ISSN 0971-9318

HIMALAYAN AND CENTRAL ASIAN STUDIES

(JOURNAL OF HIMALAYAN RESEARCH AND CULTURAL FOUNDATION)
NGO in Special Consultative Status with ECOSOC, United Nations
Vol. 6 No.2 April - June 2002

WATER SPECIAL

HIMALAYAN AND CENTRAL ASIAN STUDIES

Editor : K. WARIKOO

Assistant Editor : SHARAD K. SONI

SUBSCRIPTION

IN INDIA			
Single Copy	:	Rs.	100.00
Annual (Individual)	:	Rs.	300.00
Institutions & Libraries (Annual)	:	Rs.	500.00
OVERSEAS (AIRMAIL)			
Single Copy	:	US $	7.00
		UK £	5.00
Annual (Individual)	:	US $	30.00

The publication of this issue of Himalayan and Central Asian Studies, Vol.6 No.2, has been published with partial financial assistance by the Indian Council of Historical Research, New Delhi.

Printed and published by Prof. K. Warikoo on behalf of the Himalayan Research and Cultural Foundation, BA/1G, D.D.A. Flats, Munirka, New Delhi-110067. Printed at Print India, A-38/2, Mayapuri-I, New Delhi-64 and published at New Delhi.

EDITORIAL ADVISORY BOARD

CONTRIBUTORS

Prof. K. Warikoo is Chairperson, Centre for South and Central Asian Studies, School of International Studies, Jawaharlal Nehru University, New Delhi.

Prof. Jayanta Kumar Ray is Vice Chairman, Maulana Abul Kalam Azad Institute of Asian Studies, Kolkata.

Dr. Sangeeta Thapliyal is Projects and Programme Officer at Delhi Policy Group, New Delhi.

Khalid Bashir Ahmad is Deputy Director, Department of Information, Jammu and Kashmir Government, Srinagar. He is the author of *Jhelum: The River Through My Backyard* (Srinagar, 2001).

Dr. P.K. Kaul is a researcher from Jammu.

HIMALAYAN AND CENTRAL ASIAN STUDIES

Vol. 6 No. 2 **April - June 2002**

CONTENTS

Editor's Page

The Earth Summit which is scheduled to be held in Johannesburg in November 2002, shall review efforts since the Rio Summit of 1992 towards sustainable development. That water is "vital for the life and health of people and ecosystems and a basic requirement for the development of countries", has been reiterated by the Ministerial Declaration of the Hague issued on 22 March 2000. The Declaration focussed on one common goal to provide water security in the 21st century. Kofi Annan, the UN Secretary General in his message on the occasion of the World Water Day on March 22, 2002, stressed the need for preserving the water resource and maintain equity and sustainability while sharing fresh water between nations in order to avoid conflict.

For quite some time fears are being expressed about the possibility of violent conflicts over water issues. Fresh water is getting exhausted and 26 countries around the globe are now considered to be water scarce. Population explosion, deforestation and the resultant shortfall in rainfall, global warming, phenomenal increase in water consumption and poor management of limited water resources have been causing depleted supplies, fall in water tables, shrinking inland lakes and stream flows. More than 3000 delegates at the International Freshwater Conference which was held recently in Bonn, were told that 21st century wars will be over disputed water resources. It is well recognised that water security can be achieved by providing access to water and sanitation through proper management; by enhancing food security through the efficient mobilisation, use and equitable allocation of water for food production; by maintaining the ecosystem through sustainable water resources management; by providing security from floods, droughts,

pollution and other hazards; and by equitable and just sharing of trans-boundary water resources.

It is against this perspective that this Special Issue of the ***Himalayan and Central Asian Studies*** focusses on the Himalayan rivers and their importance in the Indian society and culture, and the problem of water sharing between South Asian countries.

Prof. Warikoo's study of the Indus Waters Treaty, which has been in force for more than 40 years now and is often cited as a success story in the field of trans-boundary water sharing, makes a critical review of the Treaty with particular attention to its implication for Jammu and Kashmir. As the study explains, there is a sound basis for reviewing the Treaty, so that it is turned into a resilient one after making necessary modifications and adjustments which can take care of the substantial changes in the ground situation in Jammu and Kashmir during the past four decades or so.

Prof. Jayanta Kumar Ray in his paper on Optimum Management of Himalayan Waters while pleading for replacement of hydropolitics with hydroharmony, stresses the need for effective national efforts, popular participation and bilateral cooperation for dealing with the issue of Himalayan Waters.

Sangeeta Thapliyal makes out a case for India-Nepal cooperation for better utilisation of the water resources for their mutual benefit.

Khalid Bashir Ahmad and P.K. Kaul present a historico-cultural perspective on the rivers Jhelum and Tawi, respectively, bringing out the importance of these rivers in local folklore, society, culture and economy.

K. Warikoo

INDUS WATER TREATY
View from Kashmir

K. Warikoo

It is for quite some time now that the Indus Waters Treaty, which was signed by India and Pakistan in September 1960 after more than eight years of negotiations to resolve the dispute over the usage for irrigation and hydel power of the waters of the Indus water system, has been publicly denounced by the Jammu and Kashmir government for being "discriminatory" to the Indian State of Jammu and Kashmir.[1] On 3 April 2002, the Jammu and Kashmir Legislative Assembly, cutting across party affiliations, called for a review of the Treaty. Speakers who denounced the Treaty ranged from the National Conference's G.M. Bawan to the Bhartiya Janata Party's Shiv Charan Gupta and Communist Party of India (Marxist) leader Mohammad Yusuf Tarigami.[2] The State government has been contending that inspite of having an untapped hydro-electric potential of 15,000 MWs, the State has been suffering from acute power deficiency due to restrictions put on the use of its rivers by the Indus Treaty. And when the State Chief Minister, Dr. Farooq Abdullah or his officials point to the losses accrued to the State by virtue of this Treaty, they are not indulging in any rhetoric. In fact their views that the requirements of the J&K State were not taken into account while negotiating the Treaty with Pakistan are shared largely by the intellectual, media and public circles in Jammu and Kashmir. Not only that, some people even stretch it further suggesting that the central government has been insensitive to the State's problems.

It is against this background that this paper seeks to have a relook at the Indus Waters Treaty. That the Treaty has been in force for nearly 40 years is a considerable period for making an appraisal whether the Treaty really served the larger purpose of bringing India-Pakistan amity and cooperation on other fronts.

THE INDUS BASIN

The Indus system of rivers comprises of the main river Indus, known as the river *Sindhu* in Sanskrit, and its five tributaries from the east, the Jhelum, Chenab, Ravi, Sutlej and the Beas, and three tributaries from the west, the Kabul, Swat and the Kurram rivers.[3] The great Indus river is 2880 kms. long and the length of its tributaries as mentioned above is 5600 kms.[4] Historically, India has been named after this great river-Indus. The main Indus river rises in Tibet and after flowing through the Indian State of Jammu and Kashmir enters Pakistan. The river Jhelum originates in Verinag in the valley of Kashmir and enters Pakistan. The Chenab river rises in Lahoul in Himachal Predesh State of India and after flowing through Jammu province enters Pakistan. The Ravi river rises near Kulu in Himachal Pradesh and flowing through Punjab enters Pakistan. The Sutlej rises in Tibet and flows through Punjab before entering Pakistan. River Beas rises in Himachal Pradesh and flows wholly within India. The Kabul and Kurram rivers rise in Afghanistan. The Kabul river is joined by the waters of the Swat in Peshawar valley.

Though the Indus basin is known to have practised irrigation since ancient times, it were the British who developed an elaborate network of canals in the Indus system of rivers. However, their emphasis was that lands belonging to the Crown received such irrigation so that the British Indian government would earn revenue from water cess as well as from the sale of crown waste lands.[5] In this manner, the Indus system waters were used to irrigate annually about 23.4 million acres in the Indus plains and 2.6 million acres above the rim stations before partition.[6]

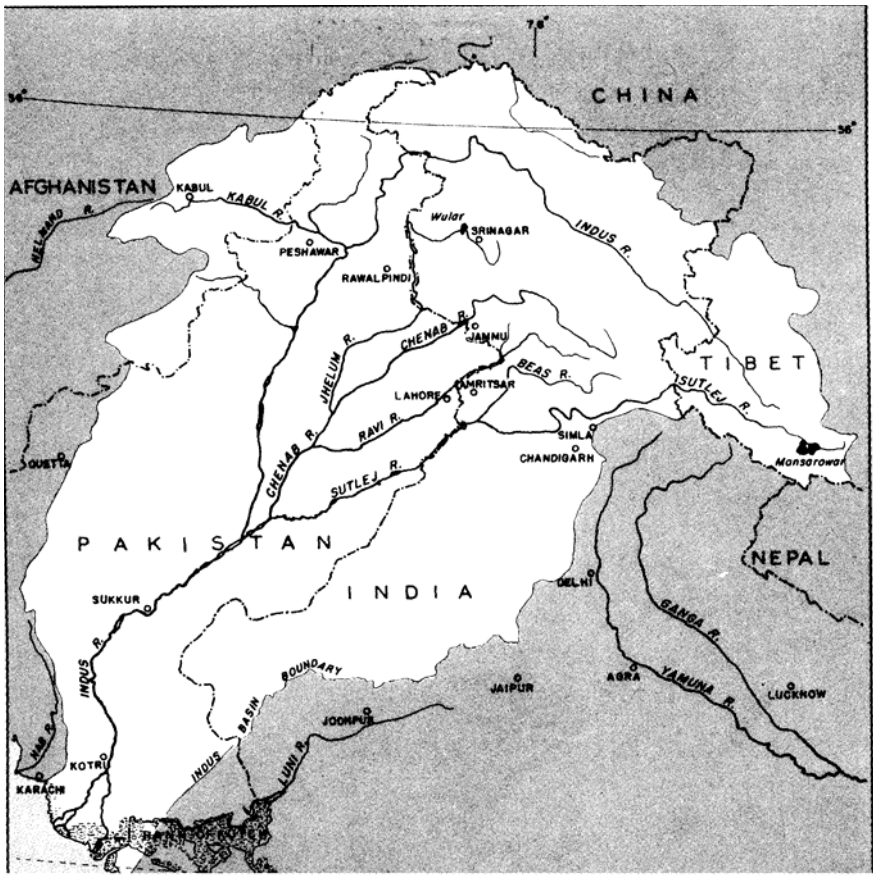
PARTITION AND ITS AFTERMATH

Immediate aftermath of the partition of the Indian sub-continent and the creation of two Dominions of India and Pakistan in 1947 was that bulk of the irrigation canals developed on the Indus system went to Pakistan. Out of 26 million acres of land irrigated annually by the Indus canals, 21 million acres lay in Pakistan and only 5 million acres in India.[7]

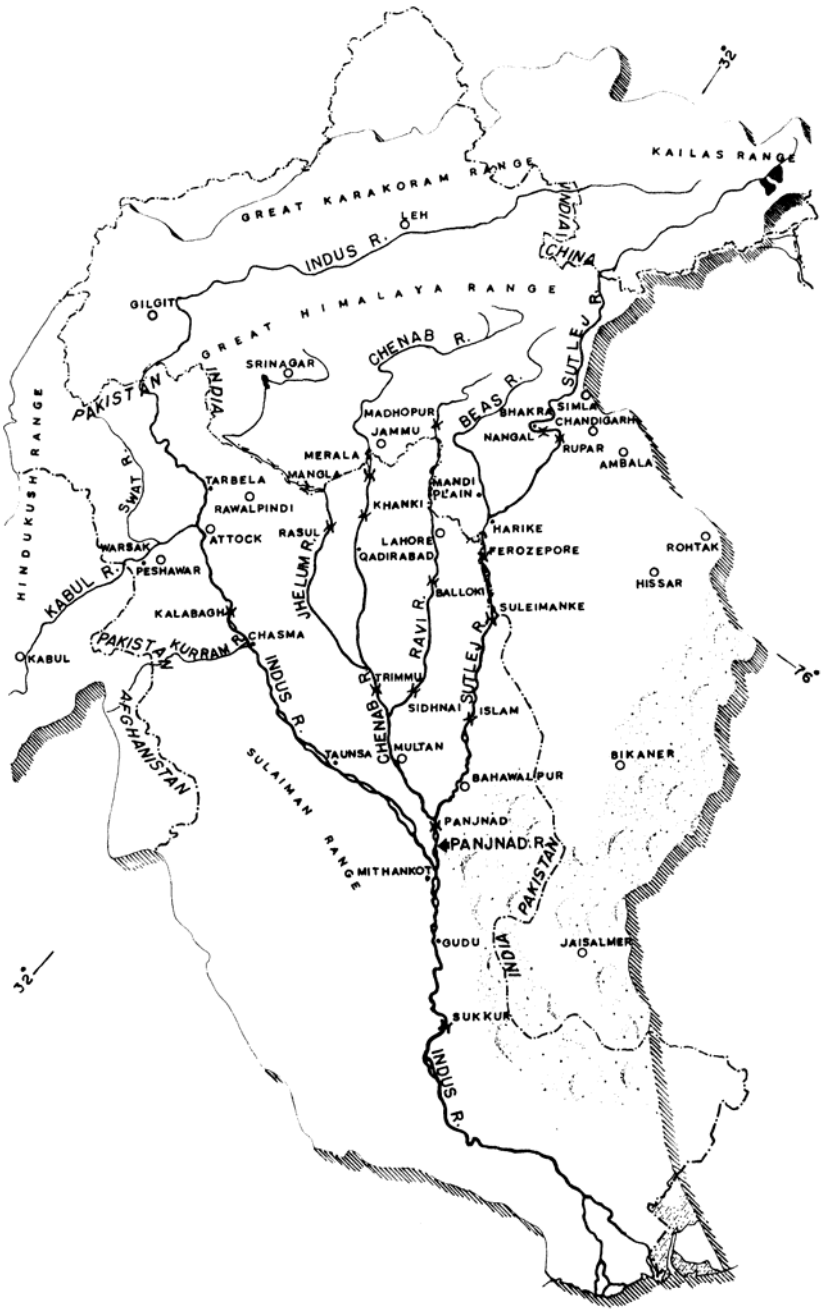
As per the 1941 census, the population dependent on the Indus system waters was 25 million in Pakistan and 21 million in India.[8] Besides, India had "another 35 million acres of lands crying out for irrigation from the Indus basin sources".[9] Thus the partition gave independent India much less undeveloped area inspite of the fact that it was an upstream country with control over Ravi, Beas, Sutlej, Jhelum and Chenab. India had not only to cater to the food requirements of 21 million people but also those millions who migrated from irrigated areas in West Punjab and Bahawalpur, now in Pakistan, all of whom were dependent on the Indus waters.

The dispute over sharing of Indus waters came to fore immediately after partition because the existing canal headworks of Upper Bari Doab Canal (UBDC) and Sutlej Valley canals fell in India (State of East Punjab), while the lands being irrigated by their waters fell in Pakistan (West Punjab and Bahawalpur State). In order to maintain and run the existing systems as before partition, two Standstill Agreements were signed on 20 December 1947 by the Chief Engineers of East Punjab and West Punjab. These interim arrangements were to expire on 31st March 1948, after which East Punjab started asserting its rights on its waters. It was on 1 April 1948 that the East Punjab Government in control of the head works at Madhopur on the Ravi and at Ferozpur on the Sutlej, cut off water supplies to the canals in Pakistan fed by these head works, after the Standstill agreements expired on 31 March 1948.

In fact, East Punjab had formally notified West Punjab on 29 March 1948 that the 'Standstill Agreements' would expire on 31st March, and had accordingly invited the Chief Engineers of West Punjab to Shimla for negotiating an agreement for resumption of water supplies.[10] According to Rushbrook Williams, the water supplies were cut because "the canal colonies in Pakistan served by these head works did not pay the standard water dues. The people incharge of the head works were applying exactly the same kind of sanction that they would have applied in an undivided India – no canal dues, no water."[11] The Chief Engineers of the two Punjabs met in Shimla and on 18 April 1948 concluded two



The Indus Region **Not to Scale**



The Indus Basin **Not to Scale**

agreements which were to take effect from the date of their ratification by the Dominions of India and Pakistan. Finally at the inter-Dominion Conference on 3 May 1948 at Delhi the matter came up for discussion. It was on 4 May 1948 that an agreement was reached after a meeting at Nehru's instance between the Indian Prime Minister and Pakistan's Finance Minister, Ghulam Mohd. By the Delhi Agreement of 4 May 1948, East Punjab agreed not to withhold water from West Punjab without giving the latter time to tap alternative sources. On its part West Punjab recognised "the natural anxiety of the East Punjab government to discharge the obligation to develop areas where water is scare and which were underdeveloped in relation to parts of West Punjab."[12] As regards the payment of seigniorage charges to East Punjab, the West Punjab government agreed to deposit immediately in the Reserve Bank of India "such adhoc sum as may be specified by the Prime Minister of India."[13] It may be pointed out that the British Province of Punjab recovered, before partition, from Bikaner State seigniorage charges for the supply of water to the State in addition to proportionate maintenance costs etc. of the Ferozepore headworks and of the feeder canal.[14] East Punjab now wanted to recover a similar charge for water supplied to West Punjab.

Though this agreement was not final, it did provide some basis for dealing with the vexed problem. But soon it was found that Pakistan was unwilling to stick to the agreement, as it was seeking to use the Indus Water dispute as a political tool in the battle over Kashmir being fought at the United Nations. Pakistan also sought to create anti-India hysteria in Pakistan over this issue. As such Pakistan unilaterally abrogated the May 1948 Agreement saying that it was signed "under duress".[15] Besides, Pakistan refused to pay the dues to India even after a year of the agreement.[16] Pakistan now asked for a reference to the International Court of Justice for final verdict, which was objected to by India. Pakistani media and politicians launched a campaign over the issue of canal waters dispute to create a scenario of serious crisis in Indo-Pakistani relations. All along Pakistan's policy was to seek third party adjudication, which India was opposing.

THE LILIENTHAL PROPOSAL AND WORLD BANK INITIATIVE

It was in this atmosphere of mutual distrust and contrived tensions, that David E. Lilienthal, formerly Chairman of the Tenessess Valley Authority and the U.S. Atomic Energy Commission visited India and Pakistan in February 1951 on a supposedly private visit. Before embarking upon this visit Lilienthal had met the then U.S. President Truman, the U.S. Secretary of State, Dean Acheson, Pakistan's Foreign Minister, M. Zafrulla Khan and Secretary General of Pakistan's Delegation to the U.N., Muhammad Ali.[17] While in India, Lilienthal was a guest of Prime Minister Nehru and he also held talks with Sheikh Abdullah on Kashmir. In Pakistan, Lilienthal discussed with Prime Minister Liaquat Ali Khan, Kashmir and the "economic warfare" between India and Pakistan. Liaquat Ali was reported to have told Lilienthal that "unless the Kashmir issue is settled it is unreal to try to settle the issues about water or about evacuees".[18] On his return to America, Lilienthal wrote an article titled *Another "Korea" in the Making* analysing the Indo-Pakistani relations. He prefaced his article with a loaded comment : "India and Pakistan are on the edge of war over which shall possess Kashmir – a fight the U.S. might be forced to enter….. The direct issue is whether the historic region of Kashmir and Jammu shall be part of India or Pakistan. On one of this disputed region's frontiers lies Red China, on another Red Tibet. Along another frontier is Soviet Russia".[19] Explaining the importance of the Indus waters for ensuring food security to millions of people in India and Pakistan, Lilienthal proposed that the canal waters dispute could be solved by India and Pakistan by working out a program jointly to develop and operate the Indus basin river system. He wrote : "Jointly financed (perhaps with World Bank help) an Indus Engineering Corporation, with representation by technical men of India, Pakistan and the World Bank, can readily work out an operating scheme for storing water wherever dams can best store it, and for diverting and distributing water".[20] Lilienthal, who appeared to be concerned about the presence of Communist China and Soviet Union on the borders of Kashmir, was

hoping to become the head of the proposed Indus Engineering Corporation.[21] Whereas Lilienthal sent copies of his article to the Indian Ambassador and the Pakistani Counsel on the water dispute, he also persued the proposal with the U.S. State Department.

Interestingly around the same time, Eugene R. Black, then President of the International Bank for Reconstruction and Development, Washington (World Bank) and a close friend of David Lilienthal[22] became interested in the Lilienthal proposal. In September 1951, World Bank formally offered its good offices to both India and Pakistan to work out a solution of the Indus waters issue on the basis of Lilienthal proposals. The World Bank offer was conditioned by the 'essential principle' that "the problem of development and use of Indus Basin water resources should be solved on a functional and not a political plan, without relations to past negotiations and past claims, and independently of political issues".[23] Both countries accepted the suggestion after the World Bank President, Eugene Black personally net both the Indian and Pakistani Prime Ministers. By May 1952 the first of a long series of conferences opened at Washington which were continued at Karachi and Delhi. But it soon became clear that Lilienthal's proposal of a joint Indus Engineering Corporation could not be realised. Instead it was found necessary to replace the existing supplies from alternative sources. So in February 1954 the World Bank officials proposed to India and Pakistan, the division of rivers. "The three eastern rivers (Ravi, Beas and Sutlej) would be available for the exclusive use and benefit of India, after a specified transitionary period. The Western rivers (Indus, Jhelum and Chenab) would be available for the exclusive use and benefit of Pakistan, except for the insignificant volume of Jhelum flow presently used in Kashmir … Each country would construct the works located on its own territories which are planned for the development of the supplies. The costs of such works would be borne by the country to be benefitted thereby".[24] Whereas India accepted the World Bank proposals, inspite of its sacrifices, Pakistan vacillated and accepted 'in principle' only after the Bank pressed her for a reply. In his letter of 22 March 1954 to the World Bank President, Prime Minister of India while conveying his general

acceptance to the principles governing the Bank proposals as the basis of agreement stressed that : "the actual agreement which would be worked out with the assistance of the Bank authorities will naturally deal with a number of details including the question of the small requirements of Jammu and Kashmir."[25] On the other hand, Pakistan continued to ask for clarification of details and further technical studies, thereby taking several years in the negotiations.

India's acceptance of the World Bank proposals was based on the hope that in five years' time India would be able to make use of the waters of the eastern rivers. This was, however, frustrated by Pakistani procrastination. Pakistan was seeking a comprehensive replacement-cum-development programme in Pakistan involving high investment of about 1.12 billion US dollars.[26] And in 1959 the World Bank, USA and certain western countries became ready to foot the bill for this huge construction programme in Pakistan, so that the vexed canal waters dispute between India and Pakistan could be solved. It was on 1 March 1960 that the World Bank made a public announcement of the financial plan it had evolved for the replacement and development works of the Indus system. It was estimated to cost about 1000 million dollars (partly in foreign exchange and partly in local currencies). The Bank announced that the requisite expenditure would be contributed by Australia, Canada, New Zealand, Germany, United Kingdom, United States, the World Bank besides the contributions by India and Pakistan. Ironically as it may sound, the bulk of this financial plan was meant to be spent in Pakistan (691 million dollars out of 747 millions of grants and loans with India getting only 56 million dollars as loan for the Beas Dam, as against Pakistan getting all her development underwritten by the Bank's financial plan).[27] Besides, the World Bank press release did not mention about the additional U.S. grant of 235 million dollars (in local currency).[28] Yet, India stuck to its commitment to conclude the Indus Waters Treaty based on the World Bank proposals. And the Treaty was duly signed on 19 September 1960 at Karachi by Jawaharlal Nehru, the Prime Minister of India, President Ayub Khan of Pakistan and W.A.B. Iliff of the World Bank.

