

Document:-
A/CN.4/320 and Corr.1

**First Report on the law of the non-navigational uses of international watercourses, by Mr.
Stephen Schwebel, Special Rapporteur**

Topic:
Law of the non-navigational uses of international watercourses

Extract from the Yearbook of the International Law Commission:-
1979, vol. II(1)

*Downloaded from the web site of the International Law Commission
(<http://www.un.org/law/ilc/index.htm>)*

THE LAW OF THE NON-NAVIGATIONAL USES OF INTERNATIONAL WATERCOURSES

(Agenda item 5)

DOCUMENT A/CN.4/320*

**First report on the law of the non-navigational uses
of international watercourses,
by Mr. Stephen M. Schwebel, Special Rapporteur**

[Original: English]
[21 May 1979]

CONTENTS

		Page
<i>Abbreviations</i>		144
Introduction	Paragraphs 1-3	144
Draft articles on the non-navigational uses of international watercourses	2	144
<i>Chapter</i>		
I. Nature of the topic	4-31	145
Some salient characteristics of water	8-31	146
A. The hydrologic cycle	9-21	146
B. Self-purification	22-23	149
C. Quantity and flow of water	24-31	149
II. Uses of international watercourses	32-62	150
<i>Article 1. Scope of the present articles</i>	60	158
III. User agreements	63-110	159
A. Diversity of watercourses	63-85	159
B. The multilateral convention as a framework treaty	86-91	165
<i>Article 2. User States</i>	91	166
<i>Article 3. User agreements</i>	91	166
<i>Article 4. Definitions</i>	91	166
C. Parties to user agreements	92-110	167
<i>Article 5. Parties to user agreements</i>	101	169
<i>Article 6. Relation of these articles to user agreements</i>	101	169
<i>Article 7. Entry into force for an international watercourse</i>	109	171
IV. Regulation of data collection and exchange	111-136	171
A. Data collection	112-127	171
<i>Article 8. Data collection</i>	123	175
B. Data exchange	128-133	176
<i>Article 9. Exchange of data</i>	131	176
C. Costs of data collection and exchange	134-136	177
<i>Article 10. Costs of data collection and exchange</i>	134	177

* Incorporating document A/CN.4/320/Corr.1.

ABBREVIATIONS

ECE Economic Commission for Europe
 ILA International Law Association

UNEP United Nations Environment Programme
 UNITAR United Nations Institute for Training and Research

Introduction

1. This report contains four chapters. Chapter I is introductory and deals with the nature of the subject, suggesting distinguishing factors that call for its singular treatment. Chapter II summarizes salient aspects of the history of the treatment of the subject to date, particularly by the Commission, and addresses the scope of the draft articles. Chapter III discusses the utility of user agreements as a means of affording States immediately concerned with a particular international watercourse the possibility of undertaking detailed obligations that are calibrated to the particular characteristics of that watercourse, but within the framework of the draft articles. Chapter IV addresses one fundamental area of obligations which both the draft articles and user agreements entered into pursuant to them should contain, that of collection and exchange of data. It also considers cost sharing in respect of data collection and exchange. Subsequent reports will be required which will take up other elements of what may come to be a set of draft articles on the subject of non-navigational uses of international watercourses. Those elements might well include articles on:

Categories of uses (such as domestic or "consumptive" uses, irrigation, power, industrial uses other than power, fish and other aquatic food production, recreation, and timber floating);

Specialized problems (such as flood control, erosion, sedimentation, salt water intrusion and perhaps drought);

The interrelationship among categories of uses and among specialized problems;

Institutional arrangements for the co-operative use of international watercourses; and

Settlement of disputes.

Problems of pollution would be addressed in connection with particular uses.

2. It may be useful at the outset to set forth the draft articles which the Special Rapporteur invites the Commission to consider initially.

Draft articles on the non-navigational uses of international watercourses

Article 1. Scope of the present articles

1. The present articles apply to the uses of the water of international watercourses, and to associated problems such as flood control, erosion, sedimentation and salt water intrusion.

2. The use of the water of international watercourses for navigation is embraced by these articles in so far as provisions of the articles respecting other uses of water affect navigation or are affected by navigation.

Article 2. User States

For the purposes of these articles, a State which contributes to and makes use of water of an international watercourse shall be termed a user State.

Article 3. User agreements

The present articles may be supplemented by user agreements among user States.

Article 4. Definitions

For the purposes of the present articles:

1. "Contracting State" means a user State party to these articles which may or may not be party to a user agreement.
2. "Co-operating State" means a user State party to a user agreement which is not party to these articles.
3. "Non-contracting State" means a user State which is not party either to these articles or to a user agreement.

Article 5. Parties to user agreements

A user State not party to these articles may be party to a user agreement provided that one or more user States parties to the user agreement are parties to these articles.

Article 6. Relation of these articles to user agreements

1. A user agreement shall be entered into within the framework of these articles.
2. These articles shall apply to States parties to a user agreement with respect to matters not regulated by the user agreement.

Article 7. Entry into force for an international watercourse

These articles shall enter into force for an international watercourse on the thirtieth day following the deposit of the second instrument of ratification or accession by a user State.

Article 8. Data collection

1. A contracting State shall collect and record data with respect to precipitation and evaporation of water and with respect to the stage of flow, mean velocity and abstraction of the water of an international watercourse in its territory as follows

- (a) ... (to be completed)
- (b) ... (to be completed)
- (c) ... (to be completed)
- (d) ... (to be completed)

...

2. Each contracting State shall employ its best efforts to collect and record data in a manner which facilitates co-operative utilization of the data by contracting and co-operating States.

3. User agreements may provide for the collection of such additional data, notably in respect of water quality and water-related disease, as may be significant for development, use and

environmental protection of the international watercourse. They may specify the method of data collection and the nature of the records to be employed.

Article 9. Exchange of data

1. Data collected under the terms of paragraphs 1 and 2 of article 8 of these articles shall be made available to contracting and co-operating States at regular intervals of . . .

2. Contracting and co-operating States shall use their best efforts to comply with requests from contracting and co-operating States for special data (data not included in the provisions of article 8, paragraph 1) and with requests from contracting and co-operating States for data collected prior to the entry into force of these articles for the contracting State requested or to the entry into force of the user agreement for the co-operating State requested.

3. User agreements may regulate additional aspects of data exchange.

Article 10. Costs of data collection and exchange

1. Costs of the collection and exchange of data pursuant to article 8, paragraph 1, and article 9, paragraph 1, shall be borne by the State providing the data.

2. The requesting State shall bear the costs incurred by the requested State in fulfilling a request for special data, as defined in

article 9, paragraph 2, and in making available data collected prior to:

(a) the entry into force of these articles for the contracting State requested, or

(b) the entry into force of the user agreement for the co-operating State requested.

3. User agreements may provide for different or additional cost provisions relating to the collection and exchange of data.

3. Any successor special rapporteur is necessarily indebted to predecessor special rapporteurs. In this case, however, the debt owed by the current Special Rapporteur is exceptional. For this report in large measure derives from work that Mr. Richard D. Kearney, the first Special Rapporteur of the Commission on this subject, performed under the auspices of the American Society of International Law. The Special Rapporteur is most grateful to him and to his research assistant, Miss Janice Callison.¹

¹ He also wishes to express his appreciation to the American Society of International Law and to the members of a working group on environmental aspects of international watershed management convened by it.

CHAPTER I

Nature of the topic

4. The preparation of draft articles on the law of the non-navigational uses of international watercourses is a subject of a different nature from that of those currently under consideration by the Commission. The simplest explanation of the difference is that the subject-matter of international watercourses deals with a physical phenomenon that is unique. If water did not possess special qualities, it would not require a special legal régime. These qualities are actual, not abstract.

5. The subject-matter of the law of State responsibility, by way of contrast, is an abstraction; the State is a legal conception of such complexity that the Commission has not attempted to define it. The object of the study is equally abstract: to determine what principles should apply in the allocation of responsibility to a State for wrongful acts that have produced effects with respect to other States.² Similarly, the recently adopted Vienna Convention on Succession of States in Respect of Treaties³ is almost completely

conceptual in character. It provides rules to govern the effects upon treaties between States of the replacement of one State by another in responsibility for a territory's international relations. The physical existence of a document embodying a treaty is of course a reality. So is the physical existence of the territory to which it applies. However, the physical features of the territory do not play a part in defining the content of the treaty's rules. These examples could be multiplied.

6. It is necessary in the work of the Commission to go back to the Conventions on the Law of the Sea⁴ to find a topic in which the legal content was as directly affected by the physical character of the subject-matter as it will be in the draft articles on uses of the water of international watercourses. The parallelism is obvious. The basic subject—water—is the same, although there are real differences between sea water and sweet water. The basic objective is identical: to lay down rules that govern uses of water by States. And, in both cases there must be a certain similarity of approach, that is

² For the text of the draft articles on State responsibility adopted by the Commission up to 1978, see *Yearbook . . . 1978*, vol. II (Part Two), pp. 78 *et seq.*, document A/33/10, chap. III, sect. B, 1.

³ *Official Records of the United Nations Conference on Succession of States in Respect of Treaties*, vol. III, *Documents of the Conference* (United Nations publication, Sales No. E.79.V.10), p. 185.

⁴ Convention on the High Seas (United Nations, *Treaty Series*, vol. 450, p. 11); Convention on the Territorial Sea and the Contiguous Zone (*ibid.*, vol. 516, p. 205); Convention on Fishing and Conservation of the Living Resources of the High Seas (*ibid.*, vol. 559, p. 285); Convention on the Continental Shelf (*ibid.*, vol. 499, p. 311).

to say, in the law of the sea there has been, and in the law of international watercourses there must be, conceptualization and formulation of legal principles that respond to the nature of water and to physical facts respecting it.

7. It may indeed be that there is much in the experience of the Commission and in the First, Second and Third United Nations Conferences on the Law of the Sea that will be instructive to an effort at codifying the law of non-navigational uses of international watercourses. The Commission is fortunate to embrace in its current membership a number of the world's leading experts in the law of the sea, distinguished lawyers who have contributed greatly to the conception, negotiation and formulation of what at this writing is the Informal Composite Negotiating Text of the Third United Nations Conference on the Law of the Sea.⁵ From their rich experience, they may well be able to bring to bear lessons on questions such as the responsiveness of the codification process to physical realities, the generality and specificity of such responses, and the degree to which use by many States of inevitably interacting resources requires that the product of the codification process embody co-operative principles and procedures.

Some salient characteristics of water

8. In view of the ineluctable impact that the nature of water must exert on any codification of the law of international watercourses, it may be desirable, by way of introduction, to summarize the fundamental distinguishing physical characteristics of water. Water flowing in rivers has for present purposes three salient aspects: (a) the hydrologic cycle, (b) self-purification, and (c) variations in quantity and flow. These will be touched upon in turn.

A. The hydrologic cycle

9. The movement of water through a watercourse is one phase of the operation of what is known as the hydrologic cycle. Discovery of the nature of the operation of this cycle is a relatively recent event in human history when viewed in the light of the very long record of man's effort to control river systems. The earliest appearances of civilization centred upon rivers, among them the Nile of Egypt, the Tigris and Euphrates of Mesopotamia, the Indus of India, the Yellow River of China and the river valleys of Persia and Peru. Yet, during the some 6,000 years when elaborate river control methods were developed by these and other societies, explanations of the nature of

the phenomenon being controlled remained relatively unsophisticated and rested largely upon conjecture, mythology and religious conviction.

The idea of a complete cycle—that water evaporated from the sea and land, was drawn into the atmosphere, fell as rain and snow, sank into the earth to reappear in watercourses, and then drained back into the sea—had attracted brilliant men over the years, but it could not be proved at that time and therefore was not generally accepted. With the development of modern science in the 16th and 17th centuries, however, attention was directed again and again to what seemed to be the cyclical pattern of all nature: Newton's law that for every action there must be a reaction, the recirculating blood system demonstrated by Harvey, the planetary orbits postulated by Copernicus. These rules of balance and repetition had been established by close observation and careful measurement. It was only natural, then, to seek a similar balance in the world's water supply and to seek it with similar techniques.

In the mid-17th century, two French scientists individually attacked the puzzle of the rivers. Each—Pierre Perrault first and Edme Mariotte a little later—measured the precipitation in the watershed of the Seine and then measured the river's rate of discharge, i.e. the amount of water it poured into the ocean in a given time. Their measurements, although crude, proved that, contrary to ancient belief, precipitation alone could account for the river's flow. Moreover, enough water would remain to supply the springs and wells. Mariotte went a step further; he showed that rain deeply infiltrated the ground wherever it fell, seeping downward through porous soil until it reached impermeable material.

Another essential factor in the distribution cycle—the origin of rain and snow—remained to be proved. Shortly after Perrault and Mariotte completed their investigations, the English astronomer Edmond Halley showed that the earth's precipitation was of such magnitude that it could be balanced by evaporation: the evaporation from a large body of water was of an order of size equal to the amount it regained from the rivers that flowed into it. The key to Halley's discovery was the determination of the rate of evaporation.

The concept of a hydrologic cycle unravelled the ancient riddle of water. Man could now understand that the water going out from the surface of the earth must come back in equal amount—a perpetual cycle with no beginning, middle or end.⁶

10. The nature of the hydrologic cycle is simplicity itself once it becomes apparent that, on a world basis, water leaving the land mass of the earth returns in an equal amount. This process goes on in an unbroken pattern. Variations in the patterns of departure and return occur continuously and universally, but as far as water is concerned whatever goes up comes down. Moreover, the cycle operates at a fairly rapid pace: once every 12 days practically all the water in the air falls and is replaced.⁷

11. There is substantial expert opinion that about 500 Tm³ of water are taken up and returned to earth each year (one Tm³ (tera cubic metre) equals 1,000,000,000,000,000 litres). The quantity taken up from the sea is about 420 Tm³, while the amount taken up from the land is about 80 Tm³. However, of the

⁵ See *Official Records of the Third United Nations Conference on the Law of the Sea, Sixth Session*, vol. VIII, *Informal composite negotiating text* (United Nations publication, Sales No. E.78.V.4), document A/CONF.62/WP.10.

⁶ L.B. Leopold and K.S. Davis, *Water* (New York, Time, 1966), pp. 38–39.

⁷ *Ibid.*, p. 39.

amount precipitated back to the earth as rain, hail or snow, 380 Tm³ fall over the seas and 120 Tm³ over the land. This means that some 40 Tm³ which fall upon land do not evaporate but instead make their way to the sea to replace the 40 Tm³ of sea water which is precipitated upon land in the course of the year.⁸ It is these 40,000,000,000,000,000 litres of water that form international watercourses and are the subject of this report.

12. Water falls to the earth in various forms of precipitation, with four results:

- (1) some water will be intercepted by vegetation and will never reach the ground;
- (2) some will remain on the earth's surface, dampening the soil or forming pools;
- (3) a proportion will seep directly into the soil;

(4) the balance will form streams and begin to flow to lower ground. When precipitation stops, the water lying on vegetation and any remaining as mist in the lower atmosphere or lying in pools on the ground will begin to evaporate again. Where streams have been formed, these will flow into rivers, the water discharging eventually into lakes or the sea. And all the time a certain amount of water lying in pools or lakes, or flowing in rivers, will seep into the earth and percolate slowly down until it reaches the water table, the natural level of free groundwater. This water, prevented from percolating still lower by a watertight geological layer, will now tend to flow horizontally through the subsoil until it reaches land at a lower altitude, where it may reappear as a spring or artesian well, or flow from below the surface into a lake or even into the sea. Where groundwater appears above the surface, new streams are formed and the water resumes its journey overland to the sea.

But gravity is not the only force at work here. Some groundwater is drawn above the water table through the interstices (fine interconnecting spaces) in the soil by capillary action. Together with moisture percolating from above or held in the soil by molecular attraction, it may then be absorbed into the roots of vegetable matter and conveyed up into the leaves. The transpiration by the leaves returns the water, as vapour, to the atmosphere. Water that precipitates as ice or snow may remain temporarily immobile where it falls on the earth's surface. But most of this, too, will eventually reach the sea in the form of glaciers, or via rivers when it melts. Some of the melted ice and snow will seep into the ground, some will evaporate.⁹

13. The following summary of the activities of water that constitute the hydrologic cycle evidences water's unending mobility:

It is never still. The apparently inert tumblerful that stands beside a dinner plate may simultaneously convert ice cubes into liquid, release tiny amounts of vapour into the air above it, and condense vapour into droplets on its smooth glass sides. This is the fidgety world of water in microcosm. Projected into a grand global scale, all 326 million cubic miles of this active substance are constantly responding to a complex of mighty natural forces—the rotation of the earth, the radiant heat of the sun, and the gravitational effects of the earth and its companions in the solar system. Added to these forces are the effects of surface irregularities—the mountains, valleys and plains on the continents and oceans' basins—the shifting, changing, fickle nature of gaseous, solid and liquid water.

In one vitally important respect, however, water's behaviour is steadfast: the total supply neither grows nor diminishes. It is believed to be almost precisely the same now as it was 3 billion years ago. Endlessly recycled water is used, disposed of, purified and used again. Last night's potatoes may have boiled in what was, ages ago, the bath water of Archimedes. And while the idea of using "used" water may at first repel a hygienic civilization, the knowledge that the world supply of this vital substance cannot be depleted should offer comfort.¹⁰

14. The role of the watercourse in the cycle is the channelling of surface water and some groundwater to the sea. Considered together, surface water and groundwater are called "runoff". Surface flow, however, consists of three parts: channel precipitation, overland flow and interflow.

15. Channel precipitation is the fall of rain, etc., directly upon watercourses. Normally, it is a very small proportion of total runoff because of the limited catchment area, except in such unusual cases as the Great Lakes, and because of the effects of "evapo-transpiration" which refers to the processes of both evaporation (absorption of water into the atmosphere from inorganic surfaces) and transpiration (absorption of water into the atmosphere from the leaves of plants). Overland flow is water that does not infiltrate the ground surface but travels overground to reach a stream channel. It results when saturation or freezing prevent water from penetrating the earth.

16. Interflow is

water which infiltrates the soil surface and then moves laterally through the upper soil horizons towards the stream channels, either as unsaturated flow or, more usually, as shallow perched saturated flow above the main groundwater level . . . It is also called storm flow, storm seepage, and secondary base flow.¹¹

Available evidence indicates that interflow may account for up to 85 per cent of total surface runoff.

17. While surface runoff is the most visible source of moisture for watercourses, it is less important than groundwater, which is believed to constitute 97 per cent of the water on earth, excluding oceans, ice-caps and glaciers. As the following quotation reveals, however, the significance of groundwater lies also in the steady nature of its flow:

Most of the rainfall which percolates through the soil layer to the underlying groundwater will eventually reach the main stream channels as groundwater flow through the zone of saturation. Since water can move only very slowly through the ground, the outflow of groundwater into the stream channels may lag behind the occurrence of precipitation by several days, weeks, or often years. Groundwater flow also tends to be very regular, representing as it does the overflow from the slowly changing reservoir of moisture in the soil and rock layers. It must not be inferred from this that groundwater may not show a rapid response to precipitation. Indeed, the push-through mechanism of transitory flow frequently results in a rapid response of groundwater flow to precipitation during individual storm periods, and especially on a seasonal basis. Since transitory flow can only operate in moist soil and subsoil conditions, however, the

⁸ M. Overman, *Water: solutions to a problem of supply and demand* (Garden City, N.Y., Doubleday, 1969), p. 36.

⁹ *Ibid.*, pp. 33–34.

¹⁰ Leopold and Davis, *op. cit.*, p. 33.

