Lecture 8
Managing Resources (II): Transboundary Water Resources

KEY QUESTION:

How do we manage conflicts over transboundary water resources?

With the completion of this lecture, attached readings and tutorial, you should be able to discuss:
- transboundary nature of rivers that are shared by multiple countries
- conflicts between countries sharing transboundary water resources due to negative impacts of the actions of one country on another
- varying success of strategies to manage conflicts over transboundary water resources

Lecture Outline

8.1 The transboundary nature of rivers: Definition and occurrence

8.2 Factors that contribute to conflict over transboundary water resources
- **8.2.1** Quantity of water
  - Box 1: How China turned off the tap on the Mekong River
- **8.2.2** Quality of water
  - Box 2: Pollution in River Danube Basin
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8.3 Strategies to manage conflicts over transboundary water resources
- **8.3.1** International Water Agreements (Treaties)
  - **(a)** What is a water agreement?
  - **(b)** Why are water agreements difficult to set up and enforce?
- **8.3.2** Transboundary water cooperation

8.4 End note: Will we go to war over water?
- Box 3: International cooperation over water far outweighs conflict

Readings:

(1) The Mekong Agreement and the Mekong River Commission
(2) The Israeli-Jordan Water Agreement
(3) The Aral Sea Basin Project by GEF

The Mekong River runs through six countries, with China being the uppermost riparian state. China's recent construction of multiple dams has in various ways affected its lower stream riparian neighbours, especially water supply. This cartoon hints at the power relations at play among these countries.

8.1 The transboundary nature of rivers: Definition and occurrence

- While flowing in its natural course, a river may not necessarily follow state boundaries.
- **Transboundary rivers and river basins are shared by two or more countries** to support the lives and livelihoods of vast numbers of people across the world. **Countries that adjoin or may directly influence a river and its basin are referred to as *riparian*.**
- There are more than 260 transboundary lakes and river basins in the world, and collectively cover almost half the Earth's surface (see **Table 1** and **Fig. 1**). Sound management is essential, especially in areas vulnerable to the impacts of climate change and where water is already scarce.
- **Table 1** highlights the predominance of transboundary river and lake systems within the developing world. Although the majority of international water bodies are shared by only two countries, there are nine river basins and lakes which cut across more than six countries. Except for the Danube (19 countries) and the Rhine (9 countries), all of these systems – the Niger, Nile, Zaire, Zambezi, Amazon, Lake Chad and the Mekong – are in the developing world.

Table 1: Distribution of transboundary river basins and lakes by continents

Continents	No. of rivers and lakes extending into two or more countries	% of area within international basins
Asia	53	39
Europe	71	54
North America	39	35
South America	38	60
Africa	60	62
Total	261	45.3 (excluding Antarctica)

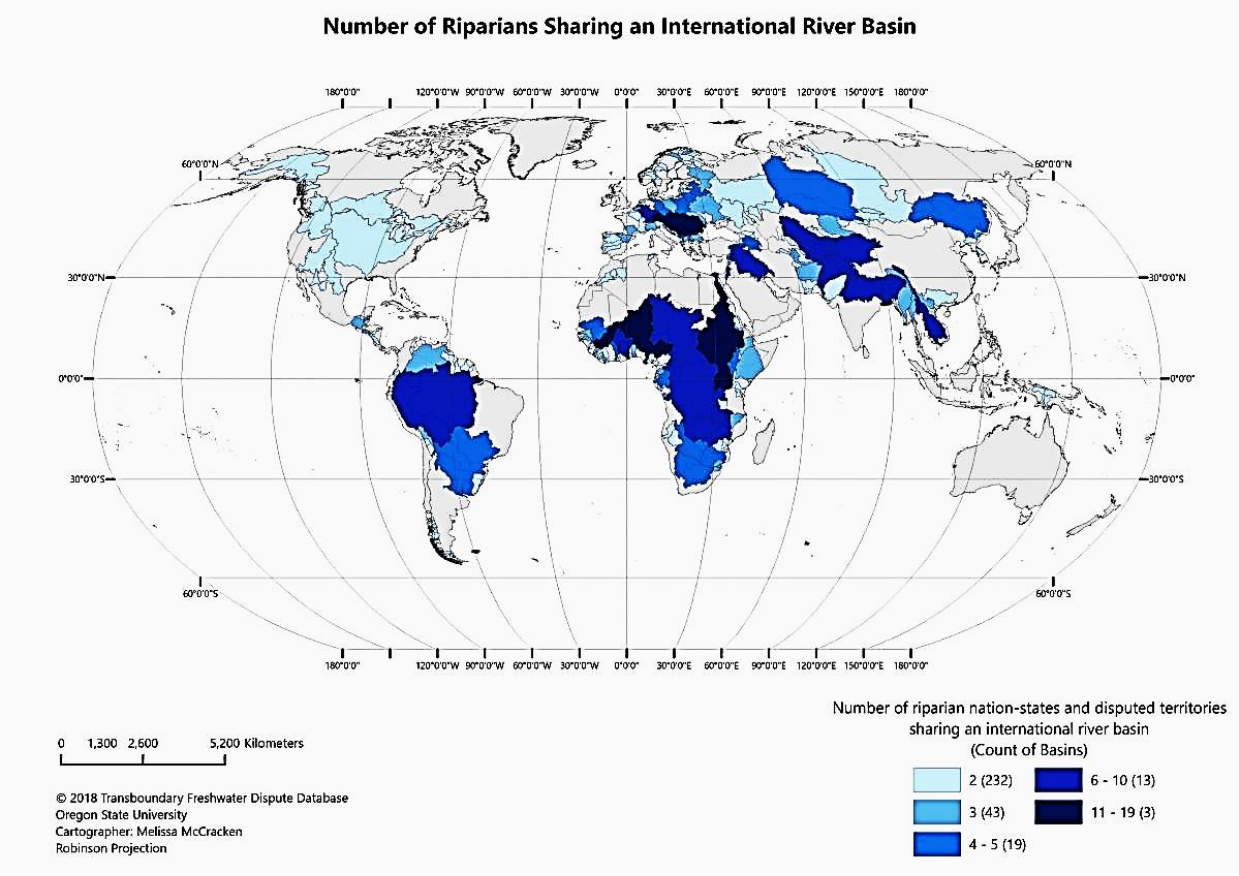


Fig. 1

- There are a few ways in which transboundary rivers and their basins are shared (**Fig. 2**). The same situations can also apply to lakes and aquifers.
  - Between neighbours sharing a common boundary river.
  - Between upstream and downstream **riparian** countries, i.e. where a river flows through one country first and later through another.
  - A combination of the above two ways.