THE TREATY

The main features of the Treaty are as follows :[29]

(i) The waters of the three eastern rivers – the Ravi, the Beas and the Sutlej- would be available for unrestricted use by India, after a transition period.

(ii) The waters of the three western rivers-the Indus, the Jhelum and the Chenab – would be allowed to flow for unrestricted use by Pakistan except for some limited use such as (a) domestic use, (b) non-consumptive use, (c) agricultural use, (d) generation of hydro-electric power (run-of-river-plants) in Kashmir.

(iii) During the transition period of ten years, India would continue to give Pakistan some supplies from the eastern rivers, in accordance with detailed regulations set out in the Treaty. The period may be extended at Pakistan's request up to a maximum of another three years. If so extended, India would deduct from its contribution Rs. 4.16 crores for one year's extension and Rs. 8.54 crores for two years' extension and Rs. 13.13 crores if the extension is sought for three years.

(iv) Pakistan would build works in the transition period to replace, from the western rivers and other sources, waters she used to get in her canals from the eastern rivers.

(v) Non-consumptive use, domestic use etc. would be permitted in all the rivers by both the countries, but such use should not in any way affect the flow of rivers and channels, to be used by the other party.

(vi) India would contribute in ten equal annual instalments the fixed sum of Pounds Sterling 62,060,000 to the Indus Basin Development Fund towards the cost of replacement works in Pakistan.

(vii) Both countries have recognised their common interest in the optimum development of the rivers, and declared their intention to co-operate by mutual agreement to the fullest possible extent.

(viii) The two countries would regularly exchange data regarding the flowin and utilisation of waters of the rivers.

(ix) A Permanent Indus Commission would be constituted with the Commissioners for Indus Waters of the two countries- a post which should be filled by a high-ranking engineer competent in the field of hydrology and water use. Each Commissioner will be the representative of his Government for consideration of all matters arising out of the Treaty. The purpose and functions of the Indus Commission would be "to establish and maintain cooperative arrangements for the implementation of this Treaty and to promote cooperation in the matter of development of the rivers".

(x) If the Indus Commission fails to reach agreement on any matter pertaining to the Treaty it would be referred to a Neutral Expert. If the difference is in the nature of a dispute and the Neutral Expert certifies it to be so, the matter would be dealt with by the two Governments and might be referred to a Court of Arbitration.

(xi) Nothing contained in the Treaty, and nothing arising out of the execution thereof shall be construed as constituting a recognition or waiver (whether tacit, by implication or otherwise) of any rights or claims whatsoever of either of the parties.

CRITICAL REVIEW

The Indus Treaty was signed by Nehru in the fervent hope of ushering all round improvement in India-Pakistan relations and resolution of all outstanding problems including Kashmir. Perhaps Nehru was impressed by Ayub's offer of joint defence with India made in early 1959 in the wake of deteriorating India-China relations.[30] Ayub's offer, however, needed to be viewed in the light of Pakistan being a member of SEATO and CENTO, which made him susceptible to western prescriptions for regional peace and cooperation. At that time the U.S. and its friendly western nations viewed the Communist Block – USSR and China, as a greater threat. Although India did not accept the concept of joint defence, it sought to improve relations with Pakistan by agreeing to substantially pay for the cost of irrigation programme in Pakistan, besides surrendering

the use of three western rivers. India treated the Indus waters issue as a technical and engineering problem. On the other hand Pakistan exploited it as a political weapon in her cold war against India. At the same time Pakistan succeeded in extracting huge financial assistance of about one billion dollars from the World Bank, USA and other western countries, using the geopolitical environment in the region to its advantage.

Nehru went to Karachi on 19 September 1960 to sign the Treaty hoping to begin a new chapter in the history of Indo-Pak relations. Though the joint communique issued at the end of Nehru-Ayub talks on 23 September 1960, revealed little progress on Kashmir, both sides agreed to work for promotion of friendly and cooperative relations and resolve the outstanding differences. However, Pakistan did not hide its disappointment that there was no progress over Kashmir. The Pakistani press continued to harp on the theme of "free and impartial plebiscite to determine the choice of the people of Kashmir."[31] On the other hand, Indian press highlighted the positive aspects of the joint communique. *Times of India* even suggested that, "in the interests of a lasting settlement this country may be prepared eventually to accept the status quo in the State and agree to slight changes in the present cease-fire line to make it a viable international frontier."[32] Hardly a month had lapsed after Nehru's visit to Karachi, that President Ayub of Pakistan speaking at a public meeting in Muzaffrabad (Pak occupied Kashmir) in early October 1960 declared that "Pakistan could not trust India until the Kashmir question was settled and that the Pak army could never afford to leave the Kashmir issue unsolved for an indefinite period."[33] In this way Indian hopes of building up mutual trust and confidence with Pakistan were belied. What followed is too well known to be repeated. Pakistan launched Operation Gibralter in 1965 to wrest Kashmir. There was yet another war in 1971 and ever since 1989 Pakistan has been engaged in a deadly proxy war against India in Kashmir and elsewhere. More recently we had to encounter the Pakistani armed intrusion in Kargil.

As such Nehru's assertion in the Lok Sabha on 30 November 1960 that "we purchased a settlement, if you like; we purchased peace to that extent and it is good for both countries",[34] was not borne out by the

subsequent events. Members of Parliament belonging to both the Congress, PSP and Jana Sangh pointed to the glaring mistakes committed in conclusion of this Treaty. Congress MPs from Punjab and Rajasthan, Iqbal Singh and H.C. Mathur called the treaty disadvantageous to India stating that both their home states "had been badly let down".[35] Ashok Guha, another Congress MP lamented that "interests of India had been sacrificed to placate Pakistan". Ashok Mehta, leader of the PSP in the Lok Sabha described it as a "peculiar treaty under which Pakistan, already a surplus area, would be unable to make full use of her share of the Indus Water and would have to allow it to flow into the sea. On the contrary, India after the fullest development of the water resources, would still be short of supplies".[36] But Nehru's efforts of creating goodwill and understanding with Pakistan by giving concessions through the Indus Treaty, did not bear fruit. That Nehru himself had realised this soon after, is confirmed by N.D. Gulhati, who led the Indian delegation during the negotiations over Indus. Gulhati recalls : "When I called on the Prime Minister on 28th February 1961, my last day in office, in a sad tone he said, 'Gulhati, I had hoped that this agreement would open the way to settlement on other problems, but we are where we were".[37]

In retrospect, it can be stated that India was too generous to Pakistan, both in terms of allowing use of waters of western rivers and by making a payment of more than 62 million Pounds Sterling (i.e. about 430 crores of rupees in current value) to Pakistan. It is also surprising as to why World Bank advanced such disproportionate proposals to India, "particularly when the eastern rivers given to India carried 20 to 25 percent of the total flow of the Indus Basin as against the 75 to 80 percent in the three western rivers allocated to Pakistan".[38] Out of the total annual flow of 168.4 million acre feet (m.a.f) of water in the Indus system of rivers, the total requirement for irrigation water was 96.36 m.a.f for the entire cultivable area of the Indus basin, thereby leaving a surplus of 72.02 m.a.f. of water which would be going to the sea. Since the cultivable area on the three eastern rivers was 22.856 million acres, little less than on the western rivers (25.100 million acres), the mean annual supplies made available by the eastern rivers was only 32.8 m.a.f., that

is 13.57 m.a.f. less than the actual water requirement of 46.37 m.a.f. In quite contrast to this, the mean annual flow in western rivers was 135.6 m.a.f., i.e. 85.59 m.a.f. more than its requirement of only 50.01 m.a.f. of water. It is quite intriguing as to why the Indian government delegation involved in the prolonged negotiations over Indus waters, agreed to much lower share of water available in the eastern rivers, particularly when the concerned officials were in know of the facts.[39] However, it appears that the Jammu and Kashmir government, particularly its irrigation and power development departments, had not done their homework to study and quantify the existing and future water requirements for irrigation, hydel power generation and other uses inside Jammu and Kashmir. As such the Indian delegation failed to secure the necessary safeguards in the Treaty for future consumption of water for hydel power purposes, excepting by run-of-the-river methods. Gulhati himself admits that "since no study had ever been made until then, of the development locally possible, above the rim stations, none of us had, at that time, any real idea of the quantum of future developments in the upper reaches of the Western Rivers. Nor did we have any idea of the irrigation from the Indus in Ladakh. As regards hydro-electric development we felt that, being a non-consumptive use, it was not covered by the Bank proposal which dealt only with irrigation uses".[40] Moreover, it is not the number of rivers but quantum of water which was to be distributed. Besides, the World Bank did not include the Kabul river while dividing the six rivers among the two countries.

If we consider the internationally accepted Helsinki Rules framed by the International Law Association which postulate the equitable utilisation of waters of an international drainage basin taking into consideration various factors such as the extent of the drainage area, hydrology of the basin, economic and social needs of each basin state, population dependent on the waters of the basin, avoidance of unnecessary waste in utilization of waters of the basin, then India did not get a fair deal. According to S.K. Garg, who has computed the respective entitlement of India and Pakistan on the basis of the population, drainage areas, length of rivers and culturable area, India should have been given

42.8% share in the waters of the Indus Basin, as against the actual allocation of 20 to 25%, flowing in the three eastern rivers.[41]

It may be worthwhile to mention that in a somewhat similar problem of water distribution that occurred in Central Asia after disintegration of the USSR, the Inter State Commission for Water Coordination amongst the Central Asian countries has been regulating the allocation, consumption and exchange of water for natural gas, coal, oil or their monetary equivalent. For instance, as per existing agreements, Kyrgyzstan released from Toktogul reservoir to Kazakhstan and Uzbekistan 3.25ckm of water for each country in exchange of 1.1 billion kWh of power (either electricity or coal) valued at 22 million dollars from Kazakhstan and 400 million kWh of power (electricity) plus 500 million m^3 of natural gas valued at 48.5 million dollars per year from Uzbekistan.[42] Besides, agreements were worked out for supporting the operation of Toktogul reservoir in Kyrgyzstan in the irrigation mode out of compensation payable to Kyrgyzstan. All parties were agreed to be a guarantor for compensation and monetary exchanges.

VIEW FROM KASHMIR

It becomes clear that the Indian State of Jammu and Kashmir inspite of being the upstream area, has suffered due to restrictions placed by the Treaty on the unhindered usage of its river waters (of Jhelum, Chenab and Indus). The irony of the matter is that the State being rich in its hydel resources has been facing a perennial problem of shortage of hydro-electric power, more particularly during winter months and due to the dry spell in the valley. Though the State government's official estimates put the total hydel power potential of the State at 15,000 MW, the Centre for Monitoring Indian Economy (CMIE) has reported it to be at 7487 MW which constitutes about 9 per cent of the total hydel power potential of the country.[43] Since the Treaty has placed curbs on the construction of storage reservoirs which could ensure the provision of requisite water flow, all power projects in the State are to be run-of-the-river type. This not only raises the construction cost of the projects but also affects adversely the cost-effectiveness of power generation from these projects.

Cost of run-of-the-river projects using small head fall is reported to be about 75 per cent higher than hydel projects using high head fall.[44] Thus "the generating capacity of all run-of-the-river projects falls by about 65 to 75 per cent during winter because the water level in different rivers gets depleted substantially."[45] These high cost hydel projects generate electricity much below their installed capacity. For instance, run-of-the-river Uri Hydel Project built at a cost of more than 800 million US dollars has been producing a maximum of only 200 MW in winter as against the 480 MW installed capacity.[46] As such the J&K State is unable to meet its demand of about 700 MWs, even after it has been importing 230 MWs of power from the northern grid.[47] The State accounts for only 0.9 per cent of the hydel power generated in the country.[48] The shortage of power in the State has not only been causing problems for domestic consumption, but has also been inhibiting the growth of industry and agriculture. During the past forty years, since the Indus Treaty was signed, there has been sizeable increase in the State's population and standards of living. Simultaneously, the State has witnessed a big leap in agricultural and industrial development, leading to a steep increase in the demand for electricity. As such there have been fundamental changes in the ground situation, so far as the actual power requirement of the State for domestic, agricultural and industrial uses, is concerned.

Similarly, work on the construction of Tulbul Navigation Project started by the J&K government in 1984 in order to raise the level of water in the Wullar lake for facilitating transport on the river Jhelum, was stopped in 1987 after objections were raised by Pakistan.[49] Whereas the Tulbul Project would not diminish or change the flow of water to Pakistan, it would keep the Jhelum river navigable for a considerable stretch thereby bringing economic benefits to the people in the valley. The existing dam in the Salal project is full of silt upto three fourths of its 400 feet height, which needs to be flushed out urgently, in order to let the project run. Pakistan has so far succeeded in obstructing the construction of anti-siltation sluices at the Salal project. It is, therefore, understandable that there has been growing concern and anger in Jammu and Kashmir over the negative consequences of the Indus Treaty for the

State. Both the official and public circles in J&K State have been pleading for a review of this Treaty, so that the legitimate water requirements of J&K State for hydel power generation, deepening of rivers for navigation purposes, erecting protective bunds for floods and building adequate water reserves for irrigation are fulfilled. Environmental considerations also demand that the locally available hydel resources be utilised to the optimum to preserve and to maintain the deteriorating ecosystem in the State. Already, various water bodies particularly the famous Dal lake, Wullar lake and other aquatic systems have shrunk, thereby causing alarm.

Yet another associated problem has been the revenue loss of millions of rupees to the J&K State, as a result of the floating of timber logs from Jhelum and Chenab across the LoC into Pak-occupied Kashmir. This author learnt from some responsible officials of some insurance companies operating in J&K State, that the local timber merchants have been claiming millions of rupees of insurance compensation in lieu of their timber losses on this account.

And in Pakistan itself, experience has shown that its portion of Indus basin has been suffering from acute problem of water logging and salinity due to excess availability of Indus waters and consequent canal seepage and percolation of excess amount of water. According to a study, in Punjab alone, "5 million ha have already gone out of cultivation due to salinity caused by water logging, 690,000 ha are in an advanced stage of deterioration and 2 million ha are affected to a lesser degree."[50]

To conclude, Indian efforts to buy peace from Pakistan by giving concessions through the Indus Waters Treaty failed miserably. Indus water dispute was sought to be used by Pakistan as a political tool in the Indo-Pak dual over Kashmir. All along Pakistan's policy was to avoid any direct bilateral settlement with India and to seek third party intervention. The manner in which the Treaty was negotiated and concluded, lends an impression of external pressure group network exerting their influence since huge investments were involved in the construction of big dams and canals. It is a reflection on the functioning of the World Bank which was influenced by the cold war politics in the region and by the interested

construction lobbies. It also reminds that outside mediation or arbitration in bilateral disputes between India and Pakistan, as was done by the World Bank in this case, would not lead to a lasting and positive solution based on principles of equitability and just distribution of resources. The Treaty which has been in force for more than 40 years, has added to the economic woes of the people of upstream Jammu and Kashmir State by depriving them of the legitimate right to full usage of Jhelum, Chenab and Indus waters for hydro-electric generation, irrigation, navigation and other purposes. As such there is sufficient ground for reviewing the Indus Treaty, so that it is turned into a resilient one after making necessary modifications and adjustments, which can take care of the substantial changes in the ground situation in Jammu and Kashmir.

REFERENCES

1. See, Arun Joshi, "J&K to Denounce Indus Water Treaty", *Hindustan Times*, 19 December 1998.
2. See, Praveen Swami, A Treaty Questioned, *Frontline*, 10 May 2002, pp.34-35.
3. Rushbrook Williams, "The Indus Canals Water Dispute," *Leader*, Allahabad, 5 June 1955. S.K. Garg, *International and Interstate River Water Disputes* New Delhi, 1999, p. 79. N. D. Gulhati, *Indus Water Treaty : An Exercise in International Mediation*, Bombay, Allied, 1973, pp. 18,24.
4. S.K. Garg, *International and Interstate River Water Disputes*, p.79.
5. Rushbrook Williams, *op cit*.
6. N.D. Gulhati, *op cit*, p.39.
7. *Ibid*. p.59.
8. *Ibid*.
9. Rushbrook Williams, *op cit*.
10. N.D. Gulhati, *op cit*, pp. 64-65.
11. Rushbrook Williams, *op cit*.
12. N.D. Gulhati, *op cit*. p.69.
13. *Ibid*.
14. *Ibid* p. 68.

15. Sisir Gupta, "The Indus Waters Treaty", 1960. *Foreign Affairs Reports*, Vol. 9, No. 12, December 1960.
16. *Ibid*.
17. N.D. Gulhati, *op cit*. p. 92.
18. *Ibid*. p. 93.
19. David Lilienthal, "Another "Korea" in the Making", *Colliers Magazine*, 4 August 1951.
20. *Ibid*.
21. N.D. Gulhati, *op cit*. p. 445.
22. G. T. Keith Pitman, "The Role of the World Bank in Enhancing Cooperation and Resolving Conflict on International Watercourses : The Case of the Indus Basin", In *International Water Cources : Enhancing Cooperation and Managing Conflict*. Edited by M.A. Salman and Laurence Boisson de Chazournes. Washington, World Bank Technical Paper No. 414, p.159.
23. *Ibid*, p.160.
24. Gulhati, *op. cit.*, p.137.
25. Cited in *ibid.*, p. 147.
26. A.G. T. Keith Pitman, *op.cit*., p.161.
27. Gulhati, *op.cit*., pp.277-278.
28. *Ibid*.
29. For full text and annexures see *Ibid*., pp.373-410.
30. *Dawn*, 25 April 1959.
31. *Ibid*., 19 September 1960.
32. *Times of India*, 30 September 1960.
33. *Dawn*, 6 October 1960.
34. Cited in *Indian Express*, 1 December 1960.
35. *Ibid*.
36. *Ibdi*.
37. Gulhati, *op.cit*., p.345.
38. S.K. Garg, *op cit*., p.85.
39. A.N. Khosla, former Chairman of the Central Water and Power Commission who was responsible for water resources development including the Indus dispute, published details of the Indus Basin and water

flow in various Indus rivers two years before the agreement was signed. See his "Development of the Indus River System: An Engineering Approach", *India Quarterly*, Vol.14, No.3, July-Sept. 1958. pp.234-253.

40. Gulhati, *op.cit*., p.149.
41. S.K. Garg, *op.cit*., p.85.
42. USAID, Central Asia Mission, *Energy and Water Round Table*: *Analysis and Preparation for September 8-12, 1997 Meeting*, 22 August 1997.
43. Dost Mohammad and A.S. Bhat, Problems of Power Sector Development. In Shri Prakash and G.M. Shah, eds., *Towards Understanding the Kashmir Crisis*, Delhi, 2002, p.175.
44. Dost Mohammad and A.S. Bhat, *Ibid*.
45. *Ibid*., p.176.
46. *Ibid*. See also, Shujaat Bukhari, "Serious Power Shortage Stalks J&K", *The Hindu*, 18 January 2000.
47. *Ibid*. Rashid Ahmad, "Incessant Power Cut takes Valley into Dark Age", *Pioneer*, 21 January 2000.
48. CMIE, India's Energy Sector, September 1996, cited in Dost Mohammad and A.S. Bhat, *op.cit*., p.177.
49. Bharat Bhushan, "India-Pakistan Talks: Tulbul Navigation Project", *Hindustan Times*, 5 November 1998.
50. Masahiro Murakami, *Managing Water for Peace in the Middle East: Alternative Strategies*. Tokyo, United Nations University Press, 1995, p.52.

Towards an Optimum Management of Himalayan Waters

Jayanta Kumar Ray

Any discussion on an optimum management of Himalayan waters ought to commence with an undiluted emphasis on the needs and capabilities of the ordinary people in the three countries (Nepal, India and Bangladesh) covered by this paper and, of course, served by Himalayan waters. This cannot be dismissed as a truism, although Governments in these countries, including planners (often in association with experts of rich countries) have always sworn by the requirements of their people. For, despite decades of state intervention, a vast number of people in the three aforesaid countries still live below the poverty line, and the possibility of an early removal of such poverty is not really visible. If one agrees that all these countries have put due emphasis upon economic liberalization and globalization only in the 1990s, one should, in all fairness, wait for another decade before one can offer a clear verdict on the impact of this new economic policy upon poverty alleviation.

To the agonized query of U.K. Verma[1] – "how long should the people of the region have to wait?" – Governments may provide a partially evasive reply: an important reason behind their failure to remove poverty is their lack of ability to summon transnational cooperation to the required degree in the matter of harnessing the water resources of the Himalayas. The apathy of Governments towards the chronic and acute sufferings of the people could be gauged in 1954, when a decisive step towards international cooperation on the use of Himalayan waters (viz. the signing of the Kosi Agreement between India and Nepal) could be taken "only after the devastating floods in Kosi plain, when people were forced to spend several days on tree tops."[2] Not to speak of a concrete measure, even the basic idea behind such a measure towards an alleviation of apparent popular distress may not be favourably considered by a Government till it is nearly overwhelmed by a crisis. For example,

Bangladesh has long resisted the idea of diverting Brahmaputra waters for an augmentation of the flow of Ganga waters as also for mitigation of perdiodic floods caused by the Brahmaputra. But, as B.G. Verghese writes, "The devastating 1988 floods have again demonstrated the enormous stake that 'Bangladesh' has in the harnessing of the Brahmaputra-Meghna systems"[3] and the transfer of Brahmaputra waters to the Ganga.[4]

Bureaucratic incompetence or negligence in using science and technology for mass welfare is indeed a companion to bureaucratic apathy to urgent popular needs. In Nepal, for example, Governments have promised adequate and cheap electricity to the people for decades, "Unfortunately, Government has only had enough resources to provide electricity to 10 per cent of the population in over 30 years of national planning."[5] In Bangladesh, millions suffer terribly from recurrent floods. Attempts to cope with floods confront a large number of problems, e.g. economic, engineering, environmental, etc. But "these problems are exacerbated by 'top down' management that neglects the poor" in Bangladesh.[6]

If the common people of Nepal, India and Bangladesh are to benefit really from the application of science and technology to the development of Himalayan water resources, each of these countries has to fulfil a number of requirements. The *first requirement* is to redesign its water bureaucracy for the purpose of achieving greater national effectiveness and international collaboration. This redesigning is necessary to foster leadership, popular participation, accountability and transparency. Currently, in each of the abovenoted countries, "often the people concerned do not want to make decisions or take responsibility for a variety of reasons, even when they have the full legal and institutional authority to do so."[7] The most important reason – which applies not merely to the water bureaucracy but to the entire state bureaucracy – is the pronounced lack of any link between promotion and performance. Governments may not find it feasible, in the immediate future, to establish this link and, for instance, switch over to a system of short-term performance-based contracts for highly placed officials. Nevertheless,

without any delay, a Government can probably suspend the merry-go-round of frequent transfers of senior bureaucrats, which thwarts leadership and defeats accountability. Details of institution building in this area – both national and international – can be worked out not by a solitary scholar but by what I propose to designate the Kathmandu-Patna-Calcutta-Dhaka (KPCD) network, i.e. a network of water resource engineers, social scientists and human development experts, or by a "Ganga Basin Academy", as suggested by L. Douglas James.[8] (The KPCD network will certainly reinforce the efficacy of the already existing Delhi-Kathmandu-Dhaka network.)

