

Water conflicts

An annotated bibliography for 1996-2001

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Introduction

1. Rationale and relevance

In the post-Cold War world, access to natural resources has come to be seen as an increasingly important factor in international relations. Perhaps overstating the case, Klare (2001c: 54) argues that the ‘map of contested resource zones is a more reliable indicator of potential violence than any other single factor’. Traditionally it is oil that attracts most attention, however, a resource that is both vital and progressively scarce for the fast growing population of the planet is fresh water. Rising demand for human consumption, agricultural and industrial needs, deteriorating quality and naturally limited supply can be expected to generate intrastate tensions and interstate conflicts.

The problem of access to fresh water resources has been the focus of a cross-disciplinary research that is rapidly expanding. There is a rich legal literature that contributes to setting rules and norms in this field, but it is political studies that might help in predicting and preventing these conflicts. A bibliography can be a useful tool for these studies, particularly for connecting expertise generated by applied research with more theory-oriented work. One comprehensive bibliography, covering literature on managing conflicts stemming from tensions over quantity and quality of surface water, is published as a chapter in Beach et al. (2000). It contains some 1150 references and covers the period up to 1995. An attempt to supplement this work by covering literature published in 1996–2001, seems informative and timely.

2. Comprehensiveness, selectivity and limitations

All subject bibliographies are by definition selective. This Bibliography, however, aspires to be comprehensive within certain limitations. This means that the decision on including a certain work has not been guided by any evaluation of its quality or originality. Such evaluation requires expertise in the subject area and inevitably involves subjective judgement.

My intention has been to include all works on the subject of water conflicts that meet the limitations listed below.

2.1 Subject

The subject is in fact much broader than it appears and has to be narrowed in order to reduce the task to a manageable scale. The Bibliography, accordingly, does not include literature on domestic and international law, regulating the use of fresh-water resources, or on economic aspects of the problem; it will focus on *political studies*, omitting only those dealing with territorial disputes and delimitation of borders. There is an important distinction between internal and international conflicts; however, it appears possible to include both these types, indicating this distinction in the annotations to the entries.

2.2 Publication period

Documents published in 1996–2001 are included, with the necessary reservation that 2001 is covered by only some 60–75% due to the time lag (at least several months) between the publication and inclusion of works into databases. Collection of material ended in January 2002. The delay of a planned publication of a conceptual overview paper (very helpful for this Bibliography) as well as one edited volume (Gleditsch & Hamner, 2001; Wolf, in press) on the subject has also to be pointed out.

2.3 Language

The subject of water conflicts has been heavily dominated by publications in English. However, most Scandinavian authors either publish their major work in English (Gleditsch, 1998, 2001; Hauge & Ellingsen, 1998, 2001; Lomborg, 2001a) or make translations (Lomborg, 1998/2001b). For coverage of work in Scandinavia, it is therefore, perfectly possible and quite sufficient to limit this Bibliography to English-language works.

2.4 Document types

The Bibliography includes books, published by well-established academic publishers, chapters in edited volumes, and articles in international scholarly and policy-oriented journals. Only published works that can be easily obtained from major libraries, first of all in Scandinavia, are included in this Bibliography.

Dissertations are not included into this study due to their physical unavailability and limited access to their abstracts. Two exceptions are Ohlsson (1999) and Upreti (2001), both published as monographs and available in Norway.

I decided not to incorporate newspaper and magazine articles, even if focusing specifically on the water conflicts, like for instance 'Whose water' (2001). Book reviews and editorials in academic journals, for instance 'Water wars' (2001), were also left out.

An attempt to include academic papers presented at international conferences was undertaken, but the results were mostly negative: those that are found in reference lists are usually published as articles a short time after the initial presentation, for instance Kaufman, Oppenheimer, Wolf & Dinar (2000), while others tend to be unavailable.

Electronic materials and web-publications are not incorporated into this Bibliography mostly due to their unreliability. Online resources are changing on a daily basis and it is always possible that they will change content, get a new location, or disappear. At the same time it is rather easy to find these resources with the help of quality-controlled subject gateways such as SOSIG.

3. Annotations

The advantages of annotated bibliographies are obvious. Annotations increase the value of any bibliography, first of all by giving a user an idea of content. Taking into consideration the scale of the task, the limited time available, and the lack of expert knowledge, I decided to use only descriptive, informative annotations for entries. Therefore no direct or implicit evaluations of the works' value, which require a thorough knowledge of the subject, have been attempted in the annotations.

In most cases annotations were written on the basis of first-hand examination of the selected works. It certainly was not possible to read them carefully from cover to cover. When summarizing them, particular attention was given to abstract/summary (if available), the list of contents or the structure of the work, the introduction, the opening phrases of chapters and sections, and the conclusion. In some cases, evaluations and opinions gathered from book reviews in academic journals, and abstracts of

journal articles provided by abstract services were used as additional bases for the annotations.

4. Arrangement

The decision about the most suitable arrangement of entries should be dictated by the nature of the subject. A chronological arrangement is, perhaps, not quite suitable in this Bibliography since the subject is not strictly historical. The organization by medium does not appear useful as well since only three main types of literature were used; separating, for example, articles from book chapters hardly makes much sense. Strictly alphabetical arrangement by author or title (in the absence of author), or a dictionary arrangement may be too simple in our case, since the subject seems to be sufficiently complex to require subdivisions.

The analysis of the annotations makes it possible to identify several major themes in academic literature on this subject area and to follow their development over the last six years. Therefore, a combination of thematic/logical (as the main) and chronological (as the secondary) principles has been chosen for organizing the Bibliography. Judging from the patterns found in the literature, the following arrangement seems logical and useful:

1. General studies
 - 1.1 Theoretical
 - 1.2 Empirical
2. Regional studies (by region covered)
 - 2.1 Middle East
 - 2.1.1 Region as a whole
 - 2.1.2 The Jordan basin
 - 2.1.3 The Euphrates-Tigris basin
 - 2.1.4 The Nile basin
 - 2.2 The rest of Asia
 - 2.3 The Americas
 - 2.4 Europe
 - 2.5 Africa

The two main groups appear obvious: works with general and with regional focus. The latter is divided into five second-level groups: the Middle East, the rest of Asia, the Americas, Europe, and Africa. The Middle East group, which includes as many as 64 entries, can be further divided into works that address the whole region and those that focus on one of its three main river systems: the Jordan, the Euphrates-Tigris, and the Nile. The division of the 'General' group is far less obvious; however, it appears possible to split it into the works of theoretical/conceptual character and those with an empirical emphasis.

In order to trace the development of each of these groups, its evolving profile in the academic literature and the shifts of attention between the groups, the entries within them are organized chronologically, proceeding from the earliest to the latest date. Inside each year the works are then presented in the alphabetic order by author or title.

Those particular entries that could be placed in more than one subdivision, were entered only once by the first appearance in the logical arrangement and 'see-also' references from other relevant positions were provided. All the entries are numbered.

To further facilitate the use of the Bibliography, a list of contents outlining the arrangement is provided.

5. Indexes

As in all classified subject bibliographies the provision of author index, including editors, is necessary. Although the author approach is not the main concern in compiling a subject bibliography, the addition of an author index, which refers to the actual numbered entries, is useful for those who are interested to find out what a particular author has written or edited on the subject. Since users of the Bibliography cannot be expected to be familiar with non-English language rules, names containing prefixes are alphabetized both with and without them.

A title index is also provided; it should be particularly useful for references to edited books, which are arranged by editors' names.

As for a subject index, often useful in bringing out other, more narrow aspects and facets of the entries, it appears redundant for this Bibliography since most of the specific subjects (like, for instance, negotiations, water sharing, resource management, or cooperation) are touched upon in nearly every included work. The sub-division of the Bibliography into ten groups allows for sufficiently clear orientation in the subject area. Annotations provide the necessary clues and key words on the works.

6. Sources

The starting point in compiling the Bibliography was searching in online catalogues of available libraries - BIBSYS, SAMKAT, DANBIB, LIBRIS, Melvyl, the British Library, and particularly the Library of Congress. Commercial sites on the Internet, such as Amazon books, and homepages of the publishers were also very helpful.

Another very fruitful approach proved to be the 'snowball' principle, when a reference in one publication led to a discovery of another. Generally, references, citations, footnotes were very useful sources. Materials recorded in scattered works were rearranged in this Bibliography, all of them were located, verified and annotated. This chaining was supplemented with a 'forward chaining' from known items to new ones through the *ISI Citation Indexes*, especially for periodical literature.

Periodical literature is extremely important for this subject, which is rapidly developing. Like in the most other fields of knowledge, new research is first reported in periodicals and only later consolidates into books or book chapters. That is why the use of abstracting services (for example, *International Political Science Abstracts*, *Peace Research Abstracts Journal*, *Water Resources Abstracts*, *Social Science Citation Index* and companion indexes, published by the ISI), as well as database services that offer fee-based journal articles (*Ingenta*, former *Uncover*) was central in this work.

7. Reference program and entry format

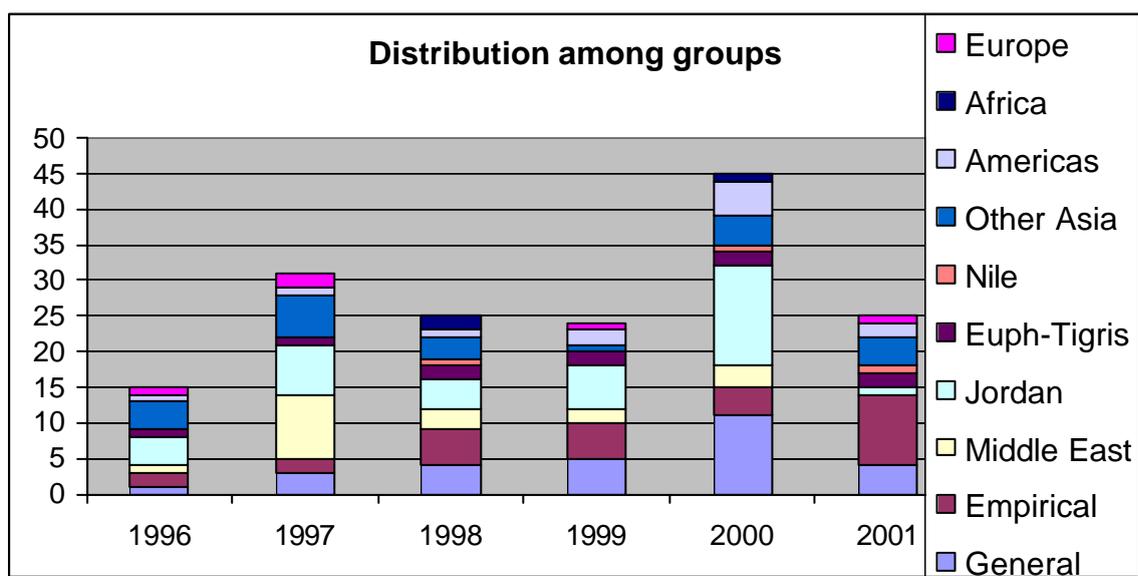
This bibliography was compiled with a help of a reference management database EndNote, a 'bibliography maker', which gives an opportunity to choose among 300 bibliographic styles. The style developed by the *Journal of Peace Research* was selected.

8. Analysis of the entries

The reasonably comprehensive character of this Bibliography makes it possible to analyze the dynamics of the development of academic research across the identified themes and topics. At the same time, the analysis of the annotations provides ground for some observations on the key focuses in the contemporary literature.

8.1 General dynamics in the subject area

The first conclusion that can be drawn from a straightforward chronological grouping of the list of sources is that there is an uneven but unmistakable growth of interest to the problems of water conflicts: there are 15 entries for 1996, 31 for 1997, 25 for 1998, 24 for 1999, 45 for 2000, and 25 for 2001. Two reservations should be added to this statistics. First, the year 2001, as mentioned in 2.2, is covered by only about 60–75% due to late inclusion of many works into databases, so the ‘real’ number of publications will probably be on the level of 2000 or higher. Second, the aggregate figures for each year are significantly influenced by the appearance of edited books and special issues of journals that add quite a few chapters or articles respectively. There were two edited volumes in 1996, one edited book and two special journal issues in 1997, three edited volumes and one special journal issue in 1998, two edited books and one special issue in 2000, and two edited books in 2001.



One additional indicator of the general dynamics could be the number of articles in academic journals (excluding special issues). There were six articles in 1996, six in 1997, 6 in 1998, 12 in 1999, 14 in 2000, and 13 in 2001. It is possible also to comment on the type of journals that publish articles on this topic: while in 1996 and 1997 we see mostly social science and environmental journals (*Current History* and *Survival* are two noticeable exceptions), in 2001 several major international relations and security studies journals published articles on water conflicts (*Foreign Affairs*, *Foreign Policy*, *Current History*, *Jane's Intelligence Review*, *Security Dialogue*).

8.2 Distribution among groups

General works make up about 34% of the Bibliography (which includes 165 entries), with a remarkably even distribution between theoretical/conceptual and empirical. The regional group is massively dominated by works on the Middle East (about 40.5% of the Bibliography), and the single most numerous sub-group is comprised by works focussed on the Jordan basin (close to 22% of the Bibliography). While works on water conflicts in South and South-East Asia are also quite numerous, the problems of Central Asia attract only marginal attention in the sub-group, which constitutes some 13.5% of the Bibliography. While the interest in water problems in the US is quite understandable, the total lack of interest in similar problems in Latin America and, particularly, Africa is not. It should be pointed out that the works on the Nile basin are included in the Middle East (perhaps, contrary to geography but according to the composition of several works), but such important river systems in water-deficient regions as Niger and Zambezi are simply ignored.

8.3 Dynamics between and inside groups

One strong trend in the development of academic literature on water conflicts is the increasing number of the general works (both theoretical/conceptual and empirical) in 2000 and 2001. Out of 56 entries in this group, 29 appeared in these two years. It is this trend that creates the above-mentioned general expansion of the field and it can only be interpreted as the growing awareness of scholars in many countries of the need to analyze and conceptualize the water-related problems on a global scale and not only in the context of particular regions.

Another, perhaps less distinctive, trend is the visible decline of academic attention to the water conflicts in the Middle East generally and in the Jordan basin in particular. This trend was slightly obscured in 2000 by the publication of an edited volume on the Jordan basin (Amery & Wolf, 2000), which generated 10 entries on the region, but became obvious in 2001 with only one entry for both sub-groups. This trend is certainly not a sign of the water problems of this region having been finally resolved. It should, perhaps, be explained by the tragic failure of the peace process between Israel and the Palestinians. The on-going escalation of violence has caused re-focussing of attention towards the more immediate issues of re-launching the peace process and pushed water-related problems to the margins of research agenda.

It could be expected that the first campaign of the US-led global war against terrorism, centered on Afghanistan, would increase the attention given to water problems in Central Asia, as well as in South Asia, while the attention towards the Middle East would, quite possibly, recover. However, the most important development for the whole field would be the sustained growth of general works, particularly of theoretical/conceptual character, that would set the agenda for empirical research and inform studies aimed at finding solutions for specific water conflicts.

8.4 Key guidelines of current research

The structure of the Bibliography and the comparative analysis of the annotations provide ground for some conclusions about the main directions of academic research. The most natural way to present these conclusions appears to be by grouping the works according to their character.

The obvious guideline to follow is the argument as to whether ‘water wars’ are becoming more probable. The works that emphasize the growing threat of such wars and those that dismiss this threat as marginal at best make two opposing groups. Even a superficial review of the literature shows, however, that only a small number of works can be placed in either of them, while more works aim at drawing attention to the destabilizing impact of water-related tensions, particularly on internal cohesion of states, without sounding the alarm about ‘water wars’.

