RIVER BASIN PLANNING: Theory and Practice

Edited by

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and

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Foreword

There is nothing new about the development of river basins, nor about the construction of dams in such development. Both activities have been going on for at least 9,000 years. What is new, however, is the acceleration in the rate of dam building and the complexity of the task of river basin development. This foreword introduces both of these themes.

The present reservoir area of South-East Asia is estimated at three million hectares. A conservative estimate of the likely equivalent area by the year 2000 is 15 million hectares. In Africa, the Volta, Kariba and Aswan schemes signalled the arrival on the continent of the age of the very large impoundments. The decision to proceed with the Senegal river basin development, contributing nearly half a million hectares of irrigable land in an area open to the ravages of drought, dramatically illustrates the potential social and economic impact of these large projects. Their size must not be allowed, however, to blind us to the longer tradition, most notably demonstrated in Africa in Northern Nigeria, of much smaller schemes to which the label 'river basin development' (with its association with the Tennessee Valley Authority) is not normally applied. In Zambia alone, it is said that small dams could produce enough irrigable land to totally transform the agricultural potential of a country that has become chronically dependent upon food imports.

Two major explanations of this extraordinary growth of dam construction in the last 20 years lie first in protection from drought and, second, in the need to increase agricultural production, either through double cropping, or through better control of water supply, making possible not only higher yields of existing crops, but also the introduction of more valuable crops. The Indian experience is particularly illuminating in this respect: what would have been the effect of high yielding varieties of rice and wheat without Bhakhra-Nangal, Damodar and, perhaps most relevant, Nagarjunasagar projects? The food imperative towards dam construction and river basin development is not going to lessen in the years ahead. Though the history of prediction in this area is far from happy, the balance of probabilities is surely that both existing agricultural technologies and patterns of land use throughout the Third World are going to have to change radically over the next 30 years to maintain per capita availability food at its present meagre level. If one looks for the eradication of periodic acute shortages and, a fortiori, the transformation of many developing countries from food importers to efficient food exporters, the need for changes in both technology and patterns of land use becomes overwhelming.

The question, then, is whether resources are going to be made available over the next 20 years to finance river basin development in general and dams (whether a smaller number of very large dams, or a very great number of small dams), in particular. While there can be no easy confidence that the huge sums involved will be forthcoming - US $750 million for the two dams for the Senegal river basin alone - the relative success of IFAD (International Fund for Agricultural Development) in re-cycling oil surpluses to agricultural development in the third world must be encouraging, the more so when it is put in the context of the likely course of negotiations stemming from the Brandt Report. Paradoxically, however, it may well prove more feasible to finance very large (particularly multi-state) schemes than a greater number of smaller schemes which was the traditional pattern of water resource development in both Africa and South-East Asia.

A number of influences explain this paradox, perhaps none more powerfully than the increasing global interest in hydro-electric power. Unless one takes a remarkably optimistic view of the rapid exploitation of unconventional sources of power and/or a no less optimistic view of the future real price of oil - and neither optimism seems at the moment to derive much support from the facts - hydro-electricity is a resource that neither individual developing countries nor the global community as a whole can afford to ignore and for which they will be prepared to pay increasingly high prices to acquire over the next 30 years. Projects which looked marginal in the 1970s will, therefore, look attractive in the 1980s and mandatory in the 1990s.

If the demand for food and power combine to ensure an exponential rate of growth in river basin development over the rest of this century, they also suggest that the formulation and implementation of river basin development plans is going to be even more complex in the future than it has been in the past. This prediction stems from a number of observations. First, the joint-product nature of river basin development is going to be much more central in the future than it often has been in the past: compare, for instance, the Volta, Kariba and Kafue projects with Tana or Mahaweli. Second, we are becoming increasingly sensitive to the complexity of the interactions between social, economic, political, medical and ecological factors in any kind of large-scale intervention, with the result that appraisal, monitoring and evaluation techniques are becoming more wide-ranging, more sophisticated and, paradoxically, less definitive. Third, the very scale of river basin development in the future is likely to lead to the inundation of an increasing proportion of inhabited land, with the result that the number of people re-located as a result of river basin developments will become very substantial. Again, a critical review of past re-settlement projects emphasises both the need for much more careful procedures of research and action and the

immense complexity of the factors involved. Finally, as indicated above, an increasing proportion of river basin plans are likely to involve more than one nation-state, thus raising to a higher power the political and administrative conflicts which even fairly modest projects breed so freely. Even a nodding acquaintance with the history of the development of the waters of the Nile (including the White Nile) is enough to warn us how sensitive the issues can become. As water management becomes an ever more valuable national resource, those sensitivities can only increase.

