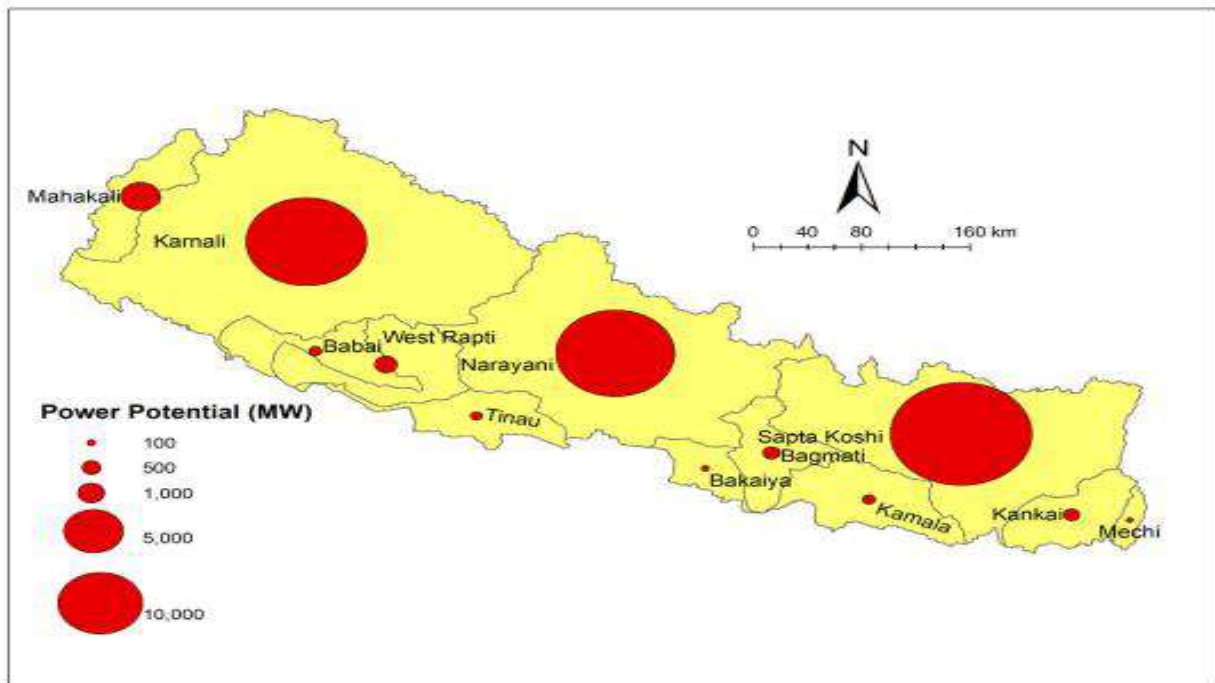
Table 2 and Map 1). [At present](#), there are 11 major hydroelectric plants, 16 grid-connected small hydroelectric plants, 23 isolated small hydroelectric plants, and 22 Private Sector Hydro Projects known as Independent Power producers (IPPs) connected to Integrated Nepal Power System (INPS) in operation in the country.

Table 2: Basin-wise Theoretical Hydro Electric Potential of Nepal

River Basin	Power Potential (MW)		Total (MW)
	Major	Small	
Kosi	18750	3600	22530
Gandak	17950	2700	20650
Karnali (Ghagra)	28840	3170	32010
Mahakali (Sarda)	3840	320	4160
Southern Rivers	3070	1040	4110
Total	72450	10830	83280

Source: [Central Electricity Authority](#), India

MAP 1: Gross Hydropower Potential in different river basins of Nepal



Source: [The Water and Energy Commission Secretariat \(WECS\)](#), Nepal

Key Agreements

The rivers on which [treaties/agreements](#) have

been signed between India and Nepal and the nature of the treaty/agreement are as under

River for which treaty/ agreement has been signed	Nature of the Treaty / Agreement
Mahakali	A Treaty had been signed with Nepal in the year 1996, viz. Mahakali Treaty concerning the Integrated Development of the Mahakali River (known as river 'Sarda' in India), including Sarda Barrage, Tanakpur Barrage, and Pancheshwar Project.
Kosi	An agreement had been signed in 1954 (amended in December 1966) regarding the construction of Kosi Barrage in Nepal.
Gandak	An agreement had been signed in 1959 (amended in April 1964) regarding the construction of Gandak Barrage in Nepal.