It is also sufficiently clear that many works avoid the argument about probability of 'water wars' altogether. One important direction of research involves various ways to resolve water conflicts, including negotiations, involvement of international institutions, etc. Another direction focuses primarily on joint management of water resources, including sharing, ecological control, etc.

Therefore, five main groups were identified and labeled (just for convenience): 1) 'War alert', 2) 'Sober skepticism', 3) 'Risk awareness', 4) 'Conflict resolution', and 5) 'Management'. Such a grouping can certainly give only the most general indication about the aims and targets of academic research; it should also be mentioned that edited volumes and special issues of journals that include works of different character, cannot be placed in either of the groups.

With all the reservations about possible errors of judgement, we find 11 works in the first group, 14 in the second, 40 in the third, 60 in the fourth, and 24 in the fifth. It may be particularly interesting to see how the debate between 'alarmists' and 'skeptics' develops: in the first group we see one work in 1996 and 1998, two works in 1999 and 2000, and five in 2001; in the second group, we see two works in 1997 and 1999, one in 1998, five in 2000, and four in 2001.

The sharp increase of the 'alarmist' group in 2001 is entirely the achievement of one prolific author (Klare, 2001a, b, c). In contrast, the literature focusing attention on potential risks of water-related conflicts, increased sharply in 1997 (to nine from three in 1996), but then decreased gradually (eight works in 1998 and 1999, four in 2000, and six in 2001).

Overall, we can establish with reasonable certainty that in 2000 and 2001 both the general academic interest in the problems of water conflicts and the intensity of debates concerning their possible escalation, increased significantly. The strong growth of general works (both theoretical/conceptual and empirical) and the prevalence of emphasis on resolving water conflicts provide good reasons for expecting a robust impact from academic research on policymaking as well as on public attitudes towards multiplying problems stemming from increasing pressure on fresh water resources.

Reference list

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1. General studies

1.1 Theoretical/conceptual studies

1996

1. Homer-Dixon, Thomas F., 1996. 'Environmental Scarcity, Mass Violence, and the Limits to Ingenuity', *Current History* 95(604): 359–365.

The article starts with presenting three sources of environmental scarcity – related to supply, demand, and distribution – and describing resource capture as one type of their interaction, giving the example of Israel's water policy in the West Bank. The violence that results is usually chronic and diffuse, and almost always subnational, not international. Wars between upstream and downstream neighbors over river water are likely only in a narrow set of circumstances. The author then identifies the 'pivotal states', giving the example of India and argues that it is not possible to rely on human ingenuity since its supply can be restricted, for instance by the stresses generated by resource crises.

1997

2. Gleditsch, Nils Petter; Lothar Brock, Thomas Homer-Dixon, Renat Perelet & Evan Vlachos, eds, 1997. *Conflict and the Environment*. NATO ASI Series. 2, Environment; 33. Dordrecht: Kluwer Academic. vii, 598 pp.

The book is the main output of a NATO Advanced Research Workshop held in June 1996 with the aim of examining the links between environment, conflict and security in the context of a rapidly changing post-Cold War world. The common point of departure was the multiple causality of conflict, so that environmental scarcity could not be presented as the most important cause of conflict. Water as a source of environmental conflict was one of the eight main topics of the book. Water scarcity and misuse were identified as significant threats to sustainability, and the need to differentiate among water availability and quality, its multiple uses and multiple sources of its scarcity was emphasized. While it is difficult to operationalise the concept of environmental security as an analytical tool or a policy instrument, the need to develop cooperative preventive mechanisms for addressing environmental security and violent conflict is growing.

3. Kaufman, Edy; Joe Oppenheimer, Aaron T. Wolf & Ariel Dinar, 1997. 'Transboundary Fresh Water Disputes and Conflict Resolution: Planning an Integrated Approach', *Water International* 22(1): 37–48.

The article starts by pointing out that water disputes, which in most cases are low-intensity conflicts, often involving non-state actors, may become a source of violent confrontations. Their large-scale project combines case studies of water disputes and their resolutions with similar conflicts over other resources. It also employs cooperative and non-cooperative game models of conflict resolution, which are to be tested at a series of workshops. The final product of the project is expected to yield useful methods and techniques for resolving transboundary water conflicts.

4. Wallensteen, Peter & Ashok Swain, 1997. *International Fresh Water Resources: Conflict or Cooperation?* Stockholm: Stockholm Environment Institute. vi, 32 pp.

The study is a part of the Comprehensive Assessment of the Freshwater Resources of the World, conducted by the UN Commission for Sustainable Development. It first examines the general parameters of the problem, including growing scarcity and falling quality. It then looks specifically into the link with international conflicts, focusing on five cases: the Colorado River, the Rhine River, the Paraná River, the Nile River, and the Ganges River. The conclusions combine the warnings about growing conflict potential with specific recommendations on ways of resolving these conflicts.

1998

5. Diehl, Paul F., 1998. 'Environmental Conflict', *Journal of Peace Research*, Special Issue 35(3): 275–409.

Rather than engaging in conceptual debates about the meaning of environmental security, the authors in this special issue seek to translate the key issues in this concept into empirically testable questions. The focus is on the relationship between environmental factors (including water) and the most traditional indicators of insecurity: violent conflict. The articles seek not only to determine the effects of environmental factors on violent conflict, but also to discover way in which such effects might be mitigated.

6. Gleditsch, Nils Petter, 1998. 'Armed Conflict and the Environment: A Critique of the Literature', *Journal of Peace Research* 35(3): 381–400.

The article states that the popular argument that environmental degradation will increase resource scarcity and therefore contribute to an increase in armed conflict, has not been supported by systematic study so far. The author identifies nine problems, which characterize the most studies on the link between resource scarcity and armed conflict. After analyzing these more or less common problems, the article suggests a program of research. Revised version as ch. 12 in Diehl & Gleditsch, eds (2001), (251–272).

7. Hauge, Wenche & Tanja Ellingsen, 1998. 'Beyond Environmental Scarcity: Causal Pathways to Conflict', *Journal of Peace Research* 35(3): 299–317.

The authors use water scarcity as one of three independent environmental variables in the study of the relationship between environmental degradation and domestic armed conflict. The link was stronger between water availability and low-level domestic armed conflict, than for civil war. Water, and other environmental variables, may be more important in explaining smaller conflicts than larger ones. Revised version as ch. 3 in Diehl & Gleditsch, eds (2001), (36–57).

8. Just, Richard E. & Sinaia Netanyahu, 1998a. 'International Water Resource Conflicts: Experience and Potential', in Richard E. Just & Sinaia Netanyahu, eds, *Conflict and Cooperation on Trans-Boundary Water Resources*. Boston, MA: Kluwer Academic (1–26).

The chapter discusses difficulties in concluding broad water-related agreements in river basins with three or more riparian states, applying theoretical models for coalition formation. After evaluating difficulties in transboundary water resource cooperation, the authors discuss the applicability of the cooperative game theory for modeling the policies aimed at overcoming these difficulties. A model of coalition building in a river basin with economic externalities is offered. The conclusion points to the questionable rationale for attempting to build multi-party coalitions. Bilateral agreements may be a preferable format, with obvious limitations but good possibilities to overcome those.

1999

9. Homer-Dixon, Thomas F., 1999a. *Environment, Scarcity, and Violence*. Princeton, NJ: Princeton University Press. xvi, 253 pp.

The author points out that although there are few examples of wars over renewable resources, water has the highest potential for stimulating international war. However, wars over river water are likely to occur only under special conditions such as high dependence on water in a downstream country or a history of antagonism between the two countries.

10. Homer-Dixon, Thomas F., 1999b. 'Thresholds of Turmoil: Environmental Scarcities and Violent Conflict', in Daniel H. Deudney & Richard A. Matthew, eds, *Contested Grounds: Security and Conflict in the New Environmental Politics*. Albany: State University of New York Press (61–90).

The chapter focuses on the question of whether and how environmental scarcity causes violent conflict; depletion and pollution of water resources is one of the four elements of the independent variable 'environmental scarcity'. While little empirical evidence was found for the hypotheses that simple-scarcity conflicts between states are caused by this variable, there is substantial evidence for the hypothesis that it causes large population movements leading to group-identity conflicts; there is also some evidence for the causation of 'deprivation' conflicts, such as civil strife. As environmental scarcity becomes more severe, some states show progressively lower capacity to adapt.

11. Ohlsson, Leif, 1999. *Environment Scarcity and Conflict: A Study of Malthusian Concerns*. Göteborg: Göteborg University. xii, 272 pp.

This PhD dissertation first presents the broad framework of contemporary debates on environmental scarcity and conflict and introduces the three main research schools. It then takes the case of genocide in Rwanda and looks into environmental scarcity as its possible causal factor. The sixth chapter focuses on water scarcity, asserting that the risks of conflicts within countries caused by this factor are much higher than between countries. The concept of social resource scarcity is tested on the case of the Nile Basin. An index of social water stress is proposed and calculated for 1995 and 2025, covering 159 states. Suggestions for a general direction of policy-relevant research are made in the conclusion.

12. Wolf, Aaron T., 1999. 'Criteria for Equitable Allocations: The Heart of International Water Conflict', *Natural Resources Forum* 23(1): 3–30.

The author argues that the question of 'equitable' allocations forms the core of the most international water conflicts. Application of an equitable water-sharing agreement is a prerequisite to hydropolitical stability. This paper explores the question of equity measures for water-sharing agreements in the context of global hydropolitics and provides a brief summary of the general principles of equitable allocations, including the general 'rights-based' criteria and the 'efficiency-based' criteria of economics. It then describes the practice of water resources allocations as exemplified in the Transboundary Freshwater Dispute Database - a computerized database of 145 treaties relating to international water resources compiled at Oregon State University.

13. Yoffe, Shira B. & Brian S. Ward, 1999. 'Water Resources and Indicators of Conflict: A Proposed Spatial Analysis', *Water International* 24(4): 377-384.

The article asserts that identification of river basins prone to water conflict requires a framework that incorporates a wide array of variables and offers a methodology for defining potential indicators within a Geographic Information System (GIS). The authors agree that it is potentially erroneous to assume that by studying historical evidence, one can predict future events. Previously unknown pressures, particularly in areas already facing water stresses, are difficult to account for. However, with access to appropriate data sources there is great potential for establishing water-related indicators of conflict.

2000

14. Barnett, Jon, 2000. 'Destabilizing the Environment-Conflict Thesis', *Review of International Studies* 26(2): 271-288.

This article counters 'water wars' theories and the argument that population growth may induce conflict. It also discusses one research program - the Project on Environment, Population and Security. The article concludes with an evaluation of the theoretical merits and practical effects of the environment-conflict thesis. It argues that the environment-conflict thesis is theoretically rather than empirically driven.

15. Beach, Heather L. et al., 2000. *Transboundary Freshwater Dispute Resolution: Theory, Practice, and Annotated References*. Water Resources Management and Policy. Tokyo: United Nations University Press. x, 324 pp.

The purpose of this book is to provide a comprehensive review of academic literature on transboundary water disputes and conflicts. The first part deals with theoretical works, which are divided into organizational theory (institutional and negotiation) and economic theory (optimization models and game theory). The second part makes an overview of literature on practical problems, comparing water disputes with other environmental disputes (with a particular angle on the concept of environmental security). Appendixes present short portraits of 13 major international river basins, extensive summaries of water treaties, annotated literature and bibliography.

16. Dinar, Shlomi, 2000. 'Negotiations and International Relations: A Framework for Hydropolitics', *International Negotiation* 5(2): 375-407.

The article asserts the relevance of hydropolitics to security studies, international relations and negotiation studies, arguing that both neorealism and neoliberal institutionalism offer useful concepts. The author develops a new framework, which is focused on a more process-oriented approach. It does not ignore systematic explanations but emphasizes interactions among parties in negotiations, adding such variables as the role of mediators and indicating additional options emerging in the more complex environment of multilateral negotiations.

17. Dinar, Shlomi & Ariel Dinar, 2000. 'Negotiating in International Watercourses: Water Diplomacy, Conflict and Cooperation [Entire issue]', *International Negotiation* 5(2): 193–410.

The central question of this issue is why some regions affected by water conflicts have seen the positive results of negotiations over water resources, while other regions not. It also focuses on the lessons learned from this phenomenon. It is stated that the political willingness of the parties is essential for a cooperative outcome. This issue shows that states are not always neatly divided on the geographic-military/economic matrix, so the process of the negotiation over water may often alter the assumed outcome. Institutional agreements are often ways of expressing the parties' desire to substantiate their negotiated agreement in a longstanding framework that fosters coordination.

18. Elhance, Arun P., 2000. 'Hydropolitics: Grounds for Despair, Reasons for Hope', *International Negotiation* 5(2): 201–222.

The article starts with elaborating the concept of hydropolitics - multidisciplinary study of the nature and conduct of conflict and cooperation between states over trans-boundary water resources. It then examines the factors that impede cooperation and induce water conflicts, emphasizing particularly lack of data. Possibilities for enhancing cooperation are further analyzed, with the focus on the benefits of hydropolitical cooperation that in most cases are much greater than the potential rewards of conflicts. The uniqueness of hydropolitics in each basin implies that universally applicable generalizations or templates cannot be offered to negotiators.

19. Falkenmark, Malin, 2000. 'Competing Freshwater and Ecological Services in the River Basin Perspective: An Expanded Conceptual Framework', *Water International* 25(2): 172–177.

The article argues that water conflicts cannot be resolved by simple sharing agreements between upstream and downstream states but require an integrated river basin approach which involves not only the use of water by societies but the ecosystem values. It is essential to look not only on the water in a river but on the whole rainfall over the basin and design techniques for sharing it. It is also necessary to include in the integrated approach various environmental side-effects origination in manipulation of landscape elements. The main difficulty in such an approach would be to find mechanisms by which the interests related to water use, land use, and ecosystem health could be reconciled.

20. Haftendorn, Helga, 2000. 'Water and International Conflict', *Third World Quarterly* 21(1): 51–68.

This article discusses the origins of international conflict over the use of water and the link between conflicts over water resources and other conflicts. The author asks whether conflicts over scarce water resources are the source of international conflict, or do they contribute to intensifying conflicts, which have arisen from other sources (such as ethnic conflicts)? Does this matter for their solution? The article concludes with discussion of possible prospects for the solution of water conflicts on a global or regional scale.

21. Lowi, Miriam R. & Brian R. Shaw, eds, 2000. *Environment and Security: Discourses and Practices*. International Political Economy Series. Basingstoke: Macmillan. xvi, 225 pp.

This book is based on a conference addressing the relationship between the environment and security in the post-Cold War world. It brings together scholars and practitioners from a variety of different disciplines and perspectives in an effort to both explore the complexities of the relationship between environmental variables and security conditions, and re-focus the debate within the environmental community. The book combines analytical frameworks and case study material with proposals for addressing environmental challenges and enhancing the security and welfare of peoples, states and regions.

22. Spector, Bertram I., 2000. 'Motivating Water Diplomacy: Finding the Situational Incentives to Negotiate', *International Negotiation* 5(2): 223–236.

The article seeks to examine when and how environmental change can facilitate negotiated solutions to shared water resource usage. A key to distinguish between changes that lead to cooperation or conflict is the concept of reference values. The results of an empirical test suggest that the motive toward conflict or cooperation is situational driven, the decision hinges on facilitating elements in the context. Additional and alternative hypotheses need to be developed to generate a richer model.