Institutional reforms in the water bureaucracy, again, will not be efficacious, nationally and internationally, without appropriate research and training in relevant engineering skills. Nepal, India and Bangladesh are in the monsoon region, "which has some very specific boundary conditions for efficient water management. These hydroclimatic conditions simply do not exist in North America or Western Europe. They require very specific approaches and solutions. And yet, all the Asian countries have neglected research on water management under monsoon conditions. Their research efforts are mostly very similar to what is being done in the various major European and North American universities."[9] This trend has to be combated, if the development of Himalayan water resources is to benefit the poor in this region.

In the monsoon belt, again, the same technology of water management will not suit the plains and the hills. "Most of Nepal's civil engineers, trained as they are in Indian or Russian Universities, are accustomed to plains technology and find it difficult to adopt to the challenges of the hills."[10] Largescale environmental and financial damages have resulted from the application of the plains technology to the hills. This situation may worsen if experts from rich Western countries turn up in a country like Nepal. "Over the last few decades, smaller countries such as Nepal have seen a flood of foreign experts coming in, mainly from donor organizations…. For many Nepalese professionals the widespread use of foreign experts inhibited the growth of local capability."[11] In order to facilitate monsoon region researches by, and

training of, water management experts in Nepal, India and Bangladesh, the Governments of these countries must opt for transparency in the collection, dissemination, exchange and utilization of relevant data. The current situation on this matter in the aforesaid countries (of the Ganga Basin or the Ganga-Brahmaputra Basin) is incredibly adverse. "Even the most easy and achievable issues remain shrouded in conflict between the basin countries. Data gaps and uncertainty continue to perpetuate mistrust. The debate about the relationship between deforestation and flood, for example, still continues subjectively rather than on the basis of historically collected data. And committed effort to update data is still missing. Geomorphologists are unable to foresee the likely changes in sediment regime in coastal Bangladesh due to climate change, because sediment load is unknown. While Indian records from 1975 show increase in the discharge of the Brahmaputra, Bangladesh records show otherwise "…Indian negotiators say that the sedimentation rate in the proposed Karnali reservoir in Nepal estimated by Himalayan Power Consultants is excessively high. And worse, even sedimentation rates remain classified."[12]

It is true that latest technologies of remote sensing and imagery may provide some of the water management data that governments are reluctant to part with.[13] But these cannot be a substitute for transparency if plans for an optimum management of Himalayan water resources are to be pursued expeditiously. In fact, the pledge for transparency is the inevitable first step that the Governments are to take if they are serious about drawing up such plans. This will, moreover, indicate how genuinely concerned these Governments are about harnessing Himalayan water resources to serve the poor.

Once they opt for transparency in the use of water management data, Nepal, India and Bangladesh may proceed to fulfil the *second requirement* for harnessing Himalayan waters to the cause of popular welfare. They are to promote – at Governmental and/or non-Governmental levels – a series of research projects – with or without the assistance of international agencies and/or rich countries. The output of these research projects, on many complex aspects of water management, will vitally

countribute to the preparation of plans for an optimum management of Himalayan water resources. They may resolve some debates and dissolve suspicion currently hindering transnational collaboration in this field. These research projects will cover investigations into groundwater availability and use, rainfall runoff, sediment transport, the seismology and ecology of the Himalayas, etc.[14]

In the area of research studies, too, some thought has to be devoted to institution-building. "Presently no means exist for continuous interaction at scientific and professional level. The implications of both actions and inactions at a basin level remain unknown due to lack of assessment."[15] The proposed KPCD network may explore whether the above noted research projects should be entrusted to existing universities, research centres, etc. or to a new institute where experts from Nepal, India and Bangladesh will work together, develop an ethos of mutual aid and respect, and even acquire a vested but honourable interest in designing an optimum plan for the management of Himalayan water resources. Such an institute may indeed uphold the ancient tradition of hydrology in the river basin to which belong Nepal, India and Bangladesh. "After all it was in the heart of this basin that Chanakya in the 4th century BC devised and used his rain gauge and laid the very foundation of modern hydrological science."[16] Ancient Sanskrit and Pali treatises have enunciated principles of sound water management, which are valid even today. For example, Kashyapa's treatise on agriculture, as Vijay Paranjapey has analysed, enunciates five principles of water resources management, which can attract profound appreciation from present day specialists.[17] These principles are: synergic development of upstream and downstream resources; a minimum of interference in natural water flows; trade-off between technological and social requirements; a balanced development of land, water, forest and animal resources and participatory development for the purpose of sharing of benefits and responsibilities. "Interestingly the three epic volumes, *Jalabindu, Jalawahana* and *Jaladeepika* written during the early Buddhist period in the Pali language, together represent the modern concepts of watershed or upper catchment, the reservoir and the command areas. Here, the

elaborate details reveal their understanding of rights, duties and accountability of the various actors."[18]

SOME MAJOR DEBATES

High Dams in the Himalayas

"Throughout history, a readily available and usable water supply has been a prime influence upon where people choose to live, work and build. Thus, to varying degrees, water resources development has moved forward hand in hand with the growth of population, irrigated agriculture, and industry. As locally available water supplies have gradually been surpassed by local water demands, … cities and nations have attempted to resolve the problems by programmes of water allocation, conservation, and pollution control, and allocation by major water storage and transportation system – reservoirs, canals, aquaducts and tunnels. An important factor in the planning and design of all these programmes is the estimation of present and future water demands."[19]

There can possibly be no disagreement about observations in the preceding paragraph. But debates begin when, for example, one suggests high dams in the mountains of Nepal for the purposes of meeting a variety of accumulated demands, e.g. hydroelectricity generation, flood moderation, irrigation, pisiculture, etc. In varying ways and degrees, these dams are expected to confer immense benefits upon the three countries under consideration in this paper: Nepal, India and Bangladesh.[20] Some of these debates may not be satisfactorily resolved till the intensive investigations, suggested in preceding pages are successfully conducted. For example, "Unless the uncertain knowledge base on the seismic risk associated with the Himalayan dams is sorted out, the uncertainty may become another major stumbling block for the construction of big dams near international borders. It may be the case that the feasibility of realizing the hydrological dreams of storage in the Himalayan rivers will be cut short by the seismological realities."[21] Recent advances in the technology of devising earthquake-resistant dams have been significant, and "there are experiences of 103 m high concrete dams that were exposed to earthquake of plus six richter, which have not failed and no damage

occurred to the non-overflow section."[22] There is also a technological possibility that reservoirs may introduce seismic stability in a quake-prone area.[23]

This debate on seismicity can be resolved by required scientific investigations. But, throughout the world since the late 1960s, there has grown up a sort of anti-dam movement whose votaries do not frequently rely on a scientific approach. They appear to heap a blanket denunciation upon all big dams constructed in the past, and impose a ban on their construction in the future.[24] "From Aswan in Egypt," as Vasudha Dhagamwar asserts, "to the DVC in India, cautions were given but to no avail. It must have been bitter satisfaction to those Cassandras when they were later proved right."[25]

Such assertions mark a gross deviation from the requirements of scientific analysis. After all, one cannot conceive of any project – a road or a bridge, a small or a big dam, etc. – which does not have some pluses and minuses, benefits for some and losses for others, advantages and disadvantages. The most important point to note is whether positive outcomes of a project so much outweigh the negative outcomes as to deserve praise and support. For example, the DVC (Damodar Valley Corporation) – entrusted with the implementation and management of the Damodar Valley Projects (including dams), may be subjected to a number of criticisms. But to suggest that, on balance, the DVC has been a failure, is a traversty of truth.[26] Undoubtedly, a major criticism of dams, which relates to an ignominious administrative failure to rehabilitate persons displaced by dams, is yet to be answered. "Of the 2,180 families displaced by the Bhakra dam in 1942-47, only 730 had been resettled till as recently as 1988. And that too, after they had submitted a petition to the Lok Sabha in 1978-79, two decades after they had been displaced."[27] But it will be thoroughly unscientific to parade such data and then even to hint that the Bhakra dam has been a failure, or, that it has not contributed to economic improvements in India's western region in the post-independence year. After all, no dam – or anything – can provide a panacea for all ills. But it is undeniable that the Bhakra dam can account for a lot of whatever is the present level of prosperity in India's western region.

There is a view that "Hydro-electric power could be to Nepal what oil is to Arab countries."[28] Others may dismiss it as a romantic view, and point to dangers confronting big dams in the high mountains. For example, there is the hazard of floods due to glacier lake outbursts.[29] One, therefore, has to bring into play the right kind of expertise and attitude to strike a proper balance between probable impacts, positive and negative, of a big dam in the mountains. There is another hazard facing high dams in the Himalayas: post-construction management and maintenance. It has been observed that in Nepal facilities of education and training for even the management of small energy projects are not adequate.[30] Therefore, there should be large investments in education and training years before a big dam comes into operation. In this context, one cannot overemphasise that "Himalayan villagers, despite their tiny incomes, are capable of carrying out and managing some largescale engineering projects. Their terraced hillsides, with their millions of gallons of impounded water, testify to that! But they create these projects step by modest step, and if one part should fail (as a result of land-slip, for instance) the rest is not affected. Often the damage is repairable; when it is not, then the affected fields can be downgraded to rainfed terraces (*bari*) and perhaps new, irrigated terraces (*khet*) can be added elsewhere. This is a process that is going on in every village and on every hillside throughout the Himalaya, and the challenge for those who wish to promote sustainable development is, not to destroy this self-managing and highly adaptive system, but to get their technological innovations caught up by it.[31] Even a mini-hydel scheme, taking 5-10 years to get into operation, can upset this system.[32] Protagonists of big dams and hydro-electric projects, therefore, must take care that they do not destroy this system without putting in place a better substitute.

"The rapid proliferation of small scale turbines and their growing popularity in recent decades in mountains of Nepal is a testimony to micro-level water management."[33] But one need not construe an unavoidable conflict between macro-level water resources development by high dams and micro-level development. For, in the first place, the full potentialities of mini-and micro-hydel plants in Nepal cannot be

realized without a vast investment in research and development.[34] Neither the private manufacturers nor the Government of Nepal may be able to afford this investment. Collaboration with foreign countries (including India) may be required. Such international collaboration in small hydel plants may pave the way to similar collaboration in big hydel plants. In the second place, big dams may require not less than 20-25 years for completion.[35] Meanwhile – or even afterwards – mini and micro-hydel plants can continue to receive encouragement from the Government as also the private sector.

The debate on high dams in the Himalayas will remain incomplete without relating it to "the totality of the development challenge that Nepal confronts in terms of accelerating the structural transformation of what is primarily a subsistence based agrarian economy."[36] Prem Jung Thapa raises the question[37] of whether the common people of Nepal will benefit more from their Government's investment of one billion US dollars in rural credit/communication and female education, than in a high dam, which may cost not less than two to four billion United States dollars, and, therefore, inevitably depend on foreign funds. It is not easy to answer this question. Nor is it to be taken for granted that the conflict posted in this question between different types of public investment is always logical or scientific. But the question deserves a sincere probe in any discussion on the development of Himalayan water resources for the purpose of benefiting the ordinary citizens in Nepal, India and Bangladesh.

Nevertheless, in the long run, hydroelectricity generated by high dams in the Himalayas may provide "the least expensive and least ecologically damaging solution" to the problems of accelerated economic development in some northern areas of India, as also in Nepal – by overcoming energy shortages in these areas of India, and enabling Nepal to enhance its income substantially by a massive sale of electricity to India.[38] Moreover, not merely India but also Bangladesh (and Pakistan) may eventually find themselves dependent on Nepal for hydroelectricity. "As per the current trend, India can rely on fossil fuels for about 40 years, Bangladesh for about 30 years and Pakistan for about 20 years."[39] Moreover, "Beyond 2020 AD the logical strategy for Bangladesh would

be to use Nepali hydropower for meeting its peaking energy" whereas "India may be able to meet all its peaking demand by hydropower up to 2030 AD after which use of peaking power from Nepal appears attractive."[40] Moreover, "Given the large increase in oil prices, many hydro-sites which were previously uneconomic have become attractive."[41] Undoubtedly, "Certain dams should obviously not be built in any circumstances – where the risks or the costs of overcoming them are too high. In all other cases, not to go ahead would be to mortgage the future."[42]

The Ganga-Brahmaputra Link Canal

There is a curious linkage between discussions on high dams in Nepal and the Ganga-Brahmaputra Link Canal. This is derived from the scarcity of waters in the Ganga during the lean season, and years of conflictual negotiations between India and Bangladesh on how to augment the dry season flow of the Ganga, so that, without any adverse impact on Bangladesh, adequate quantities of water can be diverted through the Farakka barrage for the preservation of the port of Kolkata as also of the drinking water supply system for the people of Kolkata. India and Bangladesh have signed two agreements on Ganga waters – the first in 1977, and the second in 1996. One major distinction between the two agreements is the emphasis placed on the augmentation of the Ganga's lean season flow in the 1977 agreement, and relative lack of it in the 1996 agreement. India and Bangladesh exchanged side letters along with the signing of the 1977 pact. India proposed a reference to the Ganga-Brahmputra Link Canal in the side letter. Bangladesh overruled it.[43] Instead, at the insistence of Bangladesh, India agreed to include in the side letters a reference to storage dams in Nepal as a possible means of augmentation of the Ganga's dry season flow.[44] Nevertheless, both the countries agreed that all schemes, placed in future before the Joint Rivers Commission set up by the two Governments, could claim equal attention.[45]

An important and publicized reason behind Bangladesh's aversion to the Ganga Brahmaputra Link Canal proposal is that the Ganga and

the Brahmaputra belong to two separate basins, and that means for the augmentation of the Ganga's dry season flow should be found in the Ganga basin itself. The argument may be deemed to be valid as a tactic of insurance against any potential move to deny Bangladesh a share of Ganga waters stored in dams within Nepal about which India and Nepal have been acting and negotiating for decades. But this argument may not be acceptable to all water management experts. "The area of a basin depends on the location of the point considered as the outlet of the basin. For example, if the outlet point on the river Padma in Bangladesh below the confluence of Ganga and Brahmaputra at Goalundo is considered, the two Himalayan river systems, the Ganga and Brahmaputra, will constitute a single basin. The two will be separate river basins when the outlet point located upstream of their confluence on their respective river course is considered."[46]

The Ganga (the Padma), the Brahmaputra, and its tributary, the Meghna – all these rivers have been interacting for centuries. These interactions are agonizingly apparent at the time of floods. Thus, the Padma can rise so much that Meghna waters flood India's Sylhet. There was a gigantic flood in 1787, which compelled the Teesta to abandon the Ganga, and flow into the Jamuna. "It is not necessary," therefore, "to get bogged down in the technicality of whether or not the Ganga, Brahmaputra and Meghna constitute two or more watercourse systems or single international drainage basin as under the Helsinki Rules. The fact is that they are interactive rivers," stresses B.G. Verghese correctly.[47]

B.M. Abbas, the renowned water resources engineer of Bangladesh, opposes the transfer of water from the Brahmaputra to the Ganga on the ground that this "is merely shifting the problems from one area to another and is not augmentation of the flow of a river in the real sense of the term."[48] This assessment bears reconsideration, because "the Ganga and Brahmaputra have different seasonal rhythms. The Brahmaputra flows through in February after which the river starts rising, whereas the Ganga's discharge is lowest during the last 10 days of April, two months later. This asymmetry immediately suggests the possibility of diverting Brahmaputra waters into the Ganga to meet critical shortfalls at this time."[49]

Till the first half of the 1980s, water resource experts in Bangladesh were not prepared to examine the proposal for a Ganga-Brahmaputra Link Canal. They showered all their attention upon storage dams in Nepal – suggesting as many as seven such dams – for the purpose of augmentation of the dry season flow of the Ganga. Abbas went as far as to assert that there was no technical alternative to this storage plan.[50] This contention may not be above question, nor is the contention of Abbas that the needs of the Ganga basin can be adequately met by the annual flow of water in this basin.[51] Gradually, some Bangladeshi experts came to realize that "even with most optimistic assumption about trilateral collaboration, start dates and construction times, Bangladesh could not expect to receive water from the Nepalese dams until well into the next century. This was because the rate of new water generation (augmentation) would only just keep pace with the expansion of Indian irrigation consumption until about 2015 AD. At that point the expansion of Indian irrigation use might be expected to level off, and water could be made available to Bangladesh."[52]

Therefore, in the first half of 1980s a number of water resource engineers in Bangladesh were prepared to deviate from the previously held assessment, notably by B.M. Abbas, that the Ganga Brahmaputra Link Canal could not provide much benefit to Bangladesh, and that it would cause severe damages to Bangladesh.[53] Abbas even called the Indian proposal of the Ganga-Brahmaputra Link Canal (envisaging the use of both Indian and Bangladeshi territories) something of a fantasy.[54] Yet, as a great water resources engineer, Abbas could not entirely dovetail with Ganga-Brahmaputra Link Canal, even if it was different from the proposed Indian plan for a Link Canal. He wrote: "There is fabulous hydro-electric potential estimated to be 30 million KW in the bend of Brahmaputra at the Tibet border, in which its water comes crashing down nearly 3000 metres in a short distance. Storage dams which will create hydropower can also control floods which are a major problem in both the river basins. The monsoon storages will also increase the dry season flow of the rivers, improve navigation and provide other benefits."[55]

The term "Link Canal" may sometimes be a little misleading. Therefore, it must be stressed that a successful Ganga-Brahmaputra Link Canal should provide for multi-purpose reservoirs without which it may be impossible to cope with the 1988-type flood, which devastated Bangladesh. Evidently these reservoirs can make substantial contributions towards generation of electricity, navigation, and, of course, irrigation in the dry season.

Financing

At this stage of our analysis, it is apparent that one need not rule out the consideration of the techno-economic feasibility (not to speak of political acceptability) of high dams in the Himalayas as also the Ganga-Brahmaputra Link Canal. Attention, therefore, has automatically to turn to financing. It is easy to observe that Nepal, India and Bangladesh lack the capital to build high dams in the Himalayas.[56] One can point out, for instance, that the cost of the Chisapani Multipurpose Project – five billion US dollars – equals nearly twelve annual budgets of Nepal.[57] Moreover, Nepal depends on foreign aid for 70 per cent of its development allocation.[58] Therefore, it cannot overlook the emergence of a debt trap, especially when its foreign debt nearly equals its annual gross domestic product.[59]

Bangladesh, too, depends on foreign assistance for a major part of its development budget. If it wants to build the Brahmaputra barrage and the Ganga barrage in accordance with its Ganga Brahmaputra Link Canal plan, traversing entirely its own territory, it will have to spend about six billion US dollars at 1986 prices.[60] Bangladesh can appreciably reduce this expenditure by building only the Ganga barrage on its own territory, and by agreeing to share with India a Link Canal passing through the Bangladesh territory, whereas India can build on its territory (at Jogighopa) the Brahmaputra barrage and a 3000 MW power plant at a cost of about 650 crores of Indian rupees (in accordance with an Indian proposal of 1983).[61] In this context, it is pertinent to refer to the 1996 Ganga waters treaty between India and Bangladesh. For long Bangladesh has been clamouring for a long term agreement on the sharing

of Ganga waters with India, so that, on the basis of such a long term assurance of the available quantity of water it can plan heavy engineering structures on the Ganga for irrigation, salinity moderation, etc. and become eligible for international financial support. The 1996 agreement, being valid for 30 years, has satisfied this longstanding demand of Bangladesh.

Eventually, the financing of such inordinately expensive projects, e.g. high dams in the Himalayas or the Ganga-Brahmaputra Link Canal, may have to depend not on multilateral regional collaboration, but also on extra-regional participation. Thus, the Group of Seven countries, the World Bank, globally active/reputed construction/consultancy firms, etc. may have to be urged to take interest in these projects. "In the global economic order prevailing today, international financing of such ventures through several inter-governmental financial institutions or through various consortia is a well accepted, viable proposition."[62] International assistance can combine financial aid with technological support. "Technology is supranational, and cannot be ascribed to any one country."[63] This takes us to an analysis of the issues of bilateralism and multilateralism with regard to the development of water resources in the Himalayas.

BILATERALISM AND MULTILATERALISM

Ganga is an international river, because it passes through China, Nepal, India and Bangladesh.[64] But that does not mean that all these countries have to be associated with all schemes for an optimum development and management of Ganga waters. An uncritical insistence on multilateralism in this matter can create confusion.[65] Some renowned water resources engineers are of the opinion that, "As, for all practical purposes, Nepal and India are the only two co-basin nations for all the rivers originating in Nepal, the issue of development of these rivers and the associated water resource is, distinctly and dominantly, bilateral. This is so not only from the hydrological point of view but is also in conformity with jurisdictional requirements and legal norms."[66] This opinion simultaneously recognizes that any optimal scheme of utilization of waters of the Ganga and its tributaries (e.g. Kosi) by Nepal and India would

invariably – due to inescapable hydrological factors – benefit Bangladesh in terms of flood moderation and dry season irrigation.[67]

In the interest of large scale and long term collaboration between Nepal, India and Bangladesh, envisaged in this paper, the above noted opinion may require suitable revision. It may be recalled in this connection that when, in 1986, representatives of India and Bangladesh met Nepalese officials for an inquiry about storage dams in Nepal for the purpose of augmentation of the Ganga's dry season flow, Nepalese officials were not quite responsive. The Nepalese were dissatisfied not merely because they did not get any clear view of benefits for Nepal, but also because they were interested in sharing the role of decision makers in the whole affair.[68] After all, Nepal should not have forgotten that although Ganga waters flowed mainly from Nepal, it was excluded from negotiations which led to the signing of the India-Bangladesh agreement of 1977 on the sharing of Ganga waters and augmentation of the lean season flow of these waters.

The issue of bilateralism versus multilateralism is thus a highly sensitive one, and has to be approached with extreme care. For instance, it can be argued that as many as five countries – China, Nepal, Bhutan, India and Bangladesh – should be associated with decision making on Ganga-Brahmaputra waters. "However, it is very doubtful that a multilaterial basin approach would be of substantial assistance to Bangladesh, since the concrete interests of no other participant among India, Nepal, Bhutan, and China are the same as those of Bangladesh. The cooperation needed between Nepal and India on dam building and power sales has little similarity to what Bangladesh seeks with India on water sharing, augmentation, and flood mitigation."[69] Yet, for the sake of long term regional solidarity and international financial support, multilateralism may be adopted for a string of projects, and yet adapted to each specific project in such a way that the decision making role to be performed by a participant country is strictly but imaginatively adjusted to its evident stake in that specific project.