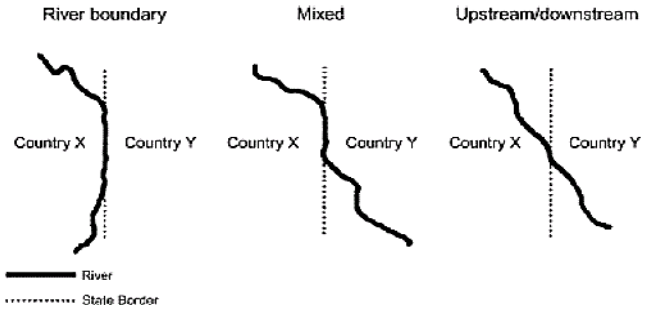


Fig. 2

- Particularly, Africa is in a challenging standing where it plays host to many of the largest river systems of the globe. Despite the potential for resource disputes presented by the geography of the African continent, conflicts over water have surfaced more predominantly in the more developed and faster developing regions of the world (**Table 2**).

Table 2: The location of major international water disputes		
River	**Countries in dispute**	**Issues**
Nile	Egypt, Ethiopia, Sudan	Siltation, flooding, water flow and diversion
Ganges—Brahmaputra	Bangladesh, India	Siltation, flooding, water flow
Mekong	Cambodia, Laos, Thailand, Vietnam	Water flow, flooding
Lauca	Bolivia, Chile	Dam, Salinisation
Rhine	France, Netherlands, Switzerland, Germany	Industrial pollution
Maas, Scheide	Belgium, Netherlands	Salinisation, industrial pollution

8.2 Factors that contribute to conflict over transboundary water resources

- A **conflict** can be defined as a **disagreement over the appropriate course of action to be taken in a particular situation**. A <u>minimum of two parties</u> must therefore be involved.
  - Conflict abounds as individuals and groups have different values, priorities, interests, and hopes for the future. Conflicts take place between **neighbours**, **communities**, **states**, **regions**, and **nations**.
  - Areas of severe water conflict correlate with **water scarcity** (i.e. demand for water exceeds availability of water); hence, the regions with the greatest conflict and potential for conflict are in regions such as Middle East, and the Indian subcontinent.
- We know that water is a valuable resource which is finite and unevenly distributed across the earth. This becomes especially crucial with the increase in demand as population increase. When water becomes a scarce resource, its **availability (or quantity)** and **quality** will, and has, become major environmental issues. Hence, management is responsible for the organised control and allocation of the water resource according to a set of priorities and criteria.

- Around half of the world's population lives in areas fed by a transnational river, meaning that the water available for supporting a country's water-dependent socioeconomic development may originate from rain falling outside its borders. Due to this heightened significance of transboundary water systems for national economies and politics, these states tend to keep up with actions of one another and clash over the question of how to develop and use these systems.
- The United Nations recognises the potential for up to 60 transboundary conflict 'hotspots' globally; more than 50 countries on 5 continents might be caught up in disputes unless agreements (see **Section 8.3**) on how to share rivers, reservoirs and aquifers are made.
- While the underlying reasons for water-related controversy can be numerous, such as power struggles and competing development interests, conflict over water supply is usually influenced by an interplay of various factors. (See below)

8.2.1 Quantity of water

- Competing claims for a limited **quantity** of water are the most obvious reason for water related conflict. The potential for **tensions over allocation** increases when the resource is **scarce**. (See **Reading 1** on Mekong River Basin and **Reading 2** on Jordan River Basin)
- The **damming and diversion of water by upstream states** have influenced flow regimes further downstream. Hence, for **transboundary rivers**, the locations of dams can be very contentious as the affected segments could be in other countries which have no ownership over the dams.
    - For instance, dam projects in China can affect the lower riparians of the Mekong, such as Vietnam. This situation become tricky as the benefits such as hydropower production will be reaped by the upstream states, while the downstream states have to bear any negative consequences with little or no share in the benefits enjoyed by the upstream states.
    - See **Box 1** for a report on China's actions on downstream states along the Mekong river.

Box 1: How China turned off the tap on the Mekong River *(Stimson Research Centre, 2020)*