23. Tøset, Hans Petter Wollebæk; Nils Petter Gleditsch & Håvard Hegre, 2000. 'Shared Rivers and Interstate Conflict', *Political Geography* 19(8): 971–996.

The article argues that while a strong case can be made that competition over water resources may exacerbate conflict and contribute to interstate violence, in fact its foundation is quite weak. The authors present the conclusions of their quantitative research based on newly generated data on boundary-crossing rivers, which was combined with the Correlates of War dataset. Both the existence of a joint river and water scarcity are shown to be risk factors but these results are far from strong.

24. Blatter, Joachim; Helen Ingram & Suzanne Levesque, 2001. 'Expanding Perspectives on Transboundary Water', in Joachim Blatter & Helen Ingram, eds, *Reflections on Water: New Approaches to Transboundary Conflicts and Cooperation*. Cambridge, MA: MIT Press (31–53).

The chapter aims to contribute to an amplified and flexible understanding of the meaning of water that would go beyond the modern view on rationalising water management through laws, institutions and structures. The authors point out that the end

of the Cold War may have even enhanced the importance of water as security issue; along with other environmental factors, water is recognised as contributing to instability and conflict within and between nations. Water can also form the basis for building non-territorial communities, so traditional game theories cannot capture the actions of political actors who possess fundamentalist or essentialist connections to water.

2001

25. Diehl, Paul F. & Nils Petter Gleditsch, eds, 2001. *Environmental Conflict*. Boulder, CO: Westview Press. viii, 343 pp.

The book takes as the point of departure that the understanding the causal linkages between environmental factors and conflict requires theorizing about this relationship and then subjecting them to empirical testing. Accordingly, the purpose of the book is to address two central shortcomings, the theoretical and the empirical. The first part of the book deals with providing empirical evidence on the influence of environmental factors on conflict, both interstate and internal. The second part considers the reduction of environmental conflict, and the third part sets future research agenda.

26. Lonergan, Steve C., 2001. 'Water and Conflict: Rhetoric and Reality', in Paul F. Diehl & Nils Petter Gleditsch, eds, *Environmental Conflict*. Boulder, CO: Westview Press (109–124).

The chapter first analyses the interrelated questions of availability, demand for, and pollution of water. It then examines the connection between water scarcity and violent conflict, supporting the conclusion on low probability of direct causation with the example of the Middle East, the most water-deficient region. Although the water wars are unlikely to happen, issues of water scarcity will be at the forefront of the international agenda for decades to come.

27. Schwartz, Daniel M.; Tom Deligiannis & Thomas Homer-Dixon, 2001. 'The Environment and Violent Conflict', in Paul F. Diehl & Nils Petter Gleditsch, eds, *Environmental Conflict*. Boulder, CO: Westview Press (273–294).

The chapter takes a issue with Gleditsch (1998) on the status of research on environment and conflict, which, in the opinion of these authors is theoretically sound and empirically consistent. While they question Gleditsch's skepticism about the seriousness of environmental scarcities, they confirm that they research on water scarcity is at odds with sensationalist claims about water wars; the world is not about to witness a surge of water wars. There is an obvious need for a more rigorous approach to data collection on soil, water and forest degradation, but it is also important to take into account the quantity of ingenuity a society supplies in response to environmental scarcity.

28. Swain, Ashok, 2001. 'Water Wars: Fact or Fiction?', *Futures* 33(8–9): 769–781.

The article argues that although availability of scarce water resources is a traditional source of tensions among riparian states, these tend not to evolve into violent conflicts. Most of potential conflicts are in the developing world where the agricultural sector is very water demanding. At the same time developed countries, which con-

sume less water due to the nature of industrial sector and are more concerned about water quality, tend to reach cooperative water-sharing agreements. The main way to contain conflicts over water is through a combination of water-sharing and demand-limiting agreements.

1.2 Empirical studies

1996

29. Baer, A., 1996. 'Not Enough Water to Go Round?', *International Social Science Journal* 48(2): 277 and other non-continuous pages.

The article indicates that some thirty countries are experiencing severe water shortages and in the next 50 years this number will double. All these countries are among the poorest in the world, and for them overpopulation, underdevelopment and water scarcity are mutually aggravating problems. In several critical regions latent conflicts may burst into open due to increasing water scarcity. If waters wars are to be prevented, a two-fold strategy, combining limiting the population growth and developing new sources of water supply, must be implemented. A key part of this 'blue revolution' is large-scale desalination of seawater.

30. Postel, Sandra, 1996. *Dividing the Waters: Food Security, Ecosystem Health, and the New Politics of Scarcity*. Worldwatch Paper; 132. Washington, DC: Worldwatch. 76 pp.

Competition over scarce water resources is increasing on various levels: urban centers compete with agricultural users, fast growing regions – against underdeveloped provinces, upstream nations come into conflict with downstream states. The author advocates the solutions based on more efficient use of water for which market methods offer a range of incentives, including rational pricing and ecological standards. Special attention has to be paid to protecting the health of freshwater ecosystems. Engineering solutions increasingly require political decision-making.

1997

31. Swain, Ashok, 1997. 'Sharing International Rivers: A Regional Approach', in Nils Petter Gleditsch et al., eds, *Conflict and the Environment*. Dordrecht: Kluwer Academic (403–416).

Both the scarcity and pollution of fresh water resources have become a source of serious concern in many parts of the world. International rivers need special attention in this regard. Their cooperative management not only makes use of available water more affective, but may also help to avoid conflicts and to advance regional cooperation. New international legal principles are being developed for dealing with transboundary river-sharing issues. While there is a need in a universal legal framework, the promotion of regional management of international rivers, first of all through regional organizations, is the most promising way forward.

32. Wolf, Aaron T., 1997. 'International Water Conflict Resolution: Lessons from Comparative Analysis', *International Journal of Water Resources Development* 13(3): 333–365.

The article starts with the assertion that while the international water law is underdeveloped, there is vast experience of conflict resolution. Specific lessons learned through this experience are divided according to three stages: pre-negotiation, negotiation and implementation. For the first stage, the lesson on crucial importance of third-party involvement is the most important one: for the second - the key is found in creating incentives for voluntary resolution; for the third - the point is to shift the focus from river management to watershed management. Generally, early planning offers the best guide for the riparians along the cooperative way.

1998

33. Gleick, Peter H., 1998. *The World's Water 1998–1999: The Biennial Report on Freshwater Resources*. Washington, DC: Island Press. 318 pp.

This report identifies and describes in detail 54 historical and ongoing disputes and conflicts over freshwater resources. In most of these disputes, water is an instrument of war or a strategic target, rather than a contested resource at the root of the dispute.

34. Hamner, Jesse H. & Aaron T. Wolf, 1998. 'Patterns in International Water Resource Treaties: The Transboundary Freshwater Dispute Database', *Colorado Journal of International Environmental Law and Policy*. 1997 Yearbook: 157–177.

The article presents some preliminary analysis of the Transboundary Freshwater Dispute Dataset, developed at the Oregon State University and available at <http://terra.geo.orst.edu/users/tfdd>. The aim of this article is to advance a comparative assessment of water treaties, and the Dataset provides for computerized categorization of these treaties according to the river basin, the state parties, the date of signature, the subject of the agreement, the character of water allocation, implementation and dispute resolution mechanisms, and incorporation of additional non-water issues.

35. Just, Richard E. & Sinaia Netanyahu, eds, 1998. *Conflict and Cooperation on Trans-Boundary Water Resources*. Natural Resource Management and Policy; 11. Boston, MA: Kluwer Academic. xxi, 432 pp.

The book contains a broad range of articles written mostly by economists and seeks to demonstrate what the discipline of economics has to offer to support the analysis of cooperative management of transboundary water resources. It originates in a symposium of the International Water and Resource Economics Consortium, organized by the University of Maryland in April 1997. The differences between international and domestic water disputes are acknowledged, but the authors mainly seek to prove that many recently developed economic tools based on the game theory could be useful for facilitating cooperation of both types.

36. Salman, Salman M.A. & Laurence Boisson de Chazournes, eds, 1998. *International Watercourses: Enhancing Cooperation and Managing Conflict: Proceedings of a World Bank Seminar*. World Bank Technical Paper; 414. Washington, DC: World Bank. xi, 223 pp.

The fourth part of the Report (pp. 101–170) deals with conflict resolution of international watercourses, underscoring the importance of international legal norms, e-

flected in the UN Convention and the various regional and bilateral instruments, in enhancing cooperation and managing conflict over international watercourses. These instruments demonstrate a trend towards more comprehensive strategies for managing and protecting international watercourses.

37. Zilberman, David & Douglas Parker, 1998. 'Internal Water Disputes: Causes and Solutions', in Richard E. Just & Sinaia Netanyahu, eds, *Conflict and Cooperation on Trans-Boundary Water Resources*. Boston, MA: Kluwer Academic (89–107).

The chapter looks into causes of internal water conflicts (most examples are from the western US) and argues that it is not scarcity as such, but rather the environmental considerations that come to the forefront. The introduction of markets is seen as the broad avenue for resolving these conflicts, but the introduction of markets can only be gradual. Institutions of water management should apply a flexible system of incentives that would reduce contamination and improve water quality. Interregional water transfers could be used, with a careful valuation of environmental consequences.

1999

38. De Villiers, Marq, 1999. *Water Wars: Is the World's Water Running out?* London: Phoenix Press. xvi, 413 pp.

The central theme of the book is the crisis in availability of water and management of this resource. The author presents a series of internal, interstate, and regional, stories about the nature of possible 'water wars'. The main emphasis of the book is in the details of the stress related to water use and their translation into political tension and conflict. The author dismisses several schemes of importing water from distant places and is cautious about energy-intensive technologies such as desalination, but his own recommendations for resolving of conflicts are not very specific.

39. Elhance, Arun P., 1999. *Hydropolitics in the Third World: Conflict and Cooperation in International River Basins*. Washington, DC: United States Institute of Peace. 309 pp.

The author looks at six international river basins around the world (the Nile, the Jordan, the Euphrates, the Tigris, the Ganges, the Mekong) and focuses on instances of cooperation and conflict. An unequal distribution of freshwater does not in itself necessarily lead to acute interstate conflict, but 'severe scarcities of an essential, nonsubstitutable, and shared resource' like freshwater may make states prone to conflict.

40. Wolf, Aaron T, 1999a. 'The Transboundary Freshwater Dispute Database Project', *Water International* 24(2): 160–163.

The weight of the historical evidence points unequivocally to the conclusion that water, by its very nature, tends to induce the parties to the numerous transboundary conflicts to cooperate. The character of this hydro-cooperation and the mechanisms of conflict resolution require more study, so reliable data becomes a crucial prerequisite for preventing escalation of water conflicts. A Transboundary Freshwater Dispute Dataset has been developed at the Oregon State University and available at <http://terra.geo.orst.edu/users/tfdd>.

41. Wolf, Aaron T., 1999b. "Water Wars" and Water Reality: Conflict and Cooperation Along International Waterways', in Steven C. Lonergan, ed., *Environmental Change, Adaptation and Security*. Dordrecht: Kluwer Academic (251–265).

The chapter presents systematically arguments against the 'water wars' hypothesis, giving most attention to the historical records, which show few occasions of minor violent conflict but massive body of evidence on cooperation, codified in international treaties. Strategic argument, shared interest, institutional resiliency, and economic argument provide supporting evidence for the conclusion that war over water is not strategically rational, hydrographically effective, or economically viable. An important caveat is that there is a connection between water scarcity and political stability, so consistent efforts at providing adequate supply of clean water are essential.

42. Wolf, Aaron T., Jeffrey A. Natharius, Jeffrey J. Danielson, Brian S. Ward & Jan K. Pender, 1999. 'International River Basins of the World', *International Journal of Water Resources Development* 15(4): 387–427.

As concerns over water scarcity grow and the demands for more efficient management of this resource intensify, the availability of reliable data becomes the key issue, particularly for cross-border problems. One invaluable source was the Register of International Rivers, which listed 214 international waterways, which basins covered 47% of land surface. This Register was last updated in 1978 by the later disbanded UN Department of Economic and Social Affairs. The authors conducted a thorough update and revision of this data, seeking to include geopolitical changes and technological achievements. The new register lists 261 international rivers which basins cover 45,3% of land surface. The data set includes notes on changes of boundaries and status of disputes; the authors give particular attention to water-sharing arrangements, including treaties and join river administrations. Available at http://terra.geo.orst.edu/users/tfdd/register/register_paper.html.

2000

43. De Villiers, Marq, 2000. *Water*. Toronto: Stoddart. xvi, 422 pp.

The author asserts that we can no longer take water for granted. Its assured supply is rapidly decreasing and the climate change is likely to affect rainfall in the most unstable ecosystems, leading to further desertification. Supply problems are massively aggravated by pollution, so that nowadays almost none of the water in the world's major rivers is fit to drink. The question about water wars in the 21st century cannot be dismissed on the base of historical evidence and deserves serious attention.

44. Gleick, Peter H., 2000. *The World's Water 2000–2001: The Biennial Report on Freshwater Resources*. Washington, DC: Island Press. 300 pp.

Update of Gleick 1998. Produced biennially. The author, a proponent of the water conflict scenario, foresees growing and increasingly serious water scarcities in a number of countries, and warns of coming water conflicts.

45. Ohlsson, Leif, 2000. 'Water Conflicts and Social Resource Scarcity', *Physics and Chemistry of the Earth* 25(3): 213–220.

The author opposes the popular argument that water scarcity causes international conflicts over shared water resources and gives empirical evidence against 'water wars' framework. He argues that the risk of conflicts within countries is larger, and that the risk of international conflict is a result of necessity to avoid conflicts within countries, caused not by water scarcity itself, but by the institutional change required to adapt to water scarcity. To show human response to scarcity, a new Social Resource Water Stress/Scarcity Index (SWSI) is developed, built on a combination of traditional hydrological indices and the UNDP Human Development Index. Calculations are made for 159 countries, the year 1995 is taken for the basis with projections to 2025.

46. Wolf, Aaron T. & Jesse H. Hamner, 2000. 'Trends in Transboundary Water Disputes and Dispute Resolution', in Miriam R. Lowi & Brian R. Shaw, eds, *Environment and Security: Discourses and Practices*. Basingstoke: Macmillan (123–148).

The empirical evidence shows clearly that wars over water are neither strategically rational, hydrologically effective, nor economically viable. That is why geographic scale and intensity of water conflicts are inversely related. While water appears to be a resource whose characteristics tend to induce cooperation, water tensions do crop up regularly. Each treaty could be considered a manifestation of a water dispute resolved, so looking into their preparations it is possible to find clues to the type and intensity of other conflicts. These indicators might include water quantity issues, water quality issues, multiple uses of water, political divisions, the geopolitical setting, level of national development, the hydrological issue at stake, water institutions, and depth of any national water ethos.

2001

47. Blatter, Joachim & Helen Ingram, eds, 2001. *Reflections on Water: New Approaches to Transboundary Conflicts and Cooperation*. American and Comparative Environmental Policy. Cambridge, MA: MIT Press. xvi, 358 pp.

The book provides a broad picture of transboundary water cooperation and conflict, with examples from such diverse and dissimilar cases as Lake Constance in Central Europe, the Chimanimani region in Zimbabwe, and Imperial and Mexicali valleys. It was the editors' goal to open up the narrow definition of water to make it more inclusive of the value that community and culture place on it. It is with broader understanding of the value of water that efficiency of such institutions as Yellowstone to Yukon Conservation Initiative (Y2Y) and the Black Sea Environmental Program (BSEP) is evaluated and patterns of such organizations as International Boundary and Waterly Commission (IBWC) and Border Environmental Cooperation Commission (BECC) are compared. All these empirical studies lead to a new look at water as a part of natural human environment.