Foreseeing, then, that river basins are likely to play a major role in the development of many Third World countries over the next 30 years, the Centre for Development Studies of the University of Wales decided to sponsor an international colloquium on river basin planning in the Spring of 1980. We had two separate but related objectives in mind - to review the state of the art and to explore whether there is a need to fashion particular training programmes for those who will be engaged in river basin planning. At the forefront of our minds was the very fact of the increasing complexity of river basin planning sketched in the last paragraph. Given this complexity, we began to ask ourselves - and the process is by no means complete - whether the traditional pattern of the formation of multi-disciplinary teams, with hydrologists, agronomists, power engineers, economists and administrators, was already, and would be in the future, an adequate response to the planning needs of river basins. Or do we need to think about producing a new generation of river basin specialists who, while professionally qualified in perhaps only one of the traditional disciplines, is able to communicate in the richest sense of that term with practitioners of other disciplines? We do not pretend to have decided that issue. We hope this volume will contribute to the debate.

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Introduction

The idea of integrated management of land and water resources is not new. The history of irrigated agriculture can be traced all the way back to 7000 BC in Jericho. Many of the World's greatest civilisations have had close association with rivers. The Hindu-Indian, Egyptian, Chinese and Sumerian civilisations emerged and flourished in the major river valleys of the Indus, Nile, Hwang-Ho and Tigris-Euphrates respectively. These 'hydraulic' civilisations rose to great heights of splendour because they were each successful in evolving a technology and in organising a social, economic and political system which enabled them to harness the water resources at their disposal. They flourished over long periods of history because they learnt to manage their land and water resources in a way that harmonised the pursuit of economic objectives with the integrity of their environment. Eventually they disintegrated or were subjugated by outside powers or suffered long periods of destabilisation because they used their technology and political authority to enforce social structures which became increasingly oppressive. There seems to be a moral in this broad sequence of history - a moral which modern societies presently trying to rediscover the ancient art of successful river basin development can only ignore at their own peril. And the moral seems to be this: Economic development can be sustained as a continuous process only if it is ecologically sound and socially just. That is the integrating theme of the papers brought together in this book.

The modern history of river basin planning can be traced back to two great events, both of which took place in the 1930s. The first was the creation of the Tennessee Valley Authority (TVA) in the United States in 1934. Second was the Presidential address given to India's National Institute of Sciences in 1938 by that country's notable physicist and planner, Meghnad Saha.

In the United States, the idea of river basin planning gradually took shape into an operational concept through a progressive synthesisation of three interrelated but separately evolved concepts of: 1) multiple-purpose project, 2) unity of the drainage basin and 3) the acceptance of state intervention in the promotion of social welfare. The third concept however was in the 1930s anathema to many Americans and still runs in the face of the dominant political philosophy of free enterprise. Nothing less than the Great Depression of the 1920s could have convinced sufficient numbers of Americans that market forces may need an occasional helping hand from the planner, and thus, gave the necessary political support to President Franklin

D. Roosevelt to carry through his New Deal. The legislation which created the TVA was a product of this New Deal. Roosevelt did not see the TVA as a public utility for performing a specified number of engineering tasks. He had set his sights much higher than that. What he was seeking to create was a regional agency which would carry out a programme of interrelated and ecologically-sound activities for achieving economic development and social justice in a depressed region. The euphoria of the New Deal, however, soon dissipated and over the following decades the TVA emerged as a massive electricity generating utility, now a far cry from what was envisaged in 1933. The main emphasis today is on supplying cheap power to sustain the expansion and profitability of private industry. Broad social issues and 'life-line' programmes have long since been relegated to the background.

