

GOALS AND FORMS OF CO-OPERATION BETWEEN COUNTRIES FOR THE DEVELOPMENT OF INTERNATIONAL RIVER BASINS

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SUMMARY

The purpose of international relations on water problems is to create favourable conditions for water management activities and also to facilitate the exploitation of benefits accruing from the international division of labour.

When water problems are involved primarily, co-operation between countries sharing the same water basin is the most important form. Such co-operation is based on bilateral or multilateral agreements concluded with the interested parties.

In order to avoid disputes and to establish a peaceful, fraternal milieu for negotiations, agreements should be based on principles codified in international water law. As a first step for the preparation of codification, it would be most desirable of the United Nations would sponsor and promote further studies dealing with the investigation of factors influencing the willingness to conclude agreements of a comprehensive nature.

INTERNATIONAL CO-OPERATION IN GENERAL

Goal and importance

The essence of water management might be defined as an activity directed towards obtaining optimal co-ordination and harmonization of the natural complement of water resources with the needs of the society by means of planned scientific, technical, economic, administrative and legal measures. Accepting this definition, it appears to be obvious that the purpose of the development of international water management co-operative agreements is to establish advantageous international conditions for those activities as well as to provide for the benefits accruing from the international division of labour.

The distinctive feature of water resources, unlike all other natural resources, highlights the importance of close co-operation between countries sharing the river basin concerned and of common efforts of countries located in the vicinity of an international river basin.

Needs and problems

Few issues in the history of mankind have caused so much controversy or, rather, hostility as the problems of international waters, and especially their use.

In general, the cause of this controversy is that in several areas of the earth, there is insufficient water and its quality is unsuited for supplying the multiple and increasing requirements of the population. The number of countries is gradually increasing where, for mere existence, more advanced methods and means of water development should be adopted. These methods and means call for continually increasing intellectual and material investments. It is also clear that the investment will be even greater and the results less satisfactory if several States situated in the same international drainage basin do not co-ordinate their activities.

With the intensification of agricultural and industrial water uses the conception of an international drainage basin, rather than that of international rivers, has gradually come to the fore. In accordance with article II of the Helsinki Rules, "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."¹

The European Water Charter, compiled by the Council of Europe, affirms a statement regarded as necessary by all who are thinking logically: "Water does not know state boundaries, but as a common resource, it needs international co-operation"² That is, in the drainage basins representing a single economic and geographical entity, the watercourses crossing political boundaries give rise to mutual interdependence and consequently a necessary relationship between the neighbouring countries and even between countries which are more remote.

However, in addition to the last-named reason, others can be mentioned as the starting-point for most countries in extending and intensifying

¹ For text of Helsinki Rules, see, *Integrated River Basin Development: Report of a Panel of Experts*, rev. ed. (United Nations publication, Sales No. E. 70. II. A. 4), annex VII.
² Council Europe, *European Water Charter* (Strasbourg, 1968).

their international relations — for example, analysis of the possibilities of decreasing the high costs of water establishments or provision of economic assistance for covering expenses.³

In addition to the need for co-operation, problems also occur in connexion with the legal rights of the States. According to the conventional concept of national sovereignty, every State has the right to control everybody and everything, including water, within its own territory. This concept holds true for international rivers touching more than one State (separating or traversing the territories of two or more States). However, the State in question cannot exercise control until the water reaches its territory or after the water has been left behind. Consequently, the quantity and quality of water available for a State situated within an international drainage basin substantially depends upon the water resources development of the other States situated within the same drainage basin (especially of those situated upstream).

INTERNATIONAL WATER LAW

The most effective method of resolving international water management problems is through direct co-operation based on bilateral or multilateral agreements between the parties concerned. The guiding principles and suggestions prepared by international organs and compiled by international jurists, with the scope to solve scientific, technical and legal problems which might arise, and to collate the methods and conceptions developed in the different countries, can provide valuable assistance in developing direct co-operation and in concluding agreements.

Principles regarding water uses of international rivers

An important factor in water uses under the sovereignty of different States is international water law. This law, similar to other international laws (except in certain details), is not yet codified. Thus, it cannot be referred to as an inter-State water law; only some principles have been derived by the States from international practice (particularly international contracts), science and a few quasi-international jurisdictions.