48. De Villiers, Marq, 2001. *Water: The Fate of Our Most Precious Resource*. Boston, MA: Houghton Mifflin. xvi, 352 pp.

The author argues that the potential for water conflicts between nations is growing as states reach the limits of their resources. Traditional solutions, like constructing dams, now create more problems than they solve, while ambitious projects on 'exporting' water from one basin to another across borders have massive political complications and uncertain environmental consequences. The book examines a range of cases, in-

cluding China, the Middle East, the Sahara, the Aral Sea, and points out that per capita irrigated acreage is decreasing everywhere. Water did not cause wars in the past, but it did cause societal collapse; in the future the latter could come together with the former.

49. Gleick, Peter H., 2001a. 'Global Water: Threats and Challenges Facing the United States', *Environment* 43(2): 18–26.

Four key water-related problems are identified as requiring priority attention of the US leadership: water availability and use in the US, conflicts over water in several regions of the world, global water crisis and human health, and climate change. The first and the fourth of these problems receive most attention in the article, with specific recommendations on possible short-term measures.

50. Gleick, Peter H., 2001b. 'Making Every Drop Count', *Scientific American* 284(2): 29–33.

In this first part of the cover story 'Safeguarding our water' describes the author the magnitude of the world's pressing water problems in terms of skyrocketing usage and ominous limits to the known supplies.

51. Klare, Michael T., 2001a. 'The New Geography of Conflict', *Foreign Affairs* 80(3): 49–61.

Three evolving phenomena - increased competition over access to major sources of oil and gas, growing friction over allocation of shared water supplies, and internal warfare over valuable export commodities - have produced a new geography of conflict, in which resource flows rather than political and ideological divisions constitute the major fault lines. Five major river systems, shared by two or more countries in arid areas - the Nile, the Jordan, the Tigris and Euphrates, the Indus, and the Amu Darya - and the underground Mountain Aquifer constitute the major contested water resource zones. Devising ways to peacefully resolve the increasing competition over natural resources is all the more urgent because many states view control over them as a national security requirement. Endeavors like exploring new desalination techniques must be accompanied by multilateral initiatives aimed at reducing the risk of violent conflict.

52. Klare, Michael T., 2001b. 'Resource Competition and World Politics in the Twenty-First Century', *Current History* 99(650): 403–407.

Globalization increases the pressure on resources through three key trends: spread of industrialization, growth of consumption by the increasing middle class, and extended reach of multinational corporations. The effects of global resource pressure are most evident in the economic area; the environmental consequences will be equally heavy. Yet another area that will be affected is the political-military. The risk of violence over the allocation of shared water resources is especially acute where major river systems constitute the main source of supply, while water is scarce. The studies of international relations must pay greater attention to the consequences of increasing pressure on the natural resource base.

53. Klare, Michael T., 2001c. *Resource Wars: The New Landscape of Global Conflict*. New York: Metropolitan. 289 pp.

The central argument of the book - that future wars will be fought over possession of natural resources - is forcefully advanced. Three categories of resources are examined - oil, water and minerals/timber, with most attention given to the former. Water conflicts are presented in two chapters, one of which takes on the issue most broadly and focuses on the Nile Basin, and the other describes the current and potential tensions in the Jordan, the Tigris-Euphrates, and the Indus basins. Besides pointing to the 'growing demand - falling supply' dilemma, the author also includes political factors that contribute to the escalation of water conflicts. His proposal on a global water authority is not developed in much detail.

54. Lomborg, Bjørn, 2001a. 'Resource Constraints or Abundance?', in Paul F. Diehl & Nils Petter Gleditsch, eds, *Environmental Conflict*. Boulder, CO: Westview (125–152).

The chapter sharply questions the common assumption that the environmental stresses are getting worse, targeting several specific areas, one of which is water. The author argues that the core of the problem is not scarcity of supply but how wisely the water is used. The main issue for resolving water problem is then about its adequate pricing. The price of desalination places an upper limit on the value of water resources, and that makes it doubtful that a war could be launched for its acquisition.

55. Lomborg, Bjørn, 2001b. *The Skeptical Environmentalist: Measuring the Real State of the World*. Rev. ed. Cambridge: Cambridge University Press. xxiii, 515 pp.

An earlier version was published in Danish as *Verdens sande tilstand*, 1998. Chapter 13 ('Water') directly touches upon the issue of conflicts over water resources. The author, acknowledging that water is becoming more valuable and, in some cases, scarce, admits that tensions over its distribution will wake up yet another element in a potentially explosive cocktail of international conflicts of interest (p. 156). However his main conclusion is that the 'water war' argument is seriously overstated. Such wars, in his opinion, make little strategic or economic sense, while more international attention to water issues may help in resolving protracted disputes.

56. Postel, Sandra L. & Aaron T. Wolf, 2001. 'Dehydrating Conflict', *Foreign Policy* (126): 60–71.

The article raises the question of how and why water-related tensions develop, beyond the simplistic equation that water shortages lead to wars. It shows with several examples that water scarcity already causes much violence and conflict inside states. Interstate conflicts follow a common trajectory: a rapid change in a river system design caused by a unilateral action finds the institutions unable to absorb the change. 17 river basins are identified with high risk of conflict and three guiding principles for reducing water pressure are proposed.

2. Regional studies (by region covered)

2.1 Middle East

2.1.1 Region as a whole

1996

57. Wolf, Aaron T., 1996. *Middle East Water Conflicts and Directions for Conflict Resolution*. Food, Agriculture, and the Environment Discussion Paper; 12. Washington, DC: International Food Policy Research Institute. vi, 28 pp.

The paper explores the political tensions that are intertwined with the scarcity of water in the Middle East and starts with a brief hydropolitical history of the Nile, Tigris-Euphrates, and Jordan basins, with attention given to the latter. Past attempts - from the early 1950s to 1991 - at resolving water issues separately from their political framework all failed, and the advance of the peace process shows that high and low political issues may be best dealt with simultaneously. Despite the relative success of the multilateral working group on water, many of the participants are frustrated that it is not, by design, a vehicle for resolving conflict. Many of the same aspects of water resources that make them conducive to conflict also allow their management to induce cooperation. Early planning with awareness of the options can help guide riparians along the latter path.

1997

58. Beaumont, Peter, 1997. 'Water and Armed Conflict in the Middle East: Fantasy or Reality?', in Nils Petter Gleditsch et al., eds, *Conflict and the Environment*. Dordrecht: Kluwer Academic (355–374).

The chapter argues that despite greater pressure on available water resources, water wars are unlikely to take place in the future. Over 75% of all water usage is for irrigation purposes, so water conflicts in fact occur over low value irrigation water. Water conflicts short of war can still arise, with 'water piracy' being an interesting case, and it is Israel that provides good examples for it. The issue of water rights is a crucial one; there may be doubts about the fairness of the agreement over water between Israel and the Palestinians, so it is encouraging that further agreements are being negotiated.

59. Biswas, Asit K., John Kolars, Masahiro Murakami, J. Waterbury & Aaron T. Wolf, 1997. *Core and Periphery: A Comprehensive Approach to Middle Eastern Water*. Water Resources Management Series; 5. Delhi: Oxford University Press. xvii, 160 pp.

The book analyses complex inter-country water issues in the Middle East. It is argued that water is the most critical resource for the long-term sustainable development of the region. Without a friendly agreement between the countries concerned to develop and use the scarce water resources on an equitable basis, no lasting peace is possible. The water issue has concurrent political, technical, economic, and social dimensions. This book is the final report of the Middle East Water Commission, a team of international water experts established to address and propose solutions to these problems.

60. Drake, Christine, 1997. 'Water Resource Conflicts in the Middle East', *Journal of Geography* 96(1): 4–12.

The article analyses the causes of increasing pressure on water resources across the Middle East, looking into specific factors that determine growing scarcity of supply in the three major basins: the Tigris-Euphrates, the Nile, and the Jordan-Yarmouk. The author examines the potential of escalation of present-day disputes into violent conflicts and offers guidelines towards possible solutions.

61. Gleick, Peter H., 1997. 'Water and Conflict in the Twenty-First Century: The Middle East and California', in Douglas D. Parker & Yacov Tsur, eds, *Decentralization and Coordination of Water Resource Management*. Boston, MA: Kluwer Academic (411–428).

The chapter begins with a broad overview of the declining availability of water resources in the Middle East, including the basins of the Jordan, the Tigris-Euphrates, the Litani-Orontes, and the West Bank groundwater aquifers, and makes a brief comparison with the situation in California. It then proceeds with evaluating a range of possible strategies of reducing potential conflicts over water, including reallocation of current supplies, introducing effective joint interbasin management, increasing efficiency of water use, opening new supplies, and applying international law. Comparisons with water policies in California give ground for the conclusion on the need for a comprehensive framework for managing shared water resources.

62. Morris, Mary E., 1997. 'Water and Conflict in the Middle East: Threats and Opportunities', *Studies in Conflict and Terrorism* 20(1): 1–13.

The article starts with presenting a couple of possible scenarios of escalation of water conflicts into large-scale hostilities. It then offers an overview of the current tensions in the Jordan Basin, the Tigris-Euphrates Basin, and the Nile Basin, emphasizing that protection of water is unquestionably a major challenge for Middle Eastern governments. Giving a positive evaluation of the potential for water conflict resolution, the author points out two critical factors: the containment of population growth and the reduction of political tensions.

63. Nachmani, Amikam, 1997. 'Water Jitters in the Middle East', *Studies in Conflict and Terrorism* 20(1): 67–93.

The article starts with a general look at the global water shortage and proceeds to examining water problems in the Middle East, emphasizing the depleted sources and growing conflicts. It then identifies 12 specific features of the regional water crisis and evaluates possible solutions, with a particular attention to water exports from Turkey. It concludes that integrating water systems is a virtually impossible task, so time, money and hope should not be wasted on regional cooperative projects, which cannot increase the supply. The only real hope, in the author's opinion, is desalination; this option is assessed in much detail and found feasible in mid-to-long-term perspective.

64. Naff, Thomas, 1997. 'Information, Water and Conflict: Exploring the Linkages in the Middle East', *Water International* 22(1): 16–28.

The article starts with a general overview of complexities of information gathering and processing regarding such dynamic systems as river basins. It then turns to the problems of control over water-related information in the Middle East, emphasizing the link between information and conflict. The author argues the necessity of establishing a region-wide integration of water information systems and offers a model for such a regional nexus based on new relational software.

65. Shapland, Greg, 1997. *Rivers of Discord: International Water Disputes in the Middle East*. London: Hurst. xi, 183 pp.

The author examines the state of water disputes around three international river systems in the Middle East - the Jordan, the Nile, and the Tigris-Euphrates. He takes a non-alarmist approach towards possible escalation of water conflicts in the region and sees diplomatic and economic mechanisms as the likely channel for dispute resolution in the future. A particular emphasis is put on water quality and transboundary pollution, which tend to aggravate problems related to scarcity of supply. The book follows in line with an important shift in the thinking about water as a critical component of, and an important vehicle for, cooperation among the many antagonists in the region.

66. 1997. 'Water Conflict', *Studies in Conflict and Terrorism* Special Issue 20(1): iii, 135.

Part 1: The Middle East. A diminishing supply of usable water is likely to become the basis for the most serious disagreement and conflict in the 21st century. Success in resolving water problems is essential for peace in the world. It is particularly in the Middle East that water tensions may become sources of violent conflict. Five articles in this special issue present different perspectives on the water dimension of the Middle Eastern conflicts.

1998

67. Scheumann, Waltina & Manuel Schiffler, eds, 1998. *Water in the Middle East: Potential for Conflicts and Prospects for Cooperation*. Berlin: Springer. x, 190 pp.

The book deals with the potential conflicts over shared rivers in the Middle East, and with approaches towards cooperation regarding the Euphrates and Tigris, the Jordan and the Nile rivers. Far from echoing the warnings about imminent water wars, the book highlights the potential for water savings and for cooperation in many fields inside and outside the water sector. Such creative approaches may foster interdependence, build trust, and create the incentives and conditions for an equitable sharing of international water resources in the Middle East. The text of the International Water Convention is also included, as well as five bilateral agreements.

68. Venter, Al J., 1998a. 'The Oldest Threat: Water in the Middle East', *Jane's Intelligence Review* 10(2): 21–26.

The article looks into three major river systems of the region - the Jordan, the Tigris-Euphrates, and the Nile - giving most attention to the conflict around the first one,

some attention to the second, and only superficial half-page to the third. It is rich in quotations from various experts and decision-makers, provides plenty of anecdotal evidence but not in terms of conclusions and recommendations.

69. Venter, Al J., 1998b. 'The Oldest Threat: Water in the Middle East', *Middle East Policy* 6(1): 126–136.

The same article as Venter 1998a, extended with a half page, covering the Nile basin and references.

1999

70. Berman, Ilan & Michael Paul, 1999. 'The New Water Politics of the Middle East', *Strategic Review* 27(3): 45–52.

Increasing shortages of water supply make this crucial resource a possible trigger and a serious cause for potential conflicts in the generally unstable Middle East. Many negotiation processes across the region are advancing too slowly and are not interconnected, so there is an obvious need to integrate them in the framework of security architecture. The water dimension has to be incorporated into this framework, with provisions guaranteeing access to this resource and aiming at its fair and equitable distribution.

71. Lowi, Miriam R., 1999. 'Water and Conflict in the Middle East and South Asia: Are Environmental Issues and Security Issues Linked?', *Journal of Environment and Development* 8(4): 376–396.

The article examines basic setting of transboundary water conflicts and focuses on the environmental variables, seeking to establish a link between the quality of water supply and the possibility of conflict. There is a need to broaden the agenda of international research, which is overly focused on the qualitative parameters of supply. The solutions to water problems should be sought in reforming political institutions for water management in such a way that would prioritize environmental concerns.

2000

72. Beaumont, Peter, 2000. 'The Quest for Water Efficiency: Restructuring of Water Use in the Middle East', *Water, Air and Soil Pollution* 123(1–4): 551–564.

By the end of the 20th century most of the renewable water resources in the Middle East had been committed to human use, so in the first few decades of the new century many of the countries will see the need in new water management strategies. In most states the emphasis has been on supply management, but in the near future more attention has to be given to demand management. The article analyses in detail the patterns of water use across the Middle East and shows that the agricultural sector has the least effective use of water. Reallocation of water resources from this sector to more productive urban use is complicated by high dependency on traditional agriculture in many areas, as well as by state policies of food security. In the long term, desalination is likely to become a more important part of the solution.

73. Dolatyar, Mostafa. & Tim S. Gray, 2000. *Water Politics in the Middle East: A Context for Conflict or Co-operation?* Basingstoke: Macmillan. xiv, 255 pp.

The main hypothesis of the book is that, contrary to the most frequently mentioned scenario in the literature that suggests that dispute over water supplies will lead to interstate war, it is unlikely that the quest for more water will cause a new war in the Middle East. Rather, the water shortage should be seen as a platform for regional cooperation that promises development and exploitation of the region's water supplies in ways that all riparian nations can achieve optimal solutions. Moreover, joint cooperative development of common water resources will actually reinforce peace.

74. Lowi, Miriam R., 2000. 'Water and Conflict in the Middle East and South Asia', in Miriam R. Lowi & Brian R. Shaw, eds, *Environment and Security: Discourses and Practices*. Basingstoke: Macmillan (149–171).