¹¹ R. C. Ward, *Principles of Hydrology*, 2nd ed. (London, McGraw-Hill, 1975), p. 240.

replenishment of large moisture deficits created, particularly during summer conditions, may result in a considerable lag of groundwater outflow after precipitation during and immediately following prolonged dry periods. In general, groundwater flow represents the main long-term component of total runoff and is particularly important during dry spells where surface runoff is absent.¹²

18. Because groundwater is usually not visible, there are understandable misconceptions about it. In nature and movement, it is subject to the same physical laws and has the same properties as water on the surface or in the air. Like fresh water elsewhere, a major characteristic is that it remains in motion, as the following exposition makes clear:

The outermost surface of the earth is composed largely of porous, fairly loose material, principally sand, gravel, silt and decayed vegetation. Most of this surface is underlain by porous rock such as sandstone and limestone. Beneath this everywhere is bedrock, so compact, as a result of molten origin or of subsequent heat and pressure, that it is totally impermeable. All layers above this impermeable base rock hold groundwater. The layers are classified by water content into two regions: the zone of aeration and the zone of saturation.

Seeping below the surface, water first enters the zone of aeration, a transition level where the earth contains both water and air. Its depth varies widely, from an inch or less near the edge of a swamp to hundreds or thousands of feet elsewhere. In this zone, water shows its powers of adhesion by clinging to particles of soil and rock. The amount held in the pore spaces by this molecular attraction fluctuates widely and rapidly. Immediately after a rainstorm, the zone of aeration may be surfeited with water; shortly after, it may contain little; during a prolonged drought, it may contain almost none at all. Some water that enters this region sinks through to the layers beneath; some is absorbed by plants or evaporates into the air. The zone of aeration ends in a moist region called the capillary fringe. It contains water lifted from the still lower zone of saturation by capillary action. Its depth depends upon the diameter of the soil's pores: if the pores are relatively large, little water will be drawn up and the belt will be narrow; but if they are fine-pored and continuous, water may climb as high as eight feet. Sometimes, though not often, this fringe reaches all the way to the surface.

The lower moist layer, comprising the zone of saturated earth, forms a principal water resource. Wells dip into it; springs, rivers and lakes are its natural outcroppings on the surface of the globe. Water seeping downward can go no further; every pore, crack and interstice is filled. The top of the saturation zone—the boundary between it and the capillary fringe—is called the groundwater-table, or simply the water-table. The water glinting at the bottom of a shallow well is an exposed part of the water-table. Around it and continuous with it, the same water-table extends—whether exposed or not—above the ground or in it. The surfaces of lakes and rivers are also exposures of the water-table and, to a hydrologist's eye, blend with the water-table into the landscape.

The changing elevations in the earth's water-table are revealed by its surface waters. Some lakes are higher than others. Streams run downhill. The water-table, which must connect them all, also slopes. Its contours reflect in part the landscape above it; it is high under mountains and dips toward river valleys. Occasionally, the surface contour drops more sharply than the water-table beneath it. It cuts into the water-table and exposes saturated earth so that water issues forth: a spring. If a wide swath of the land's surface dips beneath the water-table, a lake or swamp occurs. Across the lowest dip of a valley the water-table supplies a river. In fact, a

river's channel is often a continuous spring that sustains the river's flow under sunny skies when no rain falls.

One of the factors influencing the contour of the water-table is the contour of the land above it. This connection is best seen in an idealized landscape: a low and gently sloping hill with a river valley on either side, all underlain by homogeneous porous material. As rain falls and seeps downward, water accumulates underground at the base of the porous material. The water-table rises uniformly . . . It remains essentially flat until, as more rain falls, it rises so far above the base that it reaches the lowest portions of the two valleys. It will now seep out into the valleys and fill those channels.

Thereafter, groundwater feeds into the two rivers. As rain continues to fall on the hills, it soaks the earth, seeps down to the aquifer and—since the aquifer is now higher than the valley—seeps out the sides of the hill.¹³

19. Under certain geologic conditions, groundwater may be confined between impervious layers of rock. Such aquifers, like the one stretching across the Sahara desert from Libya to the Atlas mountains, can be very large. Confined aquifers are rare, however:

Water does not usually remain stationary in the aquifers but flows from the charging areas either to areas of natural discharge, such as springs, swamps, ponds, and lakes, or to wells . . . Water has been known to move 300 miles or more in these underground strata, although the usual distances range from 5 to 100 miles. The lowering of the water level in an aquifer through well pumping does not necessarily mean that the water supply is being permanently reduced, in the sense that less remains available for future generations. On the contrary, a local lowering of the water level often causes increased flow through the strata and decreased waste in the charging and discharging areas. However, if the local lowering reduces the hydraulic level much below sea level in coastal areas, there may be danger of contaminating fresh water with saline water. This is especially true if impenetrable strata covering the aquifer have been pierced near the sea by artificial harbours or abandoned wells. Even without such penetration, contamination may occur because in coastal areas there may be hydraulic continuity of fresh water bodies . . .¹⁴

20. The replacement of groundwater is a complicated process. An illustration of some aspects of the problem may be worthwhile:

In the final analysis, virtually all groundwater owes its existence, directly or indirectly, to precipitation. In detail, however, the main components of groundwater recharge are: (a) infiltration of part of the total precipitation at the ground surface; (b) influent seepage through the banks and bed of surface water bodies such as ditches, rivers, lakes, and even oceans; (c) groundwater leakage and inflow from adjacent aquicludes [a geologic formation or stratum that confines water within an adjacent aquifer] and aquifers; and finally (d) artificial recharge from irrigation, reservoirs, spreading operations, and injection wells.

(a) In general terms, the proportion of precipitation infiltrating the water-table depends largely on characteristics of the precipitation itself, topography, vegetation characteristics, and on the type and structure of the soil and the underlying rocks . . .

(b) Where groundwater occurs in direct contact with surface water bodies such as lakes, ponds, and streams, there will normally be a movement of water between the two water bodies. Either flow will take place from the stream to the groundwater

¹³ Leopold and Davis, *op. cit.*, pp. 56–57.

¹⁴ J. H. Hirschleifer, J. C. DeHaven and J. W. Milliman, *Water Supply* (Chicago, Ill., Univ. of Chicago Press, 1960), p. 10.

¹² *Ibid.*, p. 241.

body, in which case it is known as *influent seepage*, or the reverse movement, *effluent seepage*, will occur, in which case groundwater seeps into and adds to the volume and flow of the surface water body. The seepage relationship between surface and underground water is seldom static, but changes with the changing levels of, say, a stream and the adjacent water-table so that, in a matter of a few hours, influent seepage may supersede effluent and then, in turn, be replaced once more by the latter.¹⁵

21. Despite problems in collecting data regarding groundwater under varying hydrologic and geologic conditions, there can be no doubt that groundwater is an integral and vital part of the unbroken cycle of movement through which the supply of fresh water is continually replenished. If, in some manner, the movement of groundwater were to come to a halt, the quantity of water in watercourses would be reduced drastically. Many perennial surface streams would become intermittent, or even dry up altogether. Accordingly, the contribution of groundwater to watercourses must be taken into account in framing principles to govern the uses made of watercourses. At an elementary level, the amount of groundwater moving into an international watercourse has to be included in calculating the total volume of flow of the watercourse. At the level of water resources management, it is necessary, in framing principles regarding the use of water, to give consideration to the effects of a contribution of groundwater to a watercourse. It is necessary to consider as well the effects of the existence of available reserves of groundwater, and of the contribution of water flowing in watercourses to the quantity of groundwater.

B. Self-purification

22. A second, paramount quality of water, in the hydrologic cycle, is its ability to cleanse itself. The water flowing in rivers and streams is capable of self-purification in two ways. First, it is able to disperse wastes either through its flowing motion, which dissolves waste particles or causes them to break up and settle at the river bottom, or through the supply of fresh water that continually enters the watercourse. Secondly, oxygen reacts chemically with wastes to convert them into harmless substances or acts as host to bacteria which consumes sewage and other organic wastes. However, the supply of oxygen absorbed by a river from the air or from plants can be exhausted; when an overload of waste enters the stream, the river may become unable to purify itself.

23. Groundwater is able to perform these two functions to a lesser degree. Its more sluggish movement, for example, limits its ability to dissolve wastes or break up particles of waste matter. Similarly, its stock of oxygen is less renewable. Moreover, water that has been trapped deep within the earth for millenia is unusable for most purposes. The effects of

its existence under the pressure and heat typical of the inner layers of the earth and of its contact with mineral substances have combined to saturate it with dissolved salts.

C. Quantity and flow of water

24. As a resource, one of water's most extraordinary characteristics is its limited but forever renewable quantity. Like almost all resources, the fixed amount of fresh water in watercourse systems is unevenly distributed throughout the world. Therefore, even though the total supply of fresh water may well be sufficient for current human needs, there have always been large deficiencies of water in many regions and large excesses in others. The factors having an impact upon the quantity of water flowing in a watercourse system lend themselves to categorization into three divisions: meteorological, catchment and human.¹⁶

25. Meteorological factors determine the maximum amount of runoff for any given catchment area at any given time. The rate of evapotranspiration is a function of "solar radiation, temperature, humidity, windspeed and barometric pressure".¹⁷ The release of precipitation, on the other hand, varies according to the type of moisture: snow is able to store water for later release, while hail and sleet are similar to rain and release moisture rapidly.¹⁸

26. A broad range of variables are considered catchment factors. The slope of the catchment area has an impact upon the speed with which water travels and hence upon its percolation through the soil. A catchment area's shape generally corresponds to a precise drainage pattern, with recognizable consequences for the flow of runoff; the tributaries of a square drainage basin tend to join at the basin's centre, and runoff results in a rapid increase in the quantity of water in the main stream; the tributaries of an elongated basin are normally relatively short, join the main stream at different intervals, and lead to the discharge of runoff from lower streams before that from the upper reaches. A final feature is the orientation of the catchment area. An orientation towards the sun, for example, increases evaporation or speeds melting.¹⁹

27. Rock and soil type, as well as vegetative cover and the drainage network, are additional catchment features. The former is determinative of the porosity of the earth and has a major impact upon its absorptive capacity, while the presence of vegetation impedes water's ability to flow over the land and aids the process of infiltration. Vegetation also has an impact

¹⁵ Ward, *op. cit.*, pp. 193-194.

¹⁶ *Ibid.*, pp. 324-346.

¹⁷ *Ibid.*, p. 330.

¹⁸ *Ibid.*, pp. 326-329.

¹⁹ *Ibid.*, pp. 330-333.

through evapotranspiration, even though generalizations about its effect are difficult due to the role played by other factors, such as temperature, wind and humidity, in determining the amount of evapotranspiration that will take place. The distribution of streams in regional drainage networks contributes to the efficiency of runoff removal. Efficient—i.e. rapid—runoff removal intimates short surface flow. When surface runoff must travel a long distance to reach a stream, as it must in a poorly drained basin, greater opportunity for penetration of the soil arises and groundwater runoff is potentially increased.²⁰

28. The quantity of water in a watercourse reflects seasonal variations in flow. A pattern of seasonal changes is called the régime of a river; comparison of river régimes has produced three classifications,²¹ which need not be pursued at this juncture

29. Although fresh water is a renewable resource, it is within man's capability so to upset the order of nature that the hydrologic cycle can no longer produce "sweet water". The report of the United Nations Water Conference (1977) lists some of the activities that may affect water in the cycle:

Large-scale water-development projects have important environmental repercussions of a physical, chemical, biological, social and economic nature, which should be evaluated and taken into consideration in the formulation and implementation of water projects. Furthermore, water-development projects may have unforeseen adverse consequences affecting human health in addition to those associated with the use of water for domestic purposes. Water pollution from sewage and industrial effluents and the use of chemical fertilizers and pesticides in agriculture is on the increase in many countries. It is also recognized that control measures regarding the discharge of urban, industrial and mining effluents are inadequate. Increased emphasis must be

given to the question of water pollution, within the over-all context of waste management.²²

30. The list of human activities that have a substantially adverse effect upon the hydrologic cycle also includes deforestation, acid rain, the transformation or removal of vegetative cover and the reduction of the number of absorptive surfaces through urbanization. The following opinion has been offered as an analysis of modern flooding and is indicative of the extent of man's potential role:

Any increase in the severity of floods is therefore likely to be caused by increased rainfall intensities, reduced infiltration capacities, or the changed efficiency of the drainage network. There is no evidence to suggest that storms are increasing in intensity; but the effects of urbanization in reducing infiltration capacities have already been noted and, in addition, such factors as forest clearance and the burning, accidentally or otherwise, of large areas of peat moorland must also be taken into account. Finally, the efficiency of drainage channels is likely to be impeded by bridges, levees, flood walls, and similar structures, and although the individual effect of each may be small, their combined effect in large built-up areas may be surprisingly significant.²³

31. It merits repeating that water is a unique substance. The characteristics described—constant in quantity, self-purifying, but varying in flow—contribute to water's singular nature in many ways. Because of its atomic structure, it is a solvent of great efficacy, able to dissolve about half of all chemical elements. It has enormous capacity to absorb heat, and is consequently an immense source of energy when it releases heat. Such qualities play an integral part in the various uses to which water can be put, and must necessarily be considered in connection with its various uses. For the purposes of this introduction, it is sufficient to reiterate that physical facts have to be recognized in deciding what rules should be established among nations respecting the use of fresh water.

²⁰ *Ibid.*, pp. 333–343.

²¹ *Ibid.*, pp. 348–352.

²² *Report of the United Nations Water Conference* (United Nations publication, Sales No. E.77.II.A.12), recommendation C, para. 34.

²³ Ward, *op. cit.*, p. 346.

CHAPTER II

Uses of international watercourses

32. By its resolution 2669 (XXV) of 8 December 1970, the United Nations General Assembly recommended that the Commission take up the study of the law of the non-navigational uses of international watercourses. The Commission placed the subject on its work programme at its twenty-third session, in 1971. By the same resolution, the General Assembly also requested the Secretary-General to bring up to date his report of 1963 entitled "Legal problems relating to the utilization and use of international

rivers".²⁴ The supplementary report by the Secretary-General entitled, "Legal problems relating to the non-navigational uses of international watercourses"²⁵ was made available to the Commission for consideration at its twenty-sixth session, in 1974.

²⁴ *Yearbook ... 1974*, vol. II (Part Two), p. 33, document A/5409.

²⁵ *Ibid.*, p. 265, document A/CN.4/274.

33. At its twenty-sixth session, the Commission appointed a Sub-Committee on the law of the non-navigational uses of international watercourses, composed of Mr. Kearney (Chairman), Mr. Elias, Mr. Šahović, Mr. Sette Câmara and Mr. Tabibi,²⁶ to prepare proposals regarding the action to be taken respecting the request of the General Assembly. The Sub-Committee submitted a report²⁷ that proposed the submission of a questionnaire, to States regarding the scope of the proposed study; the uses of water to be considered, and whether the problem of pollution should be given priority; the need to deal with flood control and erosion problems; and the interrelationships between navigational uses and other uses.

34. The questionnaire contained, among other questions, three regarding the definition of "international watercourses" for the purpose of the study;

- (a) What would be the appropriate scope of the definition of an international watercourse, in a study of the legal aspects of fresh water uses, on the one hand and of fresh water pollution on the other hand?
- (b) Is the geographical concept of an international drainage basin the appropriate basis for a study of the legal aspects of non-navigational uses of international watercourses?
- (c) Is the geographical concept of an international drainage basin the appropriate basis for a study of the legal aspects of the pollution of international watercourses?²⁸

The Sub-Committee report, in proposing those questions, noted that the International Law Association, at its Helsinki Conference of 1966, had prepared a set of articles on the Uses of the Waters of International Rivers (Helsinki Rules)²⁹ based on the concept of the "international drainage basin". The term is defined in article II of the Helsinki Rules as follows:

An international drainage basin is a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus.

35. The questionnaire was submitted to States, and the Commission reviewed the answers made by States to the questions it contained at its twenty-eighth session in 1976 on the basis of a report submitted by Mr. Kearney the Commission's first Special Rapporteur for the subject.³⁰ This report stated that considerable differences had been expressed by States regarding the use of the geographical concept of the international drainage basin as the appropriate basis for the proposed study, both with respect to uses and

with respect to the special problems of pollution. Such differences were found as well in the views expressed by members of the Commission in the debate upon the Special Rapporteur's report.³¹ A consensus emerged that the question of determining the meaning of the term "international watercourses" need not be pursued at the outset of the Commission's work. The pertinent paragraphs of the report of the Commission to the General Assembly state:

This exploration of the basic aspects of the work to be done in the field of the utilization of fresh water led to general agreement in the Commission that the question of determining the scope of the term "international watercourses" need not be pursued at the outset of the work. Instead, attention should be devoted to beginning the formulation of general principles applicable to legal aspects of the uses of those watercourses. In so doing, every effort should be made to devise rules which would maintain a delicate balance between those which were too detailed to be generally applicable and those which were so general that they would not be effective. Further, the rules should be designed to promote the adoption of régimes for individual international rivers and for that reason should have a residual character. Efforts should be devoted to making the rules as widely acceptable as possible, and the sensitivity of States regarding their interests in water must be taken into account.

It would be necessary, in elaborating legal rules for water use, to explore such concepts as abuse of rights, good faith, neighbourly co-operation and humanitarian treatment, which would need to be taken into account in addition to the requirements of reparation for responsibility.³²

36. The other issues raised by the questionnaire did not result in any substantial differences among States or among the members of the Commission. The suggested outline of uses of water was approved, subject to appropriate revision in the light of State comments. Questions of flood control, erosion problems, sedimentation and the interaction between the use of international watercourses for navigation and for other uses should be addressed by the Commission. From the standpoint of methodology, specific pollution problems should be taken up in the context of the uses that occasioned pollution.³³ The General Assembly, in its resolution 31/97 of 15 December 1976, on the 1976 report of the Commission, noted with appreciation the work done on the law of the non-navigational uses of international watercourses and recommended that the Commission should continue its work on the subject. The recommendation was subsequently reiterated by the General Assembly in resolutions 32/151 of 19 December 1977 and 33/139 of 19 December 1978.

37. The replies of States to the questionnaire and the debate in the Commission are revealing of the positions that must be taken into account in framing principles regarding the uses of international watercourses. As noted, the questions that gave rise to substantial—even

²⁶ *Ibid.*, vol. II (Part One), p. 301, document A/9610/Rev.1, para. 156.

²⁷ *Ibid.*, pp. 301 *et seq.*, document A/9610/Rev.1, chap. V, annex.

²⁸ *Ibid.*, p. 302, para. 17.

²⁹ See *Yearbook ... 1974*, vol. II (Part Two), p. 357, document A/CN.4/274, part four, sect. C, 1.

³⁰ *Yearbook ... 1976*, vol. II (Part One), p. 184, document A/CN.4/295.

³¹ *Ibid.*, vol. I, pp. 268–283, 1406th to 1409th meetings.

³² *Ibid.*, vol. II (Part Two), p. 162, document A/31/10, paras. 164–165.