Multilateralism cannot but rely on bilateralism. Yet, multilateralism has some obvious limits. Take, for instance, the role of China in the

development of the Brahmaputra. "China is upstream of India, but it has little chance of diverting water from the Brahmaputra before it enters India because of the nature of its mountain terrain and low population densities in the area. Its power load centres may also be too far away to make power exploitation realistic – unless again electricity is sold to India."[70] It may not, therefore, be essential to include China in a scheme for optimal use of Brahmaputra waters. But B.G. Verghese opines that China may be included in a sort of Himalayan Rivers Commission, and adds: "The possibility of diverting some Tsangpo flows into the upper Gandak or Arun by tunneling through the modest ridge that divides these rivers in Tibet, merits study."[71]

HYDROPOLITICS AND HYDROHARMONY

Many of the issues debated above can be resolved if hydroharmony is allowed precedence over hydropolitics. Misinformation, guesswork bordering on suspicion, misperception, and press reports based on ignorance or illicit influence, are frequently at the root of hydropolitics. Even top ranking experts in various fields, including political personalities, can fall a prey to hydropolitics.

Take, for instance, the oft-repeated Nepalese complaint that Nepal has been cheated on the Kosi Project, and that its sovereignty has not been properly respected. Indians feel agonized by this complaint. For, due to financial and other constraints, India drew up the Kosi Project in a way that extended greater benefits to India than to Nepal. Actually, in such projects inside India – or other parts of the world – gains are not always equal.[72] But for Nepal's consent, India was not in a position to construct the Kosi barrage. India was (and is) more powerful than Nepal, but it certainly lacked (and still lacks) the capability for imposition of the Kosi barrage agreement on Nepal. The agreement, dated 25 April 1954, notes that the Government of Nepal "has agreed to the construction of the said barrage, headworks and other connected works by and at the cost of the [Indian] Union, in consideration of the benefits hereinafter appearing."[73] India paid compensation to Nepal for lands transferred to it for the implementation of the Kosi Project, but the India-Nepal

agreement of 1954 stipulated clearly that "sovereignty rights and territorial jurisdiction of the Government [of Nepal] in respect of such lands shall continue unimpaired by such transfer."[74] Moreover, both Nepal and India agreed to "final and binding" arbitration in regard to "any question, differences or objections" arising out of the agreement.[75]

True, benefits granted to Nepal (which need not be listed here) by Kosi agreement were not substantial. India, too, did not secure all the anticipated benefits. This was largely due to improper planning behind the Kosi barrage, which suffered from "a project-centric approach," and did not "aim at optimum development, effective management and efficient utilization of the water resources of the basin."[76] It is true that the Kosi Project has produced some adverse ecological consequences. But it is also worth noting, as the Report of the Technical Committee Constituted by the Government of Bihar in 1965 notes: "the unique translatory movement of Kosi river has for about 130 years caused a shift in its course of about 70 miles and in the process an area of about 6,000 sq. miles in North Bihar and Nepal has been devastated. This vast area received a great sense of security after the construction of the Kosi Project. This is apparent from the fast changing outlook in the districts of Purnea, Saharsa and Darbhanga…. The flood embankments on both sides of the river Kosi have protected an area of 1.27 lakh acres in Nepal Terai from annual flooding."[77]

Undoubtedly, benefits to India and Nepal would have been incomparably greater – and criticisms of the Kosi project by the Nepalese might not have arisen – if a much more ambitious multipurpose project, costing 177 crores of Indian rupees, had been carried out. This project evolved from several years of surveys and investigations carried out in Nepal (with the permission of the Government of Nepal) and in India. This project envisaged the construction of a 783 feet high dam at Barakshetra in Nepal and the storage of 6.9 million acrefeet of water, as well as a barrage at Chatara and canals for irrigation benefits to 38.4 lakh acres in Nepal and Bihar, for desiltation and improved drainage, and for the generation of 90,000 KW of hydro electricity.[78]

This project for a Kosi High Dam, if implemented, might have transformed certain areas in north India and Nepal, generating an unstoppable movement towards prosperity, as the Bhakra Dam did for India's western region. Significantly, analyses and interpretations of why the much bigger Kosi project was abandoned in favour of a small one can offer glimpses into considerations of hydropolitics, and also promise ways of substitution of hydroharmony for hydropolitics.

The Government of India's 1953 Project Report on the Kosi Project confessed on financial stringency for the failure to go ahead with building the big dam at Barakshetra. Rishikesh Shaha, a former Foreign Minister of Nepal, accepts the explanation, but modifies it.[79] According to him, Bihar could not compete with Punjab (which wanted the Bhakra dam, to which Rishikesh does not explicitly refer) in claiming a large share of India's limited resources. This may or may not be correct, partially or wholly. But the other explanation of Rishikesh – that the Barakshetra High Dam, located deep inside the Nepalese territory, was not preferred by India because of "security consideration" – is open to serious challenge, especially when he adds: "Ever since then, India's obsession with security has prevented it from thinking of building dams and power stations higher up in the mountain gorges of Nepal. India has been afraid that these costly installations will not be safe in the hands of another country, however, closely it might have been linked with Nepal in matters of security and development through a formal exchange of letters in 1950."[80]

This assessment of Rishikesh can be questioned in several ways. The Government of India did not abandon the Barakshetra High Dam Project. Its 1953 Project Report pleaded: "In view of the high cost of the project and the limited financial and material resources available in the country, the scheme was divided into seven easy stages, each self-supporting and independent in itself and yet capable of being superimposed on the preceding one without involving any engineering difficulties or wasteful expenditure."[81] The Kosi barrage, that was eventually built, represented merely the first stage in this comprehensive scheme.

U.K. Verma, a former Engineer-in-Chief and Special Secretary, Government of Bihar, provides an explanation of the postponement of the Barakshetra High Dam Project, which is devoid of hydropolitics. He writes: "The high dam project had to be deferred in view of the uncertainties about the stability of a high dam in one of the active seismic zones in the world. In the early fifties, stability of rock fill dams in high seismic regions was a major unknown issue and the technology was not developed. Even after consulting with American experts the proposal could not be taken further."[82] But the Government of India never gave up the idea of the High Dam and kept it under active consideration. That is why it established a seismological observatory at Barakshetra, and set up a project at Chatara for researches on conservation work on the Kosi mountains.

What then prevented the implementation of the other stages of the Barakshetra High Dam scheme in which the already constructed Kosi barrage formed the first stage? In order to answer the question, one may have to move from the domain of purely scientific technological explanations to that of hydropolitics, and yet offer a corrective to Rishikesh Shaha's above noted assessment. Evidently, India failed to convince Nepal of the logic and utility of the seven stages of the Kosi High Dam scheme. Evidently, also, Nepal remained preoccupied with the wrong supposed to have been done to itself at the first stage of this scheme, i.e. when the existing Kosi barrage was erected. "If further investigations indicate the necessity of storage or detention dams and other soil conservation measures on the Kosi and its tributaries, the Government [of Nepal] agree to grant their consent to them on conditions similar to those mentioned herein," stated Article 16 of the 1954 Kosi agreement. The world "conditions" in this Article need not be negatively interpreted, because Nepal would not have agreed to any unusual condition, and a perusal of the agreement would not reveal any extraordinary condition although there could always be a scope for revision or improvement. This could be interpreted to be taken care of by the words "similar to" following the word "conditions". Article 16 of the 1954 India-Nepal agreement had vast potentialities of gradual

upgradation of collaboration in the development of water resources in the following decades in tune with the availability of financial resources and the march of technology. But the potentialities were virtually lost in 1966 when, at Nepal's insistence, the 1954 Kosi barrage agreement was revised, and Article 16 was deleted. "Other suitable projects upstream of the present barrage were necessary to harness the river for mutual benefit which would have also brought direct benefits to Nepal. But the sense of past "wrong" impaired the atmosphere of cooperation between two neighbours following the agreement of 1954. As a result, the past wrong was allowed to continue of its own choice more than anything else, when Nepal should have been prompt, in seizing the opportunity to initiate other beneficial projects that would have made up the past losses."[83]

The validity of the above noted observation was confirmed by the fate of the Feasibility Report on the Kosi High Dam at Barakshetra, which was prepared by India in 1980. This was forwarded to Nepal in 1983. But Nepal did not respond favourably till February 1991, when at the Seventeenth Meeting of the Kosi Coordination Committee, India and Nepal "recognized the need" for "surveys and investigations to explore the possibility of undertaking the Kosi High Dam."[84] The above noted Feasibility Report on the Kosi High Dam reiterated that the onrush of silt was the principal problem in Kosi, and recommended that "it will be essential to construct a number of storage reservoirs on the major tributaries of the Kosi upstream of the proposed dam at Barakshetra within reasonable time to optimize the life and benefits from the proposed project."[85] As to the continuing debate on the positive and negative aspects of the present Kosi barrage, a 1983 Report of the High Level Technical Experts Committee for Kosi Barrage presented an analysis of how the behaviour of the Kosi can baffle planners, although the costs of inaction would have been immeasurably higher than the costs of unavoidably defective or non-fool-proof action.[86]

The preceding discussion on the India-Nepal agreement of 1954 on the Kosi barrage provides an example of how hydropolitics can gain precedence over hydroharmony, and also indicates how the process can

be reversed in favour of hydroharmony. Another example is provided by the Tanakpur barrage agreement of December 1991 between India and Nepal, which was revised in October 1992. During 1985-89, when Nepal was under Panchayat rule, India built within its own territory a barrage and power station at Tanakpur. The agreement of 1991/1992 related to the construction of an afflux bund within Nepalese territory for the prevention of inundation of agricultural land in Nepal. In 1991, India agreed to supply 150 cusecs of water to Nepal for irrigating 4000-5000 hectares of land. Moreover, despite a substantial reduction of the supply of electricity needed by India, it was agreed by India to supply to Nepal, free of charge, 10 million units of power. In the 1992 agreement, this was raised to 20 million units. Besides, as in the case of the 1954 Kosi agreement, Nepal would retain sovereignty over the land on which India was to carry out construction works.

"Though appearing to be beneficial to both the countries, the Tanakpur accord got enmeshed in the vortex of internal politics in Nepal."[87] The Prime Minister, belonging to the Nepali Congress, was accused by the opposition leaders of subservience to India. A faction of his own party also strengthened this attack upon him. The controversy about the Tanakpur Project did not "centre around the contents of the actual package as envisaged by Nepal's decision on the project so much as around the non-observance of the formal procedure provided for such transactions in the 1990 Constitution of Nepal."[88] Since the Tanakpur agreement related to the highly sensitive issue of water resources development, the Prime Minister ought to have submitted the agreement to Parliament for ratification in accordance with the country's Constitution. But he prevaricated. Subsequently, the Supreme Court of Nepal prescribed ratification of this agreement by Parliament which ratified it after a considerable lapse of time – but not before sowing confusion and discord within Nepal as also between India and Nepal. Actually, the Tanakpur package, becoming a part of the broader Mahakali treaty of 1996, was finally ratified by the Nepalese Parliament as late as in September 1996.

This submergence of hydroharmony by hydropolitics could have been avoided if political leaders, bureaucrats, professional engineers and mediapersons played their respective parts in a responsible manner, relied on facts and enlightened selfinterest, and refrained from infecting the public with misperceptions. "Many reporting Tanakpur, for example, have met experts and officials who have spoken only half-truths. For example, the fact that the disputed bund was built as suggested by a Nepali fact-finding mission, was made public only recently while there were people knowing about this all along," affirm B. Bhattarai and R. Dahal,[89] who have also made the following important observations on the Tanakpur debate in Nepal. First, "Those with knowledge about the technical, constitutional and legal intricacies of the project have behaved rather unprofessionally, and have also been unsuccessful in presenting facts to the public."[90] Secondly, "the politicians have been concerned more with political overtones of the debate and less with the scientific truth."[91] Thirdly, "The media in general… appear to be myopic, biased and even getting manipulated…."[92] As to the Indian press, the less said the better. Indian mediapersons did not apparently have the training for, and interest in, reporting such a vital issue of water resource development as the Tanakpur issue. They could easily be accused of chauvinism.[93]

Some Indian observers, however, have expressed their regret over the fact that Nepalis appear to play up the allegation about their being losers or cheated on such issues as the Kosi barrage or the Tanakpur barrage, whereas they play down the beneficial impact of numerous projects completed with substantial Indian assistance. Even during the Panchayat regime, "The strained relations notwithstanding, India has continued its assistance programme in Nepal. By 1984-1985 five projects were completed and handed over to the Nepali Government. These were the Devighat Power Project, Mahendra Rajmarg, a Police Hospital in Kathmandu and included one hundred drinking water schemes in rural areas…. However, even sincere Indian economic aid is perceived suspiciously in Nepal."[94] It should be added that many important Nepalese projects, e.g. the Kankai multipurpose project, the Mulghat hydroelectric project, the West Rapti project, etc. "did receive synergic support from

India."[95] All this happened despite the overall unpropitious situation in which suspicions about India's role in such issues as the Kosi and Tanakpur issues, persisted, and "Nepal made incredulous and unreasonable claims to thwart even viable and wellmerited projects" on development of Himalayan water resources proposed by India.[96]

Therefore, prospects for hydroharmony superseding hydropolitics may be deemed to be bright. There are, again, instances to demonstrate how reliance on hydropolitics may turn out to be factually untenable, dramatically counter productive, or a cause of self-inflicted injury. First, one can refer to the unprecedented flood of 1988 in Bangladesh. Although India promptly dispatched aid to Bangladesh, there was in Bangladesh a propaganda campaign against India, which pointed an accusing finger to the Farakka barrage as the cause of devastation in 1988. But this was not factually tenable, and the Farakka barrage could not have caused the 1988 flood in Bangladesh, because "The Ganga in 1988 registered a lower peak value than in 1987."[97] Secondly, for years India declined to include Nepal into India-Bangladesh discussions and negotiations on the augmentation of the flow of Ganga waters in the lean season. Whereas India stressed the need to construct the Ganga-Brahmaputra Link Canal for the purpose of this augmentation, Bangladesh insisted on building high dams in Nepal (as has been already noted in this paper). In 1985, the Indian view point underwent a change, and in 1986, Indian as well as Bangladeshi representatives visited Kathmandu to meet Nepalese officials. But the Nepalese response was far from encouraging. It was dramatically impressed upon Bangladesh that hydropolitics on the issue of bilateralism versus trilateralism was not quite productive. "The Kathmandu visit had a somewhat chilling effect on Dhaka. It brought home realization that Nepal had its own ideas, problems and priorities and that previous Indian cautions against assuming Nepal's instant readiness to fall in with Bangladesh's very ambitious plans for damming all its rivers was not just bluff."[98] Thirdly, India is reluctant to permit its technologists to associate with their counterparts in Bangladesh who have been developing, with World Bank assistance, one of the most sophisticated hydrological models in the world, which can carry out

valuable tests of simulated engineering structures.[99] This is a remarkable instance of self-inflicted injury on the part of India.

The naturally complex relationships between the upper riparian and the lower riparian affect the three countries under consideration in this paper: Nepal, India and Bangladesh. Nepal is the upper riparian vis-à-vis India, which is again the upper riparian vis-à-vis Bangladesh. The incontestable advantages of an upper riparian favour Nepal in one situation, and India in the other situation. But India is, economically and politically, more powerful than Nepal or Bangladesh. Yet, India's dependence on Bangladesh becomes apparent when one notes that India needs urgently the concurrence and cooperation of Bangladesh for the construction of a Brahmaputra-Ganga Link Canal traversing the territory of Bangladesh. India's dependence on Nepal is far more glaring, almost desperate. Nearly 75% of North Bihar is "prone to annual floods," whereas "more than 60% of the basin areas of the rivers flowing through North Bihar lie in the northern neighbouring country of Nepal."[100] India's helplessness in taming the extraordinarily turbulent and excessively silt carrying Kosi without Nepal's permission for the erection of heavy engineering works in Nepal is too obvious to need much reiteration, and many official reports have amply confirmed it.[101]

India's political-economic superiority is not of much help in negotiations on water resource development with its neighbours. For, a less powerful country is so oversensitive to the charge, real or imaginary, of subservience to a more powerful neighbour, that it may, even on mere suspicion of pressure, prefer inaction to action. "Thus the political clout and economic power of India, in the context of water accords, have become its weakness rather than its strength."[102] In a world where even the relentless adversaries of two world wars have come close economically, politically and even militarily, there is no reason why Nepal, India and Bangladesh cannot work together for water resource development, moving from mini-micro to mega-projects, so that the people do not have to wait for decades to eat the tantalizing fruits of superbig projects. Certainly, "in the changing global scenario where the economic agenda increasingly exerts greater influence on the politics of

nations, the chances of proper economic partnerships, even between unequal neighbours, are bright."[103] Although, for obvious reasons, India has to take the initiative with regard to the Kosi High Dam project, if the project materializes at some point of time, Nepal and Bangladesh will benefit in many ways. To take a few instances, Nepal may be able to sell electricity to Bangladesh, thereby depriving India of its status of a monopoly purchaser of electricity from Nepal. Moreover, Nepal may even be able to relieve the agony of its landlocked status by the construction of a waterway through Indian lands to Bangladesh. Again, Bangladesh will benefit from the augmentation of Ganga's dry season flow as also flood mitigation.

Taking all such matters into account, one can argue that "it would be economically suicidal for the smaller nations to stubbornly sit on their resources because of perceptions of being shortchanged."[104] India, again, should be careful that it does not appear to press home its advantages for being, economically and politically, more powerful than Nepal or Bangladesh, and also for being the upper riparian vis-à-vis Bangladesh. "In fact, India does not subscribe to a view of international law that would permit it to ignore the interests and claims of Bangladesh, and it has never threatened to cut off all Ganges water."[105] Nevertheless, mistrust of small countries towards India naturally persists, although "It is difficult to evaluate whether such feelings of mistrust on the part of the smaller countries are objective."[106] In the 1980s, for instance, Bangladeshi experts could not go forward with their own plan of a Ganga-Brahmaputra Link Canal (confined to the Bangladesh territory) because of the fear that anti-Indian lobbies in Bangladesh might dub it as a sellout to India due to its similarity to an earlier and larger Indian plan, which had already been rejected by Bangladesh.[107] In Nepal, "The case of the Trisuli project constructed by India, which feeds the Nepalese capital Kathmandu with much-needed electricity, has not made much difference in the public impression," which is one of mistrust towards the bigger neighbour.[108]

During 1996-97 there was a noticeable movement from hydropolitics to hydroharmony. In February 1996 the signing of the

Mahakali Treaty between India and Nepal, which aimed at an integrated development of the Mahakali river system, apportioned the costs and benefits of development equitably between the two countries.[109] In December 1996 the Ganga waters agreement was signed between India and Bangladesh. The statistical base of the agreement did not appear to be very strong. There was a genuine worry about whether the estimates of the anticipated total flow of water in the lean season were correct or realistic. The 1996 Treaty estimates substantially exceeded the 1977 Treaty estimates. The 1996 estimates relied on the obsolete data about the non-monsoon availability of water up to 1983 provided in some Government of India reports. This was unrealistic, because more recent data, i.e. data up to 1993, provided in the Bihar Irrigation Commission Report, were ignored. The Bihar Report placed the non-monsoon availability of water at a level lower than the older Government of India reports. Moreover, the statistical base of the 1977 Treaty was based on a 26-year average (1948-1973) availability of water. In contrast, the 1996 Treaty was based on a 40-year average (1949-1988). Not to speak of a deliberate attempt to evade the decline in rainfall during 1989-95, it was not all realistic to apply the 1949-1988 estimates to the 1997-2026 period, i.e., the period of validity of the 1996 Treaty. Nevertheless, hydroharmony triumphed over hydropolitics, because the Bangladesh Government (as also the Indian Government) considered the 1996 Treaty to be satisfactory.[110] For, it was a 30-year agreement on sharing of Ganga waters, and with this long term assurance of the supply of Ganga waters, Bangladesh could go ahead with large scale plans for the augmentation of Ganga's dry season flow by means of heavy engineering works, which would require and attract international funding.

The Prime Minister of India visited Nepal during 5-7 June 1997, and on 5 June, the Governments of Nepal and India signed a Power Trade Agreement and a Memorandum of Understanding on Civil Aviation. They also exchanged letters on Raxaul-Sirsiya Broadgauge Rail Link and on Paropakar Hospital. Above all, they exchanged Instruments of Ratification on the Mahakali Treaty, which is "unprecedented in its scope, as it envisions a broad perspective of maximizing and sharing total net

benefits on the integrated development of the entire Mahakali river system and not in terms of an individual barrage or power project."[111] Moreover, during the course of this visit by the Indian Prime Minister to Nepal, India agreed to provide a transit route for Nepal to Bangladesh through Phulbari. Since the route lies in the northeast region of India, infested with terrorists (including foreign mercenaries), the grant of this route to Nepal certainly represents a retreat of hydropolitics and a triumph of hydroharmony. For, Nepal's quest for such additional transit routes, and the success it achieves in such a quest, cannot but contribute towards Nepal-India collaboration in the development of Himalayan water resources. Reviewing the visit of the Indian Prime Minister to Nepal and accords reached during 5-7 June 1997, one Nepali commentator stressed that "In the game of give and take, Nepal gets more."[112] This may represent more of perceptions than of realities. Yet, this assessment is highly significant, because in the past Nepal-India relations were often vitiated by misperceptions, and, therefore, this assessment reflects a passage from hydropolitics to hydroharmony.

In order to accelerate the movement from hydropolitics to hydroharmony the Governments of concerned countries must pay proper respect to scientific-technological expertise, if they want their decisions to conform to the requirements of the ordinary people. The situation on this front does not appear to be entirely encouraging. For example, the river Ganga, whether on the plains or the mountains, presents enormous complexities. "It is doubtful if any one in the corridors of power in Delhi or Kathmandu has a handle on these complexities of the lower Ganga plain. It is even less justifiable to expect an understanding of the challenges in the highland catchment."[113] Moverover, the Governments of three countries under consideration in this paper – Nepal, India and Bangladesh– must permit transparency in the generation, dissemination and exchange of data, which can pre-empt wrong decisions on exceedingly intricate hydrological measures, and also prevent incorrect interpretations of even right decisions. There can be no better example of the validity of this contention than the resolution of a controversy between India and Pakistan on the construction of Salal Dam by India

on the Chenab in Kashmir. In 1976, when relations between India and Pakistan were far from cordial, India resorted to transparency in the transmission of adequate data to Pakistan, and convinced Pakistan that it would be thoroughly counterproductive for India, in stark economic terms, to make a military use of the Salal Dam and deluge Pakistani territory in course of a war between the two countries.[114] Unfortunately, Government officials frequently try to prevent even their own countrymen from securing legitimate access to such relevant data. There is an impression that "Information is seen as power and officials rarely want to part with it for fear of losing the monopolistic control – which could later be translated into writing and consultation assignments."[115] The sooner this impression is removed, the better for the cause of hydroharmony.