The empirical evidence illustrates that depletion, degradation, or altered allocation of water resources may be considered a potential threat to the security of states, but it has never directly provoked inter-state violence. Water is only one of the components of conflict, so it is important to study this component in order to analyze the complexity of conflicts. However, since environmental factors are neither necessary nor sufficient causes of conflict, it would be totally misguided to focus attention on them in an effort to resolve the larger conflict. In cases where states or communities are on the verge of humanitarian disaster and total breakdown, it tends to result from some combination of political, structural and institutional variables, while environmental factors function as intervening variables.

2.1.2 The Jordan basin

1996

75. Allan, J.A., ed., 1996. *Water, Peace and the Middle East: Negotiating Resources in the Jordan Basin*. Library of Modern Middle East Studies; 9. London: Tauris Academic Studies. xix, 250 pp.

The book takes a constructive approach to solving the problems of managing water resources of the Jordan Basin. The Israeli, Jordanian, and Palestine perspectives are presented, but the most solid chapter examines the political economy of water use, placing regional experiences in a larger context and identifying reasons for optimism and long-term caution. The prospects of the regional peace processes relating to water are discussed in two chapters, and environmental aspects of the problem are also reflected upon.

76. Elmusa, Sharif S., 1996. 'The Land-Water Nexus in the Israeli-Palestinian Conflict', *Journal of Palestine Studies* 25(3): 69–78.

The heart of the Arab-Israeli conflict is control over land, and this makes also a salient issue in the water dispute between the two sides. The article examines critically the Israeli claims that control over parts of the West Bank is needed to safeguard its water supply. While these claims cannot be validated by hydrological and economic analysis, Israel's retention of land in the West Bank will have marked implications for Pal-

estinian access to water. The strategy of enhancing Israel's security (including water security) by extending its borders renders the Palestinians utterly insecure. This security paradox can be overcome only through a fundamental shift in the Israeli mindset regarding land control and water supply.

77. Haddad, Marwan & Numan Mizyed, 1996. 'Water Resources in the Middle East: Conflict and Solutions', in J.A. Allan, ed., *Water, Peace and the Middle East: Negotiating Resources in the Jordan Basin*. London: Tauris Academic Studies (3–17).

This introductory chapter provides a background on conflict over water resources in the Middle East and identifies two steps to achieving a lasting solution. The first step in any attempt to solve the conflict depends on the realization that negotiation in good will is an essential element. The second step is the achievement of widespread recognition that any agreements must be comprehensive and integrated. To achieve these solutions three supportive mechanisms should be applied: the adoption of a water charter for the region, the optimization of water use in agriculture and the introduction of economic principles into the allocation and management of water.

78. Shuval, Hillel, 1996. 'Towards Resolving Conflicts over Water Between Israel and Its Neighbours', in J.A. Allan, ed., *Water, Peace and the Middle East: Negotiating Resources in the Jordan Basin*. London: Tauris Academic Studies (137–168).

The dispute between Israel and the Palestinians over the shared water resources of the Mountain Aquifer could become a major obstacle in the path of peace. However, if a just and equitable solution can be developed, it could provide a major impetus to the peace process. The chapter proposes a non-conventional approach to resolving this problem based on principles of equity and shared responsibility, which can meet the legitimate needs of all parties.

1997

79. Amery, Hussein A., 1997. 'Water Security as a Factor in Arab-Israeli Wars and Emerging Peace', *Studies in Conflict and Terrorism* 20(1): 95–104.

This short article first revisits the ambitious ideas of the Zionists in early 20th century, reminding that the founding fathers of Israel were ideologically committed to agriculture and thus recognized the strategic importance of water. The author then examines several explanations of the role of water in the war of 1967 and looks into the water dimension of Israel's occupation of Southern Lebanon, emphasizing the plans for diverting River Litani towards Northern Israel. He concludes that Israel depends upon captured resources and so is reluctant to return occupied territories. Accordingly, in the peace process the territorial issue cannot be detached from the hydrological one.

80. Beaumont, Peter, 1997. 'Dividing the Waters of the River Jordan: An Analysis of the 1994 Israeli-Jordan Peace Treaty', *Water Resources Development* 13(3): 415–424.

In a series of articles and annexes to the 1994 Peace Treaty Israel and Jordan have reached agreement on sharing of the waters of the Rivers Jordan and Jarmouk and future water policies. The article takes a look at the parameters of this agreement and concludes that Israel has compromised on very little and is able to keep all the water resources it has appropriated since the 1967 war. Not only the idea of 'equitable' dis-

tribution of water resources has been ignored, but Israel also has managed to convince Jordan that in the future the water needs of two states should be considered together. The amounts of water granted to Jordan are extremely disappointing, but it has accepted the deal assuming that other articles of the Treaty are more generous.

81. Elmusa, Sharif S., 1997. *Water Conflict: Economics, Politics, Law and Palestinian-Israeli Water Resources*. Washington, DC: Institute for Palestine Studies. xxii, 408 pp.

Elmusa states that the water conflict between the Palestinians and Israelis is related to the transboundary nature of water resources and their scarcity, and to decades of occupation. One of the key issues in the Palestinian-Israeli conflict is Israel's policy of restricting Palestinian access to water, while permitting Israelis and settlers ample supply of it. Elmusa identifies this water 'gap' as one of the key obstacles to a lasting peace, and offers plausible solutions that are rooted in international law and joint management.

82. Libiszewski, Stephan, 1997. 'Integrating Political and Technical Approaches: Lessons from the Israeli-Jordanian Water Negotiations', in Nils Petter Gleditsch et al., eds, *Conflict and the Environment*. Dordrecht: Kluwer Academic (385–402).

The chapter looks into water disputes in protracted conflicts and focuses on the case between Israel and Jordan, giving most attention to water aspects of the peace treaty of 1994. Special emphasis is put on the procedural setting of the peace process, where bilateral negotiations on political core issues were combined with parallel multilateral talks on technical matters. These parallel talks proved to be a helpful complement to the diplomatic efforts, paved the way for compromises over the issue of water distribution and improved confidence for resolution of the larger political agenda. These 'twin track' formula negotiations can serve as a procedural model for resolution of water conflicts.

83. Lonergan, Steve, 1997. 'Water Resources and Conflict: Examples from the Middle East', in Nils Petter Gleditsch et al., eds, *Conflict and the Environment*. Dordrecht: Kluwer Academic (375–384).

The chapter argues that although disputes over water will continue in the near future, the escalation of water conflicts into wars is unlikely. The author takes the case of the Middle East - the only region that is currently experiencing water-related stress. Giving particular attention to the impact of urbanization, he presents three interconnected crises in the Jordan Basin: the supply-demand crisis, the water quality crisis, and the crisis of sharing water resources between Israel and the Palestinians. While certain social and economic institutions, including water rights that create inequity in access to this vital resource, aggravate the conflict, it is encouraging that most parties see the solution on the way of regional cooperation.

84. Rouyer, Alwin R., 1997. 'The Water Issue in the Palestinian-Israeli Peace Process', *Survival* 39(2): 57–81.

The article starts with the overview of the problems stemming from the fact that during several decades the Palestinians in the West Bank have been excluded from man-

agement of the water resources and denied access to sustain agricultural and even household use. The author examines the foundation of the Israeli position that additional extraction of water for expanded Palestinian use would damage the aquifer. The limited progress in implementation of the agreements is compared with the scale of the tasks still ahead, and the conclusion asserts that in the final-status talks a formula for water sharing can be established only on the principle of securing equal minimum requirements.

85. Salmi, Ralph H., 1997. 'Water, the Red Line: The Interdependence of Palestinian and Israeli Water Resources', *Studies in Conflict and Terrorism* 20(1): 15–65.

The article starts with a detailed assessment of water resources available for Israel and the Palestinians. It then examines in much detail the provisions of international law that might be applicable for establishing a fair and equitable distribution of these resources. Then a critical evaluation of Israelis water policies is presented, with the emphasis on the degradation of arable land used by the Palestinians. The conclusion questions the need for importing large amounts of water but stresses the crucial need in formation of a joint management body, composed of representatives of Israel, Jordan, Lebanon, Syria, and the Palestinians, that would be able to develop optimal solutions for the region's water deficits.

1998

86. Dombrowsky, Ines, 1998. 'The Jordan River Basin: Prospects for Cooperation Within the Middle East Peace Process?', in Waltina Scheumann & Manuel Schiffler, eds, *Water in the Middle East: Potential for Conflicts and Prospects for Cooperation*. Berlin: Springer (91–112).

The chapter aims to analyze achievements, future prospects, and potential limits for regional cooperation on water resource within the current peace process. Due to hydrological and socio-demographic conditions, water management is extremely challenging in the Jordan Basin. The political wish to maintain absolute control over water resources for ideological reasons is a serious obstacle to joint management in which all parties would give up sovereignty over water to a joint body. Real transparency and exchange of data may be a first step to a more rational water resource planning.

87. Küffner, Ulrich, 1998. 'Contested Waters: Dividing or Sharing?', in Waltina Scheumann & Manuel Schiffler, eds, *Water in the Middle East: Potential for Conflicts and Prospects for Cooperation*. Berlin: Springer (71–87).

Conflicts over water have occurred between many countries in all climatic regions, but between countries in arid regions they appear to be unavoidable. The Middle Eastern countries have made some progress towards the distribution of water, but an overall solution through dividing water resources does not appear to be reachable. A cooperative arrangement for sharing the Jordan water does not appear a realistic option now, but because of its attractiveness it is useful to outline possible cooperative steps which might lead to a fully integrated solution at a later stage.

88. Netanyahu, Sinaia; Richard E. Just & John K. Horowitz, 1998. 'Bargaining over Shared Aquifers: The Case of Israel and the Palestinians', in Richard E. Just & Sinaia

Netanyahu, eds, *Conflict and Cooperation on Trans-Boundary Water Resources*. Boston: Kluwer Academic (41–60).

The chapter focuses on the problems of sharing water resources of the Mountain Aquifer between the Israel and the Palestinians, comparing cooperative and non-cooperative solutions. The authors then apply game theory for modeling the bargaining process, incorporating the Israel's incentives for negotiations, risks of breakdown of the process, including impatience, and the time factor. The conclusion is that market forces cannot bring a solution to the obvious problem, but cooperation can be strengthened through the initial phase of bargaining. Both sides would have incentives to deviate from an agreement, so monitoring and enforcement mechanisms are essential.

89. Renger, Jochen, 1998. 'The Middle East Peace Process: Obstacles to Cooperation over Shared Waters', in Waltina Scheumann & Manuel Schiffler, eds, *Water in the Middle East: Potential for Conflicts and Prospects for Cooperation*. Berlin: Springer (47–55).

The peace process in the Middle East has produced some results in resolving water disputes; however, it is at a standstill because the parties have different objections for future order. Israel, in particular, is immovable because it has already achieved many of its goals. In future negotiations questions of security and territory will have precedence over sheer questions of water. However, there is room for dynamic development in the water issue and the common ecological interests could function as a focal point for water cooperation.

1999

90. Albin, Cecilia, 1999. 'When the Weak Confront the Strong: Justice, Fairness, and Power in the Israel-PLO Interim Talks', *International Negotiation* 4(2): 327–367.

The article seeks to show that conceptions of justice and fairness can both serve as influential external guidelines and be subject to some bargaining. It looks into the experience of Israel-PLO talks on water and shows that it challenges two dominant approaches to justice and fairness in negotiations: the notion that there could be no role for such values when unequals bargain, and the idea that negotiated settlements are defined as just by virtue of having been agreed by the parties, irrespective of their relative power. The interim agreements on water do not simply reflect the unequal distribution of power between the two sides; they sought to change their relationship towards greater equality.

91. Allal, Samir & Martin O'Connor, 1999. 'Water Resource Distribution and Security in the Jordan-Palestinian Peace Process', in Steve C. Lonergan, ed., *Environmental Change, Adaptation, and Security*. Dordrecht: Kluwer Academic (109–129).

This chapter introduces some of the fundamental political, economic, and symbolic dimensions of conflict resolution needed to ensure water access security. An important part of the solution is to make water users more accountable for the costs, which is a far more complex affair than establishing property rights and prices for water supply. One important step in setting a new regional regime of water management is

to reframe the obligation of restraint as a responsibility of all parties for sustainable resource use.

92. Lowi, Miriam R., 1999. 'Transboundary Resource Disputes and Their Resolution', in Daniel H. Deudney & Richard A. Matthew, eds, *Contested Grounds: Security and Conflict in the New Environmental Politics*. Albany, NY: State University of New York Press (223–245).

The chapter examines the linkage between 'high politics' and 'low politics' in conflict resolution as it relates to resource scarcity. It focuses specifically on Israel's dependence on subterranean water supply of the West Bank and its impact on the Israeli-Palestinian settlement. The author examines the role of water in Israel's security thinking and the impact of this thinking on water policies. Some lessons from the settlement of water disputes are offered for the larger context of the peace process. Looking into the near future, the author argues that in addition to resolving their political disputes, the states of the central Middle East must take steps in curtailing wasteful water consumption, particularly by agriculture.

93. Sherman, Martin, 1999. *The Politics of Water in the Middle East: An Israeli Perspective on the Hydro-Political Aspects of the Conflict*. London: Macmillan. xiv, 160 pp.

Water has traditionally played a significant role in the precipitation of violence in the Middle East and since the late 1980s it has become one of the most prominent aspects of Israeli-Arab confrontation. The growing awareness of the potentially destabilizing effects of water scarcity have led to much attention and effort devoted to finding solutions. However, implementation of currently proposed peace initiatives, both on the Syrian and Palestinian tracks, would create a situation where control of 70% of Israel's water supply would be transferred to Arabs. The author, who for a long time was a secretary of a right-wing party in Israel and advocated for a firm unilateral control over water resources, finds this prospect unacceptable. Policy-oriented conclusions drawn from this analysis inevitably cast grave doubts as to the possibility of arriving at an amicable solution to the region's conflict in the foreseeable future. However, if water is to be eliminated as a potential flash point of violence, it is essential that the hydro-political realities are addressed with candor.

94. Shmueli, Deborah F., 1999. 'Approaches to Water Dispute Resolution: Applications to Arab-Israeli Negotiations', *International Negotiation* 4(2): 295–325.

The article looks for approaches that advance agreements towards a comprehensive solution applicable to the Arab/Israeli water conflict. It builds on research of negotiation processes and institutional frameworks of 13 international river basins management. A set of hypotheses is advanced on this basis and tested in the on-going Arab-Israeli negotiations. Since the institutions of implementation of the forthcoming agreements are still developing, there is time to benefit from lessons learned in other water disputes. Without the participation of Syria and Lebanon, it is not possible for the Israel-Jordan-Palestinian Authority to expand their water supplies substantially.

95. Soffer, Arnon, 1999. *Rivers of Fire: The Conflict over Water in the Middle East*. Lanham, MD: Rowman & Littlefield. xiii, 303 pp.

The book originated as a report to the Israel Foreign Ministry and focuses on the 'frenzied' development of water resources by the states of the region with little consideration for the needs of their neighbors. The author questions whether the region's leaders are aware of the need for transformation of the use of diminishing water resources. He argues that the region is running out of water and his conclusion on the possibility of escalation of water conflicts into wars is pessimistic. Solutions that are currently discussed - such as desalination or import of water from Turkey - are not sufficient to compensate for long-term structural scarcity. In the face of more optimistic writings on the water use in this region, Soffer argues that cooperation over this scarce resource is unlikely.