³³ *Ibid.*, para. 166.

striking—differences were the first three, which concerned the meaning and scope of the term “international watercourse”. The 1974 report of the Sub-Committee on the Law of the Non-Navigational Uses of International Watercourses explained the purpose of those questions. Section II of the report, entitled “The nature of international watercourses”, pointed out that a variety of terms had been used in various treaties and in the reports of international organizations and conferences to delimit the geographic area within which rules relating to uses of a specific international watercourse should be applicable. Those terms included “successive international rivers” and “contiguous international rivers”, “river basin”, “international drainage basin”, and “hydrographic basin”. The Sub-Committee concluded that it would be desirable to determine whether agreement on one descriptive term was possible, and accordingly proposed that the questionnaire ask what should be the appropriate scope of the term “international watercourse” in a study that included both the uses and the pollution of fresh water.³⁴

38. The explanation in the Sub-Committee report did not go into the effects that the selection of a particular formula for describing an international watercourse would have upon the development of the draft articles to be considered by the Commission in the course of its work on the subject. Broadly stated, the consequence of choosing a term such as “drainage basin” emphasizes the unitary nature of an international watercourse as a shared common resource, while the use of terms such as “boundary rivers” or “successive rivers” emphasizes the fragmentation of the natural unity of a fresh water system as a consequence of the existence of political boundaries.

39. The unity of a watercourse is based upon the hydrologic cycle—the process, described in chapter I of this report, by which water circulates in a never-ending flow from the land and water surface of the earth to the atmosphere to the earth and back. The basin is an essential part of this process:

The river basin, bounded by its drainage divide and subject to surface and sub-surface drainage under gravity to the ocean or to interior lakes, forms the logical areal unit for hydrological studies. ... Within this framework one can conveniently, for example, draw up a water balance and assess water resources; estimate the probability of the occurrence of extreme events, such as floods and droughts, particularly as they affect reservoir storage and water use by man; and mobilize hydrological information to enable man to manage his water resources more efficiently by knowing when and in what ways it is to his advantage to intervene locally in the hydrological cycle.³⁵

The river basin or, more precisely, the drainage or hydrologic basin, is nature's catchment unit in the complicated process of returning water that falls upon

the land to the sea. In so doing, the basin functions physically as a self-contained unit.

40. This unity has consequences that are of fundamental importance for the development of legal principles regarding international watercourses, as Teclaff points out:

The interaction of drainage, geology, soils, climate, and vegetation within a particular river basin produces an individual relationship between these physical elements different from that in another river basin or another natural unit, but topography, geology, soils, climate, and vegetation do not per se, either separately or together, distinguish the river basin in general as a *type of land area*. The distinguishing feature remains that the waters which the river basin receives tend to drain toward a single outlet and form an interconnected system which is capable of transmitting within itself any disturbance caused by changes affecting water in any part of the basin. The distribution of drainage through a single outlet constitutes an areal unity, the behaviour of the water itself a functional unity. Because it is constituted by the distribution and behaviour of water, the physical unity of the river basin can thus best be described as hydrologic.³⁶

41. The areal and functional unity of a drainage basin suggests that this indivisibility is the proper starting point for the development of principles to govern the uses of fresh water moving through international watercourses. A use in an upstream State, either alone or in combination with other uses, characteristically will have some effect upon the volume, the rate of flow or the quality of the water moving to a downstream State. Sometimes such effects will be large, other times small. In any event, from a scientific and economic—one might even say, from an objective—perspective, use of the “basin” concept for the development of legal rules regarding international watercourses would seem to be the appropriate method of taking into account the interrelationships that apply throughout the entire area that is drained by a river system.

42. There was decided opposition to use of the drainage basin concept as a basis for the Commission's work in the replies of about half of the 25 States that responded to the question.³⁷ An exact determination of States' views on the matter cannot be made, however, owing to the propensity of States to qualify their answers. For example, Canada, in replying to question A, stated that the definition of an international watercourse should be “a body of fresh water which crosses or forms an international boundary”.³⁸ However, it recognized that the work of the Commission might require expansion of the definition and, in its answers to questions B and C, stated that “use of a geographically narrow definition as a starting point

³⁴ *Yearbook ... 1974*, vol. II (Part One), pp. 301–302, document A/9610/Rev.1, chap. V, annex, paras. 7–16.

³⁵ R.J. More, “The basin hydrological cycle”, *Water, Earth and Man*, R.J. Chorley, ed. (London, Methuen, 1969), p. 67.

³⁶ L.A. Teclaff, *The River Basin in History and Law* (The Hague, Nijhoff, 1967), p. 14.

³⁷ See *Yearbook ... 1976*, vol. II (Part One), pp. 147 *et seq.*, document A/CN.4/294 and Add.1, and *Yearbook ... 1978*, vol. II (Part One), pp. 253 *et seq.*, document A/CN.4/314.

³⁸ *Yearbook ... 1976*, vol. II (Part One), p. 153, document A/CN.4/294 and Add.1, section II.

would not preclude consideration of a natural drainage basin ... where the circumstances of the case so require.”³⁹

43. Most of the States that rejected adoption of the drainage basin concept expressed the belief that the study of the non-navigational uses of an international watercourse should be based on the definition of an international river found in the Final Act of the Congress of Vienna (1815),⁴⁰ i.e. “a river that separates or traverses the territory of two or more States”. Those States included Austria, Brazil, Canada, Colombia, Ecuador, the Federal Republic of Germany, Nicaragua, Poland, Spain and the Sudan. Some of those replies put forward the definition as a traditional, accepted or “classical” one, without reference to the 1815 instrument. For the States that support the 1815 definition, the existence of international boundaries appears to be the paramount factor. For the most part, these States are in an upstream or predominantly upstream position.

44. Correspondingly, most of the States supporting the drainage basin concept are predominantly downstream States. The States that supported adoption of the drainage basin concept included Argentina, Barbados, Finland, Hungary, Pakistan, the Philippines, Sweden, the United States of America and Venezuela, as well, apparently, as the Netherlands. Two of these are island States, which may qualify them for the role of disinterested commentator. While the impartial views of States that do not have an international river problem may, in a sense, be best suited to addressing the problems that arise from the use of international watercourses, a supervening practical deficiency is that no treaty dealing with uses of international watercourses can be put into practical effect solely by island States. Substantial riparian State support is an essential ingredient of any universal treaty on laws on fresh water resources. That fact must give pause to advocates of a drainage basin approach.

45. The comments of States thus suggest that the positions of a State with respect to draft articles on the uses of international watercourses will indeed, and understandably, be influenced by the geographical position of that State on one or more river basins. A State that considers that its major water uses are based upon an upstream position, will, if it is prepared to accept any kind of treaty on the uses of fresh water, be inclined towards one that is limited in scope and effect. A State that considers that its major water uses are based upon a downstream position will be inclined to support a treaty that is broad in scope and that provides protection against overreaching by its upstream neighbours.

46. It is of interest to note that there is a difference in the traditional treatment of successive and contiguous rivers. It was especially marked during earlier stages of watercourse development, when uses were few and did not tax the resource, and before the full implications of the hydrologic cycle were known or its complex interdependencies appreciated, but it has modern illustrations. For example, the Declaration of Asunción on the Use of International Rivers, issued as resolution No. 25 annexed to the Act of Asunción,⁴¹ which was adopted at the Fourth Meeting of the Foreign Ministers of the River Plate Basin States, provides:

1. In contiguous international rivers, which are under dual sovereignty, there must be a prior bilateral agreement between the riparian States before any use is made of the waters.

2. In successive international rivers, where there is no dual sovereignty, each State may use the waters in accordance with its needs provided that it causes no appreciable damage to any other State of the Basin.⁴²

The fact that there are a much greater number of international agreements in effect on uses of boundary waters than on uses of successive international watercourses also reflects this difference in treatment. For present purposes, the consequence to be taken into account is that, regarding the proper scope of treaty provisions, the position a State will take on the uses of boundary watercourses may differ from the position it will take on the uses of successive watercourses.

47. In his first report on the law of the non-navigational uses of international watercourses, the former Special Rapporteur proposed that, for the purpose of drafting articles, the Commission accept “international river basin” as the appropriate meaning of the term “international watercourses”.⁴³ The reasons given in support of his proposal were that current practice as expressed in multilateral treaties dealing with specific rivers was to use the term “river basin”, that the concept of river basin encompassed the interrelationships that existed between the use of water in one part of a river system and the effects that such use might produce in a far distant part of the basin across several intervening national frontiers, and that the consequences of the use of tributaries must be taken into account in framing international law for watercourses.⁴⁴

48. The discussion of that report at the twenty-eighth session of the Commission disclosed a division of opinion in the Commission comparable to that which had appeared in the comments of States. Conspicuous support for the drainage basin concept was not expressed. A number of members expressed strong

³⁹ *Ibid.*, p. 162.

⁴⁰ For the text of the Final Act, see A. Oakes and R. B. Mowat, eds., *The Great European Treaties of the Nineteenth Century [1918]* (repr. Oxford, Clarendon Press, 1970), p. 37.

⁴¹ See *Yearbook ... 1974*, vol. II (Part Two), p. 322, document A/CN.4/274, para. 326.

⁴² *Ibid.*, p. 324.

⁴³ *Yearbook ... 1976*, vol. II (Part One), p. 191, document A/CN.4/295, para. 49.

⁴⁴ *Ibid.*, pp. 190–191, para. 44.

support for adoption of the definition of the Final Act of the Vienna Congress of 1815. There was no particular support for the concept of river basin as equivalent to that of international watercourse, although one or two members indicated a willingness to accept that definition if the Commission were so inclined. Their views were balanced by those upholding the 1815 Vienna definition, who found the concept of river basin almost as unappealing as that of drainage basin.⁴⁵

49. The view of a substantial majority of the Commission was that work on the subject should begin without an effort being made at the outset to draw the limits of that work with any great exactitude. The statements of a few members on that approach give some indication of what the possible parameters might be. Sir Francis Vallat said that:

The question of the definition of the term "international watercourse" had been raised, but he thought the Commission should concentrate on the basically different question of the uses of international watercourses. He shared the view of other members of the Commission, who had stated that it was not the time to try to formulate a definition of an international watercourse, because that endeavour would only hamper the Commission's work unnecessarily. Perhaps after hearing the Commission's discussion, the Special Rapporteur would also be able to agree that the problem of definitions should be left aside for the time being, while the Commission considered the main principles to be applied internationally.⁴⁶

Mr. El-Erian said that:

With regard to the scope of the Commission's work on the topic, the Special Rapporteur appeared to favour the drainage-basin concept, whereas Mr. Sette Câmara had proposed that the Commission should proceed on the basis of existing practice and of the time-honoured and traditional definition of an international watercourse adopted in the Final Act of the Congress of Vienna of 1815. As was pointed out in paragraph 8 of the Special Rapporteur's report, a useful point had been made by the Government of Hungary, which had argued that there was no general geographic term that could be applied to all the legal relations relating to waters that were on the territory of more than one State, and that consequently the need was not to study the meaning of terms, but to consider whether a term was suitable for the regulation of certain legal relations. An equally interesting point had been made by the Special Rapporteur in paragraph 21 of his report when, commenting on the definition adopted by the Congress of Vienna in 1815, he had observed that, "a definition devised for purposes of navigation is not necessarily the best choice for the requirements of the wide range of uses other than navigation". Mr. Ustor had suggested that the Commission should follow the inductive method and should take stock of existing law and practice before proceeding to formulate general rules. In his view, the Commission would be well advised to leave the question open for the time being and content itself with its thorough discussion of the topic, which would provide a basis for eliciting the views of Governments.⁴⁷

Mr. Quentin-Baxter said that, in his view:

... the Commission should not be unduly concerned with the definitional element, that was to say, the question whether the

basic unit for its work should be the international watercourse or the river basin. In their replies to the questionnaire sent to Member States, Governments had shown no inclination to adopt an unduly restrictive approach. For instance, no State had maintained that pollution originating in a tributary which subsequently flowed into an international watercourse was not a source of State responsibility. There were many cases in which two or more States sharing a particular river basin had combined to uphold their common interests, and that process should, and undoubtedly would, continue.

It was clear that, where water lay upon or crossed an international boundary, there was a set of rights and obligations which needed to be developed in particular contexts, according to physical and economic interests. The degree of responsibility did not depend on proximity to the boundary. In the modern world, States would clearly be unwilling to create a condominium over every river basin that crossed an international boundary. They would increasingly be able to provide, however, that the responsibility of the riparian States extended to all that happened in such river basins and that damage or, conversely, increased advantages through development, were matters requiring equitable adjustment.⁴⁸

50. The issue of the scope of the Commission's work on the non-navigational uses of international watercourses came up in the General Assembly's review of the report of the Commission on its twenty-eighth session. A number of States that had not submitted comments to the Commission expressed their views on the subject. That of the representative of Mali was summarized as follows:

It was essential that the Commission should take account of the experience of States in that sphere. He recalled the existence of several State organizations concerned with the non-navigational uses of international watercourses, such as the Organization for the Utilization of the Senegal River and the Mekong Commission. With regard to the Senegal River, he noted the emergence of a new concept: beyond the joint exploitation of the river, the foundations had been laid for co-operation aimed at the integrated development of riparian States under the authority of an institution. At the legal level, the integration of the river went beyond the limits of the river basin and extended to the national territories in their entirety.⁴⁹

The representative of Turkey, however, took a strong contrary position, namely, that the study of international watercourses:

... should be based on certain principles already existing in State practice and on the traditional definition of an international river contained in the Final Act of the Congress of Vienna of 9 June 1815 and reproduced in numerous treaties and conventions. Hydrographic or drainage basins were part of the territory of the State and could not be treated differently from the rest of that territory. Moreover, there could not be two different definitions of the same subject. It was also necessary to specify the interrelation between navigational and other uses.

As watercourses were one of the natural resources of the State, the State exercised full and complete sovereignty over the watercourses within its territory. The physical nature of water could not affect its legal régime; otherwise, the same argument could be used for other liquid natural resources.⁵⁰

⁴⁸ *Ibid.*, p. 280, paras. 6-7.

⁴⁵ For discussion of the report, see *Yearbook ... 1976*, vol. I, pp. 268-283, 1406th-1409th meetings.

⁴⁶ *Ibid.*, p. 275, 1407th meeting, para. 19.

⁴⁷ *Ibid.*, p. 281, 1408th meeting, para. 13.

⁴⁹ *Official Records of the General Assembly, Thirty-first Session, Sixth Committee*, 30th meeting, para. 72; and *ibid.*, *Sessional fascicle*, corrigendum.

⁵⁰ *Ibid.*, 24th meeting, paras. 13-14; and *ibid.*, *Sessional fascicle*, corrigendum.

The representative of Paraguay discussed the topic at some length, noting difficulties that affected decisions regarding the scope of a study of the uses of international watercourses:

With regard to the law of the non-navigational uses of international watercourses, it was his understanding that the term "watercourses" meant fresh water watercourses over which temporary or permanent sovereignty was exercised by two or more States. The notion of temporary sovereignty applied to watercourses which were apt to appear or disappear as the result of natural causes such as thawing or drought. That concept as well as the water-table concept would have to be defined because of their international implications. Such notions as contiguous or successive watercourses and international lakes would also have to be dealt with. Definition problems should, however, be put off until later because they were apt to delay the progress of work.

In view of the rights of States to permanent sovereignty over their natural resources, watercourses which originated and terminated within the territory of a single State must not be regulated by the norms of international law even if they formed part of the regional *divortium aquarum* or of an international hydrographic basin.

In his delegation's opinion, the question of the pollution of international watercourses, which would have to be the subject of a precise hydrographic delimitation, could be dealt with at a later stage of the work on the topic . . .

Referring to the replies of Governments to the ILC questionnaire on international watercourses, he noted that the replies to some questions had been less contradictory than the replies to others. The most contradictory had been the replies to the questions involving notions which had a bearing on the political and the social and economic interests of States. Often, the replies of Governments had been influenced by geographical situation and degree of economic and technological development. Furthermore, as some questions demanded detailed replies, the possibility of different approaches became more pronounced. It was difficult to see how States could arrive at a consensus, at least at the present time, on a definition of the term "international watercourses".⁵¹

The representative of France offered the same advice in more abbreviated form:

Referring to the non-navigational uses of international watercourses, he noted that divergent views had been expressed with regard to the question of geographical scope. Consequently, the Commission should exercise considerable caution in that regard.⁵²

51. In the light of the foregoing differences, caution dictates that article 1 of the draft should be couched in agreed language, substantially identical with the language of General Assembly resolution 2669 (XXV) of 8 December 1970, which requested the Commission to take up the subject. Paragraph 1 of the resolution provides that the General Assembly:

Recommends that the International Law Commission should, as a first step, take up the study of the law of the non-navigational uses of international watercourses with a view to its progressive development and codification and, in the light of its scheduled programme of work, should consider the practicability of taking

the necessary action as soon as the Commission deems it appropriate.

It should not of course be assumed that there was any substantial agreement on the meaning of "international watercourses" in the Sixth Committee at the time the resolution was adopted. Finland had proposed General Assembly item 91, "Progressive development and codification of the rules of international law relating to international watercourses". The explanatory memorandum attached to the Finnish proposal⁵³ for an agenda item suggested that the Commission should be requested to take up the codification of international law relating to international rivers on the basis of the Helsinki Rules. Introducing the item, the Finnish delegation urged that the Helsinki Rules serve as the basis for the study and codification of the law of international watercourses by either the Commission or an *ad hoc* committee. The Helsinki Rules could be regarded as the most up-to-date code now available on the law of international watercourses. The Finnish delegation specifically pointed out that:

... the provisions relating to the equitable use of waters of international drainage basins rested on the coherence principle, formulated by the Austrian lawyer, Mr. Hartig, under which an international drainage basin, whether it belonged to two or several States, was considered to be an integrated whole, the use of which should be shared equitably by the riparian States.⁵⁴

52. A draft resolution was prepared which served as a basis for discussions in the Sixth Committee. The debate centred largely upon whether there should be reference to the Helsinki Rules in the draft resolution. Opposition to a reference to the Helsinki Rules was said to be based upon the undesirability of adopting the product of a single non-governmental organization without reference to work done by other organizations, and lack of agreement with various provisions of the Rules. The drainage basin concept was not specifically opposed, although the statements of a number of States implied opposition. Supporters of the reference to the Helsinki Rules, however, did not deal with the issue directly, although favourable statements stressing the advantages of the Rules clearly included the drainage basin concept.⁵⁵ The difference was settled, by a vote on which the reference to the Helsinki Rules was rejected by 41 votes to 25, with 32 abstentions.⁵⁶

53. In its reply to the Commission's questionnaire, Finland interpreted the term "international watercourse", as used by the General Assembly, in a way that sums up the case for the proponents of a broadly based study:

The concept of "international watercourse" was used by the Government of Finland in its motion of 1970 to the General Assembly and later on included in General Assembly resolution

⁵¹ *Ibid.*, paras. 95-97 and 99; and *ibid.*, *Sessional fascicle*, corrigendum.

⁵² *Ibid.*, 26th meeting, para. 10; and *ibid.*, *Sessional fascicle*, corrigendum.

⁵³ *Ibid.*, *Twenty-fifth Session, Annexes*, agenda item 91, document A/7991.

⁵⁴ *Ibid.*, *Sixth Committee*, 1225th meeting, para. 5.

⁵⁵ For example India (*ibid.*, 1232nd meeting, paras. 9-12).

⁵⁶ *Ibid.*, 1236th meeting, para. 32.