It is often argued that the 1960 Indus Basin Treaty between India and Pakistan offers a good example of how to resolve international controversies on division of water resources. "Nevertheless, the division was far from an optimum economic solution. Pakistan had to invest massively in facilities that would have been largely unnecessary if the subcontinent had remained unified (the interbasin transfers to the Ravi and the Sutlej)."[116] This provides a clue to what Nepal, India and Bangladesh can do in the world of the 21st century, which is far different from the world of 1940s or 1960s. In the 21st century many countries have demonstrated how adversarial political relations can give way to mutually beneficial economic interaction. Nepal, India and Bangladesh, therefore, can proceed to push political inhibitions to the background, and rely on science and technology for the preparation of a comprehensive people-centred plan for the optimum development of Himalayan water resources. This may imply a theoretical assumption of absence of political boundaries. This also implies "a redefinition of national interests," which should be "guided by an obsession for sustainable and effective utilization of resources" of the Ganga-Brahmaputra Basin.[117]

REFERENCE

1. U.K. Verma, "Socioeconomic Renaissance Through Dynamic Indo-Nepal Cooperation in Water Resources Development", *Water Nepal*, Vol.4, No.1, September, 1994, p.144.
2. *Ibid*., p.140.
3. B.G. Verghese, *Waters of Hope* (New Delhi, Oxford and IBH), 1990, p.379.
4. *Ibid*., p.376.
5. Bikash Pandey, "Small Rather than Big: Case for Decentralised Power Development in Nepal", *Water Nepal*, Vol.4, No.1, September, 1994, p.181.
6. L. Douglas James, "Flood Action: An Opportunity for Bangladesh", *Water International*, Vol.19, No.2, June, 1994, p.62.
7. Asit K. Biswas, "Capacity Building for Water Management: Some Personal Thoughts", *Water Resources Development*, Vol.12, No.4, 1996, p.400.
8. L. Douglas James, *op.cit.*, p.68.
9. Asit K. Biswas, *op.cit.*, p.402.
10. Damodar Bhattarai, "Issues of Irrigation Managementin Nepal", *Water Nepal*, Vol.4, No.1, September, 1994, p.134.
11. Jayanta Bandyopadhyay, "Water Management in the Ganges-Brahmaputra Basin: Emerging Challenges for the 21st Century", *Water Resources Development*, Vol.11, No.4, 1995, p.434.
12. Ajaya Dixit and Dipak Gyawali, "Building Regional Cooperation in Water Resources Development", *Water Nepal*, Vol.3, No.2-3, October, 1993, pp.4-5, Also see Rosegrant, Mark W., *Water Resources in the Twenty-First Century: Challenges and Implications for Action* (Washington, D.C., International Food Policy Research Institute), 1997, p.23. L.A. Bruijnzeel and C.N. Bemmer, *Highland-Lowland Interactions in the Ganges-Brahmaputra River Basin: A Review of Published Literature* (Kathmandu, ICIMOD), 1989, p.118. Kiran Shankar, *Status and Role of Mountain Hydrology in the Hindu Kush-Himalaya Region* (Kathmandu, ICIMOD), 1991, p.23.
13. U.K. Verma, *op.cit.*, p.144, and L. Douglas James, *op.cit.*, p. 68.
14. A.R. Rao and T. Prasad, "Water Resources Development of the Indo-Nepal Region", *Water Resources Development*, Vol.10, No.2, 1994,

pp.171-172. Anon, *Proceedings of Interaction during the visit of the CWRS Team to RONAST in November 1993: A Report Pertaining to the Exercise of Formulation of a Collaborative Research Proposal on Indo-Nepal Water Resources* (Kathmandu, Royal Nepal Academy of Science and Technology), 1994, p.13. Monirul Q. Mirza and Ajaya Dixit, "Climate Change and Water Management in GBM Basins", *Water Nepal*, Vol.5, No.1, January, 1997, pp.84-92.

15. Ajaya Dixit and Dipak Gyawali, *op.cit*., p.6.
16. *Ibid*.
17. Vijaya Paranjapye, "Preliminary Look at Arun III in Light of Tehri Experience", *Water Nepal*, Vol.4, No.1, September, 1994, pp.30-31.
18. *Ibid*., pp.31-32.
19. John C. Kammerer, "Estimated Demand of Water for Different Purposes", in International Water Resources Association, *Water for Human Consumption* (Dublin, Tycooly International), 1982, p.141.
20. Kanwar Sain, *Reminiscences of an Engineer* (New Delhi, Young Asia), 1978, pp.282-283.
21. Jayanta Bandyopadhyay, *op.cit*., p.430. Also see Peter Rogers and others, *Eastern Waters Study: Strategies to Manage Flood and Drought in the Ganga-Brahmaputra Basin* (Washington, D.C., USAID), 1989, pp.XIII, 27-28.
22. U.K. Verma, *op.cit*., p.143.
23. S.N. Jha, Interview, Patna, 8 May 1997. S.N. Jha is a retired Engineer-in-Chief to the Government of Bihar.
24. Anon, *Down to Earth* (New Delhi), 15 May 1997, pp.18-19.
25. Vasudha Dhagamwar, "The Search for a Rehabilitation Policy", in Enakshi Ganguli Thukral, ed., *Big Dams, Displaced People* (New Delhi), 1992, p.188.
26. Sudhir Sen, "Making of the DVC and its Initial Phase: An Impression", *Damodar Valey: Evolution of Grand Design* (Calcutta, Damodar Valley Corporation), 1992, p.63.
27. Enakshi Ganguli Thukral, "Introduction", *op.cit*., p.10.
28. Kanwar Sain, *op.cit*, p.283.
29. Jack D. Ives, *Glacial Lake Outburst Floods and Risk Engineering in the Himalaya* (Kathmandu, ICIMOD), 1986, p.35. John R. Dunsmore, *Mountain Environmental Management in the Arun River Basin of Nepal* (Kathmandu, ICIMOD), 1988, p.(i).

30. Deepak Bajracharya, *Decentralised Energy Planning and Management for the Hindu Kush-Himalaya* (Kathmandu, ICIMOD), 1986, p.35.
31. Michael Thompson, "Huge Dams and Tiny Incomes", *Water Nepal*, Vol.4, No.1, September 1994, p.194.
32. *Ibid*.
33. Jayanta Bandyopadhyay and Dipak Gyawali, "Ecological and Political Aspects of Himalayan Water Resources Management", *Water Nepal*, Vol.4, No.1, September 1994, p.19.
34. Jean-Marion Aitken and others, *Mini-and Micro-Hydropower in Nepal* (Kathmandu, ICIMOD), 1991, p.52.
35. Ajaya Dixit and Dipak Gyawali, *op.cit*., p.4.
36. Prem Jung Thapa, "Water-led Development in Nepal: Myths, Limitations and Rational Concerns", *Water Nepal*, Vol.5, No.1, January 1997, p.36.
37. *Ibid*.
38. Peter Rogers and others, *op.cit*., p.27.
39. Rajendra D. Joshi, "Nepali Hydropower and Regional Energy Needs", *Water Nepal*, Vol.4, No.1, September 1994, p.157.
40. *Ibid*., p.156.
41. Enzo Fano and Marcia Brewster, "Financing the Planning and Development of Water Resources", in *Water for Human Consumption*, 1982, p.225.
42. B.G. Verghese, *op.cit*., p.237.
43. B.M. Abbas, *The Ganges Water Dispute* (New Delhi, Vikas), 1982, p.88.
44. *Ibid*., p.7.
45. *Ibid*., p.88.
46. Triyugi Prasad, "Himalayan Water Resources Development: Bilateral Action, Regional Consideration and International Assistance", *Water Nepal*, Vol.4, No.1, September 1994, pp.250-251.
47. B.G. Verghese, *op.cit*., p.375.
48. B.M. Abbas, *op.cit*., pp.148-149.
49. B.G. Verghese, *op.cit*., p.375.
50. B.M. Abbas, *op.cit*., p.148.
51. *Ibid*., p.149.

52. Ben Crow and Alan Lindquist, "Negotiations about Development of the Ganga and Brahmaputra Rivers", *Water Nepal*, Vol.3, No.2-3, October 1993, p.26.
53. B.M. Abbas, *op.cit*., p.123.
54. *Ibid*., p.122.
55. *Ibid*., p.150.
56. Ajay Dixit and Dipak Gyawali, *op.cit*., p.4.
57. Govind D. Shrestha, "Himalayan Waters: Need for a Positive Indo-Nepal Cooperation", *Water Nepal*, Vol.4, No.1, September 1994, p.272.
58. Damodar Bhattarai, *op.cit*., p.137.
59. *Ibid*.
60. B.G. Verghese, *op.cit*., p.380.
61. *Ibid*.
62. Anon, Theme Paper, Centre for Water Resources Studies, Workshop on Cooperative Development of Indo-Nepal Water Resources – Prospects, Opportunities and Challenges (Patna, Patna University) 29-30 May 1992, p.25. Also see M.R. Josse, "The Case for New Thinking", *Water Nepal*, Vol.4, No.1, September 1994, p.260.
63. Triyugi Prasad, *op.cit*., p.253.
64. B.M. Abbas, *op.cit*., p.5.
65. T. Prasad, "Water Resources as a Factor in Indo-Nepal Relations", *Indian Journal of Nepalese Studies*, Vol.5 and 6, 1995-96, p.78.
66. Anon (1992), *op.cit*., p.24.
67. *Ibid*.
68. Ben Crow and Alan Lindquist, *op.cit*., p.29.
69. Peter Rogers and others, *op.cit*., p.30.
70. *Ibid*., p.XII.
71. B.G. Verghese, *op.cit*., p.393. Also see M.R. Josse, *op.cit*., p.258.
72. Sudhir Sen, *op.cit*., p.68. Govind D. Shrestha , *op.cit*., p.272.
73. Anon, *Agreements on Development of Inter-State and International Rivers* (New Delhi), Government of India, Ministry of Agriculture and Irrigation, Central Water Commission), 1979, p.355.
74. *Ibid*., pp.356-357.
75. *Ibid*., p.358

76. T. Prasad and D. Gyawali and others, "Cooperation for International Rivers and Basin Development: the Kosi Basin", in Celia Kirby and W.R. White, ed., *Integrated River Basin Development* (New York), 1994, p.497; also see p.499.
77. Anon, *Report of the Kosi Technical Committee Constituted by the Government of Bihar in 1965* (Patna, Secretariat Press), 1966, p.11,13.
78. Anon, *Kosi Project: 1953 Project Report* (New Delhi, Government of India, Central Water Commission), 1953, pp.46-47.
79. Rishikesh Shaha, "Politics of Water Power in Nepal", *Water Nepal*, Vol.4, No.1, September 1994, p.286.
80. *Ibid*.
81. Anon (1953), *op.cit.*, p.47.
82. U.K. Verma, *op.cit*., p.140.
83. Govind D. Shrestha, *op.cit*., p.269.
84. Anon, *A Short Note on the Utility of the Proposed Kosi High Dam at Barakshetra for the Existence of the Existing Kosi Project and its Present Status* (Patna, Government of Bihar), 1991, p.73.
85. Anon, *Feasibility Report on Kosi High Dam Project* (New Delhi, Government of India, Central Water Commission), 1980, pp.2-3.
86. Anon, *Report of the High Level Technical Experts Committee for Kosi Barrage* (Patna, Government of Bihar), 1983, pp.12-13.
87. Pitambar D. Kaushik, "Water Resources of Nepal: Key to Indo-Nepalese Relations", *Water Nepal*, Vol.4, No.1, September 1994, p.280.
88. Rishikesh Shaha, *op.cit*., p.283.
89. Binod Bhattarai and Rajendra Dahal, "Dissemination of Scientific Knowledge and Management of Mass Opinion: Challenges before Journalism", *Kathmandu Meeting on Cooperative Development of Himalayan Water Resources* (Kathmandu, Nepal Water Conservation Foundtion), 27-28 February 1993, no page number.
90. Binod Bhattarai and Rajendra Dahal, "Media: The Missing Fourth Dimension of Water Resources Development", *Water Nepal*, Vol.4, No.1, September 1994, p.291.
91. *Ibid*., p.292.
92. *Ibid*., p.295.
93. *Ibid*., p.297.

94. Pitambar D. Kaushik, *op.cit*., p.279.
95. I.N. Sinha, "Opportunity, Delay and Policy Planning Vision in the Synergic Development of Eastern Himalayan Rivers: A Conspectus, *Water Resources Development,* Vol.11, No.3, 1995, p.307.
96. *Ibid*.
97. B.G. Verghese, *op.cit*., p.371.
98. *Ibid*., p.367.
99. *Ibid*., p.372.
100. I.N. Sinha, "Irrigation Policy for Realisation of High Agropotential of Bihar State in India", *Journal of Irrigation and Drainage Engineering*, Vol.122, No.1, January/February 1996, p.36.
101. Anon, *Reports on Investigations of Kosi Valley Schemes*, Part-II (New Delhi, Government of India, Ministry of Irrigation and Power, Central Water and Power Commission), 1964. Anon, *Report of the Kosi Technical Committee Constituted in 1965 by the Government of Bihar*, 1966. Anon, *Feasibility Report on the Kosi High Dam Project*, 1980. Anon, *Report of the High Level Technical Experts Committee for Kosi Barrage*, 1983. Anon, *Comporehensive Plan of Flood Control for the Ganga Sub-Basin Part-II/6: Comprehensive Plan of Flood Control for the Kosi River System Volume II/6 (a), Report* (Patna, Government of India, Ministry of Water Resources, Ganga Flood Control Commission), 1986. Anon, *A Short Note on the Utility of the Proposed Kosi High Dam at Barakshetra for the Existence of the Existing Kosi Project and its Present Status,* 1991.
102. Bhim Subba, "Tapping Himalayan Water Resources: Problems, Opportunities and Prospects from a Bhutanese Perspective", *Water Nepal*, Vol.4, No.1, September 1994, p.210. Bhim Subba was formerly the Director General, Department of Power, Bhutan.
103. *Ibid*., p.214.
104. *Ibid*., p.216.
105. Peter Rogers and others, *op.cit*., p.29.
106. Jayanta Bandyopadhyay, *op.cit*., p.434.
107. Ben Crow and Alan Lindquist, *op.cit*., p.31.
108. Jayanta Bandyopadhyay, *op.cit*., p.433.
109. Jayanta Kumar Ray, "Introduction" in Jayanta Kumar Ray, ed., *India-Nepal Cooperation Broadening Measures*, (Calcutta, K.P. Bagchi), 1997, p.6.

110. Ajaya Dixit and Monirul Qader Mirza, "Who's Afraid of Farakka's Accord?" *Himal South Asia*, Vol.10, No.1, January/February 1997, pp.56-62. Jayanta Kumar Ray, "The Farakka Agreement", *International Studies*, Vol.17, No.2, 1978. Ahmad, Q.K. and Rahman, Khalilpur, *The Ganges Water Treaty: Cooperation for Mutual Benefit* (Dhaka, Bangladesh Unnayan Parishad), 2001.

111. Anon, *Press Release* (Kathmandu, Embassy of India), 5 June 1997.

112. Suman Pradhan, "In the game of give and take, Nepal gets more", *The Kathmandu Post*, 8 June 1997.

113. Ajaya Dixit and Gyawali, Dipak, "Understanding the Himalaya-Ganga: Widening the Research Horizon and Deepening Cooperation", *Water Nepal*, Vol.4, No.1, September 1994, p.314.

114. Ajaya Dixit and Dipak Gyawali (1993), *op.cit.*, p.5.

115. Binod Bhattarai and Rajendra Dahal (1994), *op.cit.*, p.294.

116. Harald D. Frederiksen and others, *Water Resources Management in Asia, Volume 1, Main Report*, World Bank Technical Paper Number 212 (Washington, D.C., World Bank), 1993, p.23.

117. Jayanta Bandyopadhyay, *op.cit.*, p.439.

Resource Exploitation for Mutual Benefit: India-Nepal Cooperation to Harness Water Resources

Sangeeta Thapliyal

In the international market India is the sixth largest energy consumer. Despite being a significant energy producer India is ranked twenty-third amongst the oil producers and nineteenth in the natural gas production. This is not to dismiss the country's achievements but to acknowledge the power potential and the task to be performed ahead. With a population of one billion the country needs a fast GDP growth. However, a fast growing economy needs energy for industrial and domestic consumption. India is the growing economy in the region and is striving to become an industrial power. A country, which started with emphasizing on self-sufficiency in industrial and agrarian reforms, is still striving towards it.

The transport sector and industry are largely dependent on oil. However, India's oil production (less than 33 mn tonnes) does not meet its consumption (80 mn tonnes) hence, the country is largely depending on imports (nearly 64 mn tonnes) which nearly take one-third of the foreign exchange. In the nineties, the demand for energy was about 8% per annum while the supply was about 6% per annum. This gap between the demand and supply has widened from 21 billion KWh in 1990-91 to around 26.9 billion KWh in 1995-96. Thermal power accounts for the largest source of energy in India and its production is 31.2 bn KWh, accounting for 80.3% of the total generation during 1996-97. Thermal plants are largely coal based but now the country is increasingly switching over to oil and natural gas of the poor quality of ash-laden coal that requires import of coking coal.

India's consumption of natural gas has risen at a remarkable speed than compared to any other fuel in recent years. The actual production of natural gas is 67 mcmd (million cubic meters per day) as against the demand of approx. 96 mn mcmd that is likely to increase to 200 mcmd

by the year 2007. 'Increased use of natural gas in power generation will account for most of the increase, as the government is encouraging the construction of gas-fired electric power plants in coastal areas where they can be easily supplied with LNG by sea.'[1] Because of India's reliance on imports of crude oil and refined products nearly one-third of the country's foreign exchange goes to buy petroleum imports. India imports annually 30-35 million tonnes of crude oil to be refined indigenously and 20-22 million tonnes of petroleum products and in the near future import of natural gas will also begin unless utmost priority is given to exploration of its own reserves. Emphasis is also laid on harnessing renewable sources of energy such as hydropower, wind and solar energy. In fact, India ranks fourth in the world in term of harnessing of wind energy, though the contribution is insignificant. This paper focusses on the harnessing of water resources, with particular attention to India's efforts to meet its energy requirements through harnessing of water resources in collaboration with the resource rich Nepal.

INDIA'S WATER RESOURCES

The hydropower potential of the country is nearly 84,000 MW of which only 26% have been utilised. India is the first country in Asia to developed hydropower in Sivasamudram station on river Kaveri for 4,200 KW (kilowatt) in 1902. However, the hydropower generation in India has experienced a downward trend from 70 billion KWh during 1992- 93 to 68.8 billion KWh in 1996- 97. The decline in hydropower projects is due to the long gestation period of the projects or large investment of capital required in completing the projects. Most of the projects also face scathing attacks by environmentalists on displacement of population or controversy over the size of the dam.

The Government of India has taken various measures to meet its energy requirements either through developing indigenously to attain self-sufficiency or through joint ventures and collaborating with the resources rich neighboring countries leading to interdependence. The ninth plan envisaged development of hydropower with an additional 9,820 MW through various institutional and financial arrangements. The National Hydro-electric Power Corporation (NHPC) is exploring the potential

of new turn- key projects and also small and mini-hydro projects likely to rectify the existing imbalance in the hydro- thermal mix.[2] Efforts are also being made on developing the immense water resources in the north-eastern states of India for generating hydropower. The Northeastern Electric Power Corporation (NEEPC) has undertaken several projects in the region. It is estimated that the hydroelectric potential in the north-east is around 31,875 MW at a 60% load factor. Another 20,000 MW can be generated from marginal and minor hydroelectric projects.[3] The Government of India has decided to develop cluster of small hydropower projects in the north- eastern states in order to meet the requirements of other parts of the country. There is plan to set up a 13,000 MW of hydel project on the river Brahmaputra in Arunachal Pradesh.[4]

Simultaneously, efforts are being made to cooperate with the water resource rich neighbouring countries for harnessing of water resources especially with Nepal. India shares three major river basins with its neighbouring countries: the Indus, the Ganga and the Brahmaputra-Meghna basins. Of these the Indus is shared between India and Pakistan and has been interestingly less stressful on sharing riparian rights except in the initial days of partition which was settled by the Indus Water Treaty in 1960. However, India's experience with its neighbouring countries on sharing of Ganga- Brahmaputra Meghna (GBM) has not been successful. India shares GBM basin with Bangladesh, Nepal and Bhutan. India's hydropower potential is estimated to be around 23.8% in the Indus basin, 41.5% in the Brahmaputra and 12.8% in the Ganga basin. Nearly 75% of the hydro- electric potential is in the GBM, which is lying untapped.[5] It is estimated that the GBM carries about 214 million hectometers of water annually to the sea and if properly harnessed could generate 162,600 MW of energy.

India's cooperation with Bhutan on harnessing of water resources has led to successful ventures. Bhutan has four major rivers- the Torsa, Sankosh, Wanghchu and Manas. All the four rivers have a potential of 15.5 billion KWh of firm and 24.7 billion KWh of secondary energy. India helped Bhutan construct 366 MW Chukha Hydel Project on river Wanghchu. Power is transmitted to India through transmission lines

connecting Chukha with the Eastern Region Electricity Board in Calcutta. Bhutan generates Rs. 360 million from exporting power to India. Stage II of the Chukha project is a 1000 MW run of the river project and on Stage III is a 660 MW high dam project on the Bhutan-India border.[6] Both India and Bhutan have also agreed to cooperate in implementing hydropower project at Kurichu (45 MW), Tala (1020 MW) and Sankosh rivers (1545 MW) from where India has agreed to purchase the surplus electricity.

Bangladesh has enormous water resources but is unable to exploit it for power generation due to the flatness of the country's elevation. There is nearly 170 million acre feet of water flow in the country but only 230 MW has been generated for hydropower in the Karnafuli hydro station. The country has a potential of another150 MW of hydropower.[7] To meet the country's energy needs efforts have been made to cooperate with India which can export excess power from its northeastern states to Bangladesh.

NEPAL'S WATER RESOURCE

It is a recognised fact that geography has played a key role in shaping Indo- Nepal relations. The high Himalayan ranges have given hearth to many rivers and streams that have found their natural way towards India, the downstream country. There are 6000 rivers and streams flowing from Nepal to India carrying 174 billion cubic meters of water per year. Both the countries share not only the precious natural resource but also the anxieties associated with it. They share not only rivers and river basins but also sedimentation, floods and ecological hazards. Floods in the plains of Bihar are a recurrent feature that brings in colossal damage to life and property. Hence, it is essential for both the countries to harness water resource and give it a place of primacy in their relations.