2000

96. Amery, Hussein A., 2000. 'A Popular Theory of Water Diversion from Lebanon: Toward Public Participation for Peace', in Hussein A. Amery & Aaron T. Wolf, eds, *Water in the Middle East: A Geography of Peace*. Austin, TX: University of Texas Press (121–149).

The chapter examines the origins of the theory - popular in Lebanon and the Arab world - that Israel seeks to divert the water of Litani River for its growing needs. It produces a range of factors that give credibility to this theory, since the project is feasible and a desire to carry it out indeed has been expressed in Israel. Available evidence tells that it is unlikely that substantial amounts of water are indeed diverted, but the total weight of evidence is tilted in favor of the theory. To prove the theory invalid, an open trust-building process with public involvement between the Lebanese government and population, as well as between the Lebanese and the Israelis should be advanced.

97. Amery, Hussein A. & Aaron T. Wolf, eds, 2000. *Water in the Middle East: A Geography of Peace*. Austin, TX: University of Texas Press. xviii, 293 pp.

The 10 chapters of the book give various geopolitical treatments of the critical role water plays in the Arab-Israeli peace process. The general aim is to provide interpretations from diverse geopolitical perspectives of the hydrological, historical, managerial, and political issues of water in the Jordan system. Using forward-looking analysis (even if not very consistently), the authors jointly advance the general proposition that unless Israel and the Arab states (including Palestine) conclude fair and cooperative agreement for sharing the increasingly scarce water supplies, any peace agreement is likely to be undermined by constant water-driven tensions.

98. Beaumont, Peter, 2000. 'Conflict, Coexistence, and Cooperation: A Study of Water Use in the Jordan Basin', in Hussein A. Amery & Aaron T. Wolf, eds, *Water in the Middle East: A Geography of Peace*. Austin, TX: University of Texas Press (19–44).

The chapter starts with a historical overview of the water use in the Jordan Basin and proceeds to examining in considerable detail water needs and availability of Jordan, Israel, and the occupied West Bank. Assessing the value of the Jordan water, the author points out that for Israel the redistribution of water from agriculture towards the urban sector makes good sense, but that is not the case with the Palestinians. A condition for cooperation among the riparians is Israel's readiness to run down its agricul-

tural water consumption. In the long term, Israel and Jordan will become increasingly dependent on water supplies other than those currently available; desalination offers the most promising option.

99. Haddadin, Munther J., 2000. 'Negotiated Resolution of the Jordan-Israel Water Conflict', *International Negotiation* 5(2): 263–288.

The article first revisits in significant detail the Johnston Plan of 1954 for sharing and joint use of the waters of the Jordan basin and re-examines the reasons of its failure. It then describes the process of reaching the compromise on water issues between Israel and Jordan that was fixed in the Treaty of 1994. The author concludes that the success of the negotiations was largely due to the comprehensiveness of the process, where all issues of the day were on the table. The crucial factor was the joint will of Jordanians and Israelis.

100. Hof, Frederic C., 2000. 'The Water Dimension of Golan Heights Negotiations', in Hussein A. Amery & Aaron T. Wolf, eds, *Water in the Middle East: A Geography of Peace*. Austin, TX: University of Texas Press (150–167).

The chapter seeks to clarify the water-related issues in the Syrian-Israeli negotiations and to offer a framework for resolution, acknowledging that neither side has set forth authoritatively its position. The author asserts that if the parties were able to devise security measures for total Israeli withdrawal, their different perspectives on the water issue would not be an insurmountable obstacle. Ultimately the riparians of the Jordan Valley have to recognize that multiple sovereignties within a watershed should be subordinated to a multilateral management.

101. Kay, Paul A. & Bruce Mitchell, 2000. 'Water Security for the Jordan River States: Performance, Criteria and Uncertainty', in Hussein A. Amery & Aaron T. Wolf, eds, *Water in the Middle East: A Geography of Peace*. Austin, TX: University of Texas Press (168–190).

One aim of this chapter is to examine what adjustments to variability of water resources have been made, another is to suggest how management of water may be approached to incorporate issue of variability and uncertainty. The qualitative analysis of performance evaluation is focused on Israeli water use with three key criteria being reliability, resilience and vulnerability. Given the complexity and uncertainty surrounding water management in the Jordan Basin, the authors argue that systematic consideration should be given to adaptive management, which accepts that variability, surprise and change are inevitable.

102. Klot, Nurit N., 2000. 'A Cooperative Framework for Sharing Scarce Water Resources: Israel, Jordan, and the Palestinian Authority', in Hussein A. Amery & Aaron T. Wolf, eds, *Water in the Middle East: A Geography of Peace*. Austin, TX: University of Texas Press (191–217).

The first part of the chapter provides an extensive background on the problem, including analysis of the water-related agreements between Israel, Jordan, and the Palestinians. The second part examines and compares various frameworks for regional cooperation in water issues, including the principles that guide sharing of water resources.

The author expects that after a period of building confidence in the Israeli-Palestinian Joint Water Commission the sides would be ready for a stronger and more authoritative institution; this framework later might be expanded to include Syria and Lebanon.

103. Lonergan, Steve, 2000. 'Forces of Change and the Conflict over Water in the Jordan River Basin', in Hussein A. Amery & Aaron T. Wolf, eds, *Water in the Middle East: A Geography of Peace*. Austin, TX: University of Texas Press (45–62).

The chapter starts with a reiteration that the water scarcity and conflict in the Middle East cannot be reduced to a simple cause-effect relationship but is a part of a very complex system of linkages. It then examines the effects of global changes (population and climate) and the applicability of market mechanisms. Agreements between Israel and the Palestinians amount to another, institutional force of change. Adapting to these forces requires major structural changes, including the incorporation of the principle of equity into economic and political contexts.

104. Rouyer, Alwin R., 2000. *Turning Water into Politics: The Water Issue in the Palestinian-Israeli Conflict*. Houndmills, Basingstoke: Macmillan. xx, 297 pp.

This book analyzes the water dimension of the Palestinian-Israeli conflict and peace process. Examining historical, environmental, and economic dimensions of the water conflict, the author argues that the political conflict makes the core of the problem, which can be solved only through political accommodation. The conclusion is that no permanent peace accord can be achieved between the Israelis and the Palestinians without agreement over allocations of shared water resources. The book offers examination from different perspectives and includes information gathered from over sixty interviews with Israeli and Palestinian Authority government officials, academics, and NGOs' personnel.

105. Rowley, Gwyn, 2000. 'Political Controls of River Waters and Abstractions Between Various States Within the Middle East: Laws and Operations, with Special Reference to the Jordan Basin', in Hussein A. Amery & Aaron T. Wolf, eds, *Water in the Middle East: A Geography of Peace*. Austin, TX: University of Texas Press (218–244).

The chapter looks into the attempts to apply international law for resolving water conflicts in the Jordan Basin and asks why no definite legal measures have yet been developed. It is concluded that the formulation of general and hard legal relationships is not possible and that separate treaties between states, incorporating specific compromises, would provide a potential basis for resolving the water problem. Even a complete Israeli control over all Jordan Basin would not resolve the problem, so a new sense of real compromise must emerge among the riparians.

106. Shaheen, Murad, 2000. 'Questioning the Water-War Phenomenon in the Jordan Basin', *Middle East Policy* 7(3): 137–150.

Water conflicts in the Middle East are intertwined with political and territorial conflicts; one example of this complex interplay is the 1967 Arab-Israeli war, where water issues were a part of combat operations. The problem of water scarcity cannot be resolved without deep shifts in perceptions of its key parameters. These shifts could

only result from sustained efforts at resolving the whole complex of problems, taking into consideration the interests of all parties to the conflict. Some specific short-term solutions to water problems can be found by investing extra resources that could be generated if military expenditures are gradually reduced.

107. Shuval, Hillel I., 2000a. 'Are the Conflicts Between Israel and Her Neighbors over the Waters of the Jordan River Basin an Obstacle to Peace? : Israel-Syria as a Case Study', *Water, Air and Soil Pollution* 123(1-4): 605-630.

The article looks into the current state of water conflict between Israel, Syria and Lebanon and offers an assessment of possible water security implications of a future peace agreement between the three states. The most acceptable estimate for sharing water resources comes back to the Johnston plan of 1956. The author argues that there is no need for Israel to hold on to the Golan Heights and that its water security can be effectively guaranteed by a 1-3 km zone along the Syrian side of the border under joint control and international inspection. This water security zone would provide for effective management of all the sources of the Jordan River and Lake Kinneret vital for Israel water supply.

108. Shuval, Hillel I., 2000b. 'A Proposal for an Equitable Resolution to the Conflicts Between the Israelis and the Palestinians over the Shared Water Resources of the Mountain Aquifer', *Arab Studies Quarterly* 22(2): 33-61.

The article argues that finding a solution to endemic problems of water scarcity and security is a matter of urgency. Regional cooperation in developing water resources might alleviate water conflicts and provide a necessary condition for peace. In order to achieve this long-term aim, this cooperation has to involve Syria and Turkey.

109. Wolf, Aaron T., 2000. "'Hydrostrategic' Territory in the Jordan Basin: Water, War, and Arab-Israeli Peace Negotiations', in Hussein A. Amery & Aaron T. Wolf, eds, *Water in the Middle East: A Geography of Peace*. Austin, TX: University of Texas Press (63-120).

The chapter sets out to demonstrate that water has had much less impact on the Arab-Israeli conflict than is increasingly argued. It first examines the boundaries in the region and finds that water sources have played a role in their delineation, albeit subservient to other concerns. It then turns to wars and asserts that water resources were not a factor in strategic planning for any of the campaigns. Finally, it takes negotiations and discovers that no territory to date has been retained simply because of location of water. The true lesson of the Arab-Israeli experience is about how the desire for sovereignty gives way to principles of joint management, water being an inducement to cooperation.

2001

110. Haddadin, Munther J., 2001. *Diplomacy on the Jordan: International Conflict and Negotiated Resolution*. Natural Resources Management and Policy; 21. Boston, MA: Kluwer Academic. 560 pp.

This book presents an elaborate analysis of the conflict between the Arabs and the Israelis in the Jordan Basin, giving a historic background going back 150 years but con-

centrating on the period since the establishing of the state of Israel. The author seeks to develop a multidisciplinary perspective, focusing specifically on the water dimension, including the ecological aspects of the issue. The role of the US in promoting the negotiations between Israel and Jordan, and particularly the water agreement of 1974, is analyzed in much detail. The prospects for further development of bilateral and multilateral cooperation in the Jordan basin are examined.

2.1.3 The Euphrates-Tigris basin

1996

111. Beaumont, Peter, 1996. 'Agricultural and Environmental Changes in the Upper Euphrates Catchment of Turkey and Syria and Their Political and Economic Implications', *Applied Geography* 16(2): 137–157.

A number of large irrigation projects in southeast Turkey will substantially reduce the flow of the Euphrates into Syria, but bring large volumes of water into its two tributaries: the Balikh and the Khabour. While initially Syrian agriculture might benefit from this new water, in the mid-term it might be affected by environmental problems caused by high salination of irrigation return waters. The article presents an analysis of satellite imagery, which shows that modern irrigation projects are superimposed on traditional patterns of agricultural activity. This complicates the management of environmental issues and determines the shift of focus in water disputes between Turkey and Syria from water quantity to its quality, including salination, as well as other chemicals (pesticides and fertilizers).

1997

112. Güner, Serdar, 1997. 'The Turkish-Syrian War of Attrition: The Water Dispute', *Studies in Conflict and Terrorism* 20(1): 105–116.

The article starts with an extensive background on Turkish-Syrian conflict, which links closely together the problems of water and terrorism and offers the conceptual framework of the war of attrition. A game-theoretical perspective is developed with two key types of situation: when riparians discount their costs and benefits equally and when these discount rates are different. In both situations the result is a delicate balance: Turkish costs are higher, but Syrian impatience regarding future benefits is greater.

1998

113. Güner, Serdar, 1998. 'Signalling in the Turkish-Syrian Water Conflict', *Conflict Management and Peace Science* 16(2): 185–206.

The article develops a game theory-based approach to the Turkish-Syrian conflict, seeking to establish a link between decision-making related to water and other security issues. Turkey is assumed to be a player with superior information in a two-sided game, which essentially excludes external interference. Its position is aimed at making the water negotiations conditional to the termination of support to secessionists in eastern Anatolia. Syria is then an actor uncertain about the preferences of the counterpart and it is shown that in this game situation its perception does not matter much.

114. Scheumann, Waltina, 1998. 'Conflicts on the Euphrates: An Analysis of Water and Non-Water Issues', in Waltina Scheumann & Manuel Schiffler, eds, *Water in the Middle East: Potential for Conflicts and Prospects for Cooperation*. Berlin: Springer (113–135).

The Euphrates-Tigris Basin is supposed to be one place in the world where a water war could break out. However, at present, there is no acute water shortage - and there is a high potential for water savings. Security issues are crucial between Turkey and Syria, and tensions have derived from political intentions to maintain hegemony, which instrumentalizes the water issue. However, an agreement on water quotas is possible; such sharing is not the best but a viable solution because it limits restrictions on sovereignty. Cooperation on low water conditions and operation of flows remains a necessity.

1999

115. Güner, Serdar S., 1999. 'Water Alliances in the Euphrates-Tigris Basin', in S.C. Lonergan, ed., *Environmental Change, Adaptation, and Security*. Dordrecht: Kluwer Academic (301–316).

The chapter applies game theory to the trilateral relations between Turkey, Syria, and Iraq over dividing the waters of Tigris-Euphrates river basin. The shortage of supply and lack of regional cooperation are taken as conditions for forming alliances of various configurations. The status quo receives greater support in the model than mutual concessions or irrational strategic choices. A Turkish preference for the status quo makes Syria more attractive as a strategic partner for Iraq against Turkey, and Turkey becomes a possible ally against Syria for Iraq given the Syrian preference for cheating. The author makes a point that the linking of concessions in water conflicts to issues like oil, terrorism, or even ties with Israel, is the rule in this region.

116. Seale, Patrick, 1999. 'Turkey and Syria: The War over Water', *Middle East International* (601): 20–22.

The article points out that despite the improvement of relations between Syria and Turkey, the latter is in no haste to conclude a comprehensive agreement on sharing water resources. It shows how intensive use of underground waters by Turkish farmers has depleted the flow of River Kabur. It then turns to Turkish plans for greater use of Euphrates waters and emphasizes Syrian grievances that the flow is always determined by purely Turkish interests. The conclusion is that the two neighbors have to sit together and negotiate a new settlement.

2000

117. Kibaroglu, Aysegül & I.H. Olcay Ünver, 2000. 'An Institutional Framework for Facilitating Cooperation in the Euphrates-Tigris River Basin', *International Negotiation* 5(2): 311–330.

The article describes the emergence of the water dispute among Turkey, Syria, and Iraq, as well as their early negotiations. The authors express a strong belief in the need to resuscitate the long stalled and deadlocked negotiations among the riparians and

offer an overview of principles, norms, rules, and decision-making procedures for an institutionalized framework. In their opinion, simple sharing the already limited amounts of water would not provide the riparians with an effective and equitable formula. Determining the real needs of riparian states will have to rely on the application of scientific methods, such as inventory studies of water resources and collection and analysis of data.

118. Kolars, John, 2000. 'The Spatial Attributes of Water Negotiations: The Need for a River Ethic and River Advocacy in the Middle East', in Hussein A. Amery & Aaron T. Wolf, eds, *Water in the Middle East: A Geography of Peace*. Austin, TX: University of Texas Press (245–261).

