

## **PN 48: STRATEGIC ANALYSIS OF INDIA'S NATIONAL RIVER-LINKING PROJECT (NRLP)**

The National River-Linking Project in India has been proposed to address the simultaneous flooding and water shortage problems across different regions of the country. The project is a massive infrastructure undertaking that, on completion, would form a water grid system linking 37 rivers and handling 178 km<sup>3</sup> of inter-basin water transfer a year through a canal network 12,500 km long, at an estimated cost of US \$ 120 billion. According to project estimates, the interlinking of rivers would generate 35 gigawatts of hydro-power and add 35 million hectares to the total irrigated area in India.

Through this inter-basin transfer of water from Ganga-Bhramaputra-Meghna basin to the South and West of India, proponents of the scheme argue that water resources will be more evenly distributed through the country. Critics argue that the scheme is a gargantuan infrastructure project that may have ecological, social and economic costs that exceed the benefits. Some question the feasibility of the project given its scale.

As the main institution for the strategic analysis of the National River Linking Project (NRLP), the International Water Management Institute, with support from the Challenge Program on Water and Food, is coordinating a research effort to assess India's Water futures to 2025/2050 and analyze alternative options to meet future water challenges. For this, a taskforce has been created that draws on the knowledge of various stakeholders including academics, activists, government officials, farmers, and citizens on various aspects of the NRLP. Through an objective and inclusive methodology and debate, a 3-year program was developed to research the NRLP and the water situation in India and thus contribute to the national discourse on India's Water Future 2050.

A research program has been designed in alliance with about a 100 Indian researchers and institutions. The active partnership with civil

society and stakeholders will serve to improve and substantiate the national debate with the goal of ultimately influencing water policy outcomes in India.

Thus the main objectives of the program are to:

- impart substance and quality to the national discourse on NRLP;
- help India think through its long-term water challenge and evolve a fall-back strategy to meet it;
- rally a broad alliance of Indian researchers and institutions to participate in a distributed research and dissemination program;

The project is conducted in three phases as listed below:

- Phase I will document the recent changes of key drivers of water supply and demand, and the most likely magnitude of India's Water Futures to 2025/2050.
- Phase II will analyze whether the NRLP will be able to bridge the gap between demand and supply of water in 2025/50, and to estimate the cost effectiveness of meeting these demands. It also explores the ways in which social benefits of the project could be maximized if the Government of India decides to implement the project.
- Phase III explores the alternatives to the NRLP, and whether they will be able to meet the demands of the subcontinent in place of the NRLP.

The project opened with an inception workshop to identify the key drivers for assessing India's water futures to 2025/2050 and to assess the adequacy of the proposed activities in Phase I analyzing the water futures scenarios. The project has a

comprehensive website that serves as a repository of project documents and reports.

The studies commissioned under Phase I have been completed and can be found on the project website. Brief details on preliminary findings can be found in Box 1, which suggest that irrigation intensity – one of the main determinants of demand for water, in India is likely to increase significantly in the future. Results on the main findings on India’s Water Future will be presented at the Challenge Program Forum in Laos in November 2006.

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## The Future of Irrigation in India

India’s population is projected to increase from approximately 1 billion currently to 1.5 billion by 2050. Managing the water resources to meet the increased demand for the agricultural, domestic and industrial sectors will be a daunting task for the country. In order to estimate if India has the water resources to meet the increases in demand, this study attempts to estimate the future demand for water under different scenarios.

The main drivers of increased demand for water are population, economic growth, nutritional intake, crop yields, and crop area – all of which are projected to increase in the next fifty years.

While, the business as usual scenario projects total water demand will increase by 26 and 48 percent in 2025 and 2050, respectively, most of this increase is projected for the industrial and domestic sectors. Irrigation water demand will increase only by 5 percent. This is in stark contrast to the demand projections of the National Commission of Integrated Water Resources Development (NCIWRD) – they project a substantial increase in irrigation demand.

The main challenge to India’s water sector is that the water demand from the non-agricultural sector is increasing at a rapid pace as India's economy is expanding fostering a growth of urban centers. Competition for scarce water resources in some basins will increase. The major challenge for India in the future will be to increase agricultural productivity while meeting the increasing demand of non-agriculture sectors at the same time.

Water demand drivers	2000	2025	2050
<b>Demography</b>			
▪ Population (million)	1007	1389	1583
▪ % urban population	28%	37%	53%
<b>Economic growth</b>			
GDP growth (US\$ 1995 prices)	463	1765	6731
<b>Nutritional intake</b>			
Total calorie supply (kcal/pc/day)	2495	2770	3000
▪ % of grain crops	65	56	48
○ % from non-grain crops	28	33	34
○ % from animal products	8	12	18
<b>Grain consumption (kg/pc/year)</b>			
▪ Grain consumption	172	166	152
<b>Crop yields (Ton/ha)</b>			
▪ Irrigated	2.63	3.40	4.04
▪ Rainfed	1.00	1.27	1.58
<b>Crop area (M ha)</b>			
▪ Net sown area	142	142	142
▪ Gross crop area	189	210	198
▪ Net irrigated area	55	84	95
▪ Groundwater irrigated area	47	70	77
<b>Project irrigation efficiency (%)</b>			
▪ Surface	30-40	45	50
▪ Groundwater	55-65	75-80	80-85

Source: Amarasinghe, U. and Shah, T. 2006. *India’s Water futures to 2025-2050-Scenarios and Issue (Draft)*