TRANSBOUNDARY RIVERS AS A CONFLICT CATALYST: CHINA AS A CASE STUDY

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ABSTRACT

Due to their vital importance for the economic and social processes within the basin, transboundary rivers were always an important subject in the relations between riparian states. Moreover, the nature of these interactions is not uniform; whereas some countries are involved in interstate tensions over the use of river resources, others tend to act in a cooperative manner. At the same time, although the existing scholarly debate focuses on the question whether the international rivers are more prone to conflict or, in contrast, cooperation, the advocates of both theses point out the numerous conditions, circumstances and factors, which can explain the transboundary basin's proneness to conflict or cooperation. Hence, the present thesis aims to contribute to the existing literature by systematizing and structuring the arguments provided by researchers; furthermore, the validity of the selected factors will be tested by applying to two cases of China shared rivers (the Brahmaputra and the Irtysh). The thesis provides evidence of the correlation between several examined factors and proneness to conflict and, at the same time, shows the weak explanatory power of other conditions. However, the thesis also concludes by emphasizing several factors which might be considered from a different angle in order to be more applicable in the explanation of the interstate conflicts in transboundary river basins.

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TABLE OF CONTENTS

List of Abbreviations

BAR	Basin-at-risk scale
GBM	the Ganges-Brahmaputra-Meghna basin
GDP	Gross Domestic Product
GW	Gigawatt
IWED	International Water Events Database
KCJC	the Kazakhstan-China Joint Commission
MoU	Memorandum of understanding
MW	Megawatt
IOB	Irtysh-Ob basin
PRC	People's Republic of China
TAR	Tibetan Autonomous region
TFDD	the Transboundary Freshwater Dispute Database
TRB	Transboundary river basin
UN	United Nations

Introduction

Given their international nature, transboundary rivers[1] were always an alienable element of the relations between states. The first civilizations were found on the banks of the large international watercourses such as the Nile, Ganges, Euphrates, Tigris and many others; being a considerable and often irreplaceable component of economic development, these watercourses became a significant subject of international relations. However, the nature of the interstate interactions varies: whereas some countries tend to deal with the trans-state river issues in a cooperative manner, the relations between the others were rather conflictual and are characterized by interstate tensions.

Hence, the uncertainty of whether the transboundary watercourses are more prone to be catalysts for interstate tensions or, in contrast, urge the riparian states to conduct their water policy in a cooperative manner became a subject of the active scholarly debate. On the one hand, the advocates[2] of the widely discussed "water war thesis" argue that the scarce water resources along with their trans-state nature can serve as a trigger for a clash of interests between the nations and even lead to armed conflict. On the other hand, their opponents[3] provide the numerous empirical arguments in support of invalidity of the water war thesis and thereby argue that the states are not prone to engage in the river-related conflicts. Besides this, the idea that the conflict and cooperation

[1] The attributes "international" and "trans-state rivers" are also used in the thesis with equal meaning.

[2] e.g. W. Remans. *Water and War*. Vol. 8. Humantares Volkerrecht, 1995;
M. Falkenmark. "Water Scarcity Generates Environmental Stress and Potential Conflicts." In James, W. & Niemczynowicz, J. (eds.) *Water, Development and the Environment*, 279–92. CRC Press, 1992;
Arnon Soffer. *Rivers of Fire: The Conflict over Water in the Middle East*. Translated by Nina Copaken. Lanham, Md.: Rowman & Littlefield Publishers, 1999;
Peter H. Gleick. "Water and Conflict: Fresh Water Resources and International Security." *International Security* 18, no. 1 (1993): 79–112;
Thomas F. Homer-Dixon. *Environment, Scarcity, and Violence*. Princeton University Press, 2010.

[3] e.g. Aaron T. Wolf. "'Water Wars' and Water Reality: Conflict and Cooperation Along International Waterways." In *Environmental Change, Adaptation, and Security*, edited by S.C. Lonergan, 251–65. Springer Netherlands, 1999;
Jerome Delli Priscoli and Aaron T. Wolf. *Managing and Transforming Water Conflicts*. Cambridge University Press, 2009;
Aaron T. Wolf, Shira B. Yoffe, and Mark Giordano. "International waters: Identifying basins at risk." *Water policy* 5.1 (2003): 29-60.

over international waters can co-exist has also wide-spread support among scholars.[4] At the same time, the arguments provided by both advocates of the water war thesis and their opponents include a wide range of noteworthy reservations, made to indicate the circumstances and conditions, which can explain, foster and even lead to the emergence of interstate tensions or, in contrast, cooperation over the shared waters. The authors emphasize a broad variety of the conditions, which focus on issues such as specificity of the foreign policy approaches within the basin, the climate and geophysical variables, the source of tensions and many others.