The abundant water resource in Nepal can be imagined from the fact that its actual hydro-power potential is largest in South, South-East Asia and Far-East Asia and is equal to that of the US, Canada, and Mexico combined together. It is estimated that the hydro-power potential of Nepal is around 83,000 MWs of which the actual production is only 240 MW, about 1% of the feasible output. Nepal's per capita consumption

of electricity is as low as 19 KWh.[8] Only 15% of the population has access to electricity. The local population has been using firewood to meet its energy requirements. The demand for firewood has increased from 8.58 million tonnes in 1983-84 to 1.48 million tonnes in 1986-87 and the fire wood deficit is likely to rise by 3.5 million tonnes by 2000. As most of the population lives in poverty they do not have means to buy modern forms of fuel. Also the slow growth in industry and urbanisation has led to a slow rise in the demand for the commercial energy. Thus, it is cheaper for the people to continue using traditional source of energy. In 1990-91 use of firewood accounted for almost 75% of the energy used. It is said that this has resulted in deforestation and top soil erosion. Almost total dependence on wood with out an emphasis on replanting trees has resulted in deforestation, topsoil erosion, water pollution and floods.

Dams provide a renewable, clean source of energy and in the case of Nepal it would give relief to the over used forests. Apart from generating electricity, the multi-purpose dams also are beneficial for irrigation and flood control. Power projects are essential for the industrial growth of Nepal and unless more projects come into being the industry will receive a set back. The situation in Nepal is precarious because it has dearth of energy resources like oil and natural gas. Oil products particularly kerosene, diesel, jet fuel and gasoline are imported from India.[9] The consumption of oil has increased from 234 thousand tonnes in 1991 to 382 thousand tonnes in 1996. Since 1991, it has registered a growth of 13% as compared to 8% growth rate in petroleum consumption during 1981-91.[10] Nepal has approximately 2 million tonnes of coal reserves which are also imported mainly from India, China, and Bhutan.[11] Dependence on imports has put a burden on the foreign currency reserves on Nepal. With an abundant water resource it is logical to develop this precious resource to meet not only the country's energy needs but also earn foreign exchange by selling power to the neighbouring countries like India.

Nepal has made efforts to harness its water resources. The major step towards this direction is the adoption of Hydropower Development

Policy (HDP) in 1992. This was followed by the Electricity Act in 1993 and Electricity Regulations Act in the same year. The HDP offers time bound basis of the licensing process, royalty rates, and exempt tax.[12] To attract private enterprises it pledges not to nationalise a project that is under the tenure of license. However, licensee is not required to undertake a hydroelectric project having a capacity of less than 1,000 KW. No royalty or tax would be levied on projects with capacity upto 1,000 MW. While Table 1 shows hydro electric potential of Nepal, the actual power production in Nepal can be seen through Table 2.

TABLE 1
TOTAL HYDROELECTRIC POTENTIAL OF NEPAL
(Techno- Economically Viable)

River Basin	Capacity (MW)	Percentage	Annual Energy (GWh)	Percentage
Storage Schemes	**21,893**	**85.4**	**97,021**	**80.5**
Karnali	9,335		43,333	
Lower	6,641		33,117	
Upper	2,694		10,216	
Gandaki	4,370		19,140	
Kosi	7,186		31,030	
Chameliya	440		617	
Southern	562		2,901	
Run of River	**3,740**	**14.6**	**23,473**	**19.5**
Karnali	1,319		10,130	
Lower	124		960	
Upper	1,195		9,170	
Gandaki	995		4,357	
Kosi	1,285		8,480	
Mahakali-Chameliya	24		156	
Southern Rivers	47		167	
Small Rivers	70		183	
TOTAL	**25,633**		**1,20,494**	

Source: Technical Consolidated Report, WRSF Phase I, HMGN/World Bank, 1997 quoted in Muchkund Dubey, Lokraj Baral, Rehman Sobhan (eds.), *South Asian Quadrangle* (Delhi, 1999)

TABLE 2
POWER PROJECTS IN NEPAL

Power Plants	Installed Capacity (MW)	Energy (GW)	In Service Year
Paharping	0.50	3.29	1911
Sundarijal	0.64	5.77	1936
Panauki	2.40	5.37	1965
Pokhara	1.02	8.76	1967
Trisuli	21.00	114.55	1962
Sunkosi	10.05	56.67	1973
Tinau	1.28	10.16	1974
Gandak	15.00	43.80	1979
Kulekhani 1	60.00	154.70	1982
Devighat	14.10	92.00	1983
Kulekhani II	32.00	95.00	1986
Marshayangadi	69.00	462.00	1990

Apart from harnessing the water resource for electricity it is also essential to manage it properly lest it gets wasted. The river beds are rising at the rate of 1 feet per annum. The rivers flowing to India bring in natural disasters like flood, drought, water logging, salinity, pollution in the Himalayan rivers which cause an adverse impact on the environment, economy and the people of Indian plains at large. Nearly 4.5 lakh hectares of area and a population of 21 million is affected in Bihar by floods every year. The colossal damage to life and property can not be ignored by the regional governments.[13] The Governments of India and Nepal are making efforts on water resource development to combat the problem of floods and sedimentation and also to maintain Himalayan ecology and generate power from the same. Nepal does not have the capacity to harness its water resources on its own and can do so with the help of joint ventures with India which has technical know how. This would help not only in flood management and irrigation but also in generation of hydropower which would contribute to Nepal's economic development by earning foreign exchange after selling the surplus power

to India. India would benefit by ensuring a steady flow of electricity for its power deficient states in the north.

INDIA'S ROLE IN DEVELOPING NEPAL'S WATER RESOURCE

Since the start of diplomatic relations between Nepal and independent India, water resource has been recognised as a major area for mutual cooperation. Though the earliest water resource project between the two countries dates back to 1920 when the Allahabad Presidency and the Government of Nepal signed an agreement for the construction of Sarada barrage primarily for developing irrigation facilities and generating hydropower at a low key level.

The Indo-Nepal Treaty of Peace and Friendship of 1950 was the first official document signed between the two countries encapsulating the socio-economic-cultural linkages. The letter exchanged along with the Treaty declared that " if the Government of Nepal should decide to seek foreign assistance in regard to the development of the natural resources or of any industrial project in Nepal, the Government of Nepal shall give first preference to the Government or the nationals of India. Nothing in the foregoing provision shall apply to assistance that the Government of Nepal may seek from the United Nations Organisataions or any of its specialised agencies." India being the lower riparian country had an interest in the management of water resource of the upstream country. Be it hydro-power, inland navigation or floods, India as the downstream country was the country affected. If Nepal develops hydro-power, India would be the logical buyer as Nepal cannot consume all the electricity generated. Development of inland water navigation is meaningless without the waterways passing through India, the transit country to reach Calcutta port. Flood in the rivers was also a problem for Indian plains. Hence, India had a genuine interest in harnessing the water resources of Nepal and included it in the Treaty with the main premise of inter-dependence between the two countries.

India was the first country to help Nepal in developing its water resources. India constructed the Kosi barrage in 1963 and in 1970

undertook Gandak barrage that helped enormously in irrigation in both the countries apart from flood controls. Between the years 1961 and 1971 India spent Rs.10 crores on the Chatara canal on Kosi. In 1978, India constructed Chandra canal on Gandak at the cost of Rs 18 crores. At the cost of Rs 2 crores a barrage was built on Kamala in 1976. The first major hydro-power project was built at Trisuli in 1962 with a capacity of 21 MW of power at a time when the total capacity of Nepal to produce hydro-electric power was merely 4.56 MW. Various projects undertaken by India related to water resources in Nepal are listed in the Table 3.

TABLE 3

Name of the Project	**Duration**	**Amount in Irs Lakhs**
Minor irrigation, water supply & power	1954-73	456.63
Trisuli Hydel Project	1958-73	473.44
KathmanduWaterSupply	1962-71	87.00
Chatara Canal Project	1964-80	1053.11
Kamala Barrage Project	1973-76	175.72
Chandra Pump Canal Project	1978-85	1,813.10
Devighat Hydro-Electric Power Project	1978-83	2000.00 (prov)
Rural Electrification Project at Nuwakot	1985-88	400.00 (prov.)

The significance that India attaches to harnessing of water resources in Nepal can be visualised from analysing the draft treaty sent to Nepal in March 1990.[14] India reiterated its claims for primacy over development of natural resources in Nepal. Part VI of the treaty dealt with the cooperation in water resources. Article II provided that preference would be given to India or the Indian nationals in case of any foreign assistance for the development of natural resources or industrial projects in Nepal "provided that the terms offered by the Government of India or the Indian nationals are not less favourable to Nepal than the terms offered by any other State or its nationals or by any international organisation or agency." The article was in continuation of clause IV of

the letter exchanged with the Treaty of Peace and Friendship. However, in the 1990 draft proposal the international agencies were brought into the purview of the treaty, i.e., primacy was accorded to the Indian projects over those offered by any other country including the international organisations whereas in the 1950 treaty the international organisations were kept outside the Treaty provisions. Further, Article III of the draft proposal read that "The two contracting Parties being equally desirous of attending complete and satisfactory utilisation of the waters of the commonly shared rivers, undertake to (i) plan new uses or projects subject to the protection of the existing uses on the rivers and (ii) cooperate with each other to formulate and modify the planned new uses or project taking into consideration the water requirements of the parties." However, the draft proposal did not come through in the treaty form but it did show the Indian willingness to harness water resources of Nepal.

Bilateral negotiations on the development of water resources further continued at the diplomatic level. It was decided to set up a high level Task Force during Prime Minister Chandra Shekhar's visit to Nepal in February 1991 to discuss sharing of water resources of the rivers besides trade and transit. The first meeting of the Task Force was held on 15 April 1994 in New Delhi and the second on 21 March 1995. Emphasis was placed on Tanakpur barrage, Kosi High dam and development of medium term power production schedule instead of high cost mega- Dams.[15]

In fact amidst much fanfare India and Nepal signed in 1996, the Treaty on the Integrated Development of the Mahakali basin that also included the construction of a 2000 MW Pancheshwar power project over a period of eight years. Both the countries decided to share water and electricity from other projects in the Mahakali river and also the cost on the basis of benefits received. Provisions have also been made for setting up a Mahakali River Commission which will inspect, coordinate and monitor the execution of the agreement and is empowered to make suggestions in order to solve problems that may come while implementing the agreement. Additional benefits in the sharing of water and energy from Tanakpur and Pancheshwar projects on equal basis are also given

to Nepal. Nepal also received 350 cusecs of water from the Sarada canal for irrigation in the Chandani areas of Nepal.[16] The agreement is based on the understanding that the industrial development of Nepal and India is dependent on the sufficient availability of power which can be met with hydropower and multi-purpose projects. At the time of signing the treaty there was general euphoria among the policy planners, academia and the people that it was a fair treaty based on mutual benefits that would pave the way for further cooperation in other projects. Since then, the treaty has been into rough weather. An India-Nepal Power Exchange Committee chaired by the Managing Director of Nepal Electricity Authority was set up in 1991 to look into the existing exchange of power also also to carry out the feasibility of larger exchange using asynchronous system interconnection with HVDC technology.[17]

A Joint Task Force consisting of the Indian Industry and the Federation of the Nepalese Chambers of Commerce and Industry revealed that 25,000 MW of hydropower potential is a major area of cooperation between the signatories. Nepal can export power to India and reduce the trade deficit existing between the two countries, and, therefore, investments from private power generating companies should be introduced and encouraged in Nepal.[18] Chisapani Karnali (10800 MW), West Seti (750 MW), Budhi Gandaki (600 MW) and the Pancheshwar (6480 MW) are some of the 'mega' or 'export-oriented projects' being operated in Nepal that can meet the demand of power deficiency in the Indian states of Bihar and Uttar Pradesh.

On June 5, 1997 during Prime Minister I.K. Gujral's visit to Nepal an agreement concerning the Electric Power Trade was signed to develop power sector through participation of local and foreign private investors in their respective countries. Both sides agreed to assist the parties, government, semi-government or private sector for conducting surveys including field investigaion for construction, installation, and maintenance of facilities required for generation and transmission of power in territories of both the countries, required for such power trading (Article 3). Thus the agreement made a shift in the negotiations from diplomatic to economic sphere and also encouraged privatisation of hydropower.

FACTORS FOR SLOW PROGRESS IN INDO-NEPAL COOPERATION

Lack of adequate studies, non-availability of data, lack of finance, expertise and technological know-how to exploit these resources are some of the reasons for the slow progress. Moreover, mutual distrust and suspicion regarding the sharing of 'mutual benefit' between India and Nepal have delayed the joint effort to develop and utilise the hydropower potential. With India's technical know-how Nepal's water resources can be harnessed for hydropower, irrigation etc. However, in its dealings with India, Nepal insists on flood control and irrigation while India wants hydropower.[19] Nepal alleges that the projects have not been in the spirit of partnership but have been advantageous to India with it retaining control during construction, operations and maintenance. For example, the Kosi agreement signed in 1954 led to a controversy in Nepal, which felt that its share in irrigation was too little for the price it paid in terms of damage to agricultural land due to siltation. Also, the compensation paid to the farmers whose land got submerged was insufficient. The issue was raked up by the opposition parties in Nepal to criticise the government for compromising the nation's sovereignty and national interest.[20] India's agreements with Nepal on hydropower suffered because of the politicisation of the projects in the domestic politics of Nepal. The domestic issues were given an external dimension by those who were unable to come to power after the 1951 revolution against the Ranas and was unfairly blaming India for the political outcome.[21] Those dissatisfied for not getting power in Nepal criticised India's involvement in the policies and programs in Nepal as threatening its independence and sovereignty.[22] The Kosi agreement became the target of anti- India propaganda. Defending the agreement between the two countries the then Nepalese Prime Minister commented, "If one is determined to misunderstand a very plain situation, nobody ever can help him realise the fact. India could have very well put the barrage a couple of miles below the present site, if it had no consideration for Nepal. The sovereignty and territorial rights of Nepal have not been impaired by the Kosi Agreement."[23] Later on the Kosi agreement was revised in 1963.

Similarly the agreement reached on Gandak project (1959) received criticism from those opposed to B.P. Koirala's government and gave it a shape of an anti-India tirade.

An agreement reached on water resources with the neighbouring country can have political utility for the ruling and opposition parties. If the ruling party is particularly inclined towards a country may it be for ideology, common interest or support for survival then it can adopt a soft approach in bargaining for benefits. By decrying an agreement as a compromise on nation's sovereignty, the opposition leaders have two-pronged strategy; firstly to undermine validity of the government and secondly, to gain public sympathy through narrowly defined nationalism. These trends which have been operating in Nepal, can have a negative impact on the future agreements on economic cooperation or joint ventures.

All major rivers of Nepal are international rivers flowing towards India making the former as the upper riparian country and the latter as the lower riparian. Issues associated with the international rivers in terms of riparian rights, understanding on water sharing, concept of common river, border river, international rivers etc keep cropping up during negotiations. For example, there was apprehension in Nepal on the concept of 'Common River' contained in the Joint Communiqué signed between the two countries during the visit of Prime Minister KP Bhattarai to New Delhi from 8 to 10 June 1990. The two countries agreed to cooperate on 'industrial and human resource development for harnessing of waters of the common rivers for the benefit of the two peoples and for the protection and management of the environment'.[24] Later the term 'Common River' was interpreted by the opposition parties as a surrender of Nepal's rights on water resources. By inciting the nationalist fervour those out of power tried to be back in power in Nepal. Bhattarai's legitimacy and authority was questioned on signing the communiqué at a time when he was heading an interim government which did not consist of elected representative of the people. However, Prime Minister G.P. Koirala during his visit to India in 1991 defended the concept of common rivers and said that Nepal would like to utilise and have joint

cooperation in the rivers that flowed from Nepal to India for the economic development of the country. He said that instead of getting embroiled over the terms used in an agreement one should "keep the spirit above all so that all these natural resources also will be for the benefit of India and towards regional cooperation."[25] The cautious approach adopted by the Nepalese towards preserving their natural resources can be assessed from the present Constitution which incorporated Article 126. This makes it obligatory for two-thirds of the members present at a joint session of Parliament to ratify all agreements with a foreign country on peace and friendship, defence and strategic alliances, boundaries and natural resources of the kingdom. Thus, it was a move towards ensuring that no political party signs an agreement on any natural resource without the approval of other political parties. However, the same provision was used by the political parties to suit their political ends irrespective of national interest as was seen later in the case of Mahakali Treaty.

When Prime Minister Koirala again visited India on 19-21 October 1992, agreements were reached on a time frame for investigation and preparation of project reports etc on the Karnali, Pancheshwar, Sapta-Kosi hydel multi-purpose and medium size projects. Flood forecasting and flood protection schemes were also discussed. Further discussions were held on Tanakpur barrage and both the countries agreed to install missing pillars on India- Nepal border in the barrage area.[26] But the left opposition did not support the agreement on Tanakpur barrage and described it to be a sell out of the dignity and prestige of Nepal as a compromise to Indian security interests. It was considered as a violation of Article 126 of the Constitution. Further debate ensued in Nepal on whether it was an agreement or an understanding. In December 1991, the agreement was taken to the Supreme Court of Nepal on the plea that it was against the constitutional provisions. One year later in December 1992, the court gave verdict that the Tanakpur agreement was a treaty and not an understanding, without, however, specifying whether the matter required a simple or two-thirds majority in the Parliament for ratification. The matter was still pending in the Parliament before it was settled along with the signing of the Mahakali Treaty.

It is interesting to note the politics involved in the developmental project in the post- Panchayat period in Nepal. Both the Nepali Congress and the left opposition participated together in the popular agitation for parliamentary democracy in 1989. However in the 1990 election it was the Nepali Congress which came to power with a majority vote under the leadership of G.P. Koirala. The government had to face opposition from within the party and the opposition parties tried to cash on their contribution in the movement and clashed with each other for power and influence. The left parties taking advantage of the intra-party factionalism tried to weaken the government by opposing its policies and programs. To rouse public sentiment against the agreement it was linked with the emotionally surcharged issue of national dignity and sovereignty and the government was labeled as the 'stooge of India'.

With the signing of the treaty on Mahakali river basin the Tanakpur issue came to be closed. Previously Nepal used to receive 150 cusecs of water and 20 million units of power from the Tanakpur project. Now it was decided to provide Nepal with 300 cusecs of water in the dry season and 1000 cusecs during the monsoon besides 70 million units of power.[27] Through these revisions and concessions India has been able to make a breakthrough in the deadlock on the Tanakpur issue and bridge the gap between the two countries through economic cooperation. It is better to settle the deadlock on one issue and move on to other projects rather than get bogged down on a single issue and affect further cooperation when the economic benefits accrued through cooperation are immense for both the countries. However, the Mahakali Treaty also was politicised by the left opposition which alleged that the treaty had been tampered with, and a different version was signed in New Delhi from the one, which was initialled at Kathmandu by the Foreign Ministers of the two countries. The matter was taken to the streets demonstrations were held despite the fact that there was an all party consensus while signing the agreement. Also, the agreement was adjudged by a large section of Nepalese leaders and intelligentsia as having an element of 'mutual benefit'. However, at the time of ratification of the treaty in the Parliament four qualifications were added to the Treaty which as follows:

a. "Nepal's electricity bought by India will be sold as per the 'avoided cost' principle;

b. When the Mahakali Commission is constituted, it will be done only upon agreement by the main opposition party in Parliament as well as by parties recognized as national parties;

c. 'Equal entitlement in the utilization of the waters of the Mahakali River without prejudice to their respective existing consumptive uses of the Mahakali River' means equal rights to all the waters of the Mahakali; and

d. Saying that 'Mahakali is a boundary river on major stretches between the two countries' is the same as saying it is basically a border river.''[28]

Though the adoption of these qualifications is an internal matter of Nepal and is not binding on India, it is binding on the political parties in Nepal for taking up this matter with the Indian government. This can hamper the progress of the report. During Prime Minister G.P. Koirala's visit to India in August 2000, the two Prime Ministers agreed that accelerating the process of harnessing hydropower potential in Nepal along with the rising demand of energy in India offered immense opportunities for cooperation by both the countries. A Joint Committee on water resources headed by the water resources Secretaries of the two countries would be formed to discuss cooperation in water resources, which would meet once in six months.[29]

CONCLUSION

The deficit scenario in the energy sector would be more serious in the years to come with increasing population as well as industrialisation with consequent increase in demand. It is estimated that the growing economy will lead to an increase in the energy demand at a rate of 4.6% annually by 2010. With it the responsibility of the government will be not only to ensure the supply of energy needs but also to deal with the consequent fall out of energy related urban atmosphere pollution. One of the safest ways is to tap the renewable resources of energy viz. hydel, wind and solar energy which are not only non-perishable like coal, gas

and oil but are also environment friendly. Hydropower is also responsive to loading pattern and demand fluctuations.[30]

In this context, water resource constitutes as an important element in the relationship of India and Nepal, provided the mutual interests of both the countries are ensured. India's interests lie in tapping hydro power from the Himalayan river basins. The problem of floods and droughts can also be solved through reservoirs and dams in the river basins fostering stability and security in the region. Nepal's prime interest lies in both consumptive uses of water, like irrigation and fisheries, and for economic interests through hydropower for the internal use of the country and also for export. Though Nepal's total arable land is only 18%, it can export power to India. However, the incentive of export should not be over emphasised as it is a buyer's market with India as the only buyer. Notwithstanding the bargaining for cost of power the countries can cooperate in developing, buying and selling of hydropower through mutual confidence.

Despite various studies and reports prepared by experts of both the countries for harnessing the untapped water resources nothing substantial has been achieved. Sharing of technological expertise and mobilizing resources could help in harnessing of water for mutual benefit. For instance, the power agreement signed in 1997 allows joint ventures between the two countries in the power sector. However, the narrow political interests, petty party politics and lack of mutual trust between the two countries are some of the causes for the tardy growth and development in the harnessing of water resources. Unless the developmental projects are delinked from political interests, it would be difficult to accrue the benefits from the nature's resources. Most of the mega hydropower projects agreed by both the countries faced difficulty at the implementation phase. It means waste of time, energy and resources. Instead smaller projects would prove cost effective and wipe out certain suspicions associated with sharing of water resources.

Another approach is to develop the river basin through regional cooperation. India shares Ganga-Brahmaputra-Meghna basin (GBM)

with Nepal, Bhutan and Bangladesh. India's efforts to exploit the water resources with the GBM countries are done bilaterally. However, most of the projects, barring with Bhutan, have come under domestic political pressure. The countries sharing GBM had their first conference on the development of Eastern Himalayan water resources in New Delhi in 1993. The regional or sub-regional approach would lessen the fears of smaller countries. Harnessing of river waters through cooperative development for the mutual benefit of the co-riparian countries can promote economic development, stability, peace and harmony.