2669 (XXV) concerning the development of the rules of international law relating to international watercourses. The term "international watercourse" has generally been regarded to be broad enough to cover all the problems which have relevance in this connection, and it did not look too technical. When compared with other terms which have been used instead of "international watercourse", the scope of the latter is wider than that of "international river", because watercourse also means lakes. On the other hand "international watercourse" might be practically regarded as equivalent to "international drainage basin", provided that underground waters which are contained in the latter concept are not taken into account. Particularly for the purposes of the codification of international law of waters the term "international watercourse" seems to be as usable as the concept of "international drainage basin", which concept has been adopted by the International Law Association after a careful study of various alternatives (Helsinki Rules of 1966). A similar terminological problem was studied also in 1952 by ECE and the results of this study, which led to the acceptance of the concept "rivers and lakes of common interest", have been published in an ECE document. Those studies have indicated that synonymous terms can be used for describing the same notion, provided that the terms chosen cover the main factors which with regard to watercourses have an international legal relevance. Firstly, the term should indicate that a watercourse or a system of rivers and lakes (a hydrographic basin) is divided between the territories of two or more States. The second factor of importance in this connection is based upon the hydrographic coherence of the basin. Due to this coherence there exists, irrespective of the political borders, a legally relevant interdependence between the various parts of the watercourse belonging to different States. This interdependence, which in each individual case should decide to what extent the drainage area will be subjected to an international legal regulation, does not concern the different uses of the watercourse and its water only; it has also bearing upon problems of pollution. For that reason there is no need to make distinctions concerning the scope of the definition of an "international watercourse" or an "international drainage basin" with regard to the legal aspects of fresh water uses on the one hand and of fresh water pollution on the other hand.⁵⁷

⁵⁷ *Yearbook ... 1976*, vol. II (Part One), pp. 154-155, document A/CN.4/294 and Add.1, sect. II, question A.

It should be noted that, in its resolution on the utilization of non-maritime international waters (except for navigation) of 1961, the Institute of International Law makes a similar equation between a watercourse and a hydrographic basin:

"Considering that the economic importance of the use of waters is transformed by modern technology and that the application of modern technology to the waters of a hydrographic basin which includes the territory of several States affects in general all these States, and renders necessary its restatement in juridical terms,

"...

"Article 1. The present rules and recommendations are applicable to the utilization of waters which form part of a watercourse or hydrographic basin which extends over the territory of two or more States.

"Article 2. Every State has the right to utilize waters which traverse or border its territory, subject to the limits imposed by international law and, in particular, those resulting from the provisions which follow.

"This right is limited by the right of utilization of other States interested in the same watercourse or hydrographic basin.

"Article 3. If the States are in disagreement over the scope of their rights of utilization, settlement will take place on the basis of equity, taking particular account of their respective needs, as well as of other pertinent circumstances.

"Article 4. No State can undertake works or utilizations of the waters of a watercourse or hydrographic basin which seriously affect the possibility of utilization of the same waters

54. Yet it is clear from the record as a whole that the term "international watercourse" was not adopted by the General Assembly or interpreted by the Commission as the practical equivalent of "international drainage basin". It is also clear that a substantial number of States would doubt that the term takes into account "the hydrographic coherence of the basin" that results, irrespective of political borders, in "a legally relevant interdependence between the various parts of the watercourse belonging to different States."⁵⁸ The States that support the 1815 Vienna definition would say that it is the existence of boundaries that is legally relevant, so that the problem would be one of considering the effects on a State's authority over water subject to its sovereignty of the fact that the water forms part of or crosses a boundary.

55. These conflicting theories cannot at this juncture be reconciled, at any rate on a theoretical basis. It is necessary to accept the ambiguity of the term "international watercourse" and determine to what extent the Commission, and States, are prepared to resolve the problems that arise from the physical aspects of the hydrographic process in dealing with the specific uses of fresh water. Accordingly, the use of the term "international watercourse" in these draft articles does not represent a choice among the principal definitions of that term. It will be left for subsequent determination whether "international watercourse" means: (a) contiguous and successive international rivers, lakes, canals and other surface waters, or (b) the foregoing, plus the tributaries of such rivers, whether or not these tributaries are found wholly within national territory (a totality termed "an international river system"), or (c) contiguous and successive rivers, etc., plus their tributaries, plus underground waters that drain into these surface waters to a common terminus, whether or not these underground waters are found wholly within national territory ("an international drainage basin"). This being the case, what scope is left for an article on scope of application as article 1 of this draft?

by other States except on condition of assuring them the enjoyment of the advantages to which they are entitled under article 3, as well as adequate compensation for any loss or damage.

"Article 5. Works or utilizations referred to in the preceding article may not be undertaken except after previous notice to interested States.

"Article 6. In case objection is made, the States will enter into negotiations with a view to reaching an agreement within a reasonable time.

"For this purpose, it is desirable that the States in disagreement should have recourse to technical experts and, should occasion arise, to commissions and appropriate agencies in order to arrive at solutions assuring the greatest advantage to all concerned."

(*Annuaire de l'Institut de droit international* (Basel, 1961), vol. 49, II, pp. 381-383; text reproduced in *Yearbook ... 1974*, vol. II (Part Two), p. 202, document A/5409, para. 1076.)

⁵⁸ See para. 53 above.

56. The question of the scope of the draft does not necessarily arise from the practice of the Commission. In fact, the practice of the Commission for many years was not to have an article on scope but to introduce the articles with an initial one on use of terms and then begin laying down the law, or in some cases not even to have an article on use of terms. The Conventions of the Law of the Sea,⁵⁹ the Vienna Conventions on Diplomatic Relations⁶⁰ and on Consular Relations,⁶¹ the Convention on Special Missions⁶² and the Convention on the Prevention and Punishment of Crimes against Internationally Protected Persons, including Diplomatic Agents,⁶³ may be cited as illustrations of treaties not containing articles on scope of application. Others, including the Vienna Conventions on the Law of Treaties,⁶⁴ on Succession of States in Respect of Treaties,⁶⁵ and on the Representation of States in Their Relations with International Organizations of a Universal Character,⁶⁶ have an initial article that sets out the proposed area of application of the law. Thus article 1 of the Vienna Convention on the Law of Treaties provides:

The present convention applies to treaties between States.

57. There are a number of reasons why an article of limited substance on scope of application is desirable, despite the large measure of ambiguity it will carry. A first and fundamental reason is that the preparatory work demonstrated the existence of substantial differences among States regarding the scope of the draft; accordingly, failure to establish any common point of departure, while having some immediate advantages, would impede the development of a coherent body of rules. Secondly, as has been emphasized in chapter I of this report, the water with which the Commission will inescapably be dealing is water in the hydrologic cycle, that is, water in motion, water in the process of change. However, the draft articles will deal with only one aspect of that cycle. A statement indicating that the draft articles deal with international watercourses as such will make it clear that rain, sea water, cloud, fog, snowfall and hail are not included.

58. The term "use" also requires some development. In the report of the Sub-Committee on the law of the non-navigational uses of international watercourses, included in the Commission's 1974 report to the

General Assembly,⁶⁷ specific attention was called to certain special problems related to fresh water uses in various relations of cause and effect but that could not be described as uses. The Sub-Committee recommended that States should be asked whether two of those problems, flood control and erosion, should be included in its work.⁶⁸ The subsequent responses of States supported such inclusion, and it was further suggested by States that sedimentation problems should be dealt with as well.⁶⁹ The Commission decided to consider those matters in developing the proposed articles and so reported to the General Assembly.⁷⁰ Therefore the article on scope of application should refer specifically to these special problems, as well as to the problems of salt water intrusion, to which attention was drawn in the reply of the Netherlands.⁷¹ Another special problem is the need to clarify the effects of limiting the work to the "non-navigational uses" of international watercourses. Question G of the Commission's questionnaire inquired whether the Commission should take account in its study of interaction between use for navigation and other uses. All the responses of States were in the affirmative. A number of States considered that the study could not be successfully carried out without dealing with such interaction.⁷²

59. Finally, an article on scope of application is necessary to establish that it is the fact of water use that will bring the draft articles into play. Who uses the water does not have any bearing upon the applicability of the articles. In practice, fresh water is used by less individuals, various private organizations and businesses, municipal or regional governmental entities, constituent entities of a State and all kinds of State agencies. In theory and practice, the habitual view has been to treat the use of the waters of an international watercourse by anyone within the borders of a particular State as a use by the State for the purpose of considering the international effects of that use. Thus the 1911 Madrid Declaration of the Institute of International Law, "International Regulations Regarding the Use of International Watercourses", provides:

When a stream forms the frontier of two States, neither of these States may, without the consent of the other, and without special and valid legal title, make or allow individuals, corporations, etc. to make alterations therein detrimental to the bank of the other State. On the other hand, neither State may, on its own territory, utilize or allow the utilization of the water in such a way as

⁵⁹ For references, see footnote 4 above.

⁶⁰ United Nations, *Treaty Series*, vol. 500, p. 95.

⁶¹ *Ibid.*, vol. 596, p. 261.

⁶² General Assembly resolution 2530 (XXIV), annex.

⁶³ General Assembly resolution 3166 (XXVIII), annex.

⁶⁴ *Official Records of the United Nations Conference on the Law of Treaties, Documents of the Conference* (United Nations publications, Sales No. E.70.V.5), p. 287.

⁶⁵ For reference, see footnote 3 above.

⁶⁶ *Official Records of the United Nations Conference on the Representation of States in Their Relations with International Organizations*, vol. II, *Documents of the Conference* (United Nations publication, Sales No. E.75.V.12), p. 207.

⁶⁷ *Yearbook . . . 1974*, vol. II (Part One), p. 301, document A/9160/Rev.1, chap. V, annex.

⁶⁸ *Ibid.*, p. 303, para. 30, question C.

⁶⁹ See *Yearbook . . . 1976*, vol. II (Part One), p. 191, document A/CN.4/295, para. 45.

⁷⁰ *Ibid.*, vol. II (Part Two), p. 162, document A/31/10, para. 166.

⁷¹ *Ibid.*, vol. II (Part One), pp. 157–158, document A/CN.4/294 and Add. 1, section II, question A.

⁷² *Ibid.*, pp. 176–178, question G.

seriously to interfere with its utilization by the other State or by individuals, corporations, etc. thereof.⁷³

In some bilateral treaties there are provisions with respect to the use of water by individuals. The 1971 Agreement concerning frontier rivers between Finland and Sweden,⁷⁴ for example, requires any person carrying out hydraulic construction works that may have a harmful effect upon fishing to take measures needed to protect the fish stock or to maintain fishing at the existing level.⁷⁵ However, the treaty as a whole makes it clear that at the international level the State is responsible for the use of water of an international watercourse. This is an accepted doctrine, and there is no need for a special provision on the point. However, an article on scope will serve to reconfirm the point.

60. In light of the considerations discussed, the following article is proposed:

Article 1. Scope of the present articles

1. The present articles apply to the uses of the water of international watercourses, and to associated problems such as flood control, erosion, sedimentation and salt-water intrusion.

2. The use of the water of international watercourses for navigation is embraced by these articles in so far as provisions of the articles respecting other uses of water affect navigation or are affected by navigation.

61. It should be noted that minor modifications have been made in the formula contained in General Assembly resolution 2669 (XXV).⁷⁶ Non-navigational uses are dealt with in a separate paragraph, and "uses of the water of international watercourses" is suggested rather than "uses of international watercourses". These changes are matters of emphasis and are not essential. Starting out with "uses" rather than "non-navigational uses" makes it clearer that navigation, for the purposes of these articles, does not have a sacrosanct position. The exclusion of navigation apparently resulted from some dissatisfaction with the provisions of article XIII of the Helsinki Rules,⁷⁷ which limited the right of free navigation to riparian States. When introducing the proposal for a study of the law of international watercourses, the representative of Finland in the Sixth Committee of the General Assembly stated that:

The Helsinki Rules should be regarded as the definitive result of the codification of the law relating to international watercourses

undertaken by the International Law Association. Apart from the provisions relating to the equitable use of the waters of international drainage basins, those which dealt with the abatement of pollution, navigation and timber floating, as well as the recommendations concerning the settlement of disputes, should be treated as the basis of all codification work on the law relating to international watercourses. His delegation believed, however, that the provisions relating to navigation, which were not considered satisfactory by all the States concerned, might be excluded. On the other hand, the work done by the various private organizations which had taken up the question might well be taken into account.⁷⁸

In the debate in the Sixth Committee, the representative of the United Kingdom urged exclusion of navigation, stating that:

The question of navigation differed in many ways from other watercourse uses. Navigational regulation could directly affect the interests of non-riparian States seeking to exercise their right of navigation. That problem was of particular concern to the Government of the United Kingdom, which attached great importance to the notion of freedom to navigate on international rivers. The importance of that concept was recognized in several multilateral conventions, such as the Revised Convention on the Navigation of the Rhine signed at Mannheim in 1868, as amended in 1963, and the Convention on the Régime of Navigable Waterways of International Concern, signed at Barcelona in 1921. The Government of the United Kingdom could not agree that further work on that question should be based on a more restrictive approach, such as that embodied in the Helsinki Rules. On the other hand, it welcomed the course proposed by the Finnish delegation which would exclude navigation from present consideration of the question and was consistent with the position taken by the General Assembly in 1959 in its resolution 1401 (XIV).⁷⁹

The only additional elements were a statement by Canada that it supported the exclusion and one by Paraguay that it favoured the inclusion of navigation.⁸⁰ In so far as the debate in the General Assembly indicates, the exclusion of navigation was the result of opposition to the provisions on that topic laid down in the Helsinki Rules. As any reference to those rules was eliminated from the authorizing resolution, the exclusion was perhaps unnecessary. A more substantial reason for the exclusion may have been the existence of a substantial number of existing treaty régimes for the navigation of rivers. However, the exclusion should not be broadly interpreted. As the replies of States to the Commission's questionnaire and the facts of the uses of water indicate, the impact of navigation on other uses of water and that of other uses on navigation must be addressed in the Commission's draft articles. Navigation requirements affect the quantity and quality of water available for other uses. Navigation may and often does pollute watercourses, and requires that certain levels of water be maintained; it further requires passages through and around barriers in the watercourse. The interrelationships

⁷³ See *Yearbook . . . 1974*, vol. II (Part Two), p. 200, document A/5409, para. 1072.

⁷⁴ United Nations, *Treaty Series*, vol. 825, p. 191. See also *Yearbook . . . 1974*, vol. II (Part Two), pp. 319–322, document A/CN.4/274, paras. 307–321.

⁷⁵ *Ibid.*, pp. 320–321, para. 315.

⁷⁶ See para. 51 above.

⁷⁷ For the full text of the Helsinki rules, with commentaries, see ILA, *Report of the Fifty-second Conference, Helsinki, 1966* (London, 1967), p. 484.

⁷⁸ *Official Records of the General Assembly, Twenty-fifth Session, Sixth Committee*, 1225th meeting, para. 6.

⁷⁹ *Ibid.*, 1231st meeting, para. 38.

⁸⁰ *Ibid.*, 1234th meeting, para. 15, and *ibid.*, 1233rd meeting, para. 29.

between navigational and non-navigational uses of watercourses are so many that, on any watercourse where navigation is practised or is to be instituted, navigational requirements and effects and the requirements and effects of other water projects cannot be separated by the engineers and administrators entrusted with development of the watercourse. This fact suggests that the Commission cannot wholly

exclude navigational uses from the scope of its draft. Article 1 has been drafted accordingly.

62. The reference to uses of the water of international watercourses places the accent on the fact that it is water that plays the central and decisive role in the development of these draft articles, for the reasons outlined in chapter I of this report.

CHAPTER III

User agreements

A. Diversity of watercourses

63. One of the problems that must be faced in drafting articles on the law of the use of international watercourses is the immense diversity of international river systems. In size, they range from such enormous systems as the Congo, the Amazon, the Mississippi and the Ganges, all of which drain more than 1 million square kilometres, to the smallest of streams. Many are located in arid parts of the earth, so that they flow on the surface only intermittently, and disappear in the dry season. Many others are in water surplus areas, so that a major concern is not too little water but too much, in the form of floods. Many, such as the Rhine, have been integrated in domestic uses and productive processes for their entire lengths. Many others remain almost in a state of nature. Some pass through a succession of developed and relatively wealthy nations. Others water States in which industrial development is just beginning and in which some important resources are scanty. In short, there are international watercourses in almost every part of the world, and this means that their physical characteristics and the human needs they serve are subject to the same extreme variations as are found in other respects throughout the world.

64. Each watercourse is unique. Each has a special congeries of uses which differs from that of any other system. One may be used principally for drinking and household purposes, another for irrigation, a third for industrial production and a fourth for hydroelectric production. Normally, of course, a river serves—or has the potential for serving—a variety of uses. Yet there are rivers in which one or two uses predominate at a given time, and these uses may differ from one watercourse to the next.

65. In view of this diversity, the question arises whether it is possible to draft rules to deal with the uses of watercourses that will not be either so general as to be uncertain guides or so specific that they will be applicable to some but not to the full range of issues that may arise in an individual watercourse or, in so far as they are applicable, may deal inappropriately with

the particular facts. Brierly, for example, in discussing the relationships between the “vital interests” of States and the development of international law, wrote in 1944:

There are many rivers, especially so-called “international” rivers, which flow through or between the territories of more than one State, which it is desirable in the general interest that the law should regulate so that the maximum of advantage may be extracted from them. But this cannot be done by rules applying generally to all rivers. The political factors which have to be taken into account differ, and so do the uses to which rivers may be put; navigation, electric power generation, irrigation, water supply to cities, are some instances. Some rivers are more important for one purpose and some for another, so that they cannot all be dealt with in the same way; each requires a régime adapted to its own special circumstances. Experience has shown that special river commissions, each with its powers and duties laid down in an appropriate convention, are a more suitable method of regulating the use of rivers than a general law of rivers could ever be.⁸¹

Sauser-Hall expressed similar views in his Hague lectures on the industrial uses of international rivers:

The rules of law should reflect the social reality in which they are to operate.

More than in any other field of international law, it is difficult to formulate *a priori* principles governing the industrial use of international rivers and watercourses.

This is so for several reasons:

In the first place rivers and watercourses have many uses. . . .

It is not very advisable to adopt abstract and *a priori* rules, because the political, economic and topographical situation of these watercourses is extremely diverse. The conflicts of interests that may arise in the use of watercourses as between States members of a confederation of States or of a federal State resemble very closely those arising at the international level between sovereign States; . . . but it is obvious that disputes between those States can, at least in principle, be settled more easily, on account of the political solidarity between them, than disputes between sovereign States.

The peculiarities of the physical geography of States are so pronounced that principles applied in one case would be found to be quite futile or even harmful in respect of other watercourses. It should be noted that the influence of the various uses of rivers and streams on their flow, their volume, the drinking quality of the

⁸¹ J.L. Brierly, *The Outlook for International Law* (Oxford, Clarendon Press, 1944), pp. 42–43.

water of the chemical composition of the water is by no means uniform.⁸²

While some other scholars have argued along similar lines, still others support the formulation of a law of international watercourses.⁸³

66. Another approach is represented by the Helsinki Rules on the uses of the waters of international rivers,⁸⁴ and the pertinent resolution of the Institute of International Law.⁸⁵ While the Helsinki Rules and the resolution of the institute are the product of non-governmental bodies, the distinguished lawyers who worked on their formulation included many jurists who had represented their Governments at international conferences concerned with water, had served as counsel in various disputes relating to the uses of water and had served the United Nations and its agencies in important capacities dealing with the uses of water and the protection of the environment. In view of such auspices and authorship, and the scholarship, knowledgeability and judgement that went into their preparation, the Helsinki Rules and the Institute's resolution merit the consideration of the Commission in any study of the law of the uses of international watercourses. The Helsinki Rules are the most developed formulation of a set of legal rules for general application to the uses of sweet water. In view of that fact and of their particular pertinence to the subject of this report, they should be reviewed for the light they shed on the question whether useful rules can be drafted for international watercourses in general or whether, if rules are to be genuinely useful, they must be formulated as a separate set of articles to meet the requirements of each individual international watercourse. Examination of the resolution of the Institute will be undertaken at a later stage.