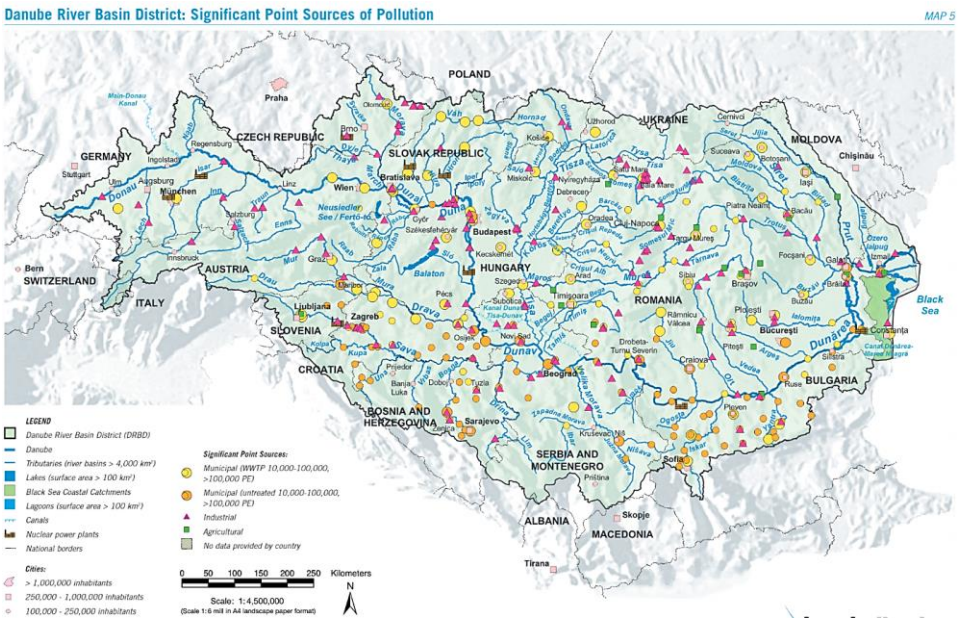
- New data shows that during a severe wet-season drought in the lower Mekong Basin in 2019, China's dams restricted nearly all upper Mekong wet season flow. Snowmelt and rainfall was normal to high for much of China's portion of the basin for the entirety of 2019. If China's dams did not restrict flow, portions of the Mekong along the Thai-Lao border would have experienced significantly higher flows from July 2019 to the end of the year instead of suffering through severe drought conditions.
- This is part of a long pattern that has driven numerous wet season droughts. The increasing frequency of wet season drought in the Lower Basin tracks closely to the way China releases water during the dry season and restricts water during the wet season.
- China is impounding much more water than it ever has in the past during wet seasons and releasing more water than ever before during the dry seasons. After the completion of the Nuozhadu dam in 2012, China's dam operations change significantly with dams collectively impounding more water in the wet season and releasing more water during the dry season.
- China's dam management is causing erratic and devastating changes in water levels downstream. Sudden unexpected flood events downstream can now be linked to the completion of the Dachaoshan dam and the Nuozhadu dam in 2002 and 2012-2014. Unexpected dam releases caused rapid rises in river level that have devastated communities downstream, causing millions in damage shocking the river's ecological processes.

- The storage of water upstream and decrease in water available downstream often leads to **negative impacts** on livelihoods in downstream riparian states.
    - Dams can reduce fish stocks as dams trap sediments needed as a nutrient source for fish and block fish migration. Saltwater intrusion into deltas and coastal aquifers damages crop production and reduces the amount of freshwater available for domestic consumption.
    - **Timing:** Upstream users may also release water from reservoirs in the winter for hydropower production, but downstream users may need water for irrigation in summer. The limited quantity of water available in summer limits crop production. The livelihoods of farmers and fishermen are thus adversely affected.

8.2.2 Quality of water

- Another contentious issue is water **quality**. Low quality – whether caused by pollution from wastewater and pesticides or excessive levels of salt, nutrients, or suspended solids – makes water inappropriate for drinking and sometimes even agriculture.
- Unclean water can pose serious **threats to human and ecosystem health** and reduce fish stock. Water quality degradation can therefore become a source of dispute between those who cause it and those affected by it.
- Water pollution control can be a complex and slow process. Although it is an environmental problem, it has socioeconomic roots. The range and source of pollutants are varied and mostly a result of human activities. (See **Box 2** for the example of Europe's most polluted river)

Box 2: Pollution in River Danube Basin



A wide-ranging 2019 global study has identified the Danube as the river with the highest concentration of antibiotics in Europe and the single most polluted on the continent. According to this study, the Danube is the most polluted river with antibiotics in Europe. After taking samples from a Danubian sites in Austria, researchers found traces of up to seven antibiotics surpassing the safety threshold.

The second longest river in Europe after the Volga, the Danube has a length of more than 2.800 kilometers and runs from Germany through nine other Central and Eastern European countries (Austria, Slovakia, Hungary, Croatia, Serbia, Romania, Bulgaria, Moldova and Ukraine) before ending in the Black Sea. It also runs through a number of major capitals in the region, including Vienna, Bratislava, Budapest and Belgrade.

8.2.3 Environmental impacts

- Upstream dam construction often creates **environmental problems for downstream states**, leading to conflict.
- The materials in **Lect 7** on the environmental effects of dam construction for hydroelectric power is relevant here. Generally, the following are commonly known effects of dams on the environment, especially felt by downstream riparian states (see **Fig. 3**):
  - **The impact of damming on fishes** occurs during all stages, including during construction, commissioning and operation of the dam. Damming rivers also expose fish populations to barrier effects, where the dam blocks their movements and causes injury when they swim up- or downstream. The migration is crucial as spawning habitats of different species may be located in different parts of the river and its tributaries.
    - An annual loss of about one million tons of fish every year happens in the Mekong.
  - Since sediments are deposited and trapped in reservoirs built behind the dams, **there is a reduced amount of sediments deposited downstream, including on deltas**. This, coupled with lower river levels due to the storage of water upstream, **accelerates seawater intrusion into the delta region, contributing to soil and groundwater salinisation and damaging delta ecosystems**.
    - A reduction of 97% sediment load reaching the Mekong Delta is predicted, which will immensely **reduce soil fertility** in the lower Mekong basin, leading to a decrease in the region's agricultural productivity, as well as increased poverty and food insecurity.
  - Downstream, water released from the dam is without load and **thus erodes the river bed and banks more extensively**. Both riverbed incision and bank erosion can extend over hundreds of kilometres, **damaging existing habitats of terrestrial and aquatic wildlife**.

