# Indo-Gangetic River Basins: Summary Situation Analysis

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Indo-Gangetic basin, one of the world's *most* populous, has emerged during the past 40 years into an intricate mosaic of interactions between man and nature, poverty and prosperity and problems and possibilities. Rapid expansion in agricultural water use is a common theme across these interactions and access to water is central for the livelihoods of the rural poor. Given the diversity of agro-climatic, social and economic conditions in the four riparian countries—Pakistan, India, Nepal and Bangladesh—the IGB is clearly one of the most complex river basin systems in the world. Home to the earliest river valley (Indus valley) civilizations as well as the present-day economic dynamism taking off in South Asia, the basin is a study of contrasts and opportunities in all respects. And yet it is 'water' that remains the principal driver (or main set of brakes) for development in South Asia. Management of IGB water resources presents some formidable challenges and, therefore, steps must be taken towards integrated management of the IGB's water and land resources in order to ensure the future sustainability of all production and ecosystems in the basin.

This report presents a brief situation analysis related to water, agriculture and poverty; water resources, water productivity, institutional aspects and opportunities and risks related to the development of the Indo-Gangetic basin.

## Water, Agriculture and Poverty

The total basin area is 225.2 million ha and the net cropped area is 114 million ha. The population of IGB is 747 million as per 2001 census. Rural population in Bangladesh, India, Nepal and Pakistan is 79.9%, 74.5%, 86.0% and 68.0%, respectively of the total population. While both rural and urban poverty were decreasing strongly in India and Nepal, the levels of poverty are static or deteriorating in Pakistan and Bangladesh (Figure 1). Major gains have been made in the Ganges, from headcount ratios of approximately 50% in the 1980s. In 2000, about 30.5% population in IGB is below poverty line.

However, poverty in rural areas where agriculture is the main livelihood is substantially higher. In India much of the rural poverty is concentrated in few states that fall in the Ganga basin (Figure 2). High population growth rates in all countries remain a cause for concern in terms of water and food security, poverty alleviation and resource conservation. IGB basins will have some of the highest growth of population in South Asia in the first half of this century. For example, India's population is increasing, but will stabilize at a level of about 1,583 million in the middle of this century. By this time (2050), about half of the India's population shall be living in cities. However, due to high population growth, more than 61% of the rural population and 56% of the urban population of India will live in IGB by 2050 (Table 1).

As far as water use is concerned, 90% of the annual water withdrawals in the Ganga is still being diverted for agriculture followed by 7.8 per cent for domestic use in IGB (Table 2). In Indus, the share of agriculture in total withdrawals is as high as 96%. However, the major drivers of increasing water demand in the future will be from the domestic and industrial sectors.