The Nepal-India Joint Committee on Water Resources (JCWR), which is chaired by the Secretary of the Ministry of Water Resources (MoWR), Government of India (GoI), is also responsible for developing the hydro resources of common rivers with Nepal.

However, there is a well-established [three-tier bilateral mechanism](#) and there is a separate technical committee for managing water issues between India and Nepal as detailed below

a) **Joint Ministerial level Commission on Water Resources (JMCWR)** headed by the Ministers of Water Resources of India &

Nepal, with Joint Secretary (Hydro), Ministry of Power (MoP) and Chairperson, Central Electricity Authority (CEA) being the Members amongst others.

b) **Joint Committee on Water Resources (JCWR)** headed by Secretary, MoWR, GoI, Member (Hydro), CEA is one of the Members, and

c) **Joint Steering Committee on Water Resources (JSCWR)** Joint Secretaries of MoWR of both countries to discuss various aspects of India-Nepal water resources.

Joint Standing Technical Committee (JSTC) led by Chairman, Ganga Flood Control Commission (GFCC), Patna from the Indian side, with Joint Secretary (Hydro), MoP, and Chief Engineer (HP&I), CEA as members among others, was established to rationalise technical committees and subcommittees under JCWR that are currently existing between India and Nepal related to flood management, inundation challenges, and flood forecasting actions. The Joint Committee on Koshi and Gandak Project (JCKGP) will take the role of the prior Bilateral Committees in this respect, and the Joint Committee on Inundation and Flood Management (JCIFM) will be established.

In addition, there is a **Joint Committee on Inundation and Flood Management (JCIFM)** which looks after the concerns related to Inundation and Flood control. The [14th meeting of the JCIFM](#) was held between 09 to 13 March 2022 in Nepal.

Key Cooperation Projects

There are several projects on which India and Nepal have cooperation (See Map 2). These are:

1. **Pancheshwar Multipurpose Project:** Pancheshwar Multipurpose Project (PMP), a bi-national Multi-Purpose Project, has an important goal to improve Irrigation and energy production in India and Nepal. The Mahakali Treaty's main component is the execution of the Pancheshwar Multipurpose Project. On the river Mahakali, which forms the international border between the State of Uttarakhand in India and the Far Western Development Region of Nepal, the Pancheshwar Main Dam has been proposed. The location of the dam is around 2.5 km downstream of where the rivers Sarju and Mahakali converge. The project would involve building a rock-fill dam with a 311 m-tall clay core in the middle, measured from the bottom of the deepest foundation.
2. **Sapta-Kosi High Dam Project and SUN Kosi storage cum diversion scheme:** A high dam on the Sapta Kosi River is planned as part of the Sapta Kosi High Dam Multipurpose Project in Barakshetra, Nepal. The enormous multi-billion dollar project will produce 3,000 MW of power, provide irrigation, and regulate floods. The project's Sun Kosi Storage cum Diversion Scheme is a crucial component of this project. The project entails building a diversion structure over the Sunkosi River near Kurule in order to redirect water through a 16.6 km long diversion tunnel to a powerhouse upstream of the already-existing Kamala Barrage.
3. **Karnali Multipurpose Project:** The Karnali basin in Nepal offers scope for large-scale hydropower development both storage and run-of-river type.
4. **Indo-Nepal Link Canal:** NHPC, India's premier hydropower company and a PSU under the Ministry of Power, laid the foundation stone of the head regulator works of [Indo-Nepal Link Canal](#) at Barrage of 94.2 MW Tanakpur Power Station of NHPC located in Banbasa, Distt Champawat (Uttarakhand) on 8th

December 2020. The 1.2 km long Indo-Nepal canal is being constructed under the ‘Mahakali Treaty’ signed between India and Nepal. It is under construction.