The chapter starts with an assertion that every river can be described from a punctiform, linear, areal, and volumetric points of view. We must learn to see a river as a living entity and become its advocates, subscribing to a river ethics. This approach is then applied to the dispute over sharing the waters of Euphrates, involving Syria, Turkey, and Iraq. A program based on cooperation, mutual sacrifice, and acceptance of restrictions by all riparians is suggested.

2001

119. Carkoglu, A. & M. Eder, 2001. 'Domestic Concerns and the Water Conflict over the Euphrates-Tigris River Basin', *Middle Eastern Studies* 37(1): 41–71.

The transformation of the Southeast Anatolia Development Project (GAP) in Turkey from a hydro-energy project (with its 22 dams) to an integrated, regional development program in the mid-1980s had important repercussions both domestically and internationally. Domestically, GAP offered a giant development vision for the country - and also coincided with the rise of the Kurdish problem. With this transformation, GAP invited growing criticism from Iraq and Syria regarding the partition of water in the Euphrates-Tigris. Syria, which already faces a serious shortage of water to maintain its agricultural and urban supply, attempted to build linkage between the water dispute and the ethnic conflict in the region; it came to the edge of military conflict with Turkey in August 1998. A sustainable resolution to this problem can be found only through 'double-edged' water diplomacy, which brings together domestic and international concerns.

120. Williams, Paul, 2001. 'Turkey's H₂O Diplomacy in the Middle East', *Security Dialogue* 32(1): 27–40.

Turkey's policy regarding the use of water from the rivers in its southeastern region has serious implications for relations with its neighbors in the Middle East. The Southeast Anatolia Project (GAP) in the Euphrates and Tigris river basins has drastically reduced the amount of water available for Iraq and Syria and affected its environmental quality. The persistent opposition from these two countries has reinforced Turkey's 'water rich' image, which has become highly politicized. In the late 1990s, Ankara initiated a new water project on the Mangavat River, offering large-scale export to Israel. The real goal of this project was to minimize obstacles to further expansion of the GAP and to alter the widespread 'water rich' perception. However, Israel's interest in purchasing Turkish water remains uncertain, which leaves Ankara with few options other than transferring Mangavat River water to Turkey's own water-deficient

coastal areas. Turkey's legal position on the use of water appears to contravene both the EU Water Framework Directive and the November 2000 report of the World Commission on Dams. Ankara needs to seriously consider the impact of its water policy on the Middle East peace processes as well as on its prospects of joining the EU.

2.1.4 The Nile basin

1998

121. Schiffler, Manuel, 1998. 'Conflicts over the Nile or Conflicts on the Nile?', in Waltina Scheumann & Manuel Schiffler, eds, *Water in the Middle East: Potential for Conflicts and Prospects for Cooperation*. Berlin: Springer (137–150).

The prospect of more intensive use of the Nile waters by any of the nine states of the upper course of the Nile, particularly Sudan and Ethiopia, have always evoked nervous reactions among Egyptian governments. An important unknown is the future development of rainfall in the Nile Basin due to climate change. There is no discussion underway in Egypt on structural reforms scenario. If irrigated agriculture in the upstream states is to be significantly expanded, over the long run genuine water conflicts might emerge in the Nile Basin.

2000

122. Dinar, Ariel & Senai Alemu, 2000. 'The Process of Negotiation over International Water Disputes: The Case of the Nile Basin', *International Negotiation* 5(2): 331–356.

The article offers a conceptual framework for assessing trends in water negotiations which includes quantitative measures to evaluate changes in parties' positions. This framework is then applied to the Nile River basin consultations so that changes in political positions of them could be measured. The analysis suggests that positions and power values do change over time for each issue and riparian. It also suggests that the consultation process is not progressing towards regional consensus-based agreement on three major issues. Recognizing this negative trend, the riparians may opt for an external intervention that might change the dynamics.

2001

123. Wiebe, K., 2001. 'The Nile River: Potential for Conflict and Cooperation in the Face of Water Degradation', *Natural Resources Journal* 41(3): 731–754.

The article presents and compares two key views of thought that guide contemporary debates on the future of the Nile Basin: that water scarcity will cause conflict between basin nations and that it encourages cooperation rather than conflict as riparian nations understand their shared responsibility. While there is indeed increasing discord between riparian countries, the history of Nile conflict could give ground to advanced cooperation. The Nile Basin Initiative is a bold and revolutionary step for the region, but suggests that it should be expanded into an efficient and explicit treaty, which would provide for a dispute-resolution mechanism and specific pollution-preventing procedures.

2.2 The rest of Asia (Central, South, South-East)

1996

124. Biswas, Asit K. & Tsuyoshi Hashimoto, eds, 1996. *Asian International Waters: From Ganges-Brahmaputra to Mekong*. Water Resources Management Series; 4. Bombay: Oxford University Press. xiv, 289 pp.

In nearly all Asian countries new sources of water are becoming scarce and more expensive to develop, so a critical issue for them is how to manage the valuable resources of international rivers. Noting the risks of looming water crisis, the Committee on International Waters of the International Water Resources Association (IWRA) convened the Asian Water Forum on International Waters in Bangkok, Thailand, 30 January-1 February 1995. Three cases with different level of disputes were selected for discussion: the Ganges-Brahmaputra, the Mekong, and the Salween. Handed properly, fairly, and efficiently, the stream of benefits to all the co-basin countries would not only be very significant but also long-lasting.

125. Nishat, Ainun, 1996. 'Impact of Ganges Water Dispute on Bangladesh', in Asit K. Biswas & Tsuyoshi Hashimoto, eds, *Asian International Waters: From Ganges-Brahmaputra to Mekong*. Bombay: Oxford University Press (60–80).

The chapter evaluates the damage caused to different sectors of water use in the Ganges-dependent areas of Bangladesh due to drastic reduction of dry season flows caused by progressive upstream diversions of water. The current impasse in the Ganges water dispute proves that a stage has been reached where the traditional approaches to sharing between India and Bangladesh may never bear fruits. Confidence building is necessary for adopting innovative approaches for maximizing benefits through a basin-wide agreement.

126. Swain, Ashok, 1996. *The Environmental Trap: The Ganges River Diversion, Bangladeshi Migration and Conflicts in India*. Report, Uppsala University, Department of Peace and Conflict Research; 41. Uppsala: Uppsala University, Department of Peace and Conflict Research. ii, 135 pp.

The study first presents a conceptual framework that points to the possibility of conflict at three levels - state vs state, state vs group, and group vs group - as a result of environmental migration. It then examines in much detail the case of Bangladeshi migration to India driven by environmental destruction caused by the Farakka Barrage. The conclusions argue that despite the widespread perceptions in Bangladesh that the Farakka withdrawals from the Ganges are a national disaster, the possibility of an open conflict between the two states remains low. Inside India, however, dangerous violent potential is accumulating.

127. Verghese, B.G., 1996. 'Towards an Eastern Himalayan Rivers Concord', in Asit K. Biswas & Tsuyoshi Hashimoto, eds, *Asian International Waters: From Ganges-Brahmaputra to Mekong*. Bombay: Oxford University Press (25–59).

Regional cooperation in the harnessing of the eastern Himalayan rivers is far removed from being a zero-sum game. However, India, Nepal, and Bangladesh have already lost a great deal of time and cannot afford further delay. The differences that have

come in the way of cooperation are based on past grievances, possibly more imagined than real. Since the basic divide is more political than technical, it would be desirable to take a holistic view of overall relations instead of looking for purely engineering solutions. The path of economic liberalization on which the states are embarked has also opened up opportunity for private initiatives in water resource development.

1997

128. Elhance, Arun P., 1997. 'Conflict and Cooperation over Water in the Aral Sea Basin', *Studies in Conflict and Terrorism* 20(2): 207–218.

The article starts with the point that conflict and cooperation are two sides of the same hydrological coin and then proceeds to examine the situation in the Aral Basin. Three factors of degradation are identified: water-intensive crop production, poor water management practices, and pollution of water from agrochemicals. Juxtaposing the potential for acute conflict and cooperation, the author concludes that the Central Asian governments have done an admirable job of putting in place mechanisms for resolving water problems. The international community, however, has to watch for conflict situations.

129. Klötzli, Stefan, 1997. 'The "Aral Sea Syndrome" and Regional Cooperation in Central Asia: Opportunity or Obstacle?', in Nils Petter Gleditsch et al., eds, *Conflicts and the Environment*. Dordrecht: Kluwer Academic (417–434).

The chapter presents briefly the multiple social and economic factors that has produced an ecological disaster in the Aral Sea area. It then focuses on the interstate water politics, looking specifically into the institutional structures of cooperation in this ecoregion. It is precisely the weakness of those structures that makes it problematic for Central Asian states to meet the dual challenge of mitigating the environmental consequences of misguided economic development and achieving a stable arrangement for water distribution. The author states that unless political priorities are changed accordingly, the water issue will turn into a source of violence rather than a source of cooperation.

130. Samaddar, Ranabir, 1997. 'Flowing Waters and the Nationalist Metaphors', *Studies in Conflict and Terrorism* 20(2): 195–206.

The article examines the dispute between India and Bangladesh over the sharing of waters of the Ganges, focusing on the language of this dispute. The author emphasizes that the language of rights and justice serves the purpose of mythologizing the claims of both sides, and thus consolidates the nationalist strategies of power around scarce resources. Regional cooperation needs a different language that would facilitate joint management of scarce resources. Sub-regional deliberations may offer one avenue towards this end.

131. Verghese, B.G., 1997. 'Water Conflicts in South Asia', *Studies in Conflict and Terrorism* 20(2): 185–194.

The article offers a broad overview of the interstate and internal water conflicts in South Asia, starting with the division of the Indus River between India and Pakistan by Treaty of 1960, which has survived two wars and numerous crises in bilateral rela-

tions. The Ganges-Brahmaputra-Maghna (GBM) system cannot be divided and has to be shared between riparians; and the author examines the most recent achievements in cooperation between India and Bangladesh, and India and Nepal. Finally, the plans for building a national water grid in India, developed by the National Water Development Agency, are presented, with the prediction of fierce political, economic and environmental battles over the water transfer schemes, which must be drafted with great care and a broad consensus.

132. 1997. 'Water Conflict', *Studies in Conflict and Terrorism* Special Issue 20(2): 137–226.

Part 2: Southern Asia and the United States. Diminishing supply of usable water is likely to become the basis for the most serious disagreement and conflict in the 21st century. Success in resolving water problems is essential for peace in the world. Five articles in this special issue examine water conflicts in South Asia, Central Asia, Indochina, and the Western part of the US.

133. Weatherbee, Donald E., 1997. 'Cooperation and Conflict in the Mekong River Basin', *Studies in Conflict and Terrorism* 20(2): 167–184.

The article starts with a description of the Mekong Basin, and then examines available development frameworks, with particular attention given to the problems of cooperation and funding. Then the focus is placed on the experience in water management, which takes the river as an interdependent system and places the emphasis on environmental and social concerns. This integrative perspective is then compared with the national interests and policy of the riparians. The conclusion addresses the ideal of economically integrated growth zone and asserts that while the Mekong Basin is most promising from the resource perspective, the governments must be willing to forgo short-term advantage and overcome the temptation to beggar their neighbors.

1998

134. Pitman, G.T. Keith, 1998. 'The Role of the World Bank in Enhancing Cooperation and Resolving Conflict on International Watercourses: The Case of the Indus Basin', in Salman M.A. Salman & Laurence Boisson de Chazournes, eds, *International Watercourses: Enhancing Cooperation and Managing Conflict: Proceedings of a World Bank Seminar*. Washington, DC: World Bank (155–165).

The chapter traces the roots of the dispute between India and Pakistan over the Indus Basin and describes the role of the World Bank in resolving the dispute and in the conclusion of the Indus Treaty. It concludes with an analysis of the reasons for the success of the Bank in the Indus Basin.

135. Salman, Salman M.A., 1998. 'Sharing the Ganges Waters Between India and Bangladesh: An Analysis of the 1996 Treaty', in Salman M.A. Salman & Laurence Boisson de Chazournes, eds, *International Watercourses: Enhancing Cooperation and Managing Conflict: Proceedings of a World Bank Seminar*. Washington, DC: World Bank (127–153).

The chapter describes the origins of the dispute between India and Bangladesh over the Ganges River. It reviews and analyses the provisions of the recently concluded

treaty, and discusses the dynamics of implementation of the treaty in its first year, and the implications for the future.

136. Swain, Ashok, 1998. 'Fight for the Last Drop: Inter-State River Disputes in India', *Contemporary South Asia* 7(2): 167–180.

The article shows how the general shortage of water in India, caused by growing urban demand and increasing agricultural use, is translated into bitter inter-state disputes. The author examines the specific features of this politicization of water disputes in the Indus, Yamuna, Cauvery, and Krishna basins. The conclusion is that a national water management policy, embodied in efficient institutions, is necessary in order to check this trend which potentially might threaten India's unity.

1999

137. Iyer, R.R., 1999. 'Conflict-Resolution: Three River Treaties', *Economic and Political Weekly* 34(24): 1509–1518.

The article starts with the examination of three cases - the Indus Treaty, the Mahakali Treaty, and the Ganges Treaty - focusing on the processes leading to the conclusion of the treaties and the experiences of their implementation. It then compares the complex interactions between water disputes and politics, showing the risks stemming from the combination of a big country arrogance and a small country over-sensitivity. It also warns against focusing too narrowly on bilateral solutions against broader regional efforts. Another risk is to reduce the scope of cooperation between state to a few large-scale and high profile projects, at the expense of other issues, including environmental problems.

2000

138. Browder, Greg, 2000. 'An Analysis of the Negotiations for the 1995 Mekong Agreement', *International Negotiation* 5(2): 237–261.

The negotiations for the 1995 Mekong agreement were not easy, even when the change from a 'zero-sum' game into a possible 'win-win' situation created a large 'zone of possible agreement' (ZOPA). The hardest bargaining took place at the pre-negotiation phase due to strategic maneuvering by Vietnam and Thailand, who were seeking to gain advantage. Only the intervention of the UNDP - an ideal third party with vested interests in maintaining the cooperation - prevented the Mekong regime from collapsing. The Mekong agreement is not a comprehensive or logically rigorous treaty, it does not address specific water management issues, but it does provide a useful framework for their resolution.

139. Crow, B. & N. Singh, 2000. 'Impediments and Innovation in International Rivers: The Waters of South Asia', *World Development* 28(11): 1907–1925.

The article starts with a broad assessment of the new situation in South Asia defined by five inter-state agreements concluded in 1996 and 1997. The authors examine which of the past obstacles to cooperation are now overcome and what new options for cooperation have emerged due to the new framework. Attention is given to the mitigation of floodings and droughts, and to expanding irrigation and industrial use of

water. Further prospects are linked mostly to cooperation on the sub-state level, including regional governments, NGOs and businesses.

140. Nishat, Ainun & Islam M. Faisal, 2000. 'An Assessment of the Institutional Mechanisms for Water Negotiations in the Ganges-Brahmaputra-Meghna System', *International Negotiation* 5(2): 289–310.

The article provides an account of the issues between India and Bangladesh relating to the sharing of common waters. It examines the formation and the activities of the Joint Rivers Commission and argues that it should be transformed into Joint Waters Commission in order to address a broader range of issues. The article also examines possible roles for a third party mediation, despite objections against such mediation expressed by India. While the involvement of Nepal and China in joint watershed management is problematic, in the long run such multilateral endeavor might prove to be more effective.

141. Sergen, Galina & Elizabeth L. Malone, 2000. 'Perceptions of Risk and Security: The Aral Sea Basin', in Miriam R. Lowi & Brian R. Shaw, eds, *Environment and Security: Discourses and Practices*. Basingstoke: Macmillan (172–191).