67. The Helsinki Rules are expressed in terms of the rights and obligations of the States which have territory within the geographic limits of a drainage basin. Article II defines the basin and article III the basin State:

Article II

An international drainage basin is a geographical area extending over two or more States determined by the watershed limits of the system of waters, including surface and underground waters, flowing into a common terminus.

⁸² *Recueil des cours de l'Académie de droit international de la Haye, 1953-II* (Leyden, Sijthoff, 1955), vol. 83, pp. 471-472.

⁸³ See H.A. Smith, "The waters of the Jordan", *International Affairs* (London), vol. 25 (1949), p. 415, and F. Berber, *Rivers in International Law* (London, Stevens, 1959). *Contra*, see *Management of International Water Resources: Institutional and Legal Aspects, Report of the Panel of Experts on the Legal and Institutional Aspects of International Water Resources Development* (United Nations publication, Sales No. E.75.II.A.2); A.H. Garretson, R.D. Hayton, C.J. Olmstead, eds. *The Law of International Drainage Basins* (Dobbs Ferry, N.Y., Oceana, 1967); and Teclaff, *op. cit.*, p. 19.

⁸⁴ For reference, see footnote 29 above.

⁸⁵ For reference, see footnote 57 above.

Article III

A "basin State" is a State the territory of which includes a portion of an international drainage basin.

The commentary to article III⁸⁶ makes it clear that States which contribute only groundwater to the basin State share in the rights and duties laid down in the articles:

Recognition of the fact that underground waters may flow from a State without reaching the surface in its territory into the territory of other States in an international drainage basin where they contribute substantially to the surface flow, demonstrates that the terms based upon the word "riparian" are inadequate to describe all States included within the international drainage basin.

These chapters therefore adopt the term "basin State" as a comprehensive one to include all States whose territories contribute waters to the international drainage basin, whether or not "riparian".

Illustration:

The International River Meander flows on the surface through States A, B, and C. An underground spring in State D contributes water to an underground stream that flows into the Meander in the territory of B. All of these States are basin States although only A, B, and C are riparian States.

As the scientific considerations summarized in chapter I of this report indicate, there is reason to include groundwater States in formulating general rules relating to the uses of sweet water, as the Helsinki Rules decisively do.

68. Article IV of the Helsinki Rules lays down a general rule to govern the use of the waters of a drainage basin:

Article IV

Each basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin.

This is a rule couched in the most general terms. It is difficult to see, however, how a principle of this nature could be expressed in other than the most general terms. If the same or a similar principle were to be applied to any individual drainage basin, it would have to be stated in substantially identical language.

69. Article IV, in and of itself, is not intended to provide a formula for allocating water resources in widely varying circumstances. That task is reserved for article V, which specifies many of the considerations to be taken into account in determining what is a fair and equitable share of the drainage basin water for use by a particular drainage basin State:

Article V

1. What is a reasonable and equitable share within the meaning of article IV is to be determined in the light of all the relevant factors in each particular case.

2. Relevant factors which are to be considered include, but are not limited to:

⁸⁶ See footnote 77 above. It should be noted that the commentaries were not submitted for the approval of the ILA Conference and may not be assumed necessarily to carry the same measure of support as the Helsinki Rules themselves.

(a) The geography of the basin, including in particular the extent of the drainage area in the territory of each basin State;

(b) The hydrology of the basin, including in particular the contribution of water by each basin State;

(c) The climate affecting the basin;

(d) The past utilization of the waters of the basin, including in particular existing utilization;

(e) The economic and social needs of each basin State;

(f) The population dependent on the waters of the basin in each basin State;

(g) The comparative costs of alternative means of satisfying the economic and social needs of each basin State;

(h) The availability of other resources;

(i) The avoidance of unnecessary waste in the utilization of waters of the basin;

(j) The practicability of compensation to one or more of the co-basin States as a means of adjusting conflicts among uses; and

(k) The degree to which the needs of a basin State may be satisfied, without causing substantial injury to a co-basin State;

3. The weight to be given to each factor is to be determined by its importance in comparison with that of other relevant factors. In determining what is a reasonable and equitable share, all relevant factors are to be considered together and a conclusion reached on the basis of the whole.

70. The commentary to article V emphasizes that paragraph 2 does not set forth all the possible relevant factors, and that only factors that are relevant require consideration. Thus if other resources are not available, paragraph 2 (h) would not be applied. The application of the article is summed up as follows:

In short, no factor has a fixed weight nor will all factors be relevant in all cases. Each factor is given such weight as it merits relative to all the other factors. And no factor occupies a position of pre-eminence *per se* with respect to any other factor. Further, to be relevant, a factor must aid in the determination or satisfaction of the social and economic needs of the co-basin states.

In determining what is a reasonable and equitable share in the uses of basin water, it is necessary to take into account the factors not only as they apply in determining the share of one basin State but also as they apply in the other basin States. A watercourse has only a limited amount of water, and devoting some portion of the water to a use or uses in one locality could have some effect upon its availability for use in other localities. To ensure that one State's use is reasonable and equitable, it is necessary to give consideration to what uses are affected in other basin States. If this were not done, what appeared to be a reasonable and equitable share for one State might be established to be unreasonable and inequitable with respect to the other basin States. The list of relevant factors in article V makes it clear that broader considerations than a single State's need for use of water must be taken into account. The factors require consideration of the extent of the drainage area in each basin State, the contribution of water by each basin State, the economic and social needs of each basin State and the population dependent on use of the waters in each basin State, as well as more general

considerations such as the climate affecting the basin and the past utilization of the waters of the basin.

71. Article VI affords an excellent example of a general rule that allows great freedom in its specific application:

Article VI

A use or category of uses is not entitled to any inherent preference over any other use or category of uses.

The commentary to article VI develops the reasons that led to the decision to abandon the historical priority of navigation and not to replace it by any other preferred use:

Preferential use. Historically, navigation was preferred over other uses of water, irrespective of the later needs of the particular drainage basin involved. In the past twenty-five years, however, the technological revolution and population explosion, which have led to the rapid growth of non-navigational uses, have resulted in the loss of the former pre-eminence accorded navigational uses. Today, neither navigation nor any other use enjoys such a preference. A drainage basin must be examined on an individual basis and a determination made as to which uses are most important in that basin or, in appropriate cases, in portions of the basin.

The commentary then discusses whether domestic uses, because they are the basis of all life, should be accepted as succeeding to the preferential position of navigation. The preference is rejected on the ground that no substantial authority to support it exists and that such a preference could be inappropriate in individual basins. The commentary concludes with the statement:

On the other hand, if a domestic use is indispensable—since it is, in fact, the basis of life—it would not have difficulty in prevailing on the merits against other uses in an evaluation of the drainage basin.

This last conclusion may be open to question. Domestic uses in one State that interfere with an important economic use in a co-basin State may not be considered as of overriding importance in the latter State.

72. The Helsinki Rules do not contemplate a procedure in which, on the basis of the relevant factors, whatever they may be, the entitlement of each basin State to its reasonable and equitable share in the use of the waters is fixed. This becomes clear from article VII, which provides:

Article VII

A basin State may not be denied the present reasonable use of the waters of an international drainage basin to reserve for a co-basin State a future use of such waters.

The commentary to article VII clarifies the objective of the article as well as the issue that is left obscure by article V. It states:

This article [art. VII] postulates the flexibility and future readjustment implicit in the principle of equitable utilization.

Here, it is necessary to make a choice between two conflicting principles with respect to the equitable sharing of water. The first is that every State whose territory lies within an international drainage basin ought to be assured the use of certain of the waters by reservation, even where such waters cannot presently be utilized. The second is that no water should be reserved for a

future use since to do so might interfere with current uses of the water or uses which come into being from time to time.

The former principle may have a visceral appeal because of what appears to be its fairness; also there is a danger that the State which commences its economic development later than its co-basin States may find such development inhibited by the existing uses of these co-basin States. (See article VIII.) On balance, however, the limitation of protection to present uses is the more reasonable approach.

73. The relevant factors are intended to be applied to the existing pattern of the uses in the basin whenever a new or possibly broadened use of water is contemplated by one or more basin States. If the requirements of the relevant factors are met, then the new or broadened use is permissible. If not, then the new or broadened use would not be acceptable. This leaves open the question of conflict between an existing use and a proposed new use that is incompatible with the existing use. The next article provides a solution for this conflict:

Article VIII

1. An existing reasonable use may continue in operation unless the factors justifying its continuance are outweighed by other factors leading to the conclusion that it be modified or terminated so as to accommodate a competing incompatible use.

2. (a) A use that is in fact operational is deemed to have been an existing use from the time of the initiation of construction directly related to the use or, where such construction is not required, the undertaking of comparable acts of actual implementation.

(b) Such a use continues to be an existing use until such time as it is discontinued with the intention that it be abandoned.

3. A use will not be deemed an existing use if at the time of becoming operational it is incompatible with an already existing reasonable use.

The commentary is here important enough to quote at length:

(a) *Protection of existing uses.* Some authorities take the position that, upon the initiation of a use, the user gains a vested right in the use and cannot be deprived of it except in rare cases and with full compensation. Other authorities take the contrary position that the fact that a use is an existing use is of no weight whatsoever in determining what is an equitable utilization. Neither approach seems persuasive because neither comes to grips with realities, including the dynamic character of water development by States and changing technology. The former freezes river development according to the requirements of the earlier user. Indeed, it is conceivable that, if a State moves quickly enough, it could appropriate all of the waters of a basin to the complete exclusion of its co-basin States. Such a result is hardly consistent with their equal status as co-basin States. (See comment to article I.)

On the other hand, failure to give any weight to existing uses can only serve to inhibit river development. A State is unlikely to invest large sums of money in the construction of a dam if it has no assurances of being afforded some legal protection for the use over an extended period of time. This is especially true since no State could possibly guess what is likely to constitute an equitable utilization at some future time when its prior appropriation is placed in issue.

The rule stated in this article reflects the current international attitude in this matter—a middle ground between two extremes.

74. The factors referred to in paragraph 1 of article VIII of the Helsinki Rules would include the relevant

factors listed in article V as well as any others that might be relevant in an individual drainage basin. We are therefore dealing with the same basic set of factors under the Helsinki Rules with respect to practically all aspects of determining whether a basin State is entitled to make a particular use of water as part of its reasonable and equitable share in the use of basin water. Possible lacunae may include the problem of incremental growth of a use and the situation of sub-basins. The issue under consideration, however, is the utility of the Helsinki Rules in their application to the problems of use of water in individual watercourse systems. At this stage, the exact scope of their application is not an aspect that requires consideration.

75. There is no doubt that the relevant factors are expressed in article V in terms of substantial generality. The geography, hydrology and climate of the basin—the initial three factors—include every possible physical feature that has some relationship to basin water. There are 19 international basins with over 1 million square kilometres within each watershed,⁸⁷ including some, such as the Congo and the Amazon, that cover half a continent. There are 78 international river basins that have between 100,000 and 1 million square kilometres within each watershed.⁸⁸ The amount of data needed to determine what is a reasonable and equitable share in the water in any drainage area in the second category, much less in the first, could be enormous, although this is not necessarily so, particularly in early stages of development. Moreover, the size or other physical characteristics of a basin may be less significant than the variety of uses and conflicts among them. Relevant factor (d) of article V, paragraph 2, requires a review of all past and current utilization of basin water at the time the new or broadened use is under consideration. As has been pointed out, the analysis of whether a new or broadened use is a reasonable and equitable sharing must be considered in light of its effects upon basin use as a whole.

76. The economic and social needs of each basin State (factor (e) in para. 2 of article V) is an open-ended criterion. The needs of States are unconfined, not least because the expectations of people may tend to increase with satisfaction rather than to diminish. Population and population growth, as dependent on basin water in each basin State (factor (f)), are reasonably determinable. Factors (g) through (k) deal with such issues as the comparative costs of alternative methods of satisfying needs (factor (g)), availability of other resources (factor (h)), avoidance of unnecessary waste (factor (i)), practicability of compensation as a means of adjusting conflicts (factor (j)), and satisfaction of one State's needs without substantial injury to a co-basin State (factor (k)). They

⁸⁷ *Integrated River Basin Development: Report of a Panel of Experts* (United Nations publication, Sales No. E.70.II.A.4), p. 6.

⁸⁸ *Ibid.*

are subject to resource and cost-benefit analysis and are more manageable in their application to individual watercourses than the initial factors.

77. None the less, geography, hydrology, climate, existing utilization of water and economic and social needs are factors that have to be taken into account in any attempt to provide guidelines under which States in a watercourse system can work out how they will share the use of a resource in which they all have an interest. While the formulation of the factors in the Helsinki Rules could perhaps be modified to reduce the substantial generality and open-ended nature that characterize a number of them, and while additional and more precise tests could perhaps be drafted, there is no real likelihood of being able to draft principles that can be applied precisely and without ambiguity to every international watercourse. Of course, principles characteristically cannot be applied precisely and unambiguously to particular cases, yet may be of very great utility.

78. Applying the 11 relevant factors contained in article V of the Helsinki Rules to the case of a two-State basin, it is apparent that the number of combinations of the factors is very large. It increases geometrically as the number of basin States increases. In practice, the relevant factors that dominate consideration of the acceptability of a new or broadened use may be much fewer than eleven. Nevertheless, the multiplicity of factors that have to be taken into account may be a formidable barrier to agreed solutions. Still more significant may be the weight given to one or more factors relative to others.

79. It is in the event of a difference among basin States as to whether a use of water is within the ambit of reasonable and equitable sharing that the factors become of concrete importance. The number of factors and their broad scope decreases their utility as standards for either co-operative river development or settlement of disputes. It would be possible to make a substantial case either for or against any proposal for a new or broadened use by judicious selection of criteria from this wide range of relevant factors.

80. Similar but more pronounced problems would arise if some other general principle, such as a requirement of co-operation or the principle of not using what is one's own in such a way as to injure others, were to be applied. An injunction to co-operate is inadequate unless coupled with norms that establish the nature and scope of the requirement. A principle that injury to others be avoided in using what is one's own requires tests to determine what is one's own, what constitutes injury and where the dividing line between a permissible measure of injury and an impermissible measure of injury lies. Because of the nature of the subject-matter, the physical differences between watercourse systems, and the diversity in watercourse uses, the norms or—at least the relevant factors that make clear the scope and content of such rules—would have to be expressed as general concepts

rather than as specific requirements. This would give rise to the same problems in application as could arise in the use of the relevant factors under article V of the Helsinki Rules.

81. The difficulties that arise in applying principles of such generality as the Helsinki Rules to individual cases is illustrated by the positions taken by Bangladesh and India with respect to the diversion of water from the Ganges to the Hooghly. The diversion is through a feeder canal which runs from the Farakka Barrage on the Ganges 11 miles upstream from the point at which the river becomes the boundary between the two States. This boundary runs south-east for 50-odd miles and then continues due south, while the river continues south-east to the Bay of Bengal, entirely through Bangladesh territory.

82. Both Bangladesh and India relied upon the Helsinki Rules in public pronouncements of their positions. India described the background in these terms:

The Ganga looms very large in the Indian economy and in the socio-economic and cultural life of the people inhabiting the Ganga basin. For 90 per cent of its length—1,925 km—the main channel of the Ganga flows through India. With its principal tributaries it flows through 8,000 km of Indian territory with a catchment area in India of 777,000 sq km. The geographical area in India dependent on the Ganga is 211 million acres (84 million ha) with a population of 250 million—more than 40 per cent of the country's total population. The cultivable area in the Ganga basin in India is more than 150 million acres (60 million ha).

The Ganga and its tributaries pass through vast arid, semi-arid and drought-prone areas in the States of Rajasthan, Madhya Pradesh, Haryana, Uttar Pradesh and Bihar, which depend entirely on the waters of this river network in the summer months. Irrigation is the prime need of the Ganga basin in India where the annual average rainfall is a mere 76 cm. It is not possible to raise even one crop a year on an average in this basin, and only about one-fourth of the area is presently irrigated from all the sources.

The inhabitants of the Ganga basin are among the poorest in India and they have one of the lowest per capita incomes in the world. The limitations on creating storages in the basin are severe owing to unfavourable topographical, hydrological and other features.

On the other hand, the length of the main channel of the Ganga (Padma) in Bangladesh is only 141 km, excluding the common boundary of 112 km. The Ganga and its tributaries, covering a 173 km course in Bangladesh, flows through a catchment area of 5,600 sq km, hardly 0.7 per cent of the catchment area in India. The Ganga basin in Bangladesh contains only 6.1 million acres (2.4 million ha) and 12 million people. More than one crop is grown yearly on an acre of cultivated land without any irrigation.

The average rainfall is between 144 and 254 cm a year. Moreover, Bangladesh is served not only by the Padma but also by the mighty Brahmaputra, the Meghna and their tributaries. These river systems which drain into the Bay of Bengal, discharge more than 1,000 million acre-feet of water every year—enough to inundate the entire territory of Bangladesh to a depth of about 30 feet.

A large part of the area said to be suffering from water shortage in the Padma actually depends upon, or can very well be served by, the Brahmaputra or Meghna.

Thus as between India and Bangladesh, India is by far the major riparian country for the Ganga waters in terms of

catchment area (99 per cent), ultimate irrigation potential (94.5 per cent) and population of the Ganga basin (94 per cent).⁸⁹

India then invoked the Helsinki Rules, as follows:

International Law on the rights of riparians has not been codified. But the Helsinki Rules of 1966 have received broad acceptance by countries as a model on water law and are based on the concept of a "drainage basin". These Rules state: "Each basin state is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international drainage basin".

The Rules provide that in computing the equitable share of a basin state relevant factors such as the geography and hydrology of the basin, economic needs, population, availability of other resources, avoidance of waste, past use, current needs and the comparative cost of alternative means and other factors should be taken into account.

In withdrawing part of the Ganga waters at Farakka India's sole obligation is to the extent possible not to affect adversely Bangladesh's "existing use" of the flow. There is absolutely no obligation, according to the Helsinki Rules, for an upper riparian to leave intact the "existing quantum" of flow. In fact, insistence on the continuance of "historical" or "natural" flow is a total denial of the principle of equitable sharing enshrined in these Rules.

Assertion of a right to "natural flow" amounts to exercising a veto on the rights of upper riparians to reasonable and equitable shares of the waters of common rivers. Its acceptance would obstruct the right of other riparians to implement development plans designed to use the water resources of the basin, thus perpetuating economic stagnation, accentuating human suffering, and impeding the progress of important regions and sectors of their economies.