5. In the context of **Power Transmission**, Since 1971, India and Nepal have had a [Power Exchange Agreement](#) in place to reap the benefits of each other's transmission infrastructure in order to meet the electricity needs in their respective border regions. There are [several locations where Nepal and India are connected](#) by 11kV, 33kV, 132kV, and 220kV lines. A 400kV D/C transmission line from Dhalkebar (Nepal) to Muzaffarpur (India) has been built to connect India and Nepal for the transmission of bulk power. Through these links, Nepal is receiving a total of around 700 MW of electricity (**See Map 3**). There have also been agreements on the 400kV D/C Gorakhpur (India) - Butwal (Nepal), 400kV D/C Dhalkebar (Nepal) - Sitamarhi (India), 132kV D/C Nanpara, Bihar (India) - Kohalpur (Nepal), stringing of the second circuit of the 132kV line Kataiya (India) - Kushaha (Nepal), and 132 kV Raxaul (India)-Parwanipur (Nepal).
6. On October 21, 2014, India and Nepal signed a document titled "[Electric Power Trade, Cross-border Transmission Interconnection, and Grid Connectivity](#)." The Agreement aims to improve grid connectivity, cross-border power commerce, and cross-border electricity transmission between Nepal and India. Recently, in April 2022, both countries come up with the '[Joint Vision Statement](#)

[on Power Sector Cooperation](#)' which further deepens each other's power sectors.

Key Challenges

The Following challenges can be considered responsible for inadequate cooperation between India and Nepal on water resources. These issues were the major talk of the table during the [recent India-Nepal Joint Secretary level meeting in September 2022](#). These are:

1. There is a **lack of clear-cut strategy in Water cooperation**. For instance, Regarding the Mahakali Treaty's release of irrigation water for the Dodhara-Chandani region, there are still a number of points of understanding between the two parties.
2. **Pancheshwar Multi-purpose Project:** Due to the disparities in cost-sharing and historical water consumption between India and Nepal, this project is experiencing delays. A Joint Project Office (JPO-PI) finished the necessary field research for the Pancheshwar Multipurpose Project in 2002 (except for some confirmatory tests). However, the Pancheshwar Project's mutually acceptable DPR has not yet been finalised. The Pancheshwar Development Authority will execute, operate, and maintain the project, including the integrated task of re-regulating the dam at the Rupaligad site, after the DPR is finalised.
3. **Karnali Chisapani Project:** Both countries failed to reach an agreement on sharing costs for different components of

the project and how to apportion the benefits of energy, irrigation, and flood control. It also raises several concerns about the flora and fauna of the area where it is located. For instance, [The Karnali Project would inundate about 100 km of the streambed and 340 sq km of land](#). Its dam would also constitute a 270 m high ‘fence’ against migratory fish life. Moreover, the Discussion/finalization of the Detailed Project Report (DPR) and other issues shall be taken up shortly.

4. ***Sapta Kosi High Dam Multipurpose Project (3300 MW) and Sun Kosi Storage cum Diversion Scheme:*** Under this project, studies on the advantages of flood control, balance drilling, the entirety of drifting work, the completion of power potential studies, power system and evacuation studies, studies on the impact on the environment, geophysical studies, and geo-mapping for the Sisauli barrage [are still pending](#). Additionally, a Joint Project Office (JPO) was established in August 2004 following the exchange of a letter of understanding between the two governments in June 2004 in order to conduct extensive field research for the creation of the DPR for the SaptaKosi High Dam Project in Barakshetra in Nepal. The DPR is under process.
5. The ***transmission of power also faces numerous challenges***. For instance, several ethnic groups are objecting to these power transmissions as they are affecting their livelihood. Moreover,

These power transmissions are hampering the agricultural land of the local people living along the transmission area. In return, farmers are demanding high compensation.

To Know other several key concerns, access [here](#).