Hence, this thesis aims to analyze the particular conflict factors[5] in terms of their actual affiliation with the conflictual/cooperative regime over the trans-state rivers. For this purpose, the factors, underscored by different authors, will be elaborated in the form of four sets, structured according the core issue they focus on. In particular, they will be structured in terms of, firstly, the power configuration of the riparians (namely, factors such as the regional power's upstream position and significant difference in the relative power of the riparians); secondly, economic and geophysical conditions of the basin (water scarcity, high dependence of the downstream state for the particular watercourse, high extent to which water supply is shared). Thirdly, the proneness to conflict will be considered in terms of the source of tensions (factors such as predominance of the quantity and infrastructure issues, asymmetric impacts of negative externalities, management of multiple use) and, finally, interstate political environment (generally uncooperative interactions, combination of the high dam density and low amount of signed treaties, weak epistemic community).

In order to test their validity, every particular indicator will be tested by applying two cases of China's shared rivers. In particular, the thesis will cover one river basin, which features the non-cooperative/conflicting political environment (the Brahmaputra), and one, which is characterized by non-conflicting/cooperative regime (the Irtysh). Hence, the particular indicators

[4] e.g. Mark Zeitoun and Naho Mirumachi. "Transboundary water interaction I: Reconsidering conflict and cooperation." *International Environmental Agreements: Politics, Law and Economics* 8.4 (2008): 299. Sebastian Biba. E-mail. Personal Correspondence. E-mail, May 24, 2016.

[5] The conflict factors, conflict indicators and conditions are used in the thesis with equal meaning.

will be separately analyzed in each basin for the purpose of identification of its (ir)relevance. Hereby, the presence of the factor, which is hypothesized to explain/contribute to the proneness to conflict, in the conflictual basin, and, at the same time, its absence in the cooperative one will serve as evidence of the factor's validity. Thus, the two cases aim to identify which indicators among the elaborated list indeed possess certain conflict/cooperation potential, and thereby partially or even entirely corroborate the following hypothesis:

> The conflict indicator, being considered isolated and independent from others, should be present in the non-cooperative/conflicting case, and (necessarily) should be at the same time absent in the non-conflicting/cooperative case.

It is important that as the elaborated set of indicators includes eleven variables, the hypothesis should be answered for every particular factor. Importantly, given that every factor is considered isolated from others, it should be emphasized that the set of factors does not constitute a comprehensive theoretical framework and by no means presupposes that all the variables should be simultaneously met for conflict to occur. Hence, the following research question aims to identify the conditions, which will be determined as evidence of the hypothesis above:

> Under which circumstances are conflicts over transboundary rivers more likely to emerge?

By this, the thesis aims to contribute to the existing literature on interstate relations over international water issues by testing the validity of the different scholars' arguments through the China case study. Finally, the comparative case analysis concludes with emphasizing different validity for particular indicators examined: thus, all factors, which are related to power configuration and source of tensions, demonstrate weak explanatory power. Whereas some conditions (high extent to which water supply is shared and combination of the high dam density and low amount of signed treaties) prove its correlation with conflictual political environment, the rest of the

variables (such as weak epistemic community, considerable water scarcity, etc.) show only limited validity and should be considered in detail in further researches.

The topic and the particular cases were selected due to a number of reasons. It is noteworthy that, since the international agenda tends to more frequently include issues which are related to water scarcity, river resource allocation and water availability, the necessity to obtain a more explicit notion of how the cooperative mechanisms function in the transboundary river basins is required. Similarly, the understanding of the preconditions of water conflicts can contribute to the more pragmatic and mutually beneficial conflict resolution.