The literature deals in particular with the questions of water use, analysing the principles accepted and applied in several instances. Every principle has its supporters and opponents. Furthermore, different jurists did not arrive at the same conclusion on the same principle.

According to the literature, the most frequently used principles are:

- (a) Absolute territorial sovereignty;⁴
- (b) Absolute territorial integrity;⁵
- (c) Principle of established rights;⁶
- (d) Theory of servitude;⁷
- (e) Common property — common interests;⁸
- (f) Good neighbourliness;⁹
- (g) Restriction of territorial sovereignty;¹⁰
- (i) Priority of inland navigation.¹¹

Concerning the use of international waters, the acceptability of the foregoing and other principles is generally limited. According to Klimentko,¹² the imperative principles of modern international law should be taken as starting points. These principles are: the sovereignty, equality, immunity and integrity of the territory of countries.

Role of international organizations

The basic principles of international water law and the ability of codification have been and is being investigated by several governmental and non-governmental international organizations.

Governmental organizations¹³

Conferences organized and sponsored by the League of Nations and recently by the United Nations have prepared a number of draft conventions. However, these draft treaties have been ratified only by a few countries; thus sparse, if any, benefits have accrued therefrom.

Among the recommendations or proposals of the different international organizations, the resolutions of the meeting on "The economic development and water resources on underdeveloped countries" of the Economic and Social Council might be stressed.

Non-governmental organizations

The first step in the field of international water law was taken by the Institute of International Law (Madrid Resolution) and this initiating action was followed by broader activities.

Special attention should be given to the Helsinki Rules elaborated by the International Law Association, some recommendations of which are mentioned below:

(a) Each basin State is entitled to a reasonable and equitable share in the uses of the waters of an international drainage basin (article IV);

⁴ D. M. Klimentko, *International Rivers, Legal Problems Concerning Industrial and Agricultural Water Utilization of International Rivers* (In Russian) (Moscow, 1969); *The Law of International Drainage Basins*, A. H. Garretson R. D. Hayton and C. J. Olmstead, eds. (Dobbs Ferry, N. Y., Oceana Publications, for the Institute of International Law, New York University School of Law, 1967); International Commission on Irrigation and Drainage, *International Problems Relating to the Economic Use of River Waters* (New Delhi, 1961).

⁵ *Ibid.*

⁶ Klimentko, *op. cit.*

⁷ *Ibid.*

⁸ F. J. Berber, *River in International Law* (London, 1959).

⁹ Klimentko, *op. cit.*

¹⁰ Klimentko, *op. cit.*; Berber, *op. cit.*

¹¹ "Legal problems relating to the utilization and use of international rivers (A/3409).

¹² Klimentko, *op. cit.*

¹³ "Legal problems relating utilization..."

³ F. Jastrzebski, "International co-operation in the field of water management" (in Polish), *Gospodarka Wodna*, 1965:7; *Management of International Water Resources: Institutional and Legal Aspects*, Natural Resources (Water Series No. 1 (United Nations publication, Sales No. E. 75. II. A. 2).

(b) In each particular case this reasonable and equitable share is to be determined in the light of all the relevant factors (article V);

(c) No single use is entitled to any inherent preference over any other use (article VI);

(d) No water should be reserved for a future use, since to do so might interfere with the current reasonable uses of a State (article VII);

(e) The States are obliged to:

(i) Prevent any new form of water pollution or any increase in the degree of existing water pollution which would cause substantial injury in the territory of another co-basin State; and

(ii) Take all reasonable measures to abate existing water pollution so that no substantial damage is caused in the territory of a co-basin State (article X).

Naturally, the Helsinki Rules cannot be regarded as a treaty, because no authentic official delegates have signed it, consequently, states are not bound to respect them. Nevertheless, the establishment and systematization of the principles of international law concerning the use of international rivers by several jurists of different nationalities is not merely theoretically, but practically, of great importance.

INTERNATIONAL AGREEMENTS ON WATER PROBLEMS

As previously mentioned, international water law, like other international laws, is not yet codified. Consequently, the prevention or peaceful settlement of disputes is, in practice, ensured only through bilateral or multilateral agreements.