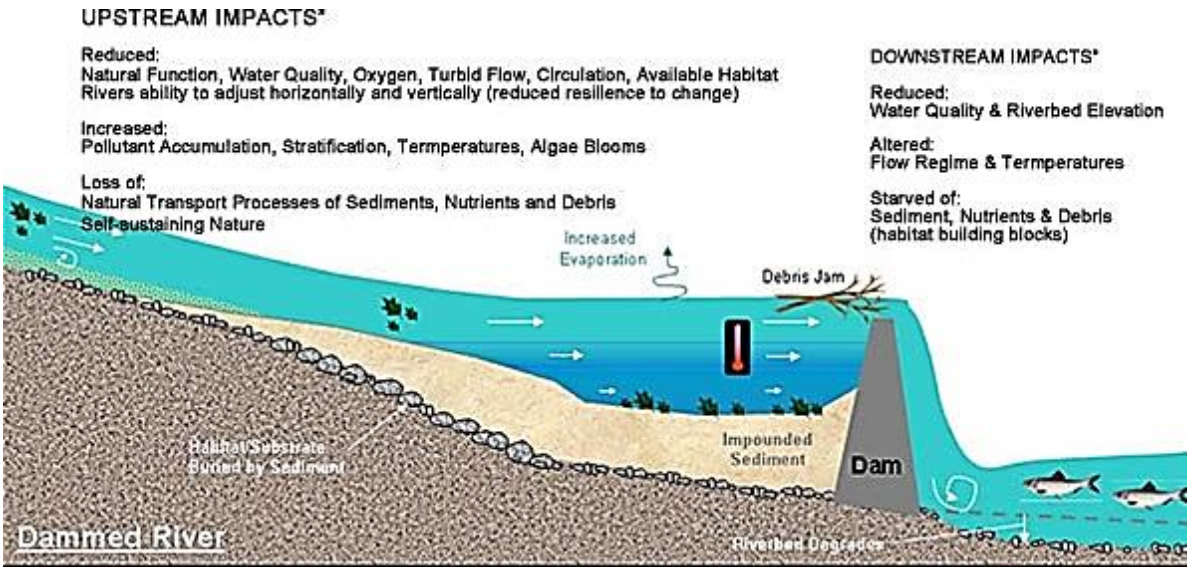


Fig. 3

8.3 Strategies to manage conflicts over transboundary water resources

- Whether the dispute is caused by environmental, socio-economic and/or political factors, however, the key to understanding – and preventing – water-related conflicts can be found in the **institutions** established to manage water resources.
- Problems associated with individual transboundary water systems (including aquifers) are very country-specific. They accommodate factors including fears over national sovereignty, political sensitivities, historical grievances and national self-interest. Thus, developing international principles for the management and control of such resources remains problematic.
- A common strategy (but by no means easy) used to manage are **international water agreements** or treaties (see **Section 8.3.1**) which are usually legally-binding and requires formalised long-term commitment. Approximately 40% of the world's international watercourses are currently the source of an international agreement or treaty.
- However, for countries who do not wish to be bounded by legality, an alternative strategy is to adopt institutional approaches for **enhancing cooperation** (see **Section 8.3.2**) between countries for the management of transboundary freshwater bodies and contributing basins, often through the establishment of a **River Basin Organisation** (RBO), though not always so.
- **Fig. 4** shows the extent to which water treaties **or** RBOs have been used as a conflict management strategy for transboundary water sources.

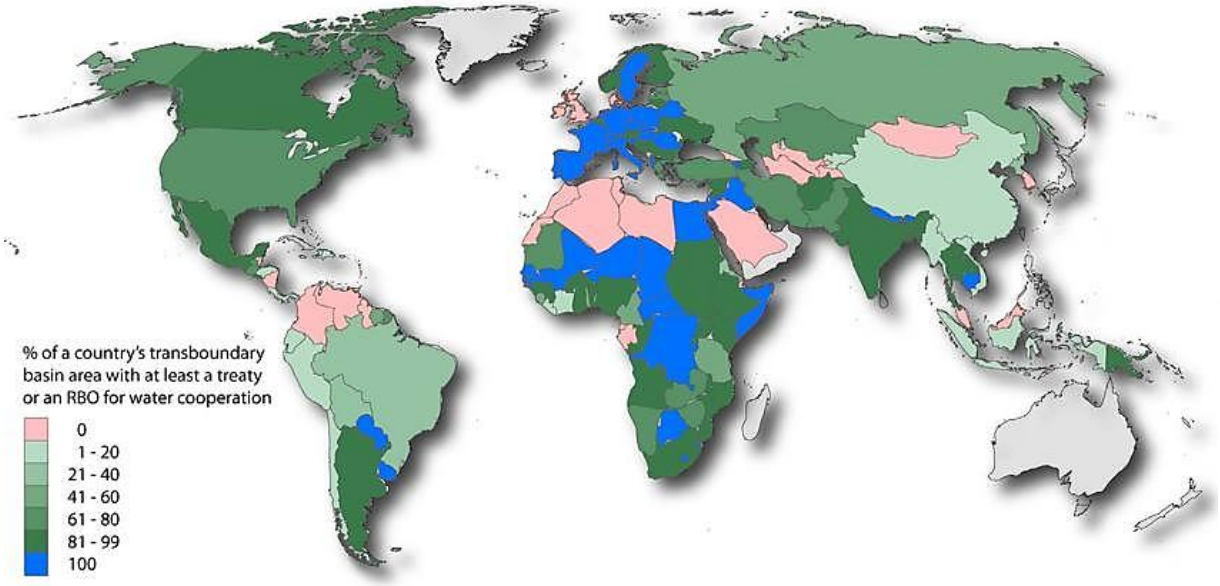


Fig. 4

8.3.1 International Water Agreements (Treaties)

(a) What is a water agreement?