The case study will focus on China primarily due to the fact that PRC is one of the most considerable riparian states in terms of amount, size and importance of shared rivers; indeed, China is an upstream country in more than 40 transboundary river basins shared with 18 countries. The variety of the riparian states makes PRC a suitable case as it makes Beijing's water policy approaches more diverse. Speaking about the specific Chinese shared watercourses, the Brahmaputra and Irtysh river basins were selected owing to their comparability and, at the same time, the opposite types of water regime. Hence, the major characteristics between the two rivers bare a certain resemblance. Firstly, both the Brahmaputra and Irtysh rivers are the largest watercourses in their regions; the rivers' potential in terms of hydropower, irrigation, navigation and industry are comparable and constitute an extremely important social and economic factor in South and North Asia respectively. Secondly, both cases are based on a similar riparian configuration that includes three inalienable parts: the upstream hegemon (China), the considerable downstream state (India and Russia) and downstream country with relatively small profile in relations with PRC (Kazakhstan and Bangladesh). Finally, both headwaters are located in China's regions, which have specific local-center relations (Xinjiang and Tibet).

Nevertheless, the political environment in these river basins are different: in the Brahmaputra case, the upstream-downstream relations lie within the non-cooperative water regime characterized by lack of effective cooperative mechanisms. At the same time, the political

environment in the Irtysh basin features the less conflictual forms of interaction and higher willingness of all parties to act in the cooperative manner.

Empirical basis of the research embraces data from the reports, policy briefs and datasets provided by various NGOs and research institutes. For instance, the thesis relies on the data from the United Nations departments (United Nations Water, UN Department of economic and social affairs, UN International Children's Emergency Fund), International Rivers Organization, the Central Intelligence Agency Factbook, Human Development Report, SIPRI Database, Environmental Performance Index, etc. One of the most important empirical bases of the thesis are datasets compiled by the researchers from Oregon State University. In particular, it is based on the data from the Transboundary Freshwater Dispute Database (TFDD) and the related project, International Water Events Database (IWED), which constitute a comprehensive endeavour to include all issues, related to transboundary waters, into one dataset.

It is important to note that the geographical scope of the research focuses on the basin-wide consideration of the transboundary watercourses (including tributaries and the entire drainage area). However, both the Irtysh and Brahmaputra cases exclude the Ob and Ganges rivers respectively, on the river part from the headwater to the confluence, due to the risk of inaccuracy as the river use of the Ganges and Ob does not directly link with China. Thereby both cases focus on the riparians such as China, India, Bangladesh, Russia, Kazakhstan and, to much lesser extent, Bhutan and Mongolia. Another important limitation is that, although the core water treaties will be discussed, the research will not cover the issues related to the public international law on transboundary waters as it is worth considering much more deeply in a specific research. The time-frame of the research embraces the period of the last two decades as this space of time is characterized, on the one hand, by intensive dam and canal construction and increasing draw off for industrial and agricultural purposes, which heightened the tensions on the river issues. On the other hand, this time-frame also features noteworthy collaborative initiatives and the establishment of the cooperation mechanisms (especially, in the Irtysh basin). Finally, the selected case of China presupposes that the potential

conflict and collaboration are considered primarily between China and the downstream states, however, the noteworthy issues within the downstream states relations will be also taken into account.

The structure of the thesis is the following: the first chapter aims to provide an overview of the existing views on the conflict and cooperation in the transboundary river basins, point out the scholars' arguments on the conflict conditions and hereby proceed with the set of factors which can potentially indicate the conflicting/cooperative environment. In the second chapter, I will apply every condition to the Brahmaputra case; in the third chapter, the similar procedure will be performed in relation to the Irtysh case with addition of the comparison with the previous case. Finally, the conclusion will underscore the outcomes of the comparative analysis and hereby identify which of the selected conditions proved to be affiliated with the proneness to conflict.

Chapter 1: Transboundary rivers in interstate relations: theoretical background

Due to its undoubted importance for the human existence, water (especially, its transboundary sources) was always on agenda in terms of the relations between tribes, regions and nations. However, there is a scholarly debate between those researchers, who consider international water as a cooperation catalyst and those scholars, who believe that the interactions over international watercourses tend to lead to the conflicting political environment. This chapter will introduce the main debates in the literature, analyze the similarities and differences between the various theses and proceed with the scholars' views on the circumstances, which matter in the identification of the proneness to conflicts over the international waters. These conditions will be subsequently structured according to the factors which they focus on; finally, it will result in the list of indicators whose applicability will be tested in the following chapters.