General survey

Historically, co-operation between States was limited to navigation. Roman law fixed the possibility of the free use of waterways. In the Middle Ages, royal privileges impeded free communication. The Roman principle of law was revived only in contracts concluded at the end of the eighteenth century or at the beginning of the nineteenth century (agreements concerning the Rhine and the Danube; and, subsequently the Odera, Vistula, Elba and Po rivers, etc.).

International co-operation and the extension of the tenor of agreements, however, began after the First World War and increased after the Second World War.

The treaties on navigation on the Danube (Belgrade, 18 August 1948) and on fishing in the Danube (Bucharest, 29 January) were concluded in the spirit of this concept. These agreements bear the marks of the stage of economic development, the natural character, the economic and political power relations and of the ethical concepts of the Governments concerned. In the case of defencelessness, the agreements came into existence on the basis of absolute areal sovereignty (if the upstream State refuted it from the position of superiority), or of the absolute areal integrity (if the

down-stream State dictated the agreement). Recently, there has been a gradual increase in the number of agreements in which — rejecting the "concept of absolute" — the concept of equality constitutes the basis. Under these agreements, the respect for the other Party's rights and interests are assured, and, moreover the drainage area is considered a quasi-single economic unit¹⁴.

The treaties on navigation on the Danube (Belgrade, 18 August 1948) and on fishing in the Danube (Bucharest, 29 January 1958) were concluded in the spirit of this concept. These agreements, however, contain only direct measures concerning water management.

The first effective steps in this respect were taken by the Integrated Programme of the Council for Mutual Economic Assistance (CMEA) in 1971. This Programme prescribes the responsibilities of the member States in elaborating the special interests of each State concerning the long-range integrated development of water management in the Danube basin, including solution of the problems concerned.

The multilateral co-operation in the Tisza valley was begun in 1969, and the forms of collaboration of the five interested countries are now laid down in the Integrated Programme of CMEA: the concerned member States of CMEA are under obligation to prepare proposals on the organization and implementation of co-operation concerning the water resources development and run-off control in the entire Tisza drainage basin.

Principles and recommendations

On the basis of the most informative bilateral and multilateral international agreements in water management¹⁵ as well as the theoretical work by prominent experts in international law, the responsibilities and rights of countries located in international drainage basins can be discussed. The acceptance of such obligations depends upon the willingness of the countries and their realization takes the form of treaties or agreements.

It might be stated that the sovereignty of the countries is restricted rather than absolute; indeed, all countries have to consider — moreover, to respect — the interests of the neighbouring country. The most urgent task in this regard appears to be the determination of:

(a) The extent of restriction on the state and its sovereignty (i.e., defining the responses accruing from the principles for implementation);

(b) The possible ways to warrant recognition of these principles and the responses accruing therefrom.¹⁵

Acting on the basis of these principles and conditions is the prerequisite of considering water to be a source of fraternity instead of a source of discord.

The problems to be solved and their importance vary in time and space; accordingly, the

¹⁴ „Legal problems relating to the utilization . . .”
¹⁵ *Management of International Water Resources . . .*

contents of the agreements can not be uniform. Nevertheless, it is desirable that the agreements of a given State be established on the same principles; that is, should be as comprehensive as possible and should serve the integrated development of the drainage basin as much as possible.

Draft recommendations concerning the structure and contents of international agreements on water problems, in accordance with the report of the Panel of Experts on the Legal and Institutional Aspects of International Water Resources Development,¹⁶ are outlined below. It is understood, however, that no such recommendation can cover all possible variations; thus, adjustments may be necessary in particular cases. Furthermore, mutual benevolence is needed in order to establish a useful and fruitful agreement, as well as to realize the provisions thereof.

Basic principles

A system of rivers, lakes and ground waters in a drainage basin should be treated as an integrated whole and not independently. Therefore, the parties should agree on:

(a) Respecting the integrity of the drainage basin from the point of view of water management as well as the rights, advantages and obligations originating from that integrity;

(b) Studying and seeking a common solution for all the problems, measures and works of water management which may affect water flow, water-level and water quality, in accordance with the foregoing statement.

Validity of the agreement

In consequence of the basic principles, the validity of the agreement should cover:

(a) From a geographical point of view, the international catchment area shared by the parties;

(b) As concerns water resources, both surface and ground waters;

(c) With respect to the various water management branches, the entire field of water resources development, with all the pertinent problems, measures, institutions and works.