Despite the unfulfilled promises of the TVA, the concept of river basin planning seems to have survived in the USA. A series of interstate compacts for unified development of river basins have been recently signed giving rise to a number of interstate River Basin Commissions, the most notable of which is the New England River Basin Commission.

In India, the political leadership, the scientists and the academic community realised long before Independence in 1947 that the future post-Independence government of the country would be facing a massive task of national reconstruction after nearly two centuries of colonial underdevelopment. The Congress Party, which has been leading the movement for Independence since the 1920s, appointed a National Planning Committee in 1938 with Jawaherlal Nehru as its Chairman. Since then it has become generally accepted that planned development, and not unfettered free enterprise, will be the guiding ethos of Independent India. Meghnad Saha was simply building on that national concensus when he argued in 1938 that river basins, because of their intrinsic ecological integrity, were ideally suited territorial units for undertaking comprehensive programmes of socio-economic development. He made a strong plea for a systematic study of all the river basin of India so that a scientific foundation could be laid for future integrated programmes of flood control, irrigation, navigation and generation of hydro-electricity. He saw these programmes as instruments of revitalising agriculture and initiating industrialisation - pieces of a jig-saw which all fit together into a comprehensive plan of regional development (Saha, 1938).

Meghnad Saha's ideas saw fruition in 1948, when the Damodar Valley Corporation (DVC) was created by an Act of the Indian Parliament for designing and administering a comprehesnive programme of regional development of the Damodar river basin. The DVC was just the beginning, for a series of other river

valley development schemes soon followed. Bhakhra Nangal in the Punjab, Hirakud in Orissa, Gandak and Kosi in Bihar, Narmada in Madhya Pradesh, Tawi in Jammu and Kashmir, Nagarjunasagar in Andhra Pradesh, Jayakwadi in Maharashtra and Lower Bhavani in Tamilnadu are a few important ones among a long list of programmes. By 1974, over 30 million hectares of agricultural land were brought under irrigation through various river basin schemes.

The spread of the river basin planning approach across the rest of the Third World has been rather spatially selective and highly localised in a few large prestige projects. The main areas of activity have been in Thailand, Sri Lanka, Turkey, Iraq, Egypt, Ghana, Senegal, Nigeria, Kenya, Zambia, Mozambique, Brazil and Surinam - in most of these countries there was only one large prestige project. In all cases multinational finance and technical services were involved. Feasibility reports and project designs were prepared by Western 'experts' who had very little exposure to local social processes, and sometimes little understanding of environmental conditions. Addressing local conditions and meeting local needs were in any case rarely among the major terms of reference of these projects - the over-riding concern was often the exploitation of a local resource (e.g. bauxite or copper) required by multinational companies. This was of course less so in some countries than in others - in Egypt, for instance, the main motivating force in creating the Sadd el Ali seems to have been the desire to provide more irrigated farm land to impoverished peasants. In nearly all cases however huge profits were made by overseas construction and consultancy firms.

In India foreign finance capital and expertise were involved to a much lesser degree than elsewhere. But like everywhere else, the major emphasis has invariably been on construction and not on end-use planning. The main actors in the drama have been the engineers and the technocrats, and to a lesser extent the bureaucrats - the people who build dams and power houses, dig canals, erect pylons, design transmission lines and manage office procedures. All these no doubt need to be done, but they do not constitute sufficient conditions for integrated regional development, which is what river basin planning must be. For this to happen, two more components must be added to the whole process: (i) the planning of linkages between construction programmes and the need structures of the population, and (ii) the planning of measures to correct dislocations in the ecological balance caused by these construction programmes. One has to think in advance about what happens to the electricity that is generated and the new irrigation potential that is created. Demand structures are of course the products of existing patterns of distribution of income and property. If the end-uses of the new programmes are passed on to the population through the market, there is a real danger of river

basin planning becoming in effect a mechanism which merely reinforces the existing structure of social and economic privilege. One also needs to plan in advance the necessary measures to prevent disasters such as: vast irrigated areas degenerating into waste lands through increased salinity or impoundments leading to epidemics through the introduction of new disease vectors. Without this preventive planning, limited economic advantages gained today may be totally wiped-out through major ecological disasters in a few years' time.