Figure 1. Trends of poverty in IGB countries

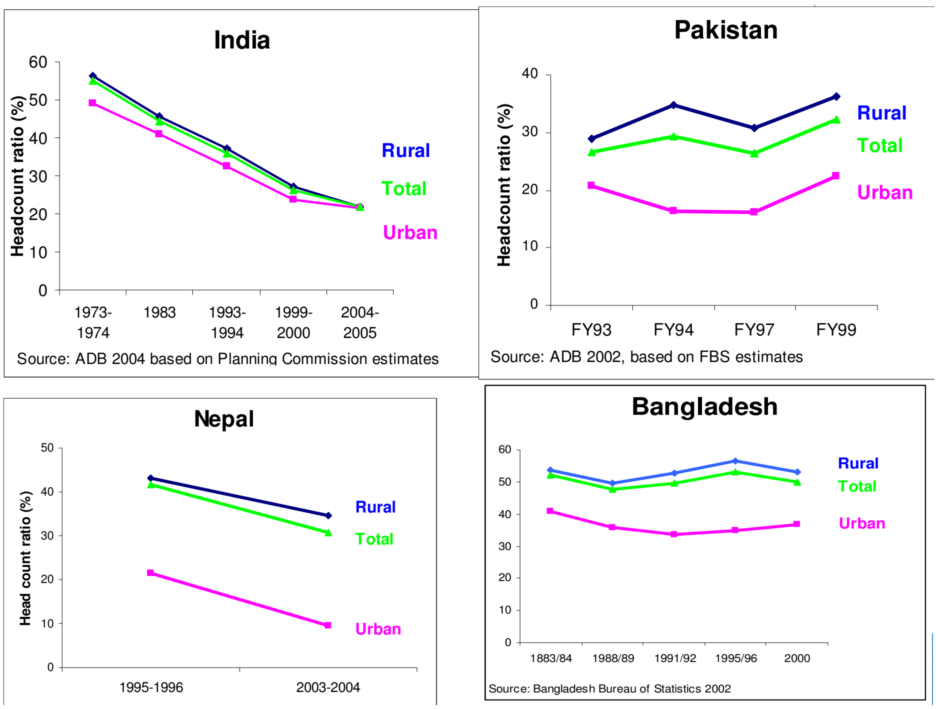


Figure 2. Trends of poverty at state level in India between 1983-1984 to 2005-2006.

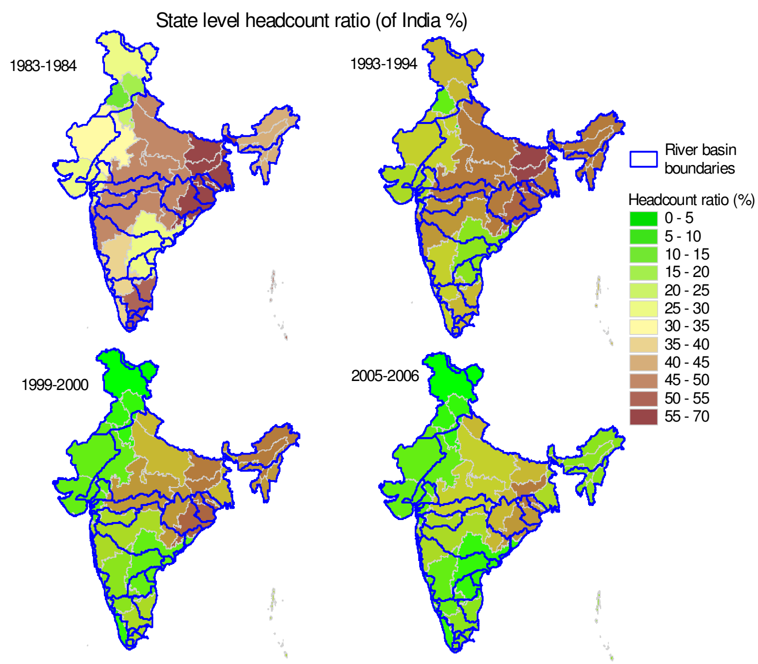


Table 1. Population of India and Indian part of Indus and Ganga basin

| Basin | Total population (millions) | | | | Urban population (millions) | | | | Rural population (millions) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1991 | 2001 | 2025 | 2050 | 1991 | 2001 | 2025 | 2050 | 1991 | 2001 | 2025 | 2050 |
| Indus | 39 | 46 | 61 | 56 | 10 | 14 | 28 | 40 | 29 | 32 | 33 | 17 |
| Ganga | 362 | 445 | 684 | 868 | 82 | 105 | 220 | 411 | 280 | 340 | 464 | 457 |
| Basin total | 401 | 491 | 745 | 924 | 92 | 119 | 247 | 451 | 309 | 372 | 497 | 474 |
| % of India | 48% | 49% | 54% | 58% | 42% | 43% | 49% | 56% | 49% | 51% | 57% | 61% |
| India | 844 | 1007 | 1389 | 1583 | 218 | 278 | 510 | 807 | 627 | 728 | 879 | 776 |