Distribution of water resources

According to article V of the Helsinki Rules each basin State is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the water of an international drainage basin. This reasonable and equitable share is to be determined in the light of all relevant factors in each particular case. Relevant factors to be considered include, but are not limited to:

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

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

¹⁶ *Ibid.*

(c) Climate affecting the basin;

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

(e) Economic and social needs of each basin State;

(f) Population dependent upon the waters of the basin in each basin State;

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

(h) Availability of other resources;

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

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

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

(l) Other factors.

Water pollution control

The parties must prevent any new kind of pollution or the increase of the degree of existing pollution which would have detrimental effect in the territory of the co-basin State. They also must take reasonable action to prevent further pollution and put into effect all practicable means of reducing existing pollution loads to a less harmful degree.

Maintenance

The parties must preserve in good condition the river-beds, as well as all the installations and structures pertaining to the river system.

Operation

The maintenance and operation of installations, structures and facilities must be undertaken in co-ordination, having regard for the interest of the other party (parties).

Research, planning and construction

Any alternation of the river-bed and hydraulic installations, as well as the establishing of new hydraulic installations, works or measures which, according to the party undertaking them, would adversely affect the water régime in the territory of the other party must not be carried out without the agreement of the other party. When works of common interest are concerned, each party should establish the works in its own territory. In exceptional cases, when the parties agree on the necessity for the construction of such works, but disputes arise regarding implementation, a joint commission as established according to conditions denoted under paragraph 14 may entrust one of the parties under agreement with the implementation. The other parties, however, must make available to the party concerned all the relevant data and support.

Long-term planning

The parties, when preparing long-term plans for water resources development for frontier waters, should consult and assist each other, as well as make available all information needed. The projects must be co-ordinated.

Water rights

Matters relating to water rights must be governed by the laws of the party in whose territory the proceeding for the grant of water rights is to be instituted. In the case of hydraulic installations to be constructed in the territory of both parties, the grant of water rights for the part to be territory of each party be made by that party's competent authority for water matters.

Communication of information

The authorities of the parties should notify each other as soon as possible of any danger or extraordinary situation concerning boundary waters.

Financial matters

The costs of the works of common interest (maintenance, operation, research, planning and construction works) are to be borne by the parties in proportion to their own interests in the works.

Supervision

The parties undertake to afford each other at all times an opportunity for technical and financial verification of the work executed at the expense or for the benefit of both parties.

Compensation for damages

The extent of compensation in case of damage must comprise also the interest of the loss expressed in monetary terms for a period that appears expedient.

Joint commission

In order to promote co-operation in matters of water management and to deal with water management problems covered by the agreement, the States should establish a joint commission consisting of the representatives and experts of the parties. According to the context of the agreement a restricted decision-making power should be given to the commission.

Regulations

Common regulations should be established for the practical application of the provisions of the agreement, as well as for the composition, competence and methods of procedure of the joint commission.

Settling of disputes

The disputes regarding the interpretation and application of the agreement should be submitted to a conciliation committee. If no agreement can be reached, the matter should be submitted to the respective Governments.

Coming into force and validity

The agreement enters into force on the day of exchange of instruments. For the duration of validity a five-year period seems expedient, with the provision that the agreement is valid until any of the parties renounces it for the end of the following year.

Appendices

The following appendices appear desirable: definitions; enumerations; statutes, regulations regarding flood and excess waters etc.; any other matter.

RECOMMENDATIONS

The future satisfactory, peaceful arrangement of disputes between countries sharing a common drainage basin or the prevention of such disputes might be assured only by bilateral or multilateral agreements that are strictly based on principles codified by international water law.¹⁷ In this way, it might be possible to approach a consistency and completeness in the agreements, and the real target of integrated development of water management regions (drainage basins).