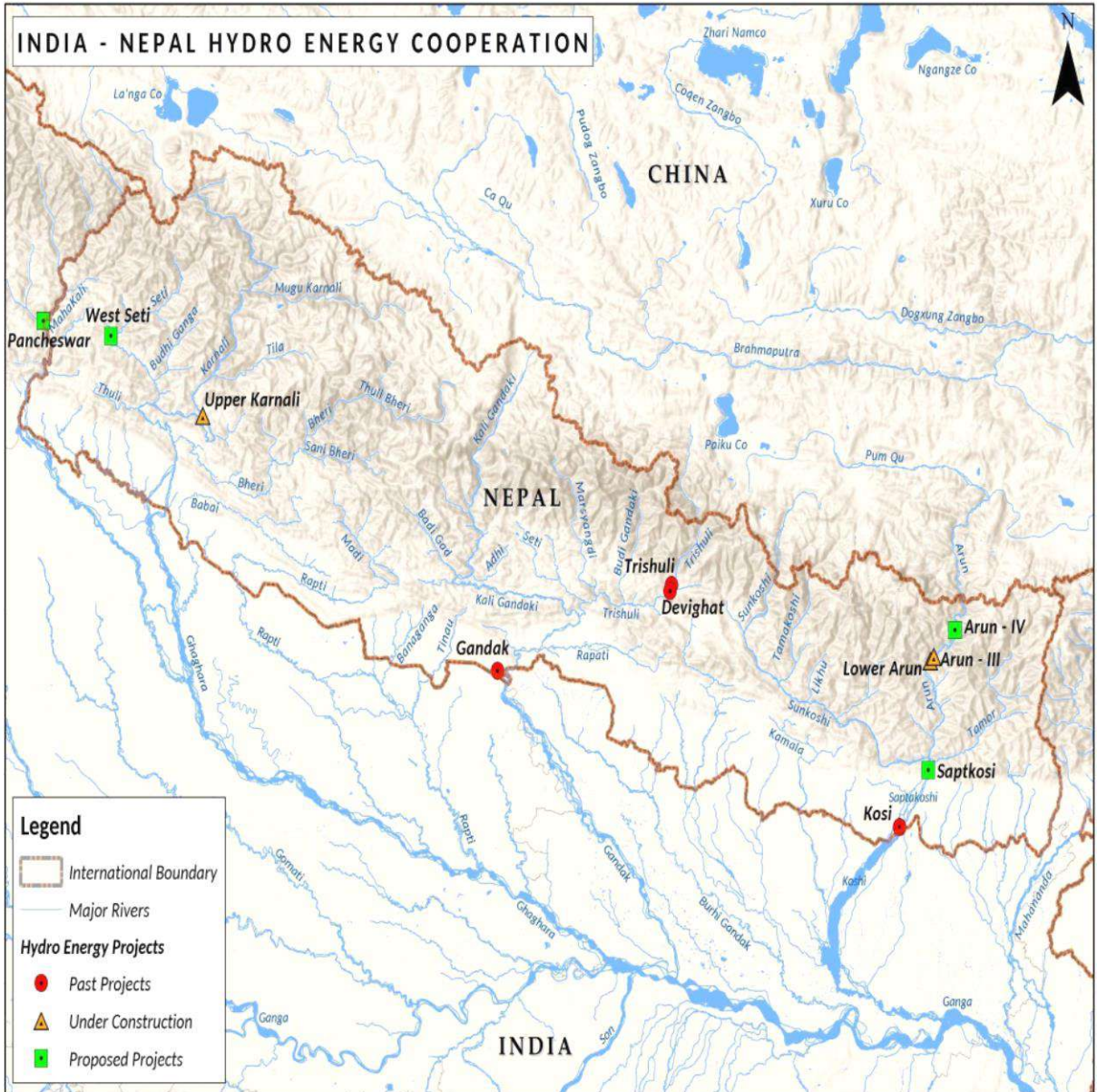
Recent News

1. Foreign Secretary of Nepal, Shri Bharat Raj Paudyal was on an [official visit to India from 13 to 14 September 2022](#) at the invitation of Foreign Secretary, Shri Vinay Kwatra. In accordance with the Joint Vision Statement on Power Sector Cooperation adopted during the visit of the Prime Minister of Nepal to India in April 2022, both parties resolved to further deepen their cooperation.
2. The Pancheshwar Multi-purpose Project and other bilateral water resource issues were discussed at [a three-day India-Nepal Joint Secretary level meeting](#) between India's and Nepal's top officials in September 2022. In addition, the high dam of Sapta Koshi, and irrigation in Dodhara-Chandani were discussed during the bilateral meeting.
3. Several issues related to cooperation in areas of flooding and inundation between India and Nepal were discussed during the [9th Meeting of the Joint Committee on Water Resources and the 7th Meeting of the Joint Standing Technical Committee](#).

Further Recommended Readings

1. Treaties related to Water between India and Nepal, [Here](#)
2. India-Nepal Joint Ministerial Commission on Water Resources (JMCWR) - [Joint Press Statement](#)
3. Meetings of Nepal-India Joint Committee on Water Resources (JCWR) - [First](#), [Second](#), [Third](#), [Fourth](#), [Fifth](#), [Sixth](#), [Seventh](#), [Eighth](#), [Ninth](#).