It is also important to remember that India has no alternative source of water to flush the Hooghly and preserve Calcutta port. On the other hand Bangladesh is served by alternative river systems and actually has a problem of surplus water, most of which flows unused down to the sea.⁹⁰

83. The Bangladesh White Paper on the Ganges water dispute of September 1976 also quotes article IV of the Helsinki Rules, and refers to the relevant factors of article V as a means for determining what is "a reasonable and equitable share". In the introduction and in a section regarding "The impact of India's unilateral withdrawal of Ganges water", the White Paper takes up the effect of the diversion of water at the Farakka Barrage upon various aspects of the uses of the Ganges, such as agriculture, intrusion into the basin area of saline water from the Bay of Bengal, irrigation, fisheries, forestry, navigation, industry, and the wealth and ecology of the region.⁹¹ While not organized on the same basis as the relevant factors in article V of the Helsinki Rules, the content of the discussion is clearly directed towards them. Thus, it is stated that the Ganges system waters about 37 per cent of the area of Bangladesh, inhabited by 25 million people, or one third of the total population:

The Ganges is an international river, with its basin spread over China, Nepal, India and Bangladesh. The life and prosperity of

the people of Bangladesh which is a riverine country are dependent on the waters of its rivers. The Ganges system serves about 37 per cent of the total area of Bangladesh, in which about 25 million people or one third of the total population live. The river provides drinking water to the people, sustains agriculture, forestry and fishery, serves as the main means of transport, keeps back the saline water from the Bay of Bengal and plays a dominant part in the ecology of the region.⁹²

The detailed analysis by Bangladesh in respect of each use of the Ganges presents a quite different view of the effects of the barrage from that set forth in India's paper. Nevertheless, as a result of goodwill, co-operative effort and statesmanship on both sides, an agreement on sharing the waters of the Ganges at Farakka and on augmenting its flows was concluded at Dacca on 5 November 1977.⁹³

84. The Commission is not concerned with the substance of any specific difference between States in use of fresh water, and it is not empowered to express any view with regard to any such difference. It is, however, appropriate for it to consider the utility of the Helsinki Rules in a matter in which they have been relied upon by both parties. In the first place, it can be said that the reliance upon the Rules of the two States demonstrates the need for the adoption of a set of articles to help in resolving international differences regarding conflicting uses of water. The fact that both States turned to principles that had been developed by what is a learned and broadly based—but non-governmental—organization supports the view that development of such principles through international agreement on a global basis is necessary. Secondly, however, the fact that each State was able to rely upon the same relevant factors in developing its position supports the conclusion that principles sufficiently general to apply to all watercourses would be more useful if they could be organized so as to apply as well to the highly individual problems of each individual watercourse. What is needed is a set of articles that lays down principles regarding the use of international watercourses in terms sufficiently broad that it can be applied to all international watercourses, while at the same time providing the means by which the articles it contains can be more sharply defined or modified to take into account the singular nature of an individual watercourse and the varying needs of the States whose territory it drains.

85. Once a difference between States has arisen because of conflicting uses, once each State has become convinced that its vital or even just important interests are involved, the solution of water problems (and other international problems) on the basis of scientific analysis and co-operative action becomes extremely difficult. The situation is well summed up in

⁸⁹ India, Ministry of External Affairs, *The Farakka Barrage* (New Delhi, The Statesman Press [n.d.]), "Relative dependence on the Ganga waters".

⁹⁰ *Ibid.*, "Position in International Law".

⁹¹ Bangladesh, *White Paper on the Ganges Water Dispute*, (September 1976), pp. 5–10.

⁹² *Ibid.*, p. 5.

⁹³ American Society of International Law, *International Legal Materials* (Washington, D.C.), vol. XVII, No. 1 (January 1978), p. 103.

the conclusions of the United Nations report on integrated river basin development:

The vital character of current and impending disputes on international streams has been shown in chapter IV, where it is pointed out that lack of accepted international law on the uses of these streams presents a major obstacle in the settlement of differences, with the result that progress in development is often held up for years, to the detriment not only of the countries concerned but of the economy of the world in general.⁹⁴

In such a situation, it would be most helpful to have general principles, accepted by the international community as a whole, to apply. But it would be better still, if certain uses are of outstanding importance in a watercourse, to have an agreement in force among the States concerned regarding the legal basis for determining priority uses (as well as for settling disputes arising under the agreement). Is it possible to devise a set of articles that will provide both the general principles needed to codify the law of international watercourses on a global basis and a means of ensuring the development of more detailed rules, based on those principles, for application to individual watercourse systems?

B. The multilateral convention as a framework treaty

86. The 1923 Geneva Convention relating to the development of hydraulic power affecting more than one State⁹⁵ introduces a means of achieving a marriage of general principles and specific rules. Article 1 lays down, with a certain indirection, the principle that the development of hydraulic power by a State within its own territory must be carried out subject to the limits of international law:

Article 1

The present Convention in no way affects the right belonging to each State, within the limits of international law, to carry out on its own territory any operations for the development of hydraulic power which it may consider desirable.

The Convention does not prescribe what the applicable limits of international law are with regard to the development of hydraulic power. However, articles 2, 3 and 4 each deals with a situation which must have been considered as coming within those limits. They read:

Article 2

Should reasonable development of hydraulic power involve international investigation, the Contracting States concerned shall agree to such investigation, which shall be carried out conjointly at the request of any one of them, with a view to arriving at the solution most favourable to their interests as a whole, and to drawing up, if possible, a scheme of development, with due regard for any works already existing, under construction, or projected.

Any Contracting State desirous of modifying a programme of development so drawn up shall, if necessary, apply for a fresh investigation, under the conditions laid down in the preceding paragraph.

No State shall be obliged to carry out a programme of development unless it has formally accepted the obligation to do so.

Article 3

If a Contracting State desires to carry out operations for the development of hydraulic power, partly on its own territory and partly on the territory of another Contracting State or involving alterations on the territory of another Contracting State, the States concerned shall enter into negotiations with a view to the conclusion of agreements which will allow such operations to be executed.

Article 4

If a Contracting State desires to carry out operations for the development of hydraulic power which might cause serious prejudice to any other Contracting State, the States concerned shall enter into negotiations with a view to the conclusion of agreements which will allow such operations to be executed.

The following norms of international law appear implicit in these articles:

(a) If the reasonable development of hydraulic power requires international investigation, the States concerned are under a duty to co-operate in that investigation in order to find solutions favourable to the interests of all the States concerned. There is also an obligation to join, in good faith, in an effort to draw up a scheme of development for the agreed solution;

(b) When development of hydraulic power in the territory of one State requires the use of—or affects changes in—the territory of another State, the development cannot be carried out in the absence of an international agreement. Both States are required to engage in good faith negotiations for the purpose of concluding an agreement “which will allow such operations to be executed”;

(c) A State may not unilaterally engage in activities on its own territory for the development of hydraulic power which could cause serious prejudice to another State, in the absence of authorizing international agreement. The States concerned are required to engage in good faith in negotiations for the purpose of reaching an agreement or agreements that will permit the development of the power. There is perhaps an implicit condition that the development programme agreed upon should eliminate the prospect of serious injury or that this injury be compensated by some benefit from hydraulic works or by payments or other means satisfactory to the injured party.

87. The foregoing norms, although limited to a single aspect of watercourse use, and naturally to the contracting States, are general in nature and applicable to any watercourse capable of producing hydro-electric power. In each case, the general norm is to be applied by means of an agreement expressly tailored to fit the requirements of the international watercourse and the specific problems of the States concerned.

88. Articles 5 and 6 of the 1923 Geneva Convention are designed to assist in the formulation of the agreements called for under articles 2, 3 and 4. Article 5 states, again in an indirect fashion, that the technical aspects of the agreements should be developed on the

⁹⁴ *Integrated River Basin Development* . . . (op. cit.), p. 44.

⁹⁵ League of Nations, *Treaty Series*, vol. XXXVI, p. 75.

basis of considering as a unit the area affected by the development:

Article 5

The technical methods adopted in the agreements referred to in the foregoing articles shall, within the limits of the national legislation of the various countries, be based exclusively upon considerations which might legitimately be taken into account in analogous cases of development of hydraulic power affecting only one State, without reference to any political frontier.

This is an early expression of the concept of basin or sub-basin development. From the scientific and technical point of view, the optimum development of hydroelectric power in any watercourse system can be achieved only if water retention and water releases are co-ordinated throughout the watercourse system. As a group of experts convened by the United Nations put it:

From the experience that has accumulated through development of numerous areas—the Damodar, Nile, Rhone, Tennessee and Volga, to name only a few—it is now possible to distinguish certain lessons that have been learned, and to outline in broad terms the character of work which seems essential to productive use of river basin development as a tool of social action. It is also possible to define the more troublesome problems of an economic, social and administrative character that will be involved in carrying out new river basin programmes.

The need for integrated river basin development arises from the relationship between the availability of water and its possible uses in the various sectors of a drainage area. It is now widely recognized that individual water projects—whether single or multipurpose—cannot as a rule be undertaken with optimum benefit for the people affected before there is at least the broad outline of a plan for the entire drainage area. Integrated river basin development with the aim stated involves the co-ordinated and harmonious development of the various works in relation to all the reasonable possibilities of the basin. These may include irrigation and drainage, electric power production, navigation, flood control, watershed treatment, industrial and domestic uses of water, recreation and wildlife conservation.⁹⁶

89. Article 6 of the 1923 Convention sets forth eight subjects with which the agreements specified in articles 2, 3 and 4 of that Convention might deal:

The agreements contemplated in the foregoing articles may provide, amongst other things, for:

- (a) General conditions for the establishment, upkeep and operation of the works;
- (b) Equitable contributions by the States concerned towards the expenses, risks, damage and charges of every kind incurred as a result of the construction and operation of the works, as well as for meeting the cost of upkeep;
- (c) The settlement of questions of financial co-operation;
- (d) The methods for exercising technical control and securing public safety;
- (e) The protection of sites;
- (f) The regulation of the flow of water;
- (g) The protection of the interests of third parties;
- (h) The method of settling disputes regarding the interpretation or application of the agreements.

⁹⁶ *Integrated River Basin Development . . . (op. cit.)*, p. 1. See also *Report of the United Nations Water Conference (op. cit.)*, Recommendation G.

These eight suggested subjects of agreement afford a fairly adequate structure for developing a bilateral or multilateral treaty providing for the effective hydroelectric development of an international river. In the light of experience since the adoption of the 1923 Convention, additional provisions to deal specifically with such matters as determination and allocation of benefits, collection and exchange of hydrographic data, and the setting up of joint management machinery, will be desirable.

90. There is a substantial difference between the eleven relevant factors in article V of the Helsinki Rules and the eight subjects of agreement in article 6 of the 1923 Convention. The difference stems from the different ends sought. The Helsinki Rules contemplate consideration of specified relevant factors in determining or adjudicating the permissible uses by States of water in an international drainage basin. The subjects of agreement in the Convention are directed towards producing agreement among directly interested States with respect to a single use for an individual watercourse.

91. These ends are not divergent but supplemental. General principles regarding all uses of international watercourses are essential if the ever growing and conflicting demands for water throughout the world are to be satisfied. These general principles must be supported by rules that provide how these principles should be applied on a general basis. But these general principles and rules need to be supplemented in a manner that will assist in the development of regulations for application to specific uses of the water of individual watercourses. What is required—without prejudice to the question whether it is the river, the river system, or the drainage basin that is in point—is a blending of the approach of the Helsinki Rules with that of the 1923 Convention. To this end, the following articles are proposed:

Article 2. User States

For the purpose of these articles, a State which contributes to and makes use of water of an international watercourse shall be termed a user State.

Article 3. User agreements

The present articles may be supplemented by user agreements among user States.

It may also be useful to include, at this juncture, a clause on definitions which will complement the paramount definition found in article 2.

Article 4. Definitions

For the purposes of the present articles:

1. “Contracting State” means a user State party to these articles which may or may not be party to a user agreement.

2. "Co-operating State" means a user State party to a user agreement which is not party to these articles.

3. "Non-contracting State" means a user State which is not party either to these articles or to a user agreement.

C. Parties to user agreements

92. Although the 1923 Geneva Convention entered into force, there is no record of agreements entered into pursuant to its articles 2, 3 or 4. Only a few States ratified it. None of them was situated on the same watercourse, so the need for an implementing agreement did not arise. None the less, the solution which it adopted, that of dealing with the disparity of the character and uses of international watercourses through recourse to subsidiary agreements between the parties to a general convention, is a sound and innovative way to approach the problem.

93. The 1923 Convention envisages bilateral agreements as the appropriate form for the development of hydroelectric power. The Commission, however, will be required to lay down principles regarding all possible uses of an international watercourse, including the reciprocal interplay of navigation. When the watercourse drains several States, all those States should be entitled to become parties to any subsidiary agreement applying to that watercourse. This concept is illustrated by the River Plate Basin Treaty (Brasilia, 23 April 1969),⁹⁷ to which Argentina, Bolivia, Brazil, Paraguay and Uruguay are parties, as well as by other treaties which are referred to below.

94. The River Plate Basin Treaty entered into force on 14 August 1970. By its terms, the parties agree to combine efforts to promote the harmonious development and physical integration of the Plate Basin:

To this end, they shall promote, within the scope of the basin, the identification of areas of common interest and the undertaking of surveys, programmes and works, as well as the drafting of operating agreements and legal instruments they deem necessary, and which shall tend toward:

- a) Advancement and assistance in navigation matters;
- b) Reasonable utilization of water resources, particularly through regulation of watercourses and their multiple and equitable uses;
- c) Conservation and development of animal and vegetable life;
- d) Perfection of highway, rail, river, air, electrical and telecommunication interconnections;
- e) Regional complementation through the promotion and installation of industries of interest to the Basin development;
- f) Economic complementation in frontier areas;
- g) Reciprocal co-operation in matters of education, health and combating of disease;

h) Promotion of other projects of common interest, particularly those related to inventory, assessment and utilization of the area's natural resources; and

i) Total familiarity with the River Plate Basin.

The foregoing list of objectives affords an excellent example of the broad range of subject-matter which requires consideration in dealing with a drainage basin on an integrated basis. It extends beyond the scope of the current work of the Commission on watercourses; however, if the Commission were to produce a set of articles of general acceptability, it will have provided a foundation for achievement of the broader goals listed in the River Plate Basin Treaty.

95. Article VI of the Treaty provides:

Article VI

The stipulations of the present Treaty shall not inhibit the Contracting Parties from entering into specific or partial agreements, bilateral or multilateral, tending towards the attainment of the general objectives of the Basin development.

While the Treaty deals with a single, if immense, basin, that basin contains two sub-basins of very wide geographical extent, each with at least three concerned States. Thus the inclusion of such a proviso for sub-basin agreements is understandable.

96. Nevertheless, the better course appears to be to include a requirement in the draft articles that a user agreement should apply throughout each watercourse and that all user States should be entitled to become parties to the user agreement. This would have the desirable result of promoting an integrated system which, from the technical point of view, is considered both the most efficient method of using an international watercourse and one that results in providing the greatest benefits to all the user States:

In spite of the fact that most States possess water resources in several basins, and all water resources available need to be considered as a whole for national programming purposes, the waters within the geographical area of a particular basin have been found to constitute a critical and, therefore, a most useful conceptual unit for establishing a legal régime and for organizing co-operation and collaboration with respect to water resources development, conservation and use. The basin is a naturally delimited area within which the waters appear and are stored or discharged to the common terminus. Changes, natural or man-made, within the basin are likely to produce effects only on the water resources within that basin. The basin concept provides, therefore, a much needed rational basis for dealing with non-maritime water-related problems.⁹⁸

97. A more detailed analysis of like thrust is contained in a recent ECE publication:

59. With regard to the full stage of river basin development, it is reasonable to work out a complete regulation and utilization plan for the river basin as a part of the unified planning system at an earlier stage of development. In such plans, and other plans prepared on a higher level of development, greater emphasis should be given to water demand control (changes in technology, basin-wide re-use, recycling, economic means and stimulators, etc.) to automatization, to the management of river basin

⁹⁷ See American Society of International Law, *op. cit.*, vol. VIII, No. 5 (September 1969), p. 905. See also *Yearbook . . . 1974*, vol. II (Part Two), pp. 291–292, document A/CN.4/274, paras. 60–64.

⁹⁸ *Management of International Water Resources . . . (op. cit.)*, para. 28.

development, to water quality, environmental architecture and the joint management and regulation of surface and groundwater resources, including coastal waters, and to the inter-basin transfer of water between large river basins. Because of the increase in uncertainties according to the length of the planning horizon, it is very important to ensure flexibility of long-term plans.

60. Planning may be applied to regions formed on the basis of various requirements (administrative and political, historical and economic, etc.) or to river basins, i.e., significant hydrological entities. In the long term, it seems preferable to aim at river basin management rather than regional management. In cases where a river basin is composed of several regions, the regions should be grouped together with a view to the gradual introduction of joint hydrological planning.

61. The socio-economic growth of countries with common river basins and its effect on the water management in these countries, as well as the quantitative and qualitative limitations of common water resources, need careful long-term planning for the benefit of all riparian countries. In view of the large variety of interests of the riparian countries, this planning process, being similar in many ways to the long-term planning process of national river basins, needs a gradual approach. This includes long-term plans for separate activities, joint research work on data and the collection of information. In the framework of existing organizations, the preparation of comprehensive long-term water management plans for international river basins can be approached in two steps: first the harmonization of long-term plans prepared by the individual riparian countries for their part of the basin, secondly the joint preparation of a basin-wide plan prepared by a team of experts from the interested countries. The forms of co-operation, which may also be different from those indicated above, will be determined jointly by the riparian countries concerned in each specific case.⁹⁹

98. In modern treaties on river basins, the usual practice has been for all riparian States of the watercourse to be parties to the convention, or at least be eligible to be parties. The Statute of the Organization of the Senegal Riparian States (1968)¹⁰⁰ is a notable example. Its Article 34 provides that the Statute enters into force only after ratification or approval by all the signatory States, which include all the Senegal riparian States. The Act regarding navigation and economic co-operation between the States of the Niger Basin (1963)¹⁰¹ provides, in article 2, that the "utilisation of the River Niger, its tributaries and sub-tributaries is open to each riparian State in respect of the portion of the River Niger basin lying in its territory...". The Convention and Statute relating to the development of the Chad Basin (1964)¹⁰² anticipates the participation of all the riparian States. The

Treaty for Amazonian Co-operation (1978)¹⁰³ to which Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Surinam and Venezuela are signatories, thus includes all the States in the Amazon Basin. These examples are not exhaustive.

99. The problem of river pollution provides a strong argument for the view that a user agreement should include all the States from which water drains into an international watercourse. There are various categories of pollutants whose effects are sufficiently toxic and are so persistent that, once introduced into a watercourse, they will remain a danger to life until the watercourse runs into the sea. Some of the substances remain dangerous even after they have moved into the sea, particularly in estuary and coastal waters. And some pollutants may persist in the bed of the watercourse or infiltrate ground water.

100. The most effective way to eliminate dangers of this nature is by co-operative action of all the States that contribute to and make use of the water of the watercourse, i.e. the user States. In some cases, if only one such State fails to join in the co-operative effort, it may severely impair the benefits of corrective action that is being taken by the other watercourse State. The Convention for the protection of the Rhine against chemical pollution (Bonn, 1976)¹⁰⁴ may be said to illustrate the need for action by all the States concerned, in that France, the Federal Republic of Germany, Luxembourg, the Netherlands, Switzerland as well as EEC are all parties. Its Article 1 sets forth the major steps to be taken, as well as the need for those steps:

Article 1

1. In order to improve the quality of the Rhine waters, the Contracting Parties will take, in accordance with the following provisions, appropriate measures to:

a. Eliminate pollution from the surface waters of the Rhine basin by dangerous substances included in the families and groups of substances shown in Annex I. . . . They propose to achieve gradually the elimination of discharges of those substances, taking into account the results of studies made by experts concerning each one, as well as the technical means available.

b. Reduce the pollution of the Rhine waters by dangerous substances included in the families and groups of substances shown in Annex II. . . .

2. The measures referred to in paragraph 1 above shall be adopted taking into account, within reason, that the waters of the Rhine are used for the following purposes:

- a. Production of drinking water for human consumption,
- b. Consumption by domestic and wild animals,
- c. Conservation and development of natural species, both fauna and flora, and conservation of the self-purification property of water,
- d. Fishing,
- e. Recreation, taking into account health and aesthetic requirements,

⁹⁹ *Long-Term Planning of Water Management: Proceedings of the Seminar on Long-Term Planning of Water Management, Zlatni Piasatzi (Bulgaria), 17-22 May 1976*, vol. I (United Nations publication, Sales No. E.76.II.E.27), part I, sect. B, paras. 59-61.