In order to deal with this ever-increasing task, it is suggested that the United Nations should sponsor and promote the following activities:

1. The outstanding work of the United Nations in the collection and procession of the existing international water-related agreements, published in 1963 under the title "Legal problems relating to the utilization and use of international rivers", should be updated. The usefulness of this updated collection would be greatly increased if, in addition to the principles and important statements of the different agreements, the actual and, to some extent, detailed information contained in those agreements also were to be prepared, particularly as concerns the implementation clauses of water resources distribution and water pollution control. As a guideline for preparation, the principles contained in the Natural Resources Water Series No. 1,¹⁸ as well as the report by the Secretary-General¹⁹ should be taken into consideration. It would be most useful if the conclusions of executive committees established by those agreements could be also summarized.

2. According to the analysis and evaluation of the above-mentioned work, it would be most important to prepare recommendations concerning the form and content of international agreements to be adopted by the Governments.

¹⁷ Management of International Water Resources...

¹⁸ Ibid.

¹⁹ "Water resources development, international river basin development: progress report of the Secretary General on recent activities" (E/C. 7/46), paras. 38-41.

SIMULATION AS A TOOL IN INTERNATIONAL RIVER DEVELOPMENT

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SUMMARY

International river development programmes are, to the water resources analyst, constrained river basin development programmes and thus amenable to treatment by operations research techniques as used in water resources planning. Among those techniques, simulation ranks high, and this tool has been developed extensively in recent years. Some important methods and a critique of their applicability are given, and results of their application to practical problems are presented.

INTRODUCTION

The rivers of the world are among its most precious natural resources, which, in these days of growing populations with rising expectations, must be utilized to their fullest extent, in an optimum manner. But what is an optimum use of rivers? Clearly, the answer to this question depends upon numerous engineering, economic, socio-logical and political factors which are at best difficult to quantify. This task becomes even more complex, if the river flows through two or more countries, each of which has a claim to its use. As is well known, the division of the waters of a river among different countries is accomplished by a political decision embodied in a treaty or agreement between the countries in question, according to which certain standards of quality and quantity of river water are set which have to be maintained at the borders. The way in which these standards are set ranges from dictates by the stronger country, perhaps as a result of war, to carefully negotiated treaties on the basis of comprehensive evaluations of all relevant socio-economic and political factors. One of the most important tools in decision making for the latter type of treaty is a water resources development plan.

The water resources development plan lists the strategies which are available to the parties involved. Examples of strategies range from a complete lack of co-ordination, in which each country develops the part of a river basin within its boundaries without regard to the need of others, to fully co-ordinated optimization of the benefits deriving from river basin development, as would

be obtained if the basin were in one country only. The former strategy will undoubtedly result in inequalities and wasteful planning. As an example one may mention the Euphrates River, for which Iraq, the Syrian Arab Republic and Turkey each have prepared development plans without regard to the other countries. For their implementation, these plans would require twice the actually available long term mean annual river flow.¹ The advantage of independent development plans is that they do not require concessions in sovereignty, but fully co-ordinated optimization is likely to require the greatest sacrifices in sovereignty. In between these extremes are a number of alternative decisions, as has for example, that which has been shown for the Ganges River.² Ultimately, politics will decide which of the feasible alternative strategies is the most acceptable — i.e., the Government will have to determine the value of the trade-off between benefit and independence. It is the task of the water resources planner to clarify the options and to make clear the consequences of the decisions that are to be taken.

In the language of systems analysis as applied to water resources, the different strategies set constraints on the decision variables, so that the optimum solution for each of the different strategies is contained in the set of all possible solutions for the strategy which is unconstrained by international politics. Consequently, it is possible to obtain solutions by classical systems analysis techniques. The only new aspects that arise are those that involve the final decision process in which the final solution is selected from the set of alternative strategies. The water resources planner, therefore, can select from the techniques of systems analysis those that are most suited for the constrained problem. Among these techniques, simulation ranks very highly, because of the great flexibility of the method and its general applicability. It offers a possibility of obtaining near-optimum solutions in situations involving stochas-

¹ G. Barbrecht, "Wasserwirtschaftliche Probleme beim Ausbau internationaler Flüsse, aufgezeigt am Beispiel des Euphrat", *Zeitschrift für Bewässerungswirtschaft*, Heft 2 (1971), p. 157.

² P. Rogers, "A system analysis of the Lower Ganges-Brahmaputra basin", paper submitted to the International Symposium on Floods and their Computation, Leningrad, Union of Soviet Socialist Republics, August 1967.