- As mentioned above, much of the world's water is shared water; consequently, because all waters in these basins are connected, **political arrangements** may be necessary for the nations which share them in order to manage them efficiently. Despite the complexity of transboundary issues, records show that water disputes can be handled diplomatically.

- Such arrangements for effective long-term cooperation frequently take the form of transboundary **water agreements or treaties** which are generally regional or bilateral in nature.
    - ***These are legal documents, developed, signed and ratified by all affected countries whose borders are adjacent to, or encompass, the international water body in question.***
    - ***They establish clear guidelines for cooperation and sharing of water as well as measures to deal with conflict.***
- **Legal agreements** on water sharing have been negotiated even among bitter enemies and maintained even as conflicts have persisted over other issues. Few developing countries have adequate funds for capital-intensive water development projects, therefore, donor (such as the World Bank) conditions can be influential and instrumental in promoting the adoption of international treaties and the management of need across the whole system. For example:
    - Cambodia, Laos, Thailand and Vietnam, supported by the United Nations, have been able to cooperate since 1957 within the framework of the Mekong River Commission, formerly known as the Mekong Committee, and they had technical exchanges throughout the Vietnam War. (See **Reading 1** for the Mekong River Basin case-study)
    - Since 1955 Israel and Jordan, with United States involvement, have held regular talks on the sharing of the Jordan River, even as they were until recently in a legal state of war. (See **Reading 2** for the Jordan River Basin case-study)
    - The Indus River Commission, established with World Bank support, allowed India and Pakistan to control their own water resources within the context of wider conflict between the two states. The mediation of the World Bank, and very importantly the lure of financial aid from the World Bank, encouraged cooperation of both states to allow for a successful water-sharing agreement to be negotiated.
- Certain positive trends have been observed in recent treaties. These include:
    - Provisions concerning information exchange, monitoring and evaluation, and conflict resolution are included in many treaties of the past decade.
    - Second, a growing percentage of treaties address some aspect of water quality management in international rivers.
    - Third, a number of agreements establish joint water commissions with decision-making and/or enforcement powers, a significant departure from the traditional advisory standing of basin commissions.

(b) Why are water agreements difficult to set up and enforce?

- A number of **conditions** are important for international water agreements to be effective in managing transboundary sources of water and associated conflicts.
    - **Promoting consensus on reliable data, as well as quantifying the overall and distributive costs and benefits of water agreements**, is key. Countries will join in water agreements only if they obtain **positive gains** (or greater benefits than through unilateral action alone), and if they feel that they receive a **fair share of the gains**.

        - An example of equitable allocation of benefits from water amongst riparian states is the 1961 Columbia River Treaty which mandated the construction of three dams in Canada. The US paid Canada for the benefits of flood control and Canada was granted rights to divert water between the Columbia and Kootenai for hydropower purpose.
    - **Stakeholders** involved are **not homogeneous states**, but specific groups and individuals that make up the states, such as national and subnational government bodies and water users. An understanding of the different perceptions and motivations of stakeholders is required to identify possibilities for benefit sharing.
- Critics have pointed out **institutional vulnerabilities** in a number of key areas.
    - Institutional weakness often allows lengthy delays in both the decision-making processes, causing discussion process and the implementation of agreements for projects to take **a long time** – the Indus agreement took 10 years; the Ganges, 30; and the Jordan, 40 – because of the need to build trust and a sense of ownership of the process by the countries involved. Time lag between the start of water disputes and final agreements can cause water issues to exacerbate tensions.
    - Agreements between states sharing a water resource are **usually static** and seldom take into account the variability of shared water systems, such as working on the assumption that future water supply and quality will not change. (See **Reading 2** for example)
        - Problems also arise when projections are inaccurate on how pressure on limited water resources will increase due to socioeconomic factors such as population growth, as well as potential climatic changes.
    - **References to water quality, monitoring and evaluation, and conflict resolution mechanisms**, while growing in numbers, often are **weak in actual substance**.
        - For example, only about half of the existing treaties have provisions for monitoring, and most monitoring efforts include on the most basic elements. This is particularly problematic given that data collection and sharing often provides a basis for negotiation. Furthermore, data collection, preparation and processing are costly endeavours which some countries do not wish to bear.
    - **Enforcement measures and public participation of stakeholders** (groups of people who also use the water), the two elements that can greatly enhance the resiliency of institutions, are **largely overlooked**.

8.3.2 Transboundary water cooperation

- Shared water resources can actually provide **the basis for cooperation and sharing of benefits rather than conflict**, provided that the threats to the international waters are objectively recognised and institutional structures for collaboration are created.
- Sound management of freshwater basins and aquifers, particularly those shared across political boundaries, is largely about **balancing the water needs across different sectors and nations**.

- Legality, as in water treaties (see **Section 8.3.1**), need not always be invoked to achieve these. Based on a system of **trust** and **shared responsibility**, **cooperation** (instead of conflict) can be fostered among riparian states, often through the establishment of River Based Organisations.
- Similar to legal water agreements, such efforts often involve a third party acting as a facilitator or a mediator, such as the ***Global Environment Facility*** **(GEF)**, which was established through the partnership of the United Nations Development Programme (UNDP), United Nations Environment Programme (UNEP) and the World Bank.
- But success is not always a given despite the best attempts as many other factors come into play. We explore one of the GEF projects in **Reading 3** on the Aral Sea Basin.

8.4 End note: Will we go to war over water?

The wars of the next century will be about water.
(Ismail Serageldin, former World Bank Vice President, 1995)

- Despite the best of efforts, treaties or agreements may not be honoured, and tranboundary water cooperation efforts can fail. Many fears have been expressed that wars over water, or *hydrowars*, will occur in the future as water becomes scarcer. Fortunately, historical studies have not supported this hypothesis that water disputes lead to war.
- An extensive study University of all hydro-related interactions between riparian states published in 2013 by Oregon State University concluded that in fact, international cooperation have outweighed conflicts. Read **Box 2** for an excerpt of this article.