REFERENCES

1. India, Country Report, Energy Information Administration, United States Energy Information Administration, February 2000, *www.eia.doe.gov*.
2. R.K. Pachauri and G.Vasudeva, *Energy in the Indian Sub-Continent* (London:Petroleum Economist Ltd, 2000), p.74.
3. *The Statesman* (New Delhi), 31 March 1998.
4. *Business Standard* (New Delh), 15 March 1999.
5. Refer B.G.Verghese, Ramaswamy R. Iyer, eds. *Harnessing the Eastern Himalayan Rivers: Regional Cooperation in South Asia* (New Delhi: Konark Publishers, 1993), p.106.
6. Refer DNS Dhakal, "Hydropower in Bhutan: A Long Term Development Perspective", *Mountain Research and Development* (California), vol. 10, no.4, 1990, p.298.
7. B.D.Rahmatullah Khan, *Potential for Small Hydropower in Bangladesh* (Internet).
8. B.C.Upreti, *Politics of Himalayan River Water* (Jaipur, 1993), p.70.
9. Of late Nepal is making an attempt to find out sites for oil reserves. In December 1998, Texana Resources Co. of the United States won a bid to carry out seismic surveys at Nepalganj in the southwest and Chitwan in the south-center of the country, internet.
10. Muchkund Dubey, Lok Raj Baral, Rahman Sobhan, eds., *South Asian Growth Quadrangle: Frame Work for a Multifaceted Cooperation* (Delhi: Macmmillan,1999), p.20.
11. Nepal, Energy Information Administration, internet, *www.eia.doe.gov*.

12. Bharat Bahadur Pradhan, "Development of Infrastructure in the Energy, Transport and Communication Sectors in Nepal", Paper presented in the SAARC Seminar on Improving Infrastructure in the Energy, Transport and Communications Sector, New Delhi, December 1999.
13. *Ibid*.
14. For the text of the agreement refer A.S.Bhasin, *Nepal's Relations with India and China* (New Delhi, 1994), pp.545-549.
15. *Rising Nepal* (Kathmandu), 18 April 1994.
16. *Asian Age* (New Delhi) 13 February 1996.
17. Bishnu Bam Malla, Managing Director NEA spoke in Kathmandu on 19 March 2001 on 'Nepal Electricity and its Role in Regional Power Trade', www.sari-energy.org.
18. *Hindustan Times*, 13 February 1996.
19. Ajaya Mani Dixit and Dipak Gyawali, "Environmental and Energy Dimensions of Cooperative Security in South Asia: A Perspective from Nepal", in D.D. Khanna, ed., *Sustainable Development* (Delhi,1997), p.449.
20. Leo E. Rose, *Nepal*: *Strategy for Survival* (Berkeley, 1971), pp.199-200.
21. Bhuvan Lal Joshi, Leo E. Rose, *Democratic Innovations in Nepal* (Berkeley, 1966), p.133, 163.
22. B.C. Upreti, *op.cit.*, p.98.
23. See, press interview of M.P. Koirala held in Kathmandu on June 3, 1954 in A.S. Bhasin, *Documents on Nepal's Relations with India and China* (New Delhi, 1970), p.148.
24. *Rising Nepal*, 11 June 1990.
25. *National Herald*, 11 July 1991.
26. *Rising Nepal*, 11 June 1990
27. *Rising Nepal*, 30 January 1996.
28. Quoted from Dipak Gyawali and Ajaya Dixit, 'Mahakali Impasse: A Futile Paradigm's Bequested Travails' in Dhruba Kumar, ed., *Domestic Conflict and Crisis of Governability in Nepal* (Kathmandu, center for Nepal and Asian Studies, 2000), p.260.
29. Nepal-India Joint Press Statement, *Rising Nepal*, 4 August 2000.
30. Muchkund Dubey, *op.cit.*, p.33.

The River Jhelum Through The Ages

Khalid Bashir Ahmad

The river basin or the plain comprises the low-level alluvium brought down by the Jhelum and its tributaries. The width of this plain varies from 5 kilometers to 25 kilometers.[1] This is the fertile area of the Valley stretching from Anantnag, in the southeast to Baramulla in the northwest. North of Anantnag, the plain area is somewhat narrow and its width is about 20 kilometers.[2] This width is broadened beyond the Srinagar city. The lower areas have swamps which are filled with water in spring and summer. The plain or the river alluvium is the gift of Jhelum. "If Egypt be the gift of the Nile, it is truer that Kashmir is the gift of the Jhelum."[3] "There is no other instance of a valley of the dimensions of Kashmir, and at an altitude of five thousand feet above sea level, having a broad river intersecting it for so long a distance."[4] The Jhelum is an imposing feature on the landscape of Kashmir. The river not only adds to beauty of the Valley but sustains it as well.

Among the physical factors which make Kashmir 'The Paradise on Earth', the Jhelum, its main river, has played the lead role. Like all major rivers upon whose banks great civilizations were born, it has shaped the lives of the people and enriched their economy, besides upgrading the landscape along its course. More than a river, the Jhelum is a strong symbol of the land of its origin, deep rooted in the ethos of its people. As a bosom friend, it has given them moments of happiness and occasions of despair, and shared their agonies and ecstasies. It is a witness to their rise and fall, to their glory and struggle. The river is intricately linked with all aspects of Kashmir and is as much a part of its mythology as of history, culture, economy and social life.

BIRTH OF THE JHELUM

The birth of the Jhelum is connected with the origin of the Kashmir Valley itself which, according to geologists, started emerging as land like

rest of the Himalayan mountain range, out of the Tethys Ocean, after collision of the Indian plate with the Asian plate some 50 million years ago.[5] With continued collision, there developed a large depression at the beginning of Pliocene epoch nearly 4 million years ago. Soon, this depression started getting filled with water as a result of drainage impoundment. At this point of time, the Kashmir intermontane depression assumed the status of a large inland lake. The lake or lacustrine conditions attained greater depth when its western margin, the Pir Panjal Range, rose to its present height due to tectonic reactivation about 25,000 years ago. Concurrent with this, the Baramulla gorge opened and the entire lake water got drained, restoring the Valley to terrestrial conditions once again. The river Jhelum which became oriented towards the northwest, carried out uneven erosion of the emerged lake deposits due to which the present day lakes (Dal, Anchar, Wular) and swamps were formed.

The scientific explanation apart, there is a legend, based on Hindu mythology, woven around the emergence of the Kashmir Valley to explain the river's taking form out of a vast lake known as *Satisar*. The mythological account, related in the *Nilmata Purana*, has it that the *Satisar* was inhabited by a demon, Jalodbhava (water-born), who had obtained the boon of immortality in water.[6] The demon had created a crisis for the people dwelling on and beyond the shores of the lake by devouring them.[7] Around this time, a sage, Kashyapa, was on pilgrimage here. He came to know about the atrocities of Jalodbhava, went to the eternal world and narrated the tale of woes of the people to gods there. The gods, after having a battle with Jalodbhava, killed him by cutting off his head. The legend credits Ananta with the drainage of the *Satisar* due to which the Valley attained the land form.[8]

When the whole water was drained, those who lived here were again in trouble, this time because of the absence of water. Kashyapa had to then plead with gods for a solution to this problem of the distressed people.[9] Shiva, a Hindu god, the legend goes on, was moved by the plight of the people and told his consort, Parvati, to take the form of a watercourse. She asked him to identify the place of her emergence from the subterranean world. Shiva pitched his *trishul* (trident) in the ground

and there sprang a *vitasta* (span) of water[10] and the Vitasta (one of the many names of the Jhelum) was thus born.

DIFFERENT NAMES OF JHELUM

The river is known by many names – Vitasta, Vyath, Bihat, Hydaspes and Jhelum – to different people depending on their language. The earliest of these, Vitasta, is its ritualistic and mythological name obtained from a legend as told in the *Nilmata Purana*. It constitutes with an umpteen number of tributaries, big and small, the drainage network of Kashmir which is the result of contrast in physio-graphic setup and climatic conditions. The river is born to a famous south Kashmir spring, Verinag, at an altitude of 1860 meters, amid pine groves, in the lap of the Pir Panjal mountain range is a great wall of rock, running up to peaks of over 4500 meters, and forms the boundary of Kashmir Valley to the south and southwest. The Banihal Pass, at an altitude of 2805 meters, is the lowest depression in the chain of mountains, on the Kashmir side of which numerous valleys run parallel with the stripe of rocks.

The Verinag spring is situated at 85 kilometers southeast of Srinagar. The spring was originally a shapeless pond where water, oozing out from different places in it, spread and formed a little marsh. It caught the eye of the Mughal emperor, Jahangir (AD 1606-27), who built an octagonal tank of well carved stones around it in AD 1612 and later, in AD 1619, laid out a fine garden in front of the spring with fountains, aquaducts and cascades and planted *chinars* (*Plantinus orientalis)* therein.[11] This famous tourist resort, attracting foreign and domestic tourists in large numbers, derives its name from the *pargana* (an administrative unit) of Ver, now known as Shahabad. The small amount of water from the spring of Verinag is joined by that of the Vyathvutur spring, situated about a kilometer and half in the northwest of Verinag. The Vyathvutur is identified by Stein, as the ancient Vitastatra where king Ashoka erected *stupas*[12] (pagodas). The spring is considered as the real source of the Jhelum for it lies some distance ahead of the Verinag spring.

From its origin to the end of its journey at Trimmu, the Jhelum runs a total course of 724 kilometers.[13] Of this, 241 kilometers are within

the Kashmir Valley, 162 kilometers within the portion of the erstwhile united Jammu and Kashmir, now beyond the Line of Control and the major portion of 321 kilometers in Pakistan.[14] Within the Valley, the river passes through three stages during its run from the south to the north. In the first stage, from its origin to Khanabal, it is a narrow non-navigable watercourse. In the second stage, from Khanabal to Baramulla, the river, running through flat alluvial plains whose surface length is about 83 kilometers and width ranging from 5 to 25 kilometers,[15] is slow and sluggish. The area is fertile, thanks to river and its tributaries that bring along alluvium in bulk, particularly during heavy annual floods. The fall of the river from Khanabal (5400 feet altitude) to Srinagar is 165 feet and fron Srinagar to Baramulla 55 feet.[16] Here, the Jhelum is compared to the Thames at Kew in breadth.[17] During its journey through this stage, the Jhelum runs a serpentine or meander course where its banks are mostly uneven with an average height, above the river water level, of a little less than 3 meters. However, during floods, the river over-runs its banks in most of the alluvial plains.

The third stage, beginning from the Baramulla gorge, changes the character of the Jhelum from a placid, slow and sluggish river to a roaring torrent. It takes a northwest course through the Valley in a "slow rushing gray green torrent, foam flecked, beaming in curly waves, its sound as eternal as the whisper of the wind through Pine and Fir and its force primeval in its untamed splendour"[18]. From the Baramulla gorge to Kohala, across the Line of Control, the Jhelum descends a deep incline of rocks and forms a continuous series of rapids like "those of St. Lawrence and the Danube, yet surpassing, not in volume but in majestic scenery those noble rivers"[19].

The Jhelum leaves the Valley with a total fall of 349.46 meters.[20] It has a sandy bed with an average depth of 3.4 meters. The average rate of flow of its water is 2 to 4 kilometers per hour. The total discharge of the river below Muzaffarabad is about 100 cubic meters per second[21], while at its point of entry into the plains (of Punjab) it is about 115 cubic meters per second.[22] Within the Valley, the river is so sinuous that for a road distance of 136 kilometers from Verinag to Baramulla, it has to

cover a course of almost double the distance. Some of its loops have necks less than a kilometer across. In the limits of the Srinagar city, the waterway width and depth varies from 45 meters to 180 meters and 1 meter to 7 meters, respectively.[23] The sharpest bend within the city stretch has a radius of 150 meters. The bed material of the river in the city consists essentially of sand, silt and clay. No rocks are found up to the depth of 20 meters.[24] The catchment area of the river is 12,570 square kilometers.[25]

Beyond the dictionary meaning of a river as a copious stream of water flowing in a channel to sea, lake, marsh or another river, the Jhelum is the cultural symbol of Kashmir. The river that flows through almost the entire length of the Valley and beyond, has an intimate relationship with the life and times of the people living on its banks and their surroundings. It has had its admirers in emperors, poets and common folk alike. Alexander felt awed by its spate, Awantivarman beautified it by erecting embankments along its channel, Kalhana waxed eloquent about its virtues, Akbar loved to cruise on its waters and Zain-ul-Aabideen celebrated its birthday with festivity. Kashmir and the Jhelum are synonyms and one is known by the other.

The cultural significance of the river is enormous and primarily rooted in the Hindu mythology about its origin according to which the river is the incarnation of Parvati, the consort of Hindu god, Shiva. The ancient Hindus of Kashmir believed that those who drank water from Vitasta at the time of death obtained final deliverance. The religious touch about the river makes it auspicious, if not sacred, for the local Hindus. The *Nilmata* "equates" the Vitasta with the Ganges, the most revered river by the Hindus, in all aspects other than the collection of bones of the dead human beings after their cremation which the Ganga (Ganges) has in excess.[26]

Rooted in the belief that the river is the incarnation of Parvati is the observance of *Vyathtruvah*, birthday of the Jhelum, celebrated for long by Kashmiri Hindus on the 13th Bhadoon, the fifth month of the Hindu calendar. The occasion was so popular with the Hindus of Kashmir that

the prominent secular minded Muslim ruler of Kashmir, Zain-ul-Aabideen, made it an annual feature to celebrate the day on public scale. The highlight of the occasion was the immersion of lighted lamps on the water of the river and illumination of the roofs of houses and boats in the capital city of Srinagar. The King would personally take part in the celebrations. On one such occasion, he embarked on a boat and went to see the capital. At the time of embarking and disembarking, the King accepted the blessings of the citizens and, while on board, listened to well composed songs. The display of lamps was graceful. The rows of lamps placed at the ferry on both banks looked beautiful.

Akbar's son and successor, Jahangir, during his stay in Kashmir in AD 1620, "sat in a boat and went round" to see the lamp-lighting festival of *Vyathtruvah*.[27] The King says that it is an ancient custom that each year on this day everyone, whether rich or poor, whosoever has a house on the banks of the Jhelum, should light lamps.[28] Over the centuries, the celebration of *Vyathtruvah* has become a thing of the past. Attempts to revive it have failed. A group of locals tried to re-enact the ritual sometime around 1980 by immersing lighted lamps in the river near the Zero Bridge. The effort, however, did not succeed.

The local Hindus who prefer to be called Kashmiri Pandits, hold the river very auspicious and perhaps second only to the Ganges in India which commands immense religious appeal for the Hindus in general. Like the Ganges in case of other Hindus, the Pandits immerse the ashes of their dead relatives into the Jhelum at its confluence with the Sindh at Shadipore below Srinagar. The act is performed amid chanting of religious hymns. Although many rivulets and mountain streams make numerous confluences with the Jhelum along its course, there are only two held sacred by the local Hindus, viz., the confluence of the Lidder and the Jhelum at Sangam, about 44 kilometers from Srinagar, in south Kashmir and the one of the Jhelum and the Sindh at Shadipore, 20 kilometers north of Srinagar. The first confluence has lost its religious importance but the one at Shadipore still enjoys some sanctity which it had in great measure during the reign of Hindu rulers like Queen Didda (AD 890-1003) who "sanctified" the confluence by construction of *Mathas*[29] and

Ananta (AD 1028-1063) who made it "resplendent with temples glittering in gold, with *Mathas* and *Agaraharas*."[30]

CULTURAL SIGNIFICANCE

Like any river, the Jhelum has been culturally important to the places along its course. The major towns and cities of Kashmir, including the ones that from time to time served as the capital cities, were built on the banks of the Jhelum. Places of great cultural significance were also similarly situated. Being the main means of transportation for ages until the first half of the present century, the cultural significance of the river has been immense. Various ghats on its banks served as present day bus stands and railway platforms where people would collect in numbers to go to their destinations in different types of boats and also to send a receive cargo. Lovers would also meet here. The ghats remained crowded throughout the day. Vegetables would be sold here and people belonging to different faiths would begin their day with a visit to these ghats for cleaning their bodies before morning prayers. The banks of the Jhelum are dotted with various shrines, mosques and temples visited by devotees in thousands. Each devotee would first take a bath or wash his limbs before entering a prayer house. This religious duty would provide an occasion for the people to meet one another and have social interaction. The ghats would witness great hustle and bustle throughout the day and served as important social spots. There were, and in fact still are, many ghats on the banks of the Jhelum although only few, like the Khanabal Ghat, earned mention in local literature.

The ghats have been also used by washermen. At such ghats in the city, like the ones at Aali Kadal and Maharaj Ganj, washermen are still seen busy with their job. Since the river transport system has ceased to operate in Kashmir, these ghats are now known as *dheb ghats* or washermen's ghats. Carpets, weaving of which forms the major handicraft activity in the Valley, are also washed here before being sent to the market. Adjacent to a ghat was another social spot known as *yarbal*. The word literally means 'a meeting place for friends'. *Yarbal* was used by people, mostly womenfolk, to wash clothes and fetch water for drinking and

cooking purposes. There are several places in Kashmir with *yar* connected with their names, like Khanyar, Naidyar, Surasyar, Shurahyar, Badyar, Sehyar, Ganpatyar, Batyar, Dal Hassanyar, Haftyarbal, etc. pointing to their being social spots at some point of time.

A ghat and a *yarbal* is a platform made of a local stone on the river bank and connected with a stone-stair going up to the bund. Till a couple of decades ago, the bund served as an important centre of social and religious activity. Women would sing *rouf* (folk song) on Muslim festivals of *Eid* on the bund and in Srinagar city such festivities would add colour to the event. On occasions of other festivals like *Shab-e-Baraat* or *Eid-e-Milad*, the banks of the Jhelum were illuminated by rows of lighted lamps in the evening.

The banks of the Jhelum have provided fertile ground for various religious places like shrines, mosques and temples and all along its course such sacred buildings enrich the skyline of Kashmir. The shrines are of great religio-cultural value as the people with whom these are associated have had a significant influence on the lives of the local people during their stay in Kashmir. Of these, Mir Syed Ali Hamdani and Syed Abdur Rehman stand out very prominently in the galaxy of Muslim preachers and religious men who came to Kashmir. The shrines of the two saints stand on the banks of the Jhelum at Khanqah-e-Moalla and Bulbul Lankar, respectively in the interior Srinagar city.

Similarly, the temples of Maha Kali, Raghunath Mandir, Hanuman Mandir and Ganesh Mandir, situated on the banks of the river, attract Hindus in large numbers. Besides religious places, there are also some ruins of landmark buildings like the archaeological sites of Awantipore and Pandrethan situated on the banks of the Jhelum and pointing to the rich cultural heritage of Kashmir. The Jhelum has closely watched the intellectual and educational development of Kashmir as well. On its banks, the scholars and the academics would assemble and exchange their thoughts. Bilhana refers to the scholarly discussions held in his time in the high rising buildings situated on the banks of the Vitasts.[31] Some of the "most eloquent teachers of Shaivism, an influential form of Hinduism

in Kashmir, were also found on the banks of the river."[32] Major educational centres were also set-up on its banks.

PERIL OF POLLUTION

As a cultural symbol of Kashmir, the Jhelum is as healthy as ever but as a river it is fast losing its individuality. Its water that once looked to the beholder as clear as crystal is today repugnant to the eye. It is difficult for an octogenarian to convince his children that the Jhelum once flowed brimful with clean water. Should the pace of pollution in the river go unarrested, the environmentalists worried about the deteriorating status of the Dal, will have to spare some tears for the Jhelum too. Perhaps the situation is best summed up in the warning: "From a river, Jhelum is fast turning into a sewer and once you have a sewer, you have lost the river."[33]

The source of pollution in the river is sewage and effluents that have considerably spoiled the quality of its water. The problem assumes greater dimension due to dense human settlements along the banks where the river is used as a 'dumping ground' for municipal garbage. Open drains carrying concentrated sewage and human excreta directly flow into it. The Jhelum, as we have seen, flows, besides the capital city of Srinagar, through three major cities of Kashmir – Anantnag, Sopore and Baramulla. It is through these stretches that the river receives maximum of its pollutants.

In Anantnag town, there are three major drains with their out falls into the river, besides the minor ones originating from innumerable households in its close proximity that directly flow into it. With no organized solid waste management system available in the town, the waste is normally disposed into the river. The town generates 57 cubic meters of solid waste per day, out of which 18 cubic meters are collected by the Town Area Committee and dumped near Idgah or into the river.[34]

Within Srinagar city, where there is no proper sewerage system, the drains carry the sewage, through contributory nallahs, into the Jhelum. Of the total 525-575 cubic meters of solid waste generated in the city daily, 70 per cent is causing public health nuisance and "finally reaches

the river".[35] Likewise, in Sopore, open drains carry household refuse and other effluents to nallas which empty themselves into the Jhelum. The town generates 35-40 cubic meters of solid waste per day of which about 85 per cent goes into the river.[36] The Baramulla town has no different story. Here also, the solid waste generally disposed under the bridges finds way into the river. Other towns like Bijbehara and Pampore, sitting on the river banks, too contribute to the pollution of the river in a big way.

The Jhelum, as a matter of fact, is dying both physically and biologically, whereas the physical deterioration is in terms of shrinking of its channel and rising of the bed, the biological decay is reflected in the increase in chemical contents and the consequent deterioration of water quality. Most of the parameters exceed the permissible level. Nitrogen, phosphorus and calcium have increased to the level where the water is now unfit for human consumption. Alarming increase in ortho-phosphate, iron, total phosphorus and depletion in dissolved oxygen content has been recorded in the river water throughout its stretch in the Valley.

The ortho-phosphate level recorded at Anantnag, Srinagar, Sopore and Baramulla is 263, 451, 334 and 303 micrograms per litre, respectively[37] which normally should be in traces only. Similarly, the quantity of iron is 427, 456, 489 and 583 micrograms per litre, respectively against the permissible level of 300 micrograms per litre. The level of total phosphorus is about 700 per cent higher at Srinagar against the permissible level of 200 micrograms per litre.[38] At Anantnag, Sopore and Baramulla, the level is, respectively, 300 per cent, 400 per cent and 350 per cent higher than the normal. The level of dissolved oxygen depicts anoxic condition detrimental to fish population. The biochemical oxygen demand level of over 22 miligram per litre at all the four places has made the water of the river unfit for potable purposes which is now good for irrigation of hardy cops.

The insensitivity of the people and the local bodies, towards the health of the river is glaring. Working separately, both contribute to the illness of the life-line of Kashmir. The dumping of hazardous wastes into

the Jhelum generated by the two major city hospitals, Lal Ded Hospital and the Children Hospital situated on the right bank of the river in srinagar, is being overlooked. The issue was raised in a newspaper story quoting experts that "if proper waste-management techniques are not applied soon, it may breed worst ever environmental disaster in Kashmir".[39] It is pertinent that excluding the SMHS Hospital and the Institute of Medical Sciences, Soura, no other hospital in the Valley has incinerators installed for disposal of bio-medical wastes.

In Srinagar alone, the Urban Environment Engineering Department runs 52 de-watering units, of which 35 flow directly, and the rest indirectly, into Jhelum.[40] The pumps run for five hours daily in normal times and in wet seasons for 20 hours and each unit adds 3000 cubic feets of sewage to the river every second. Dead cattle are also routinely sent into it. Boat people, living on the river, throw all domestic refuse directly into it. As if all this was not enough, excessive use of the pesticides, insecticides, weedicides and chemical fertilizers by farmers in rural areas along the river course have further changed the water chemistry of the river for the worse. In fact, there is nothing unwanted that does not go into the Jhelum.