4. Meetings of Nepal-India Joint Standing Technical Committee (JSTC) - [First](#), [Second](#), [Third](#), [Fourth](#), [Fifth](#), [Sixth](#), [Seventh](#).
5. Meetings of Nepal-India Joint Committee on Inundation and Flood Management (JCIFM) - [First](#), [Second](#), [Third](#), [Fourth](#), [Fifth](#), [Sixth](#), [Seventh](#), [Eighth](#), [Ninth](#), [Tenth](#), [Eleventh](#), [Twelfth](#), [Thirteenth](#), [Fourteenth](#).
6. Meetings of Nepal-India Joint Committee on the Kosi and Gandak Projects (JCKGP) - [First](#), [Second](#), [Third](#), [Fourth](#), [Fifth](#), [Sixth](#), [Seventh](#), [Eighth](#).
7. The Water and Energy Commission Secretariat (WECS), Nepal - [Reports and Publications](#)
8. Minutes of the First Meeting on Inland Waterways Connectivity between Nepal and India, [Here](#)
9. The Water and Energy Commission Secretariat (WECS), Library Online Catalogue, Nepal, [Here](#)
10. First Joint Inspection Report of JCIFM's Sub-group on Inundation and Flood Management issues in bordering areas of Nepal and India (June 26th - 30th, 2018), [Here](#)
11. Dixit, Ajay & Basnet, Shreshna (2005). Recognising Entitlements and Sharing Benefits: Emerging Trends in Nepal's Hydropower Terrain. *IUCN Nepal*. [Here](#)
12. Nepal-India Cooperation on Hydropower (NICOH) [Here](#)
13. Hydropower Development in Nepal [Here](#)
14. Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti, "Annual Report 2020-21", *Central Water Commission*, [Here](#)
15. Pancheshwar Development Authority (PDA) [Here](#)