Source: Amarasinghe et al 2007

Table 2. Water withdrawals of India and Indian part of Indus and Ganga basin

| Basins | Irrigation water demand ($km^3$) | | | Domestic water demand ($km^3$) | | | Industrial water demand ($km^3$) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2025 | 2050 | 2000 | 2025 | 2050 | 2000 | 2025 | 2050 |
| Indus | 94 | 81 | 71 | 1.6 | 3.1 | 4.0 | 2.4 | 5.0 | 7.6 |
| Ganga | 256 | 272 | 260 | 13.9 | 31.0 | 54.0 | 13.6 | 40.0 | 75.6 |
| Basin total | 350 | 353 | 331 | 16 | 34 | 58 | 16 | 45 | 83 |
| % of India | 58% | 52% | 52% | 46% | 52% | 57% | 38% | 49% | 52% |
| India | 605 | 673 | 632 | 33 | 66 | 101 | 42 | 92 | 161 |

Source: Authors' estimates based on PODIUMSim model

The regions experiencing water scarcities shall also witness migration from agriculture to non-agriculture sector. Further, odds of rural youth moving out of agriculture are high in areas where water scarcities are more, and where non-agricultural employment opportunities in the neighborhoods are high ( Sharma and Bhaduri, 2006).

## Water Resources

The IGB system drains from the southern Himalayan and Hindu Kush "water tower" of Asia and provides the economic base for agriculture, forestry, fisheries, livestock, plus urban and industrial water requirements for about a billion people. Water availability in the Indian part of the IGB is presented in Table 1. The per capita water availability in the Indo-Gangetic basin under the projected water demand by 2025 is going to be reduced to the level that it will become a water stressed area (ie., having per capita water availability < 1700 $m^3$).

**Table 1: Water resources potential and availability of the Indian portion of IGB**

| Water Resources | Indus | Ganges | Total IGB (India) |
|---|---|---|---|
| Average annual surface water potential ($km^3$) | 73.3 | 523.0 | 596.3 |
| Estimated Utilizable flow excluding ground water ($km^3$) | 46.0 | 250.0 | 296.0 |
| Total replenishable ground water resources ($km^3$) | 26.5 | 171.0 | 197.5 |
| Per Capita available water ($m^3$) | 2382 | 1951 | 2166.5 |

The water availability in all the four basin countries and in the designated basin area is likely to decline very sharply due to an ever increasing population pressure (Table 3 and Table 4).

Table 3 Total renewable water resources (TRWR) and per capita water availability in the basin countries of IG basin

| IGB countries | TRWR ($km^3$) | Per capita water resources ($m^3$/person) | | | |
|---|---|---|---|---|---|
| | | 1990 | 2000 | 2025 | 2050 |
| India | 1985 | 2352 | 1971 | 1429 | 1254 |
| Pakistan | 223 | 2008 | 1561 | 892 | 639 |
| Bangladesh | 105 | 960 | 761 | 504 | 412 |
| Nepal | 210 | 11121 | 8934 | 5556 | 4137 |

Table 4. Total renewable water resources (TRWR) and per capita water resources in the Indus and Gangetic regions of India and Pakistan

| IGB basins | TRWR ($km^3$) | Per capita water resources ($m^3$/person) | | | |
|---|---|---|---|---|---|
| | | 1990 | 2000 | 2025 | 2050 |
| Indus- India | 97 | 2487 | 2109 | 1590 | 1732 |
| Indus- Pakistan | 190 | 1713 | 1332 | 761 | 545 |
| Ganga - India | 663 | 1831 | 1490 | 969 | 773 |

**The Indus Basin:** The total length of the Indus river is 3,199 km. From its origin to the Guddu Barrage in Pakistan, it is called the Upper Indus, while downstream from the barrage it is known as the Lower Indus. In Upper Indus Basin, the principal tributaries are the Kabul, the Swat and the Kurram on the right bank and the major tributaries on the left bank are Jhelum, Chenab, Ravi, Beas, and Satluj. The basin extends over an area of 1,165,500 km$^2$ and lies in Tibet (China), India, Pakistan, and Afghanistan. The drainage area lying in Pakistan is 692,700 km$^2$. The area lying in Afghanistan and China is 15,100 km$^2$. The drainage area lying in India is 321,289 km$^2$. The mean annual flow of the Indus Basin Rivers amounts to about 187 cubic km. There is a significant contribution from snowmelt. For the Satluj basin, the contribution of snow and glacier melt to annual runoff is about 60%.