1.1 Transboundary rivers: an overview

Being an important component of the economic and social development of the countries, the use of transboundary[6] watercourses has been a considerable issue within the interstate relations since the first civilizations emerged along the waterways such as the Euphrates, Nile, Ganges, etc. Karl Wittfogel defined the early, primarily Oriental, societies as hydraulic empires; he argued that the development of the ancient states and related control over the population were based on the control over access to water. In this sense, rivers serve as a source of political power exploited by the central bureaucracy, which was defined by Wittfogel as a "hydraulic monopoly".[7] Later, industrialization supplemented the river use agenda with issues of water pollution, hydropower industry and, more recently, climate change impacts on the river basin. Hence, these factors along with intensifying irrigation and population growth seriously complicated the potential

[6] The attributes "international" and "trans-state rivers" are also used in the thesis with equal meaning.
[7] Karl Wittfogel. *Oriental Despotism; a Comparative Study of Total Power.* New York: Random House, 1957.

communication between the riparians on the river use issues. Due to the new variables and often worsening environmental situation, the joint elaboration of the river use decisions might be more problematic; however, owing to the rising interdependency and common problems, the transboundary waterways can also emerge as an incentive to cooperation.

To date, according to the UN, there are 276 transboundary river basins on the globe, which are situated on the territory of 148 states; what is more, 39 of them are more than 90% covered by transboundary river watersheds including 21 countries, which are lying completely within one of these watersheds.[8] International river basins cover 40% of the global population; moreover, 90% of people lives in the countries, which share the catchment area with the other states.[9] In addition, the majority of the largest world's rivers are transboundary: the Nile, Zambezi, Amur, Salween, Mekong, Indus, Amazon, Ganges, etc.; one of the most noteworthy example, Danube river basin, is located on the territory of nineteen European countries.[10]

Being an inalienable component of the geophysical and environmental systems, the watercourses are highly significant in terms of sculpturing relief and sustaining ecosystems. Rivers shape conditions not only for fluvial organisms, but also contribute to the existence of numerous species, which are indirectly related to the water flow; for instance, rivers often form the water regime in the lakes and wetlands, which are the breeding cites for numerous migratory birds.

International rivers are not equally distributed throughout the globe; apparently, their amount depends on the level of territorial unities fragmentation and length of the land frontier. Thus, 68 transboundary rivers are located in Europe, 64 in Africa (by and large, due to the insufficiently considered post-colonial border making),[11] 46 and 38 in North and South America

[8] "International Decade for Action 'Water for Life' 2005-2015. Focus Areas: Transboundary Waters." *UN Department of Economic and Social Affairs-UNDESA*, 2013. http://www.un.org/waterforlifedecade/transboundary_waters.shtml.
[9] *Transboundary Waters: Sharing Benefits, Sharing Responsibilities*. UN-Water., 2008. http://www.unwater.org/downloads/unw_transboundary.pdf.
[10] Igor Liska. "Managing an International River Basin Towards Water Quality Protection: The Danube Case." In *The Danube River Basin*, edited by Igor Liska, 1–19. The Handbook of Environmental Chemistry 39. Springer Berlin Heidelberg, 2015.
[11] Claudia W. Sadoff and David Grey. "Beyond the River: The Benefits of Cooperation on International Rivers." *Water Policy* 4, no. 5 (2002): 389–403.

respectively. There are 60 international river basins in Asia and the significant part of them are partially located in China.

Due to its vast area and the high-altitude regions, China controls the headwaters of 17 major trans-state watercourses, which can be divided into four subregions: Northeast (Amur, Tumen, Yalu and Suifun), Northwest (Tarim, Ulungur, Emin, Ili and Irtysh) and rivers, which spring from Tibetan Autonomous Region (TAR) – Southeast (Salween, Mekong, Red and Pearl River) and Southwest (Indus, Brahmaputra and Ganges). The latter two are presumably the most remarkable as the annual outflow of the Tibetan rivers is 527.9 km^3, which is 80% of the entire discharge of the Chinese international rivers[12].