¹⁰⁰ United Nations, *Treaty Series*, vol. 672, p. 251.

¹⁰¹ *Ibid.*, vol. 587, p. 9.

¹⁰² For the English and French texts, see *Journal officiel de la République fédérale du Cameroun* (Yaoundé), 4th year, No. 18 (15 September 1964), pp. 1003 *et seq.* See also B. Rüster and B. Simma, eds., *International Protection of the Environment* (Dobbs Ferry, N.Y., Oceana, 1977), vol. XI, p. 5633.

¹⁰³ See American Society of International Law, *op. cit.*, vol. XVII, No. 5 (September 1978), p. 1045.

¹⁰⁴ *Ibid.*, vol. 16, No. 2 (March 1977), p. 242.

f. Direct or indirect supply of fresh water for agricultural lands,

g. Production of water for industrial use;

and the need to preserve an acceptable quality of sea water.

3. The provisions of this Convention are but a first step to achieve the objective referred to in paragraph 1 above.

...

The Bonn Convention of 1976 (which does not appear to have come into force as of this writing) deals with but one aspect of pollution. The basic treaty to which the Rhine States are parties, namely, the Agreement of 29 April 1963 which establishes the International Commission for the Protection of the Rhine against Pollution,¹⁰⁵ and another 1976 Convention, on the Protection of the Rhine against Pollution by Chlorides,¹⁰⁶ are further examples of the need for common action by all States of a watercourse in preventing and reducing pollution of the watercourse.

101. If each user State should be—or at least should be eligible to be—a party to the user agreement, the question arises whether it is essential that every party to a user agreement must also be party to the convention which may evolve from the Commission's articles. While it might be anticipated that a State which is prepared to enter into a user agreement would also be prepared to become bound by the convention, there may be States which prefer to act only in the context of a specific international watercourse. There should be no objection in principle to authorizing such a user State to become party to the user agreement, subject to two qualifications. First, there would have to be one or more user States which are party both to the convention and to the user agreement to ensure that the user agreement is entered into within the framework of the convention. Secondly, the user agreement would have to reinforce this connection by recognizing the principles and rules set forth in the convention as applicable to the extent that provision on a matter is not made in the user agreement. Otherwise the objective of establishing basic, if residual, principles through the medium of the convention would be sacrificed. The following articles are proposed.

Article 5. Parties to user agreements

A user State not party to these articles may be party to a user agreement provided that one or more user States party to the user agreement are party to these articles.

Article 6. Relation of these articles to user agreements

1. A user agreement shall be entered into within the framework of these articles.

2. These articles shall apply to States party to a user agreement with respect to matters not regulated by the user agreement.

102. The entry into force of treaties is a topic generally dealt with in the context of final clauses. It is not the practice of the Commission to draft final clauses for the articles it prepares, although, if a clause normally considered as a final one has a direct relationship to the operative aspects of a set of draft articles, the Commission has not hesitated to propose such articles. Some instances of such proposals have been articles dealing with reservations and settlement of disputes.

103. The prior discussion in this section on the necessity both for development of general principles regarding the uses of fresh water and for recognition of the individual characteristics of international watercourses demonstrates that a set of articles on use of sweet water presents problems regarding entry into force that are not usually found in multilateral treaties. It has already been pointed out¹⁰⁷ in connection with the 1923 Geneva Convention that the Convention did not have tangible results because, although it entered into force, no two of the parties were so located on the same river as to have a joint interest in hydroelectric production. This precedent demonstrates that the generally accepted provisions for the entry into force of treaties require reconsideration in respect of articles on the uses of international watercourses. The collection of clauses on entry into force for multilateral treaties in *The Treaty Maker's Handbook*¹⁰⁸ indicates that the almost invariable condition is that of ratification by a specified number of the States entitled to ratify. Occasionally all such States are required to ratify, but the customary requirement is for ratification by some fixed number, or a proportionate number, of the States entitled to ratify. Certain clauses lay down additional qualifications. One type of requirement is ratification by specified individual States, either by themselves, as in the 1947 Treaty of Peace with Hungary,¹⁰⁹ or in addition to a fixed number of other unspecified States, as in the 1968 Treaty on the Non-Proliferation of Nuclear Weapons.¹¹⁰ A not uncommon requirement, particularly in financial and economic treaties, is that the ratifying States include, for example, a number of States which together hold a certain position in a commodity market, or have invested a certain amount of capital in an international institution.

104. The clause on entry into force is thus adaptable to a wide variety of situations. The situation as far as

¹⁰⁷ See para. 92 above.

¹⁰⁸ H. Blix and J. Emerson, eds., *The Treaty Maker's Handbook* (Dobbs Ferry, N.Y., Oceana, 1973), pp. 75–86.

¹⁰⁹ United Nations, *Treaty Series*, vol. 41, p. 135.

¹¹⁰ *Ibid.*, vol. 729, p. 161.

¹⁰⁵ See Rüster and Simma, eds., *op. cit.*, vol. X (1977), p. 4820.

¹⁰⁶ See American Society of International Law, *op. cit.*, vol. XVI, No. 2 (March 1977), p. 265.

international watercourses are concerned is that, to be effective, the draft articles should come into force between two or more States of the same watercourse.

105. The question then arises whether there is any objection to the draft articles coming into force for an individual watercourse when two States of that watercourse have signified their intent to be bound by the articles. The clauses of entry into force of conventions based upon draft articles approved by the Commission have generally required a substantial number of ratifications or accessions as a prerequisite to entry into force. Twenty-two ratifications were required by the four Geneva Conventions on the Law of the Sea.¹¹¹ However, the Optional Protocol concerning the compulsory settlement of disputes (arising out of the Conventions on the Law of the Sea)¹¹² has no clause on entry into force as such. It is entitled "Optional Protocol of Signature", although its article V provides that the Protocol "is subject to ratification, where necessary, according to the constitutional requirements of the signatory States". Articles I and II, however, make it clear that the Protocol is in effect for any two States that are parties to the Protocol whenever a dispute may arise regarding the interpretation or application of any of the Conventions on the Law of the Sea to which they are both parties. The Conventions on Diplomatic Relations,¹¹³ Consular Relations¹¹⁴ and Special Missions¹¹⁵ also prescribe ratification by twenty-two States. However, the Optional Protocol to each of these Conventions regarding settlement of disputes requires only two ratifications, as does the Optional Protocol to the Convention on Diplomatic Relations concerning acquisition of nationality. The 1961 Convention on the Reduction of Statelessness¹¹⁶ entered into force two years after deposit of the sixth ratification or accession. At the other extreme, the Vienna Convention on the Law of Treaties¹¹⁷ will not come into force until deposit of the 35th instrument of ratification or accession. The most recent treaties, the 1973 Convention on the Prevention and Punishment of Crimes Against Internationally Protected Persons, including Diplomatic Agents¹¹⁸ and the 1978 Vienna Convention on Succession of States in Respect of Treaties,¹¹⁹ have returned to the provision requiring ratification or accession by twenty-two States.

106. The reason usually advanced for a substantial number of ratifications or accessions to bring a

convention originated by the Commission into force is that a general law-making treaty should have mustered substantial support in the world community before it is adopted as a codification or progressive development of international law. Whatever the merit of that approach with regard to the present set of articles, the Commission, as has been noted, is dealing with a novel and probably unique situation. The demand for a set of world-wide minimum principles and rules must be met in a manner that accords full recognition to the widely varying needs of diverse watercourses. Moreover, if they are to be effective, the articles will take effect within the confines of each individual watercourse.

107. In this situation, reliance on safety in numbers, which is a principal basis for demanding a great many ratifications or accessions, is not an operable mechanism. For example it would be possible to put the required number of ratifications or accessions at such an extreme number as 60. Nonetheless, that number could be reached without giving the articles practical force if no two of the 60 States were in the same watercourse system. This possibility is another illustration of the need for the Commission to take the nature of water into account in formulating rules. As noted, one of the principal physical characteristics of water is that it drains to the sea or other terminus within its own distinct watershed. As far as any individual State is concerned, its activities relating to the use of water in a specific watercourse area can affect only those other States that are wholly or partially in that area. Consequently, whether one State outside that watercourse area is a party to the articles or whether 50 States are parties to the articles is irrelevant to the effectiveness of the articles on that watercourse.

108. In these circumstances, the appropriate course of action is to provide that the articles will apply to each international watercourse as soon as such application can be effective. Obviously, when the area includes only two States, full effect can be achieved when both those States have ratified or acceded to the articles. What should be the position when more than two States are included in the area? It may be helpful to consider the overall geographic situation. The report by the Secretary-General of 27 October 1972 on technical and economic aspects of international river basin development¹²⁰ contains (in its annex III) a very useful breakdown in tabular form (reproduced on following page).

109. Of the 200 river basins included in the table, 180 have four or fewer riparian States. There could be little objection to applying the articles to a river basin in which one half, or two out of four, user States are parties to the articles. In the category of five to seven

¹¹¹ See footnote 4 above.

¹¹² United Nations, *Treaty Series*, vol. 450, p. 169.

¹¹³ *Ibid.*, vol. 500, p. 95.

¹¹⁴ *Ibid.*, vol. 596, p. 261.

¹¹⁵ General Assembly resolution 2530 (XXIV), annex.

¹¹⁶ In *Human rights: Compilation of International Instruments* (United Nations publication, Sales No. E.78.XIV.2), p. 76.

¹¹⁷ See footnote 64 above.

¹¹⁸ General Assembly resolution 3166 (XXVIII), annex.

¹¹⁹ See footnote 3 above.

¹²⁰ E/C.7/35. See also *Official Records of the Economic and Social Council, Fifty-fourth session, Supplement No. 4* (E/5247), paras. 129–137.

Table of first order international river basins according to number of constituent countries

Region	Area	Number of basins constituted by countries									Total
		2	3	4	5	6	7	8	9	10	
Africa	A	3	2	6		2	1		3		17
	B	30	8								38
Americas	A	10	2		1		1				14
	B	43	3								46
Asia	A	7	5	2		2					16
	B	20	3	1							24
Europe	A		2		1		1			1	5
	B	35	5								40
Total	A	20	11	8	2 ^a	4 ^b	3 ^c		3 ^d	1 ^e	52
	B	128	19	1							148
		148	30	9	2	4	3		3	1	200

A = more than 100,000 square kilometres.

B = less than 100,000 square kilometres.

^a La Plata, Elbe.^b Chad, Volta, Ganges-Brahmaputra, Mekong.^c Zambezi, Amazon, Rhine.^d Niger, Nile, Congo.^e Danube.

States there is a total of nine rivers; then there are three rivers in the column for nine States and one river in the column for ten States. There is obviously a problem of increasing difficulty in applying the articles to a river basin when only two States out of seven, nine, or ten have become parties. Nevertheless, the articles could have substantial utility in certain geographic situations and would have standard-setting utility under all circumstances. To the extent that the draft articles codify customary international law, they formulate law binding on all States, whether or not party to the articles. To the extent that the draft articles constitute progressive development of the law, they will point the direction for forward movement for all States. The following article is accordingly proposed:

Article 7. Entry into force for an international watercourse

These articles shall enter into force for an international watercourse on the thirtieth day following the deposit of the second instrument of ratification or accession by a user State.

110. A further question is whether there should be an article on the general entry into force of the articles among all the States parties and, if so, what its content should be. Whether a standard clause or a more specialized clause will be needed will become clear as work on the articles progresses. It is suggested that a decision on the point be deferred at this time.

CHAPTER IV

Regulation of data collection and exchange

111. The importance of river data collection and exchange is widely recognized, as evidenced by the presence of provisions for it in international declarations and resolutions and by the practice of States. Moreover, State practice indicates the need for the collection and exchange of data at two levels: as a standard provision in instruments regarding watercourse management, and as an integral part of the settlement of water disputes.

A. Data collection

112. On 12 December 1974, the General Assembly of the United Nations adopted resolution 3281

(XXIX), containing the Charter of Economic Rights and Duties of States, article 3 of which is to the point:

Article 3

In the exploitation of natural resources shared by two or more countries, each State must co-operate on the basis of a system of information and prior consultations in order to achieve optimum use of such resources without causing damage to the legitimate interest of others.

The terms of this provision clearly embrace international watercourses. An international watercourse necessarily is a natural resource shared by two or more countries. Moreover, the nature of the debate surrounding the adoption of article 3 suggests that it was designed to apply to international watercourses. The provision respecting "a system of information" is cast

in mandatory terms: in the exploitation of shared natural resources each State "must co-operate". The fundamental importance of information in the process of co-operation is emphasized by specifying that it is "on the basis" of a system of information that States must co-operate. Such co-operation is required "in order to achieve optimum use of such resources". At the same time, the Charter of Economic Rights and Duties of States is not an instrument which of itself gives rise to international legal obligations; it is a recommendatory resolution of the United Nations General Assembly.

113. Recommendation 51 of the United Nations Conference on the Human Environment, adopted in June 1972, endorsed the creation of river-basin commissions

to permit undertaking on a regional basis:

- (i) Collection, analysis, and exchanges of hydrologic data through some international mechanism agreed upon by the States concerned;
- (ii) Joint data-collection programmes to serve planning needs.

...¹²¹

The recognition of the need for river basin data is clear.

114. The Asian-African Legal Consultative Committee has dealt substantially with the non-navigational uses of international watercourses. Two draft proposals on "the law of international rivers" were placed before the Committee in 1970, one jointly proposed by Iraq and Pakistan and one proposed by India. Article V of the Indian draft recapitulated the list of factors in the Helsinki Rules relevant to determining a State's share of the water in an international watercourse. At the Committee's twelfth session, in 1971, the Rapporteur presented "Draft Proposals on the Law of International Rivers" based upon both drafts. Although the Draft Proposals did not refer to the Helsinki Rules, the members of the Committee's Standing Sub-Committee on the Law of International Rivers, appointed in 1972, agreed upon the following factors pertinent to determining a State's "reasonable and equitable share" of a watercourse:

- (a) The geography of the basin;
- (b) The hydrology of the basin;
- (c) The climate affecting the basin;
- (d) The past and existing utilization of the waters;
- (e) The economic and social needs of each basin State;
- (f) The population dependent on the waters of the basin in each basin State;
- (g) The comparative costs of alternative means of satisfying the economic and social needs of each basin State;
- (h) The availability of other water resources;
- (i) The avoidance of unnecessary waste in the utilization of waters of the basin; and

¹²¹ *Report of The United Nations Conference on the Human Environment* (United Nations publication, Sales No. E.73.II.A.14), p. 17.

(j) The practicability of compensation to one or more of the co-basin States as a means of adjusting conflicts among uses.¹²²

While the Draft Proposals do not expressly state the need to collect data, several of the relevant factors can be reasonably applied only if such information is available. In particular, the initial three factors relate to data on the hydrologic characteristics of the basin. Application of the other factors would give rise to the need for collection of other types of information.

115. The activities of the International Law Association reveal a history of concern for the management of international watercourses and a recognition of the importance of data collection and exchange. A resolution entitled "The Uses of the Waters of International Rivers", adopted by the ILA in 1958, contained the recommendation that:

3. Co-riparian States should make available to the appropriate agencies of the United Nations and to one another hydrological, meteorological and economic information, particularly as to stream-flow, quantity, and quality of water, rain and snow fall, water tables and underground water movements.¹²³

This was followed in 1972 by article 3 of the "Draft Articles on Flood Control" (subsequently adopted by the ILA Conference), which provides that:

Co-operation with respect to flood control may, by agreement between basin States, include among others:

- (a) collection and exchange of relevant data;
- (b) preparation of surveys, investigations and studies and their mutual exchange;
- ...

(g) setting up of a regular information service charged to transmit the height of water levels and the discharge quantities.¹²⁴

As already discussed, chapter II (articles IV–VIII) of the Helsinki Rules lists some of the factors relevant to international watercourse management.¹²⁵ As is true of the Draft Proposals of the Asian-African Legal Consultative Committee, application of at least the first three factors (geography, hydrology and climate of the basin) is dependent upon the collection of pertinent information.

116. Agreements vary in the degree of specificity assigned to the collection of appropriate data. Among them, the 1964 Agreement concerning the Niger River Commission and the navigation and transport on the River Niger¹²⁶ outlines in article 2(c), as one of the duties of the River Niger Commission, the responsibility "to collect, evaluate and disseminate basic data on the whole of the basin".

¹²² Asian-African Legal Consultative Committee, *Report of the Thirteenth Session; held in Lagos from 18 to 25 January 1972* (New Delhi, 1973), pp. 83–84.

¹²³ ILA, *Report of the Forty-eighth Conference, New York, 1958* (London, 1958), p. ix.

¹²⁴ *Idem*, *Report of the Fifty-fifth Conference, New York, 1972* (London, 1974), p. 48.

¹²⁵ See paras. 68 *et seq.* above.

¹²⁶ United Nations, *Treaty Series*, vol. 587, p. 19.

The 1971 Agreement concerning frontier rivers between Finland and Sweden¹²⁷ states, in chapter 9, article 3, that:

The Frontier River Commission shall maintain continuous observation of water flow at the point where the River Tärendö (Tärendö) flows out of the River Torne. As the basis for this activity the Commission shall have the necessary studies and calculations made as soon as possible in order to determine the volume of water flowing in each of the two rivers under prevailing natural conditions.

Protocol No. 1 of the 1946 Treaty of friendship and neighbourly relations between Iraq and Turkey, relative to the waters of the Tigris and Euphrates and their tributaries,¹²⁸ provides (in article 1) that:

Iraq may, as soon as possible, send to Turkey groups of technical experts in its service to make investigations and surveys, collect hydraulic, geological and other information needed for the selection of sites for the construction of dams, observation stations and other works to be constructed on the Tigris, the Euphrates and their tributaries, and prepare the necessary plans to this end.

...¹²⁹

The 1944 Treaty between the United States of America and Mexico relating to the utilization of the waters of the Colorado and Tijuana Rivers and of the Rio Grande (Rio Bravo)¹³⁰ provides in article 9 (j) for the collection of data and for the construction, maintenance and operation of the necessary stations and mechanisms:

(j) The Commission shall keep a record of the waters belonging to each country and of those that may be available at a given moment, taking into account the measurement of the allotments, the regulation of the waters in storage, the consumptive uses, the withdrawals, the diversions, and the losses. For this purpose the Commission shall construct, operate and maintain on the main channel of the Rio Grande (Rio Bravo), and each Section shall construct, operate and maintain on the measured tributaries in its own country, all the gaging stations and mechanical apparatus necessary for the purpose of making computations and of obtaining the necessary data for such record. . . .

The 1969 Agreement for the regulation, channelling, dredging, buoyage and maintenance of the River Paraguay, signed by Argentina and Paraguay,¹³¹ provides in article IX for a broad range of information by stating that:

With a view to carrying out the studies and works referred to in the preceding article, appropriate topohydrographic and hydrological surveys, surveys of the river-bed and of the amounts of sediment and matter in suspension and surveys relating to pollution, climatology, and so forth, shall be made, the cost thereof being borne as indicated in article VIII.