**The Ganga Basin:** The Ganga River is the most important and sacred river of India. The catchment area of the Ganga falls in four countries, namely India, Nepal, Tibet-China, and Bangladesh. Table 3 gives areas of different countries in the Ganga basin. The major part of the geographical area of the Ganga basin lies in India. Many important tributaries of Ganga originate in the Himalayas in India and Nepal; Bangladesh lies in the deltaic region of the basin. The total length of the Ganga River is 2,525 km which makes it the 20$^{th}$ longest river in Asia and the 41$^{st}$ longest in the world (Philips World Atlas). Ganga enters into plains near Haridwar and thereafter flows in south/south-easterly direction. Yamuna is the most important tributary of the Ganga that joins it on the right bank at Allahabad. After confluence with Yamuna, the Ganga River flows in an eastward direction and is joined by a number of tributaries, such as the Ramganga, the Gomti, the Ghaghra, the Gandak, the Bagmati, the Kosi, the Sone and the Damodar (Jain and , 2007).

Table 3. Areas of different countries in the Ganges basin.

| Country | Area (thousand km$^2$) |
|---|---|
| India | 862.77 |
| Bangladesh | 46.60 |
| Nepal | 140.00 |
| Tibet (China) | 40.00 |
| Total | 1,089.37 |

The delta of Ganga begins at Farakka where a barrage controls river flow. At about 40 km downstream of Farakka, the river splits in two arms. The right arm, the Bhagirathi River, flows towards south and enters the Bay of Bengal about 150 km downstream of Calcutta. The left arm, known as Padma, turns towards east and enters Bangladesh. While flowing in Bangladesh, Padma meets the Brahmaputra River at Goalundo. The combined flow, still known as Padma, is joined by another mighty river, Meghna (or Barak), at Chandpur, 105 km downstream of Goalundo. Further down, the river ultimately flows into the Bay of Bengal. The Ganga basin extends over an area of 1,086,000 km$^2$. The mean annual flow of the Ganges at Haridwar (entry into plain areas) is 23,900 MCM and of its largest tributary Yamuna at tajewala is 10,750 MCM. The combined flow of both the rivers at Allahabad is 152,000 MCM and finally the mean annual flow of the Ganges at Farakka (prior to entry into Bangladesh) is 459,040 MCM. The Ganga basin is one of the most densely populated regions of the world. The average population density is 550 individuals per $km^2$ and about 42% of India's population resides in this basin. The surface water resource potential of the Ganga and its tributaries in India has been assessed at 525 billion $m^3$ out of which 250 billion $m^3$ is considered to be utilizable (Chaturvedi and Rogers, 1985).

**Groundwater Resources:** Ground water resources can be classified as static and dynamic. The static resource is the amount of ground water available in the permeable portion of the aquifer below the zone of water level fluctuation. The dynamic resource is the amount of ground water available in the zone of water level fluctuation. Sustainable ground water development requires that only the dynamic resources are tapped. Exploitation of static ground water resources could be considered during extreme scarcity conditions, that also only for essential purposes. The static fresh ground water resource of Indus and Ganga basin are listed in Table 4. As expected, ground water resources in the Ganga basin are nearly six times that of the Indus basin.

Table 4. Static fresh ground water resource ($km^3$) of IG Basin

| River Basin | Alluvium/ Unconsolidated Rocks | Hard Rocks | Total |
|---|---|---|---|
| Indus | 1,334.9 | 3.3 | 1,338.2 |
| Ganga | 7,769.1 | 65 | 7,834.1 |

**Level of groundwater development** is more (77.7 %) in Indus than in Ganges (33.5 %) basin. State-wise development of groundwater indicates 85 to 98 % level of groundwater development in Haryana and Punjab with less than 20 % in the eastern UP, Bihar and West Bengal.