Given that Chinese economic and demographic growth has a direct impact on the river basin, it is remarkable that the kind of impact varies in different regions. Thus, one of the most problematic issue in the Northeastern provinces is a high level of agricultural and industrial water contamination; for instance the percentage of the Chinese wastewater flows (purified by only 14%) into the Ussuri river between China and Russia is about 97%.[13] Owing to arid climate in Northwest, PRC's initiatives are primarily focused on the irrigation projects, channel construction and river diversion. As to Tibetan waterways, the considerable difference between the water levels allows to produce electricity from the hydropower plants; hereby, China has eight large dams on the Mekong mainstream ("Lancangjiang cascade") and more than twenty tributary dams are planned in the Upper Mekong basin.[14] Similarly, there are numerous hydropower projects in the basins of Ganges and Brahmaputra, which will be discussed in detail in the next chapter.

In general, the impacts of the river use caused by the aforementioned activities are many-folded and dependent on the multitude of geophysical, economic and social factors. In general, the

[12] Yan Feng, Daming He, and Wenling Wang. "Identifying China's Transboundary Water Risks and Vulnerabilities – a Multidisciplinary Analysis Using Hydrological Data and Legal/institutional Settings." *Water International* 40, no. 2 (February 23, 2015): 328–41.
[13] Y.S.Malin. "Ecologicheskaya Politika Kitaya Na Mezhdunarodnom Urovne [Environmental Policy of China on International Level]." *Pravo I Politika*, no. 4 (2009).
[14] Claudia Kuenzer, Ian Campbell, Marthe Roch, Patrick Leinenkugel, Vo Quoc Tuan, and Stefan Dech. "Understanding the Impact of Hydropower Developments in the Context of Upstream–downstream Relations in the Mekong River Basin." *Sustainability Science* 8, no. 4 (November 15, 2012): 565–84.

unidirectional nature of the watercourse, varying geographical and hydrological features and different socio-economic specificities preclude the equally distributed access to the river resources in the riparian states. While some of the countries are capable to develop their hydropower, irrigation, industrial and navigational projects in the river basins, the other riparians are limited by economic and geophysical constraints; what is more, the impacts of the upstream practices are often far from having a positive impacts on the downstream ones. Nonetheless, the interests of the riverside actors often coincide with each other; the common problems sometimes lead to the creation of cooperative mechanisms in the river basins. The existing literature on the transboundary rivers does not provide an explicit answer to whether the international waters are more prone to generate a conflicting political regime based on the unequal resource use and negative environmental and socio-economic impacts or, in contrast, urge to resort to cooperation within the basin. In next two sections I will review the conflicting potential and proceed with the cooperative capacity of the international waterways.

1.2 Interstate conflicts over transboundary rivers

Being a highly important resource without any substitute, water and, especially, international water were always a subject of competition, which urge many scholars to draw attention to the conflict potential of the waterways. Hence, Hughes Butts emphasizes that the prevalence of the oil conflicts will be inevitably replaced by the water conflicts.[15] Even more, Brahma Chellaney argues that the conflict over water are "not just a future peril but a little-publicized reality already confronting the international community".[16] In general, so-called "water war thesis", which imply that scarce water resources along with their international nature, possess high conflicting potential, is widely supported by the advocates of the (neo-)realist theories and Malthusianism arguments; for instance, the water war thesis is underscored by Remans,[17]

[15] Kent Hughes Butts, "The Strategic Importance of Water." *Parameters (US Army War College Quarterly)*, 1997.
[16] Brahma Chellaney. *Water, Peace, and War: Confronting the Global Water Crisis*. Rowman & Littlefield, 2013: 2.
[17] Remans, *Water and War*.

Fallkenmark,[18] Soffer,[19] Gleick,[20] Naff[21] and others. In addition, some of the advocates of the proneness to conflict such as Nils Gleditsch,[22] Miriam Lowi[23] and Thomas Homer-Dixon[24] also resort to the concepts of environmental security. In general, the water war thesis implies that the having a water source outside the country's territory makes downstream states vulnerable and urge them to act accordingly in order to eradicate the external water dependence, which is perceived as a national threat. It is remarkable that this thesis is applicable in the cases of water scarcity; this necessary condition facilitates an emergence of a zero-sum game, within which actors seek to maximize the benefits necessary for nation's survival. This concept became more relevant since the security issues started to be considered not only within the military, but also non-traditional, in this case – environmental, dimension. Indeed, Johan Galtung argued that "environmental effects make a country more offensive because it is vulnerable to attack and because it may wish to make up for the deficit by extending the ecocycles abroad, diluting and hiding the pollution, getting access to new resources".[25]