The water in the Jhelum throughout the city, from Zero Bridge to Chhatabal, is dirty and smells foul. This stretch, once a favourite tourist attraction, is today a nauseating scene. From the murky colour of its water to all kinds of pollutants floating down, the Jhelum looked like a moving cesspool. Polythene bags, plastic containers, glass bottles, pieces of used and worn out clothes – everything that should not have been there was floating on the surface of the river. The banks along the entire course are dotted with heaps of garbage and dirty open drains flowing into the river. The increased siltation coming from the catchment also adds to the defacing of the river. At several places dry spots have emerged in the middle of the stream. Near the Abdullah Bridge, a big patch of earth had come up in the middle of the river where during low water discharge children even played games.

Having ruled out its water for human consumption, experts are now worried about the aquatic life in the river particularly the fish. The

encroachment at different stages, water diversion to agricultural land and drying up of main stream belts have also taken the toll of the breeding pockets of fish in the river. Silting in the Jhelum is another threat to the fish life. The mushrooming of makeshift houses along the banks of the Jhelum have also added to the woes of the river. In the city stretch, almost all boat people have erected one or two structures each which have not only deprived the river of that magnificent look that it would have otherwise worn but also added to the filth and other pollutants going into the river. The Bund from Sonawar to Amira Kadal, that once presented an eye-catching view with moored house-boats and flower pots along the banks, today presents the view of a slum having developed on the face of the Jhelum. During the Dogra rule, construction within the 25 meters on the river bank was banned throughout the city.

Demolition of illegal structures by local bodies institutions on the river banks proves to be ineffective as the will behind the demolition is half-hearted. The encroachers lose no time in reconstructing their razed structures as soon as the 'demolition squad' is out of sight. Human greed has brought people right on the Jhelum to construct palatial houses. Now is the time to take measures in the right earnest before it is too late to save the Jhelum from further degradation.

[For further details see Author's ***Jhelum: The River through my Backyard*** (Srinagar: The Bookman Publishers, 2001), 200pp.]

REFERENCES

1. G.M. Shehri, "Mukhtasar Jagrafia", *Hamara Adab*, Jammu wa Kashmir Number, Vol.2, p.155.
2. *Ibid*., p.156.
3. Suchchidananda, *Kashmir the Playground of Asia*, First Edition, pp.16-17.
4. G.M.D. Sufi, *Kashir*, Vol.II, p.538.
5. M.I. Bhat, Interview with the author on 15 January 1996.
6. Ved Kumari, *The Nilmata Purana*, Vol.I, p.6.
7. M.A. Stein, *Kalhana's Rajatarangini*, Vol.II, n. p.388.

8. *Ibid*., p.389.
9. Mohan Lal Aash, "Vitasta", *Sheeraza* (Urdu), Vol.27, No.2, February 1988, p.52.
10. Ved Kumari, n.6, p.37.
11. Sufi, n.4, p.536.
12. Stein, n.7, p.470.
13. Walter R. Lawrence, *Kashmir and Jammu*, Jay Kay Book House, Jammu, 1905, p.91. Also Sufi, n.4, p.538.
14. Sufi, n.4, p.538.
15. Shehri, n.1, p.155.
16. *Ibid*.
17. Sufi, n.4, p.537.
18. Shaukath Ali, *Status of Fisheries in Kashmir Valley – 1996.*
19. Sufi, n.4, p.537.
20. Shaukath Ali, n.18.
21. Charles Bates, *A Gazetteer of Kashmir*, Calcutta, 1873, p.217.
22. *Ibid*., p.218.
23. *Srinagar Urban Transport Project*, RITES, p.111.
24. *Ibid*., p.113.
25. *Uri Hydroelectric Project*, NHPC Brochure.
26. Ved Kumari, n.6, p.238.
27. *Tuzuk-i-Jahangiri* (Rogers), Vol.II, p.168.
28. *Ibid*.
29. M.A. Stein, *Kalhana's Rajatarangini*, Vol.I, p.261.
30. *Ibid*., p.286.
31. T.N. Ganjoo, "Bilhana", *Hamara Adab*, Mashaheer Number, p.263.
32. Grierson, *Linguistic Survey of India*, Vol.III, part 2, p.251.
33. M.A. Kawoosa, Interview with the author on 10 October 1995.
34. *Ecological Status and Conservation of River Jhelum* (First Technical Report), May 1999, J&K Lakes and Waterways Development Authority.
35. *Ibid*.
36. *Ibid*.
37. *Ibid*.
38. *Ibid*.
39. *The Kashmir Times*, Jammu, 6 July 1998.
40. Maqsood Hussain, *The Kashmir Times*, 6 July 1998.

Tawis' of Jammu

P.K. Kaul

It is curious and interesting to note that a good number of rivers and streams in the province of Jammu in Jammu and Kashmir State have been called by the same name. Some examples can be quoted as that of various Tawis and Devikas and Sindh or Sindhus. Why should these rivulets or streams, flowing in far apart districts be assigned the same nomenclature is a fascinating question.

Today we find some eleven streams named as Tawis in the province of Jammu, whose names are found in ancient scriptures also. These are as under:

1. Poonch Tawi[1]: This stream origintes from the Pir Panchal mountain ranges in the district of Poonch and flowing through Baflias, Surankot, Poonch, Kotli and Mirpur meets river Jehlum, somewhere in Pakistan occupied territory.

2. Rajouri Tawi[2]: This also originates from the same range, flows down the middle mountains, passing through Darhal, Thanna Mandi, Rajouri, Nowshehra etc. joins Chandrabhaga or Chenab below Jalalpur in Wazirabad district of Pakistan. It is interesting to note that many tributaries of Rajouri Tawi are also named as Tawis or Taos, such as:

(a) Sukh Tao (or Dry Tawi), which is a fair weather stream, a tributary of Rajouri Tawi, orginating from Behram Gala and meeting Rajouri Tawi near the town of Rajouri itself.

(b) Malkani Tao is another Tawi of Rajouri, a tributary of the same river.

(c) Later Barekh Tao is a tributary of Rajouri Tawi flowing near Sunder Bani in Nowshehra.

(d) Tawi Nalla another small tributary of Rajouri Tawi flows near Chak Maidan.

(e) Munawar Tawi is another tributary of Rajouri Tawi meeting it in Chamb sector of Akhnoor borders.

3. Jammu Tawi[3]: This originates from Kalinag Kund adjacent to Kund Kaplas in the Kailash mountain ranges on the Dudu Basantgarh slopes and flowing down Dudu, Latti Bandhol, Sudh Mahadev, Chenani, Udhampur, Jammu merges with Chenab near the Pakistan border. The other two branches of Jammu Tawi are:

(a) Nikki Tao is the left branch of Jammu Tawi river separating itself from the main river near the canal crossing, and passing by the side of Tawi Islands. It rejoins the main Tawi river some distant away beyond R.S. Pura.

(b) Kali Tao is the left portion of the main Jammu Tawi, after the separation of Nikki Tawi. It is probably called as Kali Tawi, because of the devastation it brings to the land of Tawi islands during rainy season.

4. Chamba Tawi[4] or **Tausha**: The river Ravi is called Tausha (or Tawi) near Rajnagar Pargana of Chamba, where it flows in east-west direction.

All the above mentioned eleven streams or rivers have derived their nomenclature from the Sanskrit term *Taush* (Happiness), or *Taushi* (one who has become happy). The change of *S* into *h* phone in local dialects is a well established phenomena. Prof. Buhlar also thinks on the same lines.[5] According to him *Taushi* is the ancient form of term Tawi, Tohi or Tao, used for several mountain streams joining the *Vitasta* (Jhelum) and the Chandrabhaga from the slopes of Pir Panchal ranges. Again Taushi of *Rajatarangini* is identified by Stien as Tohi or Tawi of Poonch.[6] According to Bates, "Two Tawis one in the province of Jammu and another in Nowshehra are tributaries of Chenab".[7] Thus we find that the nomenclature of these rivers and streams has grown out of a religious myth, or a tradition prevalent in the medieval times.

The earliest mention of river Taushi is traced from *Vishnudharmotar Purana*[8] and *Neelmata Purana*; and probably also from *Aitreya Brahman*.[9] These *Shastras* have depicted Tawi as:

i) Taushit Bhaska[10] i.e. one which pleases the sun or is pleased by the sun;

ii) Ark-Nandini,[11] the daughter of the Sun God;[12] and

iii) The warm waters of Taushi or Tawi which make a Sangam (confluence) with the cold waters of Chandrabhaga.

Now the first observation makes us to ponder about the reasons for which the river has been called as Taushit Bhaskara, i.e. one pleased by Sun God. Looking at the geography of these streams, we see that Taushi or Tawi of Jammu originates from Mount Kailash[13], 14,000 feet high, in the eastern mountain ranges of Jammu. It flows almost in the east-west direction in the Shivalik hills and middle mountain ranges of Udhampur and Jammu. It joins Chandrabhaga near Sialkot or Sakla of ancient India.

The Tawi of Poonch also has the same east-west flow pattern, in the ancient valley of Parnotsra or modern Poonch. It originates from Panchal ranges, flows in the east-west direction before turning to the south and then joins river Jhelum.

The river Tawi of Rajouri and Naushehra also flow almost in the east-west or west-east directions in the district before joining Chandrabhaga near Jalalpur.

The above geographical fact indicates that all the three main Tawis, as referred in the religious scriptures originate in their respective districts, from the sun rising direction and flow towards the sun-setting direction. This gives rise to a very fascinating natural phenomenon on the surface waters of these streams. In the morning hours, under the influence of bright rays of rising sun, the waters of these streams shine like silver, and again in the evening when the sun is crimson, red, they again reflect a golden shine, giving rise to a very enchanting scene and fascinating glitter. The worship of nature and its various forces, such as Sun, Moon, Wind etc., was a daily feature of the simple hearted and God fearing people and so was their desire for keeping their body and mind clean from disease and death.

And, therefore, when they used to go to the banks of these streams for having a morning holy dip or an evening cleansing bath or to fetch water for their daily use, or to offer their open morning or evening prayers

on the banks of these rivers, they might have watched with keen interest, delight and fascination the golden and silvery glitter of the waters of these Tawis at the time of sun set and early sun rise. Accordingly the minds of the folk people also glittered who took this shining[14] of Tawi waters as the pleasure of sun or the waters of Tawi, and declared the stream as "Taushit Bhaska" which in due course of time assumed the nomenclature as Taushi or Tawi. This is further confirmed by the fact that otherwise a well established and well described nomenclature of an ancient river, Ravi (Iravate of ancient times) has also been locally named as "Taushi" or Tawi near Rajnagar in Chamba[15], because of the same folk or Brahmanic tradition, as this river also flows in the east-west direction at this specific place. Later, this seems to have formed a tradition and we got so many streams named as Taushi or Tawi.

Tawi is also called as Ark Nandini, i.e. daughter of the Sun[16], and not as Som Suta, i.e. daughter of Moon, a name assigned to Chandrabhaga.[17] This is because the waters of Tawis were much hotter than the ice cold waters of Chenab river. Also the sun is much hotter and moon is cool and calm. Hence the nomenclature of the two rivers.

Again we find that in the of religious scriptures, viz *Neelmat Purana* etc., the waters of Taushi or Tawi are said to have made a confluence with the waters of Chenab and not with the waters of Vitasta, as is the case with Taushi of Poonch. And therefore we can presume that it was the Taushi or Tawi of Jammu, and not the Tawi of Poonch, which got the first name as Taushi or Taushit Bhaska. According to Dr. Ghai also, *Vishnudharmotar Purana* (400-550 AD) is older than *Neelmata Purana* of 7th-8th century, and *Neelmata Purana* mentions several verses of the former *Purana* after slight modifications. And, therefore, the antiquity of Jammu Tawi is well established.

REFERENCES

1. Aurel Stein, *Rajatarangini*, VII – V – 53, & 47-69 f.n.
2. Charles Ellison Bates, *Gazetteer of Jammu Kashmir and Ladakh*, 1877, p.388.
3. *Ibid*.

4. J.Ph. Vogel, *Antiquties of Chamba*.
5. Buhler, *Report*, p.3.
6. Aurel Stein, *Rajatarangini*, Vol.VII-V-53.
7. See f.no.2.
8. Ved Kumari Ghai, *Neelmata Purana*, Vol.I, p.14. f.n.4 c.f. *Vishnu Dharmotar Purana*, p.1-62-35-b.
9. See, f.no.7, p.27
10. Ghai, *Neelmata Purana*, Vol.II-V-120, 1994.
11. *Ibid* c.f. *Vishnudharmotar Purana*, p.1. 162.35.b.
12. Interestingly Chandrabhaga has been called as daughter of moon. *Ibid*., no.11.
13. Mount Kailash as referred above probably derives its nomenclature from the Kushan King Kadphises Ist or IInd. I personally know of only two Kailashs, one as referred above in Bhadarwah and Jammu and the other in Tibet. Kushan Kings were Shiva worshippers and we have a well established ancient tradition of this worship in the ancient shrine of Sudh Mahadev in the vicinity of Kailash mountain range, and folk traditions of the mountain dwellers. Recently some coins of Kushan Kings have also been excavated from Akhnoor, Ramgarh and other sites of Jammu Province.
14. Stretched over miles and miles in the westward direction, the scenic beauty of river Tawi of Jammu, in the morning and evening hours, can still be seen from Bahu Gardens.
15. J. Ph. Vogel, *Antiquities of Chamba*.
16. It is probably this mention of Tawi stream in *Vishnudharmotar Purana* that inspired Kedar Nath Shastri of Jammu to write "Taushi Shatkam" – 100 verse enlogy in praise of the river Tawi – in recent years.
17. *Neelmata Purana*, Vol.I, p.14.

INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH (ICSSR)

Indian Council of Social Science Research (ICSSR) was established as an autonomous organization in the year 1969 to promote research in social sciences in the country. The Council consists of a Chairman, 18 social scientists, 6 representatives of the Government of India and a Member-Secretary. The Council was meant to:

- Review the progress of social science research and give advice to its users;
- Sponsor social science research programmes and projects and administer grants to institutions and individuals for research in social sciences;
- Institute and administer scholarships and fellowships for research in social sciences;
- Indicate areas in which social science research is to be promoted and adopt special measures for development of research in neglected or new areas;
- Give financial support to institutions, associations, and journals engaged in social science research;
- Arrange for technical training in research methodology and to provide guidance for research;
- Coordinate research activities and encourage programmes of interdisciplinary research;
- Develop and support centres for documentation services and supply of data;
- Organize, sponsor, and finance seminars, workshops, and study groups;
- Undertake publication and assist publication of journals and books in social sciences;
- Take such measures generally as may be necessary from time to time to promote social science research and its utilization.

The Council in collaboration with respective host institutions has set up six regional centres in Calcutta, Shillong, New Delhi, Chandigarh, Hyderabad and Mumbai as part of its programme of decentralizing administration and broadbasing social science research.

ICSSR is the nodal agency in India for participating in the activities of UNESCO's Programme, namely, MOST. ICSSR is also a member of the International Social Science Council (ISSC) and the Asian Association of Social Science Research Councils (AASSREC). The ICSSR has a programme of publications and has already published, in addition to a number of journals, over 300 books, pamphlets and monographs. The publications result from the different programmes of the Council, such as (1) Surveys of research in social sciences; (2) Studies on alternatives in development; (3) Research projects, sponsored programmes and fellowships; (4) Conferences and seminars, and (5) International Collaboration. The ICSSR publishes five journals of abstracts and reviews in the fields of Economics, Geography, Political Science, Psychology, and Sociology and Social Anthropology.

ICSSR PERIODICALS

Indian Social Science Review (Half Yearly)

ICSSR Journal of Abstracts and Reviews: Economics (Half-Yearly)

ICSSR Journal of Abstracts and Reviews: Geography (Half-Yearly)

ICSSR Journal of Abstracts and Reviews: Political Science (Half-Yearly)

Indian Psychological Abstracts & Reviews (Half-Yearly)

ICSSR Journal of Abstracts and Reviews: Sociology and Social Anthropology (Half-Yearly)

Documentation in Public Administration (in collaboration with the Indian Institute of Public Administration, New Delhi)

Vikalpa (in collaboration with Indian Institute of Management, Ahmedabad)

RECENT ICSSR PUBLICATIONS

1. Antiquity to Modernity in Tribal India (4 Volume; 1998); Inter-India Publications, D-17, Raja Garden, New Delhi - 110015.

1.1. Continuity and Change among Indian Tribes (Vol. I); S.C. Dubey (ed.); pp. xvii+358; 500.00.

1.2. Tribal Self-Management in North-East India (Vol. II); Bhupinder Singh (ed.); pp.xx+348; Rs. 425.00.

1.3. Ownership and Control of Resources among Indian Tribes (Vol. III); S.N. Mishra (ed.); pp. xii+230; Rs. 320.00.

1.4. Tribal Movement in India (Vol. IV); K.S. Singh (ed.); pp. xiv + 357; Rs. 450.00.

2. Terrorism and PoliticalViolence: A Source Book; Editor M.L. Sondhi; 2000; pp.158; Rs. 250.00; Har-Anand Publications, New Delhi.

3. Reforming Administration in India; Editor Vinod K. Mehta; 2000; pp.460; Rs. 495.00; Har-Anand Publications, New Delhi.

4. New Economic Policy for a New India, EditorSurjit S. Bhalla, 2000, pp.279, Rs.395.00, Har-Anand Publications, New Delhi.
5. Democratic Peace & Its implications, Editor M.L. Sondhi, 2000, pp.184, Rs.250.00, Har-Anand Publications, New Delhi.
6. Inequality, Mobility and Urbanisation: China & India, Editor Amitabh Kundu, 2000, pp. xii+376, Rs. 600.00, Manak Publication, New Delhi.
7. Third Survey of Research in Sociology and Social Anthropology (2 Vol.), Editor M.S. Gore, 2000, pp.xxiii+381, xix+339, Rs. 1000.00 (for both Vols.), Manak Publications, New Delhi.
8. Nuclear Weapons and India's National Security, Editor M.L. Sondhi, 2000, Har-Anand Publications, New Delhi.
9. Psychology in India Revisited: Developments in the Discipline, Fourth Survey in Psychology VI-2 (Personality and Health Psychology), Editor Janak Pandey, 2000, Sage Publications, New Delhi.
10. Towards A New Era: Economic, Social and Political Reforms, Editor M.L. Sondhi; 2001, pp.688, Rs. 695.00; Har-Anand, New Delhi.
11. How India and Pakistan make Peace, Editor M.L. Sondhi, 2001, Manak Publications, Delhi
12. India's Socio-Economic Database-Survey of Selected Areas, Editor C.P. Chandrasekhar, 2001, Tulika, New Delhi.
13. Refashioning The New Economic Order Karnataka in Transition, Editor Arun P. Bali, 2001, Rawat Publications, Jaipur.
14. Economic Liberalisation in India: Japanese and Indian Perspectives, Editor K.V. Kesavan, 2001, Manak Publications, Delhi.
15. Directory of Social Science Libraries and Information Centres in India (in press).
16. Union Catalogue of CD-ROM Data Base in Social Science Libraries in India (in press).

***For Subscription and trade inquiries please write to*:**

Section Officer (Sales)
Indian Council of Social Science Research
Syama Prasad Mookherjee Information Gateway of Social Sciences (SPMIGSS)
35, Ferozeshah Road, New Delhi-110001

Phone: 3385959, 3383091 **Fax: 91-3381571**
E-mail: nassdocigss@hotmail.com **website: www.icssr.org**

HIMALAYAN AND CENTRAL ASIAN STUDIES is a quarterly Journal published by the Himalayan Research and Cultural Foundation, which is a non-governmental, non-profit research, cultural and development facilitative organisation. The Journal is devoted to the study of various issues pertaining to the Himalayan and trans-Himalayan region in South and Central Asia or parts thereof, connected with its environment, resources, history, art and culture, language and literature, demography, social structures, communication, tourism, regional development, governance, human rights, geopolitics etc.

While the principal concern of the Journal will be on its focal area, i.e. from Afghanistan to Mayanmar including the Central Asian states of Uzbekistan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, China, Mongolia, Nepal, Bhutan and the Indian Himalayan states of Jammu and Kashmir, Himachal Pradesh, Sikkim, Uttranchal and North East states; papers with a broad sweep addressing environmental, social, cultural, economic, geopolitical and human rights issues are also welcomed.

The objective is to make a scientific appraisal of the issues confronting the Himalayan and adjoining region in South and Central Asia or parts thereof, and to make specific policy oriented studies and need based recommendations as the means to promote the human, educational and economic advancement of the peoples of the region besides preserving and enriching their ethno-cultural, literary and historical heritage. Promotion of human rights, social justice, peace, harmony and national integration are the other key areas in which the Himalayan Research and Cultural Foundation has been active.

CONTRIBUTIONS FOR PUBLICATION AND ANY ENQUIRIES SHOULD BE ADDRESSED TO :

Prof. K. WARIKOO
Editor and Secretary General,
Himalayan Research and Cultural Foundation,
Post Box- 10541,
Jawaharlal Nehru University Post Office,
New Delhi - 110067 (India)
Tel. : 0091-11-616 2763, 0091-11-617 9408
Fax : 0091-11-610 6643 E-mail : warikoo@nde.vsnl.net.in
Books for review should be sent to the same address.

Registered with the Registrar of Newspapers R.No. 67256/97

HRCF PUBLICATIONS

AFGHANISTAN FACTOR IN CENTRAL AND SOUTH ASIAN POLITICS
Edited by K. Warikoo (New Delhi, 1994. 73pp.)

SOCIETY AND CULTURE IN THE HIMALAYAS
Edited by K. Warikoo (New Delhi, 1995. 316pp.)

CENTRAL ASIA : EMERGING NEW ORDER
Edited by K. Warikoo (New Delhi, 1995. 352pp.)

JAMMU, KASHMIR AND LADAKH : LINGUISTIC PREDICAMENT
Edited by P. N. Pushp and K. Warikoo (New Delhi, 1996. 224pp.)

ARTISAN OF THE PARADISE : A STUDY OF ART AND ARTISANS OF KASHMIR
By D.N. Dhar (New Delhi, 1999. 230pp.)

GUJJARS OF JAMMU AND KASHMIR
Edited by K. Warikoo (Bhopal, 2001. 317pp.)

BAMIYAN: CHALLENGE TO WORLD HERITAGE
Edited by K. Warikoo (New Delhi, 2002. XVIII, 313pp. 61plates)

HIMALAYAN RESEARCH AND CULTURAL FOUNDATION
Post Box-10541, Jawaharlal Nehru University Post Office,
New Delhi-110067 (India). BA/1G, D.D.A. Flats, Munirka, New Delhi-110067.
Tele : 0091-11-616 2763, 0091-11-617 9408, Fax : 0091-11-610 6643
E-mail: warikoo@nde.vsnl.net.in