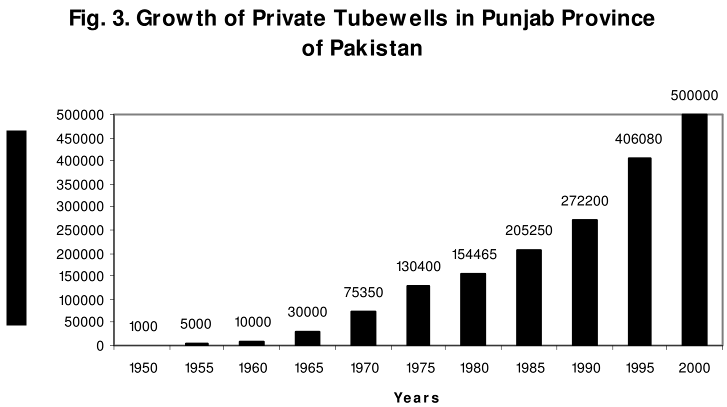


Figure 3. Growth of private tubewells in Punjab Province of Pakistan

There is a steep increase of private tubewells in Punjab province of Pakistan from the year 1950 to 2000 (Fig-3). According to Khan (2002), there are presently 3,00,000 tubewells in the Indus Basin Irrigation System (IBIS). In Indian part IGB, the groundwater now accounts for 67% of total irrigated area (Table 5), and the grain crop account for about 70 percent of total irrigated area. Therefore, irrigation and especially groundwater irrigation is central to the livelihood security of many poor people in the basins. It is even more important for India, as Indus and Ganga basin account for about two-third of the total grain production in India (Table 6). Among the grains, IG basin produces a major part of wheat production (93%) and more than half (58%) rice production at present.

Substantial production surpluses of Indus basin now meets the productions deficits other basins. In fact, that production surpluses is more than 23% percents of consumption of both in Indus and Ganga basins. Indeed, IG basin a major virtual water trader in that it trade the water embedded in food for other water scarce basins in India.

Table 5. Total, grain and groundwater irrigated area in Indian part of Indus and Ganga

| River basin | Total irrigated area (Million ha) | | | Grain irrigated area (Million ha) | | | Groundwater irrigated area (Million ha) | | |
|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2025 | 2050 | 2000 | 2025 | 2050 | 2000 | 2025 | 2050 |
| Indus | 11.6 | 11.7 | 11.9 | 8.5 | 7.1 | 7.1 | 6.8 | 6.4 | 6.0 |
| Ganga | 36.5 | 46.2 | 50.9 | 28.3 | 30.3 | 32.3 | 25.3 | 32.2 | 36.7 |
| | | | | | | | | | |
| Basins total | 48 | 58 | 63 | 37 | 37 | 39 | 32 | 39 | 43 |
| % of India | 63% | 55% | 54% | 69% | 64% | 63% | 69% | 63% | 61% |
| India | 76 | 105 | 117 | 53.6 | 59.0 | 62.0 | 46.6 | 61.2 | 69.9 |

Table 6. Grain production and production surplus or deficit as % of consumption

| River basin | **Grain production** | | | **Grain Production surplus(+)/deficit(-)** | | | **Grain Production surplus(+)/deficit(-) as % of consumption** | | |
|---|---|---|---|---|---|---|---|---|---|
| | (Million mt) | | | (Million mt) | | | (%) | | |
| | 2000 | 2025 | 2050 | 2000 | 2025 | 2050 | 2000 | 2025 | 2050 |
| Indus | 34.4 | 39.7 | 42.0 | 25.0 | 26.8 | 27.7 | 268% | 207% | 193% |
| Ganga | 98.0 | 141.3 | 188.1 | 3.2 | -2.9 | -9.8 | 3% | -2% | -5% |
| | | | | | | | | | |
| Total for basins | 132.4 | 181.0 | 230.1 | 28.2 | 23.8 | 17.9 | 23% | 12% | 7% |
| % of India | 64% | 62% | 60% | | | | | | |
| India | 206.6 | 291.6 | 382.9 | 5.7 | 0.1 | 5.4 | 3% | 0% | 1% |

Khan (2002) estimates that annual pumpage in all canal command areas has been estimated to be 50 bcm. Intensive exploitation of groundwater; declining water table; and poor efficiency of pumping equipment has resulted in exponential increase in energy demand for irrigation in the Western IGB states of both India and Pakistan.