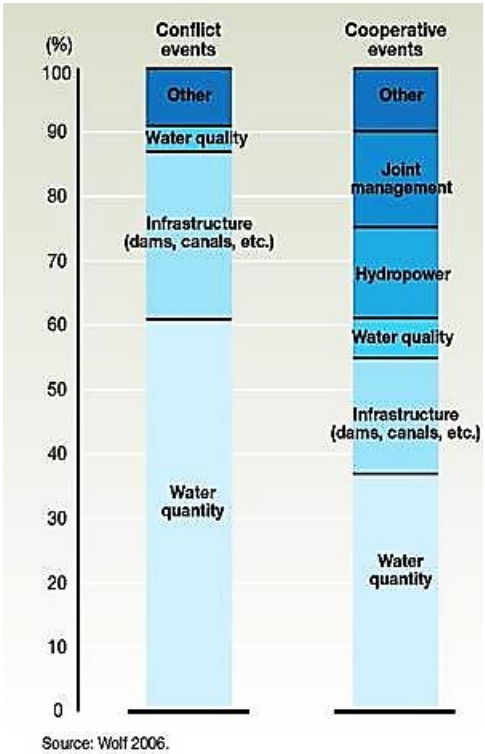
Box 3: International cooperation over water far outweighs conflict

Researchers at Oregon State University have compiled a dataset of every reported interaction between two or more nations where water was the driver of the interaction. Their analysis highlighted four key findings. (See also graph on right)

First, despite the potential for dispute in international basins, the incidence of acute conflict over international water resources is overwhelmed by the rate of cooperation. The last 60 years (1948−2008) have seen only 44 acute disputes (those involving violence), 30 of which occurred between Israel and one of its neighbours. Violence over water is neither strategically rational, nor hydrographically effective, nor economically viable.

Second, despite the fiery rhetoric of politicians, most actions taken over water are mild. Almost two-thirds of all events are verbal only and more than two-thirds of these led to no official sanction.

Third, there are more issues of cooperation than of conflict. The distribution of cooperative events covers a broad spectrum, including water quantity, quality, economic development, hydropower and joint management. In contrast, almost 90% of the conflict-laden events relate to quantity and infrastructure.

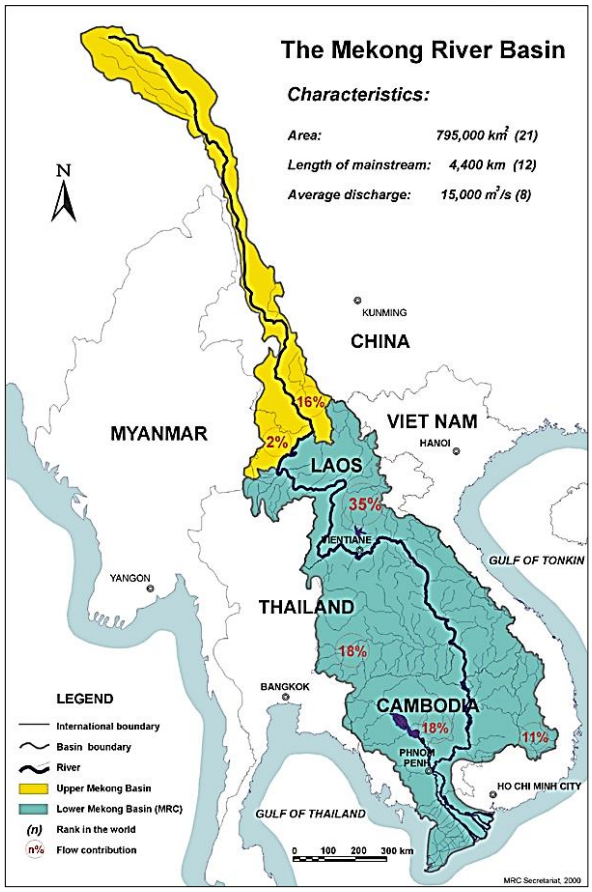


Source: Wolf 2006.

Fourth, despite the lack of violence, water acts as both an irritant and a unifier. As an irritant, water can make good relations bad and bad relations worse. Despite the complexity, however, international waters can act as a unifier in basins with relatively strong institutions.

READING 1 – The Mekong Agreement and the Mekong River Commission

- The 12th longest river in the world, the Mekong River is an international river shared by 6 countries; China, Myanmar, Laos, Cambodia, Thailand and Vietnam. The river and its many tributaries (some of which are also transboundary) and its resources affect the lives of over 70 million people.
- Entering into force in **1995**, the **Mekong Agreement** was adopted by the Lower Mekong Basin (LMB; see map on right) states of Cambodia, Lao PDR, Thailand and Vietnam, and was accompanied by the establishment of an inter-governmental basin institution, the **Mekong River Commission (MRC)**.
- The treaty was originally held up as the most progressive of institutional frameworks for the governance of an international watercourse of its time and along with MRC was lauded as a model for the world. Yet, more than 20 years later, the ability of the Mekong Agreement and MRC to effectively govern transboundary watercourse management in the region have been called into question, in particular regarding disputes related to the rapid development of hydropower dams along the river and its tributaries.



The 1995 Mekong Agreement

- The agreement is divided into six chapters comprising a total of 42 articles which variously seek to **define the roles and responsibilities of riparian states within the Basin**, working towards sustainable development, management and use of the river's water resources.
- The Mekong Agreement stipulates that all members agree to cooperate on the management, utilisation and conservation of water and associated resources in the Mekong Basin. More specifically, it addresses altered hydrological flows that would arise as a consequence of inter- and intra-basin diversions and of large storage dams.
- Certain recognised procedures of international water law, such as elements of prior notification and consultation for inter-basin diversions during wet season and intra-basin diversions during dry season (Article 5) are dealt with in the text of the Agreement. However, the main provisions relate directly to the institutional arrangements and functions of the MRC, including dispute resolution (Articles 34-35). Most procedures leave further scope for the development of detailed but non-binding protocols and guidelines by the MRC and its technical bodies.