It is important to mention that the water was thesis does not necessarily imply the emergence of an armed warfare. A large amount of researches, which emphasize the conflict potential, scrutinizes the hydropolitics in the already hostile Middle East in arid African regions as a worst-case scenario; however, the actual armed clashes over the war have are not the case even in this hot spot.[26] Similarly, Gleick suggests that "…water-related disputes are more likely to lead to political confrontations and negotiations than to violent conflict."[27] Paul Samson and

[18] Falkenmark, *Water Scarcity*.
[19] Soffer, *Rivers of Fire*.
[20] Gleick, *Water and Conflict*, 79–112.
[21] Naff Thomas. "Conflict and water use in the Middle East." *Water in the Arab World: Perspectives and Prognoses* (1994): 273.
[22] Nils Petter Gleditsch. "Armed Conflict and The Environment: A Critique of the Literature." *Journal of Peace Research* 35, no. 3 (May 1, 1998): 381–400.
[23] Miriam R. Lowi. "Water and Conflict in the Middle East and South Asia: Are Environmental Issues and Security Issues Linked?" *The Journal of Environment & Development* 8, no. 4 (December 1, 1999): 376–96.
[24] Homer-Dixon, *Environment, Scarcity, and Violence*.
[25] Johan Galtung. *Environment, development, and military activity: Towards alternative security doctrines*. Universitetsforlaget, 1982: 99.
[26] Jeremy Allouche. *Water nationalism: An explanation of the past and present conflicts in Central Asia, the Middle East and the Indian Subcontinent?*. Diss. Institut universitaire de hautes études internationales, 2005.
[27] Gleick, *Water and Conflict*, 112.

Bertrand Charrier refer to the eighteen water disputes, among which only one is characterized as a military conflict; moreover, this case is not connected with the resource use, but with the border demarcation.[28] The wide range of conflict potential is underscored by Zeitoun and Mirumachi, who argue that "Water conflict varies significantly in intensity across basins and across time, and ranges in form from stymied fuming to very public displays of hostility, affecting all levels of society, often even in distant non-riparian circles."[29] Thus, it is important to separate the conflicting potential, which is expected to lead to the hostilities, from one that is characterized by the lack of cooperation, which is necessary for the national security (in this case, non-traditional security issues). In particular, along with aforementioned environmental issues, the conflicting potential of the shared waters can potentially threaten economic, energy, food, health and other security issues.

1.3 Interstate cooperation over transboundary rivers

However, it is hard to ignore the existing evidence that water can be considered in terms of cooperative frames as well. Thus, according to the UN, during the last fifty years approximately 150 agreements were made on the international water issues; it is just one-third of all water treaties concluded since 1820. Since the first water treaty, which was confirmed 2500 BC between two Sumerian states in the issue of the Tigris river dispute, the main agenda has been gradually shifting from the issues of border demarcation and navigation toward water resources and environmental sustainability.[30] To support this, the last 145 water agreements focuses primarily on the water utilization (37%) and hydropower plants (39%). The minority of the treaties regards to the floods control (9%), industrial allocation (6%) and only six treaties (4%) include navigational use.[31]

The abovementioned multitude of the cooperative initiatives is only one of the arguments of the opponents of the water war thesis. The advocates of cooperative nature of shared water such

[28] Paul R. Samson and Bertrand Charrier. *International freshwater conflict: issues and prevention strategies*. Geneva: Green Cross International, 1997.
[29] Zeitoun and Mirumachi, *Transboundary water*, 299.
[30] *UNDESA*, 2013.
[31] *Human Development Report - Beyond Scarcity: Power, Poverty and the Global Water Crisis*. UNDP, 2006. http://www.palgrave.com/us/book/9780230500587.

as Tony Allan,[32] Arun Elhance,[33] Abdelfattah Metawie,[34] Shira Yoffe,[35] Delli Priscoli,[36]Mark Giordano[37] and most notably Aaron Wolf,[38] support the (neo-)liberal arguments that the interdependence is not a threat, but a trigger to joint problem solving. In general, they accentuate that a predictable and cooperative political regime in the river basins is a more effective and, what is more important, more widespread outcome of the transboundary water interactions.