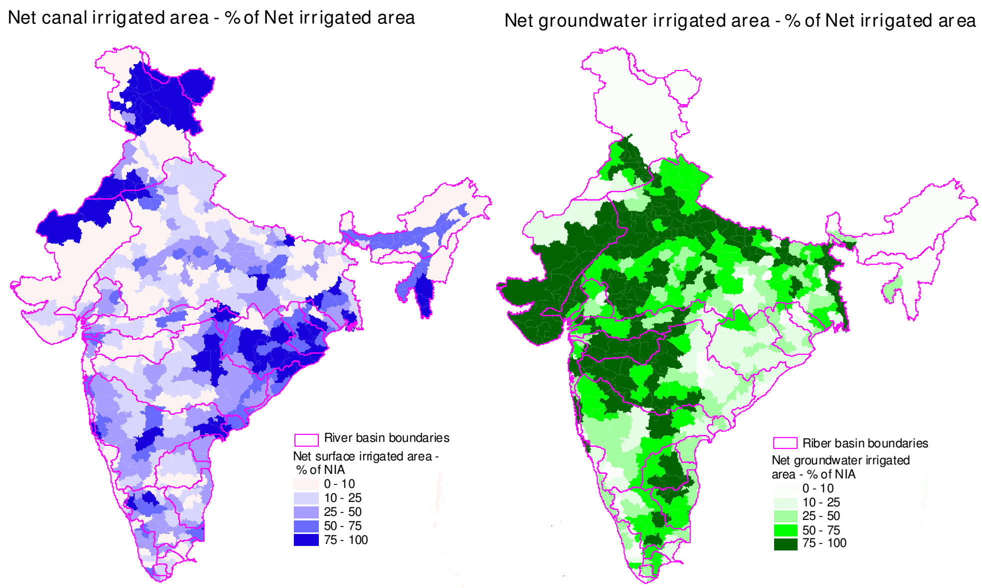


Fig. 4. Sources of irrigation water supply in the Indus and Ganges portion of the IG basin

## Water Productivity

Irrigation is a critical factor in agricultural productivity in the Indus and Ganges basins. More than anywhere else in the world, gains in crop productivity in IG basin represent the benefits of the Green Revolution. Cropping systems characterized by rice, wheat, cotton and sugarcane crops besides several other minor crops. In the lower parts of the Ganges basin in India and Bangladesh inland fisheries also forms a significant component of the agricultural production system. The Indus basin is quite productive in India and food surplus in this basin meets the food requirements of several other food deficits basins in India. However, there is a wide variation in agricultural productivity in different parts of the basin. It also reflects on how best water management practices are adopted at the farm and irrigation system levels. Average productivity of diverted water was reported to be 1.47 kg/m$^3$ and 1.11 kg/m$^3$ for Bhakra canal system of Kaithal Irrigation Circle in Indian and lower Jhelum Canal System in Pakistan (IWMI), respectively for wheat. The overall water productivity was reported to be 0.5 kg/m$^3$ for Pakistani

Punjab and 1.0 kg/m$^3$ for the Bhakra system of the Indian Punjab which shows a lot of opportunities for improving the water productivity in the region. In general, the IGB exhibits high potential but with only low-to-medium actual primary productivity of agriculture, forestry, fisheries, and livestock. However, conditions are extremely heterogeneous; as a result, it is necessary to assess potential and actual productivity separately in the Upper Catchments (UC), Western Indo-Gangetic Plains (WIGP), and Eastern Gangetic Plains (EGP) as indicated in Table 5.

Table 5: Potential and productivity under different reaches of the Indus-Gangetic basin

| IG Basin reach | Agriculture | | Forestry | | Fisheries | | Livestock | |
|---|---|---|---|---|---|---|---|---|
| | Potential | Productivity | Potential | Productivity | Potential | Productivity | Potential | Productivity |
| Upper Catchments | *low-to-medium* | *low* | *high* | *low-to-medium* | *high* | *low* | *high* | *low* |
| Western Indo-Gangetic Plains | *medium-to-high* | *medium-to-high* | *low* | *low* | *low* | *low* | *high* | *medium-to-high* |
| Eastern Gangetic Plains | *high* | *low* | *medium* | *low* | *high* | *medium* | *medium* | *low* |