The Mekong River Commission

- The MRC is the principal institution for coordinating cooperation and implementation of the Mekong Agreement (see above) between its member states. China and Myanmar are non-members of the MRC, but hold observer status. There are 3 core programme approaches:
  - Water Utilization Program develops an appropriate decision-support framework for sustainable development, rules for water utilization and a system for monitoring and management.
  - Basin Development Plan identifies trans-boundary development opportunities that are sustainable and environmentally sound.
  - Environment Program provides the environmental information to decide upon priorities and appropriate levels and areas for development.
- The MRC provides a framework for all developmental work related to the Mekong River with an emphasis on the protection of the environment and ecological balance, based on the principle of sovereign equality and reasonable and equitable utilisation of the Mekong River.
- It includes provisions for resolving possible disputes. Hence this framework has the potential to manage the Mekong as a transboundary river, or at least this international mechanism is the closest framework available to riparian states.
  - Under Articles 34 and 35 of the Mekong Agreement, matters that cannot be resolved by cooperative negotiation and that may result in impasses or conflicts between its members are referred to the MRC for attempted resolution. Procedurally, such conflicts are managed by the Council, or between regular Council sessions by the Joint Committee (Article 24(F)).
- The MRC has been the recipient of significant bilateral aid contributions (especially from the Nordic countries, Australia, Japan and Korea) as well as support from the UNDP and the World Bank. There remains a tension between the expectations of certain donors, particularly in the area of participation and environmental management, and the political realities and strong developmentalist-orientation of the countries that make up the MRC.

Criticisms of the Mekong Agreement and the MRC

Potential for differences and conflicting interests are high in the Mekong Basin, and the MRC (the implementing institution for the Mekong Agreement) has been fairly effective in dealing with them peacefully, although it needs support to improve its capacity.

- Its effectiveness as a regional mechanism to promote sustainable development has been seriously hampered by the non-participation of the two upper riparians, China and Myanmar.
  - China sees little gain in joining the MRC when weighed against the benefits of constructing a series of hydro-electric dams in Yunnan province as well as investing in projects in the lower Mekong states.
  - Myanmar's government also sees no interest in joining the MRC as it is focused on maintaining internal order.

- Like most intergovernmental organisations, the MRC's policies and decisions are also dominated by its most powerful member – Thailand.
  - For example, the lower riparian states' (the weaker states) concerns for flood control, management and mitigation are given only secondary importance compared to Thailand's concerns for hydro-power development.
  - Thailand's close economic and diplomatic tie with China restrained it from voicing opposition to the latter's decision to build a mammoth dam (Xiaowan Dam) which would have many downstream implications. Moreover, Thailand is a potential customer of the energy generate buy this dam.
- The Mekong Agreement itself has been observed to adopt terms that remain vague and open to interpretation, resulting in its inability to enforce legal principles.
  - A key contention is that the Agreement does not distinguish between the river "mainstream" and "tributaries" clearly although it uses both terms. This has significant legal ramifications for the prior notification and consultation procedures for hydropower projects. For example, with regard to the river mainstream, parties are obliged to notify on any proposed intra-basin uses, BUT notification of proposed uses that only have an impact on the tributaries of the Mekong are excluded from the Agreement.
- Although the MRC has among its key function dispute resolution, it has been criticised for being weak in this area.
  - No member country can veto another's project if concerned about adverse impacts. Instead, the MRC gives member countries only the right to receive prior notification and consultation.
  - A lack of detailed procedures to guide this process of dispute resolution between member states and the absence of any plenary jurisdiction over basin governance means that the role of the MRC is primarily one of a mediator and a facilitator of discussions between representatives of the national governments
- MRC is very donor-driven. Lenders like the Asian Development Bank are circumventing the MRC altogether, preferring to deal directly with the governments. E.g. the controversial Nam Theun-Hinboun and Nam Leuk dams are being built through the direct approval of the Laotian government.
- At the level of the people, the MRC does not have specific programs to benefit them directly, except for some "human resource development" by providing both project-based specific trainings to the local people.
- Despite the "considerable achievements" of the Commission, the living conditions within the Basin continue to be generally poorer than in areas outside the Basin. Infant and maternal mortality rates are higher, and disease is common due to lack of access to basic services such as sanitation and safe drinking water.

READING 2 – The Israeli-Jordan Water Agreement

- The most severe water scarcity in the world is in the Middle East. The deficit is particularly alarming in the Jordan River basin and the adjacent West Bank aquifers, where Israeli, Palestinian, and Jordanian water claims intersect.
- The history of water disputes continues all the way through the establishment of Israel. As a result, water became a strategic and diplomatic issue that periodically threatened to bring the country to blows with its neighbours.
- The Treaty of Peace between the State of Israel and the Hashemite Kingdom of Jordan is one of the exceptional examples of cooperation between Israelis and Arabs. It has been studied and watched closely by many scholars and politicians. So far, water management in the region has not fulfilled all the objectives stated in the treaty, but those changes that have been done are worth examining.