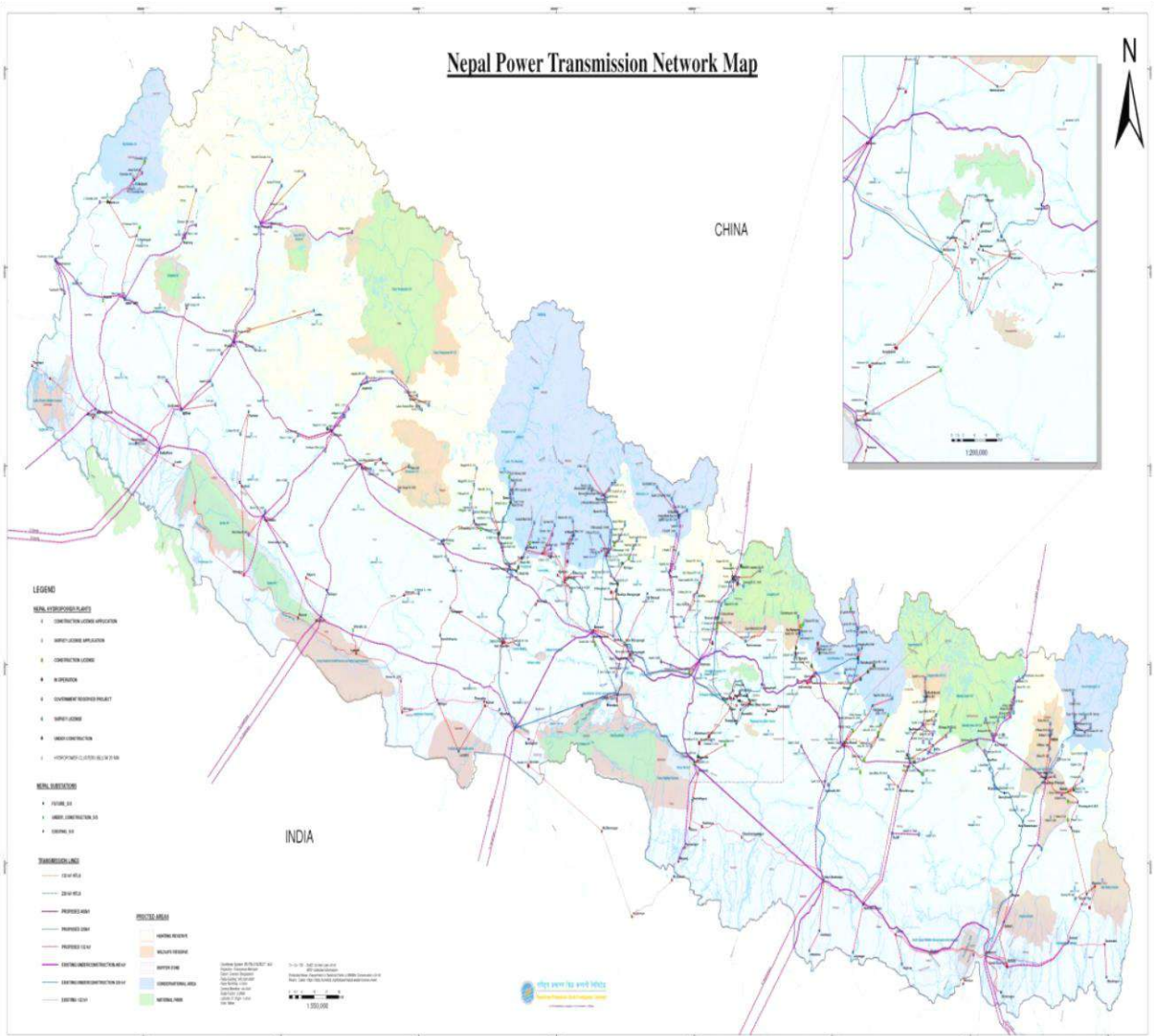
MAP 2: India-Nepal Hydro-Energy Cooperation



© GIS Section, Manohar Parrikar Institute for Defence Studies and Analyses (MP-IDSA). Map not to scale.

Source: GIS Section, The Manohar Parrikar Institute for Defence Studies and Analyses, New Delhi,

MAP 3: Nepal Power Transmission Network



Source: [Ministry of Energy, Water Resources and Irrigation, Government of Nepal](#).

Non-Traditional Security Centre

This digest has been prepared by the Non-Traditional Security Centre, Manohar Parrikar Institute for Defence Studies and Analyses, New Delhi.



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Manohar Parrikar Institute for Defence Studies and Analyses

No.1, Development Enclave, Rao Tula Ram Marg,
Delhi Cantt., New Delhi - 110 010

Tel.: (91-11) 2671-7983 Fax: (91-11) 2615 4191

Website: <http://www.idsa.in>