Environmental degradation engenders societal controversy, not armed conflict, so the literature emphasizing resource wars distracts attention from the ways in which risk analysis can help to settle environmental controversies. There is very little agreement about what the term 'environmental security' means, but in the current trend to call difficult political solutions by softer names, we need to be aware of what action we really call for. The situation in Central Asia shows that a focus on the nation state sets up a unit of analysis that does not represent the complexity of the problem and leads to a discourse that predicts armed conflict. In the current debates over environmental risk and security the search for consensus is the worst direction to follow.

2001

142. Biliouri, Daphne, 2001. 'Keeping the Lid on Central Asia's Water Disputes', *Jane's Intelligence Review* 13(4): 12–15.

Central Asia's water supply derives from the Amu Darya and the Syr Darya which cross five states and flow into the Aral Sea. What is unique for Central Asia is not the lack of water but mismanagement of its distribution. Concerns for conflicts among the five states emerge from the practice of swapping water for energy production. The governments have stated their desire to resolve all scarcity issues arising from water disputes by cooperative measures. This intention is tested by severe drought in 2000 and 2001, particularly in Tajikistan and Uzbekistan. While significant reserves in increasing the efficiency of water use could be found unilaterally, the coordination of these efforts in a transboundary water management strategy is entirely possible.

143. Garb, Paula & John M. Whiteley, 2001. 'A Hydroelectric Power Complex on Both Sides of a War: Potential Weapon or Peace Incentive?', in Joachim Blatter & Helen Ingram, eds, *Reflections on Water: New Approaches to Transboundary Conflicts and Cooperation*. Cambridge, MA: MIT Press (213–237).

The chapter examines a rare international security puzzle: Georgia and Abkhazia in the aftermath of their deadly and still unresolved secessionist conflict are able to maintain joint management of the Inguri River water and hydroelectric power resources. This cooperation shows that even under the most problematic conditions, modern and postmodern meanings of water can transcend highly conflictual meanings. This case also underlines the enduring relevance of sovereignty in water management, since the water decision-making is led by the two presidents motivated by the reality of mutual deterrence.

144. Haider, Zaglul, 2001. 'Crises of Regional Cooperation in South Asia', *Security Dialogue* 32(4): 423–437.

This article presents three key dimensions of interstate tensions in South Asia: political, economic and security, with several specific issues in each. As far as water conflicts are concerned, the Indo-Bangladesh dispute over sharing of Ganges water is examined in detail. The author argues that India fails to deliver on its commitments, as formalized in the agreement of 12 December 1996. The issue of the Fatakkah barrage, which diverts the Ganges water toward Calcutta, has therefore evolved into a 'Kashmir' of Bangladesh's grievances with India.

145. Upreti, Bishnu Raj, 2001. *Conflict Management in Natural Resources: A Study of Land, Water and Forest Conflicts in Nepal*. [S.l.: s.n.]. xviii, 195 pp.

This doctoral dissertation (thesis submitted for the PhD degree at Wageningen University) examines the experience in managing internal, and first of all, intercommunal conflicts in Nepal related to use of three types of natural resources: land, water, and forest-pasture. It first presents the context and the analytical framework for the study, and the proceeds to the empirical investigation. Of the three cases under investigation, one involves a farmer-managed irrigation system, and another - sources of drinking water. By analyzing the dynamics of conflicts, the author arrives to the practical proposals regulating interactive conflict management procedures.

See also 71, 74: Lowi (1999, 2000)

2.3 The Americas

1996

146. Earl, Richard A. & Robert J. Czerniak, 1996. 'Sunbelt Water War: The El Paso - New Mexico Water Conflict', *Social Science Journal* 33(4): 359–379.

The article examines the history of a water conflict of the 1980s, rooted in the rapid population growth of El Paso, Texas. There were legal barriers to accessible water sources, including New Mexican law that prohibited water export. Resulting conflict involved the use of police by New Mexico against the federal commerce clause. El Paso opted in 1991 - after a protracted legal battle - for a compromise solution, the major part of which was more efficient use of available water with only limited increases of supply. The experience with implementing this decision has been generally positive, providing for sufficient water security of the growing urban center.

1997

147. Boronkay, Carl & Warren J. Abbott, 1997. 'Water Conflicts in the Western United States', *Studies in Conflict and Terrorism* 20(2): 137–166.

The article starts with several historic examples of water conflicts in California, and proceeds to examine their changing dynamics, focusing on the impact of environmental movements on the development of relevant legislation. It then analyzes the shortages in the California State Water Projects and deadlocks resulting from conflict of interests between agricultural lobby, urban developers and environmentalists. The prospects for reallocation of Colorado River water are evaluated, but obstacles - more political than legal - are found to be hard to overcome.

1998

148. Kaiser, Ronald A. & Laura M. Phillips, 1998. 'Dividing the Waters: Water Marketing as a Conflict Resolution Strategy in the Edwards Aquifer Region', *Natural Resources Journal* 38(3): 411–444.

The article examines the water conflict in central Texas, where the growing urban demand for water collided with the rights of the landowners to pump as much water as they needed for agricultural needs. There was obviously not enough water underground to meet all the demands, so the state legislature created the Edwards Aquifer Authority with extensive power to control pumping. The article further offers a conceptual model for the application of market mechanisms based on optimal pricing for minimizing the disputes. The model is then applied to the management of the Edwards Aquifer, which leads to several proposals on additional use of market methods of reallocation of water resources towards higher value recreational use.

1999

149. Becker, N. & K.W. Easter, 1999. 'Conflict and Cooperation in Managing International Water Resources Such as the Great Lakes', *Land Economics* 75(2): 233–245.

The article applies a game theory-based method to assess the potential for multilateral cooperation in management of such a large international body of water as the Great Lakes. The authors find out that a non-cooperative outcome is possible but by no means inevitable. There is a certain minimum number of parties that can take the decision in favor of cooperation, and then for each of the non-cooperators it becomes more efficient to join than to stay outside.

150. Steinberg, Philip E. & George E. Clark, 1999. 'Troubled Water?: Acquiescence, Conflict, and the Politics of Place in Watershed Management', *Political Geography* 18(4): 477–508.

The article focuses on the controversies around the access to the Wachusett Reservoir in central Massachusetts, which is a crucial source of drinking water for Boston. The Boston metropolitan interests dominate the use of the Reservoir but the local residents stage protests against policies perceived to be detrimental to their interests. The authors examine in much detail the character of local protests and find out that they are rooted in a complex system of values that combine rational valuation with non-

instrumental valuation of the Reservoir as a part of the local everyday life. This analysis leads to several initiatives aimed at building consensual resource coalitions.

2000

151. Bennett, V. & L.A. Herzog, 2000. 'US-Mexico Borderland Water Conflicts and Institutional Change: A Commentary', *Natural Resources Journal* 40(4): 973–988.

The article analyses the sources of tension over use of water along the US-Mexico border and reviews the current changes in water policies. It starts with presenting the main features of the border region that have impact on water use and then summarizes the findings of the section 'Borderland Water Conflicts and Institutional Change' in this issue of the journal. The changes in Mexican water institutions are compared with the patterns of the Commission for Environmental Cooperation, then possible new organizational frameworks for addressing conflicts over water management are suggested.

152. Berry, K.A., 2000. 'Water Use and Cultural Conflict in 19th Century Northwestern New Spain and Mexico', *Natural Resources Journal* 40(4): 759–782.

The article provides an account of the complex struggle for land and water at the end of the 18th century and the first half of the 19th century in southern California. The conflicts had racial, cultural, religious, and entrepreneurial aspects, and the famous battles for rights to land, for instance the Rancho Temecula Grant, often were proxies for rights to scarce water. Thorny issues about what law applies, where and when, are as typical of these historical issues as they are to current conflicts over water divided by a physical border.

153. Hall, G.E., 2000. 'Historical and Physical International Boundaries in Borderlands Water Conflicts: A Commentary', *Natural Resources Journal* 40(4): 865–872.

Historical accounts of water-related conflicts in Southern California are closely linked to contemporary records of cross-border conflicts over shared water. All along the border between Mexico and the US the same general problems crop up: water is scarce on both sides of the border and the principles of apportionment are unclear. In many places water availability and use are fixed so tightly that even a slight reduction of supply could undermine the complex system of compromises. In order to prevent the destruction of remaining wildlife habitats, new processes in new institutions are needed.

154. Sherk, George William, 2000a. *Dividing the Waters: The Resolution of Interstate Water Conflicts in the United States*. International and National Water Law and Policy Series; 2. Boston, MA: Kluwer Law International. xvi, 998 pp.

The growing awareness of interstate water conflicts increases the demand for a legal framework to resolve water allocation disputes. The book is a comprehensive study of the resolution of interstate water conflicts in the United States. It analyses the three mechanisms serving this function - litigation in the Supreme Court, legislation enacted by Congress, and compacts negotiated by states between themselves - and examines their interrelationship. By offering an evaluation of these different means of

water conflict resolution used in the United States, this study aims to provide examples and guidelines by which international water conflicts might be resolved.

155. Sherk, George William, 2000b. 'Interstate Water Conflicts and Individual Rights Perspectives from the United States Supreme Court', *Water International* 25(4): 519–525.

The article looks into the question of the right of individual to participate in the US Supreme Court deliberations concerning the distribution of water resources between the states in the US. The author points out that on the one hand, a state is traditionally perceived as a representative of all its citizens, but on the other hand, no decision is going to satisfy all individual claims. The involvement of individual users is judged to be an inefficient way to resolve the interstate water disputes in the US Supreme Court.

2001

156. Ioris, A.A.R., 2001. 'Water Resources Development in the Sao Francisco River Basin (Brazil): Conflicts and Management Perspectives', *Water International* 26(1): 24–39.

The article examines the experiences of water resources development in the semi-arid northeastern region of Brazil, where water scarcity has been a matter of growing concern in the 1990s. Recent changes in the national legislation provide for more decentralized and flexible approaches to water management, but they also give more possibilities to better-organized conservative political lobbies to block innovative forms of water use. Resulting conflicts at the local level require attention and involvement of societal forces that recognize the need to give priority to the most efficient users thus reducing vulnerability to climatic risks.

157. Miller, Char, ed., 2001. *Fluid Arguments: Five Centuries of Western Water Conflict*. Tucson, AZ: University of Arizona Press. xxix, 354 pp.

This book places contemporary and often sharp disputes over water in their historical contexts by examining some of the most conflictive issues of the five centuries. Seventeen contributors offer perspectives from a variety of disciplines - history, geography, ethnography, political science, law - and provide an interdisciplinary analysis of the many dimensions of water in the West.

See also 132: Water conflict (1997)

2.4 Europe

1996

158. Vinogradov, S., 1996. 'Transboundary Water Resources in the Former Soviet Union: Between Conflict and Cooperation', *Natural Resources Journal* 36(2): 393–415.

The article looks into the legacies of the collapse of the Soviet Union which include both serious damage to major water systems and the underdevelopment of legal

mechanisms for resolving transboundary disputes. The author examines several river basins shared by two or more of newly independent states and shows that in most cases the Soviet practices of water use still remain dominant, while market mechanisms are barely present. The best hope for a more efficient water management is with greater reliance on international law.

1997

159. Llamas, Ramón M., 1997. 'Transboundary Water Resources in the Iberian Peninsula', in Nils Petter Gleditsch et al., eds, *Conflict and the Environment*. Dordrecht: Kluwer Academic (335–353).

The author points out that during the last few years the number and intensity of water conflicts on the Iberian Peninsula has increased; this trend is noticeable on various levels and involves different social groups. The main reason is that increasing demand for water has not been matched by improvements in water management. While a range of new approaches and technologies is needed for dealing with the problem, some lessons from the region may be applicable for resolving water conflicts in developing countries.

160. Spirin, Alexandr I.; Olga A. Turevskaya & Sergey M. Turevskiy, 1997. 'Water Management in the Seversky Donets River: A Challenge for the Near Future', in Nils Petter Gleditsch et al., eds, *Conflict and the Environment*. Dordrecht: Kluwer Academic (435–449).

The chapter presents local, regional, interregional, and inter-state (Russia, Ukraine and the Black Sea region) conflicts related to high pollution of Seversky Donets River, which is one of the key sources of the water in Eastern Ukraine. It proposes possible measures on various level that can contribute to preventing further aggravation of these conflicts and outlines an integrated action program.

1999

161. Meijerink, Sander V., 1999. *Conflict and Cooperation on the Scheldt River Basin: A Case Study of Decision Making on International Scheldt Issues Between 1967 and 1997*. Environment & Policy; 17. Dordrecht: Kluwer Academic. 376 pp.

The book examines in much detail the three decade-long experiences of negotiations between Belgium and the Netherlands over joint management of the transboundary Scheldt River. These negotiations covered such potentially contentious issues as construction of dams in order to improve port accessibility at Anwerp, the sharing of water from Meuse River, and the responsibility for pollution in the river basin. The final part of the book offers a menu of strategies applicable for resolving international conflicts between riparian states.

2001

162. Sauri, D. & L. del Moral, 2001. 'Recent Developments in Spanish Water Policy: Alternatives and Conflicts at the End of the Hydraulic Age', *Geoforum* 32(ER 3): 351–362.

The article examines the experience of implementation of the National Water Plan from 1993 which envisaged large-scale development of the 'hydraulic infrastructure', including long-distance water transfers from water-rich to water-deficient basins. The Plan has generated massive opposition and can by now be pronounced a failure. The main cause of this failure has been in the political resistance of the regions, whose power in the political organization of the state is on the rise. Economic and environmental factors have also played a role, necessitating numerous revisions of the original design. In the near future, the regional, economic and environmental factors may work cross-purpose and result in a more fragmented water policy.

2.5 Africa

1998

163. Allan, Tony & Alan Nicol, 1998. *Water Resources, Prevention of Violent Conflict and the Coherence of EU Policies in the Horn of Africa*. Discussion Paper. [London]: Saferworld. v, 32 pp.

This discussion paper constitutes a part of Saferworld's two-year research project on evaluating the efficiency of EU policies in the Horn of Africa. It focuses on possible links between water scarcity and violent conflict between the states of the region as well as within them. The authors argue that the EU does not sufficiently focus its engagement on preventing escalation of water conflicts, while this prospect appears increasingly probable. The best solution may be to develop an integrated framework for a comprehensive policy that would have essential flexibility for addressing breaking crises.

164. Percival, Val & Thomas Homer-Dixon, 1998. 'Environmental Scarcity and Violent Conflict: The Case of South Africa', *Journal of Peace Research* 35(3): 279–298.

The article starts with a theoretical overview of the model developed for the Project on Environment, Population, and Security at the University of Toronto, which identifies three types of environmental scarcity: supply-induced, demand-induced, and structural, linked to unequal social distribution of resources. Taking the case of South Africa under apartheid (with particular attention to Kwa Zulu-Natal), the authors take shortage of water as one of the demand-induced scarcity factors. Water was also a key factor in urban environmental scarcity, pushing up grievances and creating opportunities for warlords to manipulate conflicts among communities.

2000

165. Wolf, Aaron T., 2000b. 'Indigenous Approaches to Water Conflict Negotiations and Implications for International Waters', *International Negotiation* 5(2): 357–373.

The article examines the water negotiation practices of the Berbers of the High Atlas Mountain and the Bedouin of the Negev Desert, looking for guidelines that might help resolve water conflicts between states. Five lessons applicable to modern negotiations are drawn, including the need to protect the downstream rights and the incorporation of sophisticated mechanisms of dispute resolution.

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