The 1994 Agreement

- The water agreement was signed as part of the larger Treaty of Peace between Israel and Jordan in 1994. Article 6 of the Treaty is entitled simply 'Water Resources' arid is considered to be one of the most exceptional agreements considering the fact that the two nations had been formally in a state of war for nearly half a century. It is devoted to achieving a comprehensive and lasting settlement of all the water problems between Israel and Jordan.
- Article 6 and its accompanying Annex II contain extremely important points and contribute to peaceful resolution of the water debate. Among these is **allocation of water** from the Yarmouk River as well as the Jordan River (see map above). The details of which will not be shared here, but the agreement states the amount of water each country has access to during the summer (15 May – 15 Oct) and winter (16 Oct – 14 May) seasons respectively, and which part of the rivers the water will be pumped from. Among the agreed clauses are:
    - From the Yarmouk River in summer, Israel is allowed to pump 12 million m^3 while Jordan gets the rest of the flow; in the winter, Israel pumps 13 million m^3 and Jordan is entitled to the rest of the flow.
    - If Israel transfers to Jordan in summer 20 million m^3 of water from the Jordan River, it can draw the same amount from Yarmouk River in winter.

- There are more details which are not included in this write-up. These pertain to **access** and **storage of groundwater** as well as **monitoring the quality of shared water resources**.
- Also, while Jordan receives a fixed share of water from Israel, it can buy more from Israel provided Israel approves the sale.

Criticisms of the Agreement

- While the 1994 Peace Treaty as a whole is remarkable, the parts of the same agreement concerning water (that is, Article 6) has been described as "myopic" by critics, and ensured that one of the most arid countries in the world – Jordan – remains in a water scarce situation.
- Much of the criticisms centre on Israel – which controls most of the available water – being the more powerful between the two, and it has been taking advantage of this position. Some critics have gone to the extent of describing Israel as "hoarding" water. In reality, it has also been enriching its own water capacity (through means such as desalination) to a level at which it can afford to update the agreement to give Jordan more water, but this is unlikely at this time. The wider political differences and baggage from the earlier wars between these two countries have also in some ways become implicated into their ability to uphold and honour the spirit of the Agreement.
    - The Jordan River itself has run dry ever since 1964 when Israel had sole use of Lake Tiberias (aka the Sea of Galilee) near the river's source (see map). This inadvertently adversely affects the amount of water Jordan has access to under the Agreement.
    - Israel has also been accused of not following through the agreed allocation, holding back water that it is supposed to transfer for Jordan.
    - Even though Jordan can buy water from Israel under the Agreement, Israel is known to drag its feet when the requests arrive. In early 2021, Jordan requested to buy an additional 8 million cubic metres of water from Israel but the sale appeared to be delayed intentionally by PM Netanyahu, and was only approved because the US stepped in to nudge Israel into action.
    - Meanwhile Jordan is increasingly parched, with a rapidly growing population partly due to its hosting of millions of war refugees from Kuwait, Iraq and Syria. With no surface water of its own to speak of, and quickly depleting groundwater supply, Jordan resorts to desalination on its tiny coastline at Aqaba (northern tip of Red Sea, see map). It has even been encouraged to pump the expensive flows from there to the neighbouring Israeli city of Eilat, in exchange for freshwater Israel is to pump back to Jordan from Lake Tiberias.
    - Israel is arguably in less need of water compared to Jordan. Innovators in Israel have perfected drip irrigation techniques, implemented impressive schemes which re-use wastewater, and built so many desalination plants that some commentators suggest it now has too much water! Critics argue that this illustrates the importance of viewing water not as a commodity as this would make water sharing unfair.

READING 3 – The Aral Sea Basin Project by GEF

- The project deals with the world's most dramatic case of environmental collapse and land degradation: the progressive drying up of the Aral Sea, the extinction of most forms of its aquatic life, and the contamination of huge land areas with salts and toxic substances.
- This environmental tragedy was brought about in a relatively short period (about 30 years) by excessive irrigation water abstractions (up to 90%) from the two rivers which feed the Aral, with an estimated US$300 million in lost crop production each year resulting from wasteful irrigation, waterlogging of soils and subsequent salinization. Furthermore, the environmental disaster contributes to the conditions that breed discontent and could eventually lead to terrorism in the region.
- The objective of the GEF project is to address the root causes of the overuse and degradation of the international waters of the basin, which is largely due to irrigation. The project has as its main components:
    - Water and Salt Management (lead component);
    - Public Awareness, dealing with education in water conservation;
    - Dam and Reservoir Management, to improve dam safety, and prepare investment plans;
    - Transboundary Water Monitoring, to create the basic capacity to monitor water flows and quality at national borders; and
    - Wetlands Restoration, to rehabilitate a biodiversity rich wetland area near the Amu Darya delta, while increasing local income;
- With the progressive decay of the irrigation infrastructure, costly maintenance and joint multi-country management is needed. But the lack of funds for maintenance, and the growing consciousness of national sovereignty among the basin's riparian states, have so far hindered all comprehensive attempts to rehabilitate the irrigation system even partially. Periods of prolonged drought has exacerbated relations on water issues among countries, and created conflicts between upstream hydro-power exporting countries (Tajikistan and Kyrgyzstan) and downstream irrigation-dependent nations.
- Against this scenario of political, social and economic complexity, all of the efforts of the donor community have achieved little in their support to improve basin management, including inter-state institutional arrangements.
- The short-term focus is now on preventing the further collapse of the irrigation system, while efforts to support agreement on a joint vision and commitment for water sharing among riparians and the establishment of multi-sectoral and multi-country management structures are longer-term goals. The rehabilitation of the Aral Sea deltas and wetland ecosystems, which only a few decades ago supported the livelihood of large healthy populations and unique biodiversity, does not seem to be a political priority.
- The shift in focus of the countries away from the cooperative efforts over the Aral Sea resulted in the shared vision and political commitment to action (both of which the GEF tries to help facilitate among these countries) never materialising.
- The project's implementation suffered from the weaknesses of complex multi-country institutional frameworks, and was unable to confront growing conflicts and technical/economic problems. During the course of its review mission in December 2000, the World Bank correctly identified the lack of effectiveness of the 'processes' that should have brought about country ownership, commitment to joint action and informed consensus on priorities for action, as the major cause for the so far overall unsatisfactory implementation of the project.