The main argument of the advocates of water cooperation is based on the research of Oregon State University scholars; in particular, the pathbreaking piece by Wolf,[39] later developed by Yoffe, Priscoli and Giordano, demonstrates that the share of conflicting events is much lesser than the cooperative ones. The Transboundary Freshwater Dispute Database shows that among 1831 water interactions during the last half of the century only 37 can be defined as an acute dispute; moreover, 30 of them regards water issues in Israel.[40] Wolf points out that the only water war *per se* occurred between the Middle East city states Umma and Lagash more than 4500 years ago.[41] In total, the last 50 years were characterized by 1,288 cooperative (67,1%), 507 conflictive (27,7%), 96 (5.2%) neutral or non-significant events. What is important, TFDD demonstrates that almost a half of all water interactions were within the range of mild verbal support and mild verbal hostility that depicts the lack of the extreme types of interstate interactions.[42] Finally, Wolf accentuates that the water cooperation is resistant to the more considerable political tensions by giving an example of continued negotiations over the shared waters during the conflicts between

[32] John Anthony Allan and Tony Allan. *The Middle East Water Question: Hydropolitics and the Global Economy*. I.B.Tauris, 2002.
[33] Arun P. Elhance. *Hydropolitics in the Third World: Conflict and Cooperation in International River Basins*. US Institute of Peace Press, 1999.
[34] AbdelFattah Metawie. "History of Co-operation in the Nile Basin." *International Journal of Water Resources Development* 20.1 (2004): 47-63.
[35] Shira Yoffe. *Basins at risk: conflict and cooperation over international freshwater resources*. Diss. 2001.
[36] Priscoli and Wolf, *Managing and Transforming.*
[37] Wolf, Yoffe, and Giordano, *International waters*.
[38] Aaron Wolf. *Hydropolitics along the Jordan River; Scarce Water and Its Impact on the Arab-Israeli Conflict*. United Nations University Press, 1995.
Wolf, *Water Wars*.
[39] Aaron T. Wolf. "Freshwater transboundary dispute database." *Corvallis, OR, USA: Oregon State University* (2004).
[40] Priscoli and Wolf. *Managing and Transforming Water Conflicts*, 12.
[41] Aaron T. Wolf. "Conflict and Cooperation along International Waterways." *Water Policy* 1, no. 2 (April 1998): 251–65.
[42] Priscoli and Wolf, "*Managing and Transforming Water Conflicts"*, 12.

India and Pakistan, Israel and Jordan, Vietnam and Mekong River Commission members.[43] Continuous data assessment in terms of TFDD demonstrates that the tendency is relatively stable: in 2008 one-third of the events was conflicting (but never developed into actual water war) and the rest were neutral or cooperative.[44] However, one would argue that the insignificant but evident shift toward conflicting events demonstrates the argument of Brahma Chellaney, who suggests that the absence of water war "does not mean that the same will continue to hold true in the future. The world has little experience in managing what the future holds – widespread water shortages".[45]

At the same time, it is notable that the advocates of the cooperative nature of water take into consideration that the water allocation is a frequent cause of armed conflict on a subnational level or in the absence of the actual state. For instance, Aaron Wolf refers to the examples of "interstate violence and death along the Cauvery river in India, to California farmers blowing up a pipeline meant for Los Angeles, … violent history in the Americas between indigenous peoples and European settlers".[46] Similarly, Wenche Hauge and Tanja Ellingsen demonstrate the correlation between the occurrence of domestic conflict and the level of water scarcity.[47]

However, it is not only the representatives of the (neo-)liberal school, who argue that the transboundary waters could have a cooperative nature. For instance, a single hegemonic state, which controls the most considerable part of the available resources, can be considered as a precondition for cooperation by the advocates of the realism concept. In particular, the theory of hegemonic stability implies that the dominant power within the basin naturally leads to the non-conflicting environment as the neighbors have to comply with the water regime, imposed by the hegemon.[48] Nevertheless, one would assume that the compliance with the water regime enforced