Ineffectivenss of river basin planning in addressing major social and economic issues in the Third World, may perhaps be attributed to the same contradictions in the development debate and dichotomies in planning thought which have so far characterised much of the planning effort in these countries.

The last three decades of development debate seems to have mainly missed the point that the process of development has to involve the totality of relationships which together constitute the life of man. It has therefore yielded very little by way of 'insight' into the causes of underdevelopment or of operational ability in designing and carrying out effective programmes for removing these causes and initiating development. Paradigms of unequal development and exploitative global divisions of labour have been relegated to the periphery of economic thinking. The main stream of economic thinking has however been mostly concerned with the 'hot pursuit' of the gross national product and the homogenisation of an international circuit of interests which had very little relevance to the economic and social interests of the mass of the population. Token references to redistribution were no doubt made from time to time but the necessity for changing the existing structures which continuously create iniquities and which is why redistribution was required in the first place was, however, hardly ever mentioned.

The opportunity cost of adopting such a partial view of development has been immense, and this has been mainly reflected in terms of the conceptual blockages in planning thought and consequent discontinuities in planning action. The literature on planning theory and practice of the 1950s through to the mid-1970s is characterised by a whole series of dichotomies in the thinking process - viz. physical versus economic and social versus rural, sectoral versus spatial, one sector versus other sectors and so on. As a result the conceptualisation as well as the action programmes of development planning got fragmented into a series of self-contained systems. System boundaries were drawn along orthodox disciplinary and professional lines. Peoples' fundamental needs of food, drinking water, shelter, education, health, clean environment, employment, cultural and intellectual expression, social and economic justice, etc. are

however, not subject to such a system of classification. Food production, for instance, is a function of an intricate balance among several biogeophysical systems (biological, hydrological, atmospheric, geomorphological etc.) on the one hand, and between these and the production technology on the other. Similarly, the need for shelter impinges on a whole cluster of problems comprising, among others, accelerating rate of rural-urban migration, urban congestion, inner city deprivation, urban water supply, pollution, sewage disposal and crime. These clusters are indivisible and not satisfactorily encompassed within existing, professionally-structured, system boundaries of development planning. The present state of conceptual and institutional organisation of development planning, thus seems to represent a 'best-fit' between the professional interests of the expert and a total disregard of the client interests. It is an unacceptable situation that planning be for the planner and for the professional, and not for the people. River basin planning can be effective only if it moves out of that situation.

The United Nations initiatives in river basin planning seems to have largely reinforced the above dichotomies in planning thought and action. It is difficult to explain why that has been so. The narrow base of the small and exclusive consultancy circuit which dominates the UN intellectual efforts has certainly been an important reason. Close linkages between the multinational construction firms which handle much of the contract work stemming from river basin programmes and the consultancy circuits which guide conceptual approaches, determine aid priorities and prepare feasibility reports for these programmes cannot also be ruled out. The only concrete evidence by which to judge the UN approach to what it calls 'integrated river basin development', is its Report on the subject, first published in 1958 and reissued in 1970 (UN, 1970). The Report recommends a four-phase national programme for designing and implementing river basin planning schemes. The phases are: (i) preliminary investigation and organisation, (ii) general reconnaissance of existing conditions, (iii) initial implementation of pilot projects, and (iv) construction and operation of the major structures. The whole process is obviously geared to the construction work. The essential social linkages of the construction programmes are de-emphasised and the focus of scientific research and investigation is directed away from these linkages. Redistributive aspects of the programme are also totally ignored.

More recently, the United Nations has published a new report on institutional and legal aspects of managing international water resources (UN, 1975). This, like the previous Report, is a major document prepared in pursuance of a General Assembly Resolution. The approach again is totally technocratic - the institutions and legal instrumentalities proposed have no bearing on such needs as: monitoring the business practices of