Detailed provisions are also found in the annexes of the 1956 Agreement between the Union of Soviet Socialist Republics and the People's Republic of China on joint research operations to determine the natural resources

of the Amur River basin and the prospects for development of its productive potentialities and on planning and survey operations to prepare a scheme for the multi-purpose exploitation of the Argun River and the Upper Amur River,¹³² of which annex No. 1, section 1, requires research operations consisting of surveys "of the physical and geographical characteristics of the Amur River Basin (geomorphological, climatological, hydrological, pedological, pedologic-geochemical, geobotanical, silvicultural and piscicultural conditions)". Annex No. 2, section A, 1 provides that:

The purpose of the hydrometric operation shall be to provide data to determine the variations in the level and flow of the rivers, their winter flow, their solid flow and the chemical composition of the water.

117. Intergovernmental boards also provide for the collection of data. The Danube Commission was established in 1921 under the Convention Instituting the Definitive Statute of the Danube,¹³³ which stated that the Commission "shall establish such administrative, technical, sanitary and financial services as may be considered necessary". Contemporary services performed by the Commission include the following: "To co-ordinate the hydrometeorological services on the Danube, and to publish a single hydrological bulletin and short-term and long-term hydrological forecasts for the Danube".¹³⁴

The Revised Convention relating to the navigation of the Rhine signed at Mannheim in 1868¹³⁵ was negotiated to supervise navigation and related activities on the Rhine. Article 43 created a Central Commission; article 31 provided for the gathering of hydro-technical data as follows:

Hydrotechnical engineers appointed by the Governments of all the riparian States shall carry out visits of inspection from time to time, for the purpose of ascertaining the results of action taken to improve the condition of the river and noting any obstacles hampering navigation.

The Central Commission (article 43) shall specify the time at which and the sections of the river where these inspections shall take place. The engineers shall report thereon to the Central Rhine Commission.

Data collection is also required under the 1976 Convention on the Protection of the Rhine against

¹²⁷ *Ibid.*, vol. 825, p. 191.

¹²⁸ *Ibid.*, vol. 37, p. 226.

¹²⁹ *Ibid.*, pp. 287 and 289.

¹³⁰ *Ibid.*, vol. 3, p. 313.

¹³¹ *Ibid.*, vol. 709, p. 311.

¹³² USSR, Ministry of Foreign Affairs, *Sbornik deistvuiushchikh dogovorov, soglashenii i konventsii, zakliuchennykh SSSR s inostrannymi gosudarstvami* (Treaties, Agreements and Conventions in force, concluded by the USSR with foreign countries) (Moscow, 1956), vol. XVIII, p. 323. See also *Legislative Texts and Treaty Provisions concerning the Utilization of International Rivers for other purposes than Navigation* (United Nations publication, Sales No. 63.V.4), p. 280.

¹³³ League of Nations, *Treaty Series*, vol. XXVI, p. 175.

¹³⁴ UNITAR, *International Navigable Waterways: Financial and legal aspects of their improvement and maintenance* (report on the Symposium held at Buenos Aires from 30 November to 4 December 1970), Study No. 6 (New York, 1974), p. 90.

¹³⁵ Council of Europe, *European Yearbook* (The Hague, Martinus Nijhoff, 1956), vol. II, p. 258. See also *Legislative Texts . . . (op. cit.)*, treaty No. 111.

Chemical Pollution.¹³⁶ Article 8 specifies that each Contracting Party bears responsibility for controlling discharge in conformity with the Convention and stipulates that yearly reports on the data obtained must be made to the International Commission by each treaty party. Article 10, paragraph 1, further provides that:

1. In order to control the Rhine water content of Annex I and II substances each Government will assume responsibility at the measuring stations on the Rhine for the installation and operation of measuring instruments and systems serving to determine the concentration of the aforementioned substances.

The International Joint Commission, Canada/United States of America, habitually provides for the collection of data through the actions of boards it creates for the purposes of supervision of lake levels, regulation and supervision of dams and diversion canals, and co-ordination of the activities of the Governments of the United States and Canada.¹³⁷ For example, the International Great Lakes Levels Board was established by the Joint Commission in 1964 to review the factors causing fluctuations in water supply in the Great Lakes and to examine, among other things, the feasibility of further regulation of water supplies and the changes that would be required in then existing structures to accomplish additional regulation. To accomplish its study, the Board analysed the level and flow of water, based upon calculation of "net basin supply", as follows:

Net basin supply is a term used to describe the net water supply to a lake resulting from: precipitation on the lake surface; runoff from the tributary drainage area; groundwater flow into or out of the lake; and evaporation from the lake. Although available techniques do not permit the accurate determination of these factors separately, the net basin supplies can be computed quite accurately by employing reliable lake level, flow and diversion records for the required monthly and quarter-monthly periods . . .¹³⁸

118. A recent example of the role of data collection in the settlement of disputes is provided by the 1977 Agreement between Bangladesh and India on sharing of the Ganges waters at Farakka and on augmenting its flows.¹³⁹ Articles II and III set forth the basis for the division of waters at Farakka; article II states, in part:

(i) The sharing between Bangladesh and India of the Ganges waters at Farakka from the 1st January to the 31st May every year will be with reference to the quantum shown in column 2 of the Schedule annexed hereto which is based on 75 per cent availability calculated from the recorded flows of the Ganges at Farakka from 1948 to 1973.

In article IV, the Agreement goes on to stipulate that a joint committee be created to "observe and record at Farakka the daily flows".

Another example, the 1970 exchange of letters constituting an agreement between France and Spain amending the arrangement of 12 July 1958 relating to Lake Lanoux,¹⁴⁰ contains more detailed provisions regarding data collection. It sets forth the type of monitoring devices to be used and the method of emplacement, as well as specifying quantities of water to be released.

119. The foregoing examination of State practice and of the provisions of international declarations and resolutions reveals a wide diversity in requirements and recommendations for data collection. Such disparity reflects variations both in the available methods of data collection and in the characteristics of each international watercourse.

120. According to the *Manual of river basin planning* prepared by the United Nations, water resources development "requires data on precipitation, river stage, river discharge, sediment transportation, yield and storage of groundwater, and the quality of water as well as other related meteorological data such as temperature".¹⁴¹ But although a vast amount of data is appropriate to watercourse development, most information—including that mentioned above—falls generally into periodic measurement of the quality and quantity of surface runoff and groundwater contribution.

121. The potential quantity of water in any watercourse equals precipitation minus the amount lost through evaporation and transpiration.¹⁴² A relatively simple method of calculating quantity is its equation with the difference between total catchment precipitation and total evaporation losses, with allowances for changes in storage. Reliance solely on such a formula is limited, however, by the inability of the formula to deal with instances of flood peaks or with short-term, rapid changes in water quantity.¹⁴³ More comprehensive measurement of water quantity is provided by determination of "stage" (river or lake height), measurement of mean velocity of water flowing past a section of a watercourse and calculation of their relationship (called the "stage-discharge relationship").¹⁴⁴ Tests of water quality, on the other hand, include analyses of the presence of micro-organisms, dissolved gases, special salts, hardness, salinity, acidity, dissolved solids, suspended solids and the observation of temperature, colour, odour and taste.¹⁴⁵

122. In determining what data should be collected, States must consider the uses to which the data are to

¹³⁶ For reference, see footnote 104 above.

¹³⁷ L.M. Bloomfield and G.F. Fitzgerald, *Boundary Waters Problems of Canada and the United States* (Toronto, Carswell, 1958), p. 36.

¹³⁸ International Great Lakes Levels Board, *Regulation of Great Lakes water levels; Report to the International Joint Commission* (Washington, D.C., 1973), p. 65.

¹³⁹ See footnote 93 above.

¹⁴⁰ United Nations, *Treaty Series*, vol. 796, pp. 240–243.

¹⁴¹ *Multiple-purpose River Basin Development—Part 1: Manual of river basin planning*. Flood Control Series, No. 7, (United Nations publication, Sales No. 1955.II.F.1), p. 11.

¹⁴² *Ibid.*, p. 12.

¹⁴³ Ward, *op. cit.*, p. 357.

¹⁴⁴ *Ibid.*, pp. 357–358.

¹⁴⁵ *Multiple-purpose River Basin Development . . . (op. cit.)*, p. 25.

be put, the resources at a State's disposal, and the ease of collection of data. In the case of water quantity, the following passage is illustrative of the impact of use:

There are different requirements to be met depending upon the phase of development. For example, maximum flood stage and flood discharge are required for planning flood control embankments, while minimum river stage and duration are essential for planning navigation. Important to most fields of water resources development are (i) the *mean values* of the hydraulic elements (discharge, river stage, sediment discharge, etc.)...; (ii) the variation (daily, weekly, seasonal or annual) of the hydraulic elements in chronological order, which are presented as hydrographs or histograms; (iii) the frequency and duration of occurrence of the various hydraulic elements with respect to their magnitude; (iv) the accumulated values of some hydraulic elements such as runoff with respect to time; and (v) the extremes of the hydraulic elements, their magnitude and frequency of occurrence.¹⁴⁶

The position regarding data on water quality is different:

In the case of domestic supplies, the required analysis is generally prescribed by regulation or ordinances relating to public health. Water for industrial use must be suitable for the special processes involved. Irrigation water must not contain objectionable salts, solids and other substances, dissolved and suspended beyond certain limits. Surface waters utilized for recreation purposes must be free from pollutorial materials creating a nuisance and from pathogenic bacteria, while those for fish breeding should be free from toxic substances and should meet necessary standards as to dissolved oxygen.¹⁴⁷

A State's resources will affect the methods of data collection employed. Both manual and automatic techniques are available. Selection of one method over another depends, in part, upon the presence of trained manpower and the necessary financial resources. Some types of information are more easily gathered than others. While data on groundwater are highly desirable, for example, they are relatively more difficult to obtain than those relating to surface water.

123. In the light of these considerations, article 8, on "data collection", is proposed as follows:

Article 8. Data collection

1. A contracting State shall collect and record data with respect to precipitation and evaporation of water and with respect to the stage of flow, mean velocity and abstraction of the water of an international watercourse in its territory as follows:

- (a) ... (to be completed)
- (b) ... (to be completed)
- (c) ... (to be completed)
- (d) ... (to be completed)

...

2. Each contracting State shall employ its best efforts to collect and record data in a manner which facilitates co-operative utilization of the data by contracting and co-operating States.

3. User agreements may provide for the collection of such additional data, notably in respect of water quality and water-related disease, as may be significant for development, use and environmental protection of the international watercourse. They may specify the method of data collection and the nature of the records to be employed.

124. The proposed provisions are designed to ensure the collection of a minimum amount of data adequate to fulfil the aims of watercourse management, to avoid unrealistically uniform regulation, and to take advantage of the flexibility inherent in user agreements.

125. While data in addition to precipitation, evaporation, stage flow, mean velocity and abstraction are of benefit in watercourse management, a requirement for additional data would have to be considered on a case-by-case basis in the light of cost-benefit analysis. To make their collection mandatory and to specify the method of collection would be to overlook the diversity that exists among watercourses and among the needs—and resources—of user States. Data on water quality are a case in point. While information regarding the quality of water is essential for any watercourse, there is no standard as regards information on water quality that is applicable to all watercourses. Establishment of provisions on water quality is a matter best regulated by user agreements.

126. Each of the four elements on which data are required in paragraph 1 of article 8 is fundamental to any international system of regulation, however, and acknowledgement of the importance of these factors is basic to the formulation of general provisions regarding the uses of international watercourses. Collection of the four types of information specified provides a basis for co-operative action and lays the foundation for further measurement. Moreover, flexibility is permitted insofar as these four basic provisions can be implemented to provide information on a variety of water conditions and relationships, and to meet the objectives and resources of individual States. At the same time, the Special Rapporteur wishes to call attention to the Commission's need for technical, professional advice and guidance in the more precise formulation of such provisions. Blanks have been left in the draft article to emphasize this need. While the four elements regarding which data are to be collected are specified, the exact nature of the data is left undetermined pending consultation with hydrologic experts.

127. Paragraph 2 emphasizes the desirability, but does not impose the obligation, of consonant methods of collection and recording, to the co-operative benefit of the States concerned. Recognition of the utility and importance of basin-wide agreement on the character and quality of information and the methods of its collection is contained in paragraph 3, which contemplates the possibility of user agreements requiring

¹⁴⁶ *Ibid.*, p. 14.

¹⁴⁷ *Ibid.*, pp. 24–25.

additional data calibrated to the singular nature of a particular watercourse.

B. Data exchange

128. A requirement for data exchange among co-operating States is the natural complement of article 8. A review of some of the agreements cited earlier reveals, for example, that the Commission created in the 1971 Agreement between Finland and Sweden concerning frontier rivers¹⁴⁸ is empowered, in chapter 2, article 3, to "enter into direct contact with authorities of either State and may call upon them for assistance in obtaining any necessary information and arranging for any necessary consultations".

The 1944 treaty, mentioned above, between the United States and Mexico,¹⁴⁹ provides in article 9 (j): "The information with respect to the diversions and consumptive uses on the unmeasured tributaries shall be furnished to the Commission by the appropriate Section".

The 1956 Agreement between the People's Republic of China and the Union of Soviet Socialist Republics¹⁵⁰ stipulates in article 5 that:

The Soviet and Chinese organizations shall, for information purposes, exchange data, reports and other documentation on research, planning and survey operations carried out in the Amur Basin before 1956, and shall exchange similar material in carrying out the operations mentioned in articles 1 and 2.

Article 39 of the Convention Constituting the Definitive Statute of the Danube¹⁵¹ requires that:

The International Commission of the Danube and the European Commission of the Danube shall take all measures necessary to ensure, so far as it is possible and advisable, a uniform system of administration for the Danube.

The two Commissions shall, for this purpose, regularly exchange all information, documents, minutes, plans and projects which may interest both. They may by agreement draw up certain identical regulations relative to the navigation and policing of the river.

129. It will be recalled that the United Nations Conference on the Human Environment adopted a recommendation providing for "exchanges of hydro-logic data".¹⁵²

The "draft principles of conduct in the field of the environment for the guidance of States in the conservation and harmonious utilization of natural resources shared by two or more States",¹⁵³ which were approved in 1978 by members of the UNEP Intergovernmental Working Group on natural resources shared by two or more states, are of similar thrust. Two relevant clauses are contained in the draft principles. Principle 5 provides:

States sharing a natural resource should, to the extent practicable, exchange information and engage in consultations on a regular basis on its environmental aspects.

Principle 7 adds:

Exchange of information, notification, consultations and other forms of co-operation regarding shared natural resources are carried out on the basis of the principle of good faith and in the spirit of good neighbourliness and in such a way as to avoid any unreasonable delays either in the forms of co-operation or in carrying out development or conservation projects.

130. The Helsinki Rules¹⁵⁴ also deal with the question of exchange, and state in paragraph 1 of article XXIX that:

With a view to preventing disputes from arising between basin States as to their legal rights or other interest, it is recommended that each basin State furnish relevant and reasonably available information to the other basin States concerning the waters of a drainage basin within its territory and its use of, and activities with respect to, such waters.

Other specifications by ILA on the need for exchange of data are set forth earlier in this report.¹⁵⁵

131. Article 9, on exchange of data, is accordingly proposed as follows:

Article 9. Exchange of data

1. Data collected under the terms of paragraphs 1 and 2 of article 8 of these articles shall be made available to contracting and co-operating States at regular intervals of . . .

2. Contracting and co-operating States shall use their best efforts to comply with requests from contracting and co-operating States for special data (data not included in the provisions of article 8, paragraph 1) and with requests from contracting and co-operating States for data collected prior to the entry into force of these articles for the contracting State requested or to the entry into force of the user agreement for the co-operating State requested.

3. User agreements may regulate additional aspects of data exchange.

132. While the need to exchange data is generally acknowledged, specific questions emerge (what data? with whom? under what conditions?). Paragraph 1 provides a partial answer to these queries. First, it extends the application of the provisions of article 8 to all contracting and co-operating States, for it is in the best interests of international co-operation and rational and equitable development that all States parties to article 8, through adherence to the articles or to a user agreement, be the recipients of the benefits of data collection. Secondly, paragraph 1 of article 9 reinforces the importance of the data whose collection is prescribed in article 8, paragraph 1. Thirdly, it provides for the regular flow of such data, which is

¹⁴⁸ See footnote 74 above.

¹⁴⁹ See footnote 130 above.

¹⁵⁰ See footnote 132 above.

¹⁵¹ See footnote 133 above.

¹⁵² See para. 113 above.

¹⁵³ UNEP/GC.6/17.

¹⁵⁴ See footnote 29 above.

¹⁵⁵ See para. 115 above.

essential to development plans for the use of water and is the basis of estimates of short-term and long-term availability. The intervals at which such data are to be provided are left blank; this further illustrates the need for professional advice.

133. Paragraph 2 of article 9 recognizes that other kinds of data play an important role in the co-operative utilization of a watercourse system. Data such as snow survey reports, for example, provide additional information for the development of co-operative utilization of a watercourse and should be available to contracting and co-operating States which recognize that need. Moreover, previously gathered data may also be desired by a contracting or co-operating State, and paragraph 2 contemplates their exchange. Finally, paragraph 3 offers contracting States the possibility of negotiating user agreements to provide for other data exchange. (The exchange of data relative to special aspects of international watercourses, such as the production of hydroelectricity or the need for flood control, is not included explicitly within the terms of article 9. Special provisions relating to these and other characteristics may be elaborated in connection with specific uses).

C. Costs of data collection and exchange

134. It is proposed that draft article 10, on costs of data collection and exchange, read as follows:

Article 10. Costs of data collection and exchange

1. Costs of the collection and exchange of data pursuant to article 8, paragraph 1, and article 9, paragraph 1, shall be borne by the State providing the data.

2. The requesting State shall bear the costs incurred by the requested State in fulfilling a request for special data, as defined in article 9, paragraph 2, and in making available data collected prior to:

(a) the entry into force of these articles for the contracting State requested, or

(b) the entry into force of the user agreement for the co-operating State requested.

3. User agreements may provide for different or additional cost provisions relating to the collection and exchange of data.

135. Paragraphs similar to paragraphs 1 and 2 of article 10 are standard provisions of many hydrological agreements. The Agreement concerning the utilization of the rapids of the Uruguay River in the Salto Grande area, concluded by Argentina and Uruguay in 1946,¹⁵⁶ is accompanied by an Additional Protocol,¹⁵⁷ article 3 of which provides that:

The cost of the topographical and geological surveys and that of establishing and operating each meteorological station shall be borne by the respective Governments.

Article 9 of the 1956 Agreement between the Union of Soviet Socialist Republics and the People's Republic of China¹⁵⁸ specifies that:

All expenses arising from the presence of Soviet specialists in Chinese territory and Chinese specialists in Soviet territory for the purposes indicated in Article 6 shall be borne by the sending Party.

The Agreement concerning the Niger River Commission and the navigation and transport on the River Niger¹⁵⁹ provides in its article 10 that:

Any expenditure incurred in respect of special services rendered to a State by the Commission shall be paid by that State.

136. Paragraphs 1 and 2 of article 10 provide for apportionment of the costs of gathering and exchanging data in accordance with the following principle: a State's assumption of responsibility for the collection and dissemination of data under article 8, paragraph 1, and article 9, paragraph 1, gives rise to its obligation to assume the resultant expense; however, since some requests are of an extraordinary nature, it is provided that the costs of their fulfilment shall be borne by the requesting State. Finally, it remains possible for States to negotiate supplementary or alternate provisions on cost sharing through user agreements.

¹⁵⁶ United Nations, *Treaty Series*, vol. 671, p. 17.

¹⁵⁷ *Ibid.*, p. 38.

¹⁵⁸ See footnote 132 above.

¹⁵⁹ See footnote 126 above.