The region that has most closely achieved its agriculture production potential is WIGP, spanning from Pakistan Punjab, right across Indian Punjab, Haryana, western U.P. and western Nepal Terai. Agricultural potential is listed as medium-to-high in Table 1, given the constraints of salinity and sodicity of soils and groundwater in the region. Combined rice-wheat productivity is estimated to be 8-12 tons/ha/year, although quite variable. Again due to water quality constraints (both geogenic as mentioned for agriculture, but also anthropogenic resulting from high population densities and major industrial and urban concentrations), the fisheries potential and actual productivity in WIGP are considered to be low. Forestry is not a major resource in the region; though poplar and eucalyptus based agro-forestry systems have become quite popular in certain pockets of the region. Livestock on the other hand are least constrained by water quality, with the result that potential is considered to be high while productivity is medium-to-high.

Among the three IGB regions it is the EIGP that has the greatest differences between potential and actual productivity. The region comprises eastern U.P., Bihar and West Bengal in India, eastern Nepal Terai, and all of Bangladesh. Rich alluvial soils and abundant surface and groundwater provide high agricultural potential; however, for a variety of reasons including inadequate drainage, unfavorable land tenure, and inadequate infrastructure and institutional arrangement including marketing, combined rice-wheat productivity is estimated to be just 4-8 tons/ha/year. Abundant supply of good quality water combined with a traditional fish eating population gives high fisheries potential, although the achieved productivity is medium and could be increased significantly. Forestry and aquatic vegetations form a part of the lowland ecosystems but its potential has also not been fully realized. Finally, livestock potential or productivity is not considered to be as high as in either UC or WIGP primarily for want of poor infrastructure, distribution and marketing channels and high incidence of animal diseases.

In the basin there are significant spatial mismatches of the population and water resources. Less water is available in places where more people live and much of the food is grown. The Indus basin is experiencing problems of physical water scarcity and the problem of unsustainable groundwater use.

Water quality is also a serious problem in several large areas of the Indus and Gangetic basin. Whereas in the Indus basin, the problems of salinity and alkali groundwaters are encountered, the lower reaches of the Ganges basin are afflicted with arsenic contamination. The natural incidences of high arsenic in groundwater in the vast tract of alluvial aquifers within the delta plains in West Bengal, eastern India, have attained an alarming magnitude. Many studies have detected arsenic contamination of groundwater in the lower Ganga Plain of West Bengal and Bangladesh (Acharya et al., 1999; Chowdhury et al., 2000). The source of arsenic in deltaic plain of West Bengal is considered to be the arsenic-rich sediments transported from the Chotonagpur Rajmahal Highlands (Acharya et al., 2000; Saha et al., 1997) and deposited in sluggish meandering streams under reducing conditions.

## Institutional Aspects

Water management at the river basin level has undergone several shifts in paradigms over the last several decades, from largely ignoring the hydrological aspects of a river basin and resorting to interbasin transfers on the one hand, to emphasizing the interconnectedness of unique ecological systems and encouraging an integrated approach to planning, on the other. The shift in paradigm was accompanied by an increased orientation from supply-side solutions to demand-side management and to recognizing the need to preserve ecological services and address issues related to equity in water use (ADB, 2007). River basin organizations support the integrated physical and technical management of water resources and, if developed adequately, can respond to the growing competition for water among agricultural, industrial, urban and in-stream uses within basins. However, Indian and the neighboring countries geographic and geopolitical challenges generally do not favor integrated hydrologic perspective. The reasons include a short but intense monsoon season of water availability followed by a long rainless period (instead of steady river flows), and significant decentralized rainwater harvesting in many parts of the basin unrelated to the holistic basin perspective. The basin is also unique in its large-scale dependence on groundwater usage, which is equally seen as seemingly unrelated to the basin perspective.

Water resource legislations in the basin countries are also not very effective and conducive to integrated basin management. Water is chiefly a state subject and the union generally does not interfere except for the subjects related to inter-states water sharing and disputes and water/ river treaties with the neighboring riparian countries such as India-Pakistan (Indus treaty); India-Nepal and India-Bangladesh (Farakka Treaty). Water administration at the national levels do not treat water as a scarce resource and the states that do not use economic instruments or regulations to increase the efficiency of water use are not worse off and continue to receive national support (ADB, 2007). Water resource management is still developing, is functional and top-down. River basin management organizations are established only for the purpose of constructing large interstate multipurpose projects and water sharing or conflict resolution and have been successful in this respect. The more demanding and complex functions related to conservation of water and improvement of water productivity, allocation of water among the competing sectors, integrating environmental and social concerns related to the resources, ensuring equity to access and compensating for losing access or relocating are inadequately addressed. The water management thus chiefly focuses on supply augmentation.

One such mega recent initiative on supply augmentation is the National River Linking Project of India, wherein a number of river links are proposed to divert potentially surplus water from the east and north-east rivers to the water scarce basins in the south and western region. The discussions on the project have become highly polarized between the proponents and opponents of the concept and the need for undertaking such a mega irrigation infrastructure investment aimed at creating surface irrigation schemes for certain selected regions (Sharma and Upali, 2008). Apart from several issues related to environment, displacement, water and food needs for the future populations; the inadequacies of the existing policies for sharing and transferring of water between riparian and non-riparian states appears to be a major institutional issue.

However, there have been several direct and indirect policies in the past which helped in the spread of Green revolution technologies in certain parts of the basin and helped India to achieve food self-sufficiency and security. These included massive investments in surface irrigation infrastructure, spread of high yielding varieties, subsidies on fertilizers and energy supply for agriculture, minimum support prices for agricultural commodities, farm-credit policies and support for farm extension programs. Focus of the efforts remained confined to certain well-endowed pockets and several states in the east, including Nepal and Bangladesh have not much benefited from these policies and remain poverty hotspots.

A new and innovative set of policies which are more equitable and inclusive (small and marginal farmers), away from infrastructure construction to emphasis on management; proper mechanisms for water sharing and transfer , conducive energy policies, proper targeting of subsidies and creation of responsive institutions at different levels shall be required to ensure higher productivity and support to the livelihoods.

## Opportunities and Risks to Development

The Indo-Gangetic basin presents both great opportunities and serious challenges for the water and agriculture-centric poverty reduction interventions. One of the main opportunity in the large part of the Ganges basin is that in spite of adequate water and land resources, the productivity levels are exceptionally low and can be potentially enhanced through suitable physical, economic and policy interventions. Multiple water use systems through integration of crops, horticulture, aquaculture , livestock and other water-centric livelihood options offer a great opportunity for improving agriculture and water productivity (both in net and $ terms) and thus improving the livelihoods.

Though a large part of the Indus basin has reasonable levels of agricultural productivity, it is largely supported through government subsidies (water, energy, fertilizers) but still does not make great margins for the farmers as the production systems are highly grain dominated with little opportunities for value-addition and diversification. Moreover, the present production systems are also supported by the over-exploitation of groundwater resources which in the long run are hydrologically and economically unsustainable. A substantial part of the Indus basin in both India and Pakistan also suffers from geogenic and secondary salinity and alkalinity and water-logging problems and require individual and community interventions and supportive policy instruments for implementing sustainable solutions for productivity improvements under such environments. Rainfed agriculture regions, especially in the upper catchments have also received inadequate attention in the past, and have good opportunities for value-added agriculture.

The basin as a whole and Indian region in particular is witnessing a good expansion in economy and income levels which shall have substantial implications for future water and food requirements (Upali, 2007). Land use, cropping and water use patterns are changing, partly as responses to changing demographic and consumption patterns, and partly as responses to changing investment scenarios and economic growth. Rapid urbanization and changes in food consumption patterns are so significant that they have considerable impact on the needs of future food and water demand. Parts of this basin lying in the different countries have traditionally served as food bowls for the remaining parts and this exerts a tremendous pressure for improving the agricultural productivity. Potential future interventions must take cognizance of the existing opportunities and challenges for development to meet the ever-increasing water and food demands of a vast population of the Indo-Gangetic basin.

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