[43] Ibid, 14
[44] L. DeStefano, P. Edwards, L. DeSilva, & A. Wolf, "Tracking Cooperation and Conflict in International River Basins: Historic and Recent Trends." *Water Policy*, 2010: 6.
[45] Chellaney, "*Water, Peace, and War", 57*
[46] Wolf, *Conflict and Cooperation*, 255.
[47] Wenche Hauge and Tanja Ellingsen. "Beyond Environmental Scarcity: Causal Pathways to Conflict." *Journal of Peace Research* 35, no. 3 (May 1, 1998): 299–317.
[48] Sebastian Biba. "Desecuritization in China's behavior towards its transboundary rivers: the Mekong River, the Brahmaputra River, and the Irtysh and Ili Rivers" Journal of Contemporary China 23.85 (2014): 21-43.

by the dominant power can decrease the possibility of the armed water conflict, but unlikely to eradicate the economic, social and environment related tensions.

It is important to note that both advocates of the water war thesis and their opponents tend to admit the co-existence of cooperation and conflict within any particular case. For instance, it is underscored by Sebastian Biba, who argues that it is not correct to clearly demarcate cooperative cases from conflictual ones and, what is important for this thesis, admits that it is valid for all of China's international rivers.[49] Zeitoun emphasizes that it is especially typical for the researches aimed to provide an actual ways to improve the water management; at the same time, he specifies that "when it comes to the analysis, however, conflict and cooperation are inevitably treated separately".[50] Sadoff and Grey draw attention to the linkage of water with historic, environmental, cultural and economic factors; hereby, the basic assumption is that the transnational water has not conflicting or cooperative nature. Instead, its nature depends on the set of factors and "fully unbundling water's role from the complex dynamics of relationships between states is not possible". They suggest that "the management of shared water can be a force for peace, or a force for war, but politics … will determine whether cooperation or conflict is chosen."[51]

1.4 Conflict and cooperation indicators: literature review

As this thesis aims to systematize existing and to identify new factors which can explain, contribute or even directly serve as a direct cause of the conflict/cooperation emergence, this section will analyze the particular factors that are pointed out to be relevant in the existing literature. The conditions that lead to the particular political environment were widely discussed among both apologists of the water war thesis and the advocates of the (neo-)liberal approaches. What is more, their arguments belong to the various areas and include geophysical, economic, political factors along with ones that consider the variables in the integrated and inter-sectoral

[49] Biba, Personal correspondence.
[50] Zeitoun and Mirumachi, "*Transboundary water interaction"*, 299.
[51] Sadoff and Grey, "*Beyond the river*", 391.

ways. However, the major part of the relevant literature focuses on the armed water war *per se*, rather than non-cooperative and less extreme cases of the conflicting political regime.

One of the most remarkable endevour to identify these conditions is a concept by Thomas Homer-Dixon, who singles out four circumstances, which are necessary for transboundary water conflict to occur. By first two points, he suggests that "the downstream country must be highly dependent on the water for its national well-being,"[52] while "…the upstream country must be threatening to restrict substantially the river's flow." Thirdly, he underscores that there is should be a history of antagonism between the riparians;[53] in some sense, it correlates with the argument by Alan Dupont, who argues that common values and generally cooperative interactions make water conflict less probable to occur.[54] Finally, Homer-Dixon believes that "most importantly, downstream country must be militarily stronger than the upstream country";[55] however, the important reservation should be made here in regards to the type of conflict as Homer-Dixon primarily considers the extreme situation, i.e. armed conflict.

The power-based arguments by Homer-Dixon can be supplemented by the characteristics of proneness to conflict provided by Peter Gleick. He argues that the conflict is possible when the four conditions tend to reach extremes; thus, he point out, firstly, the degree of water scarcity, secondly, the extent to which water supply is shared, thirdly, the relative power of the riparians and, finally, the ease of access to alternative water sources.[56]

It is remarkable, that the researchers of the conflict in its broader meaning (such as Charles Gochman[57] and Stuart Bremer[58]) assume that major powers are more likely to get involved into the conflict with each other when their capabilities are commensurable. However, the

[52] Homer-Dixon, *Environment, Scarcity, and Violence, 179.*
[53] Ibid, *180*
[54] Alan Dupont. *The Environment and Security in Pacific Asia*. Oxford University Press for the International Institute for Strategic Studies, 1998: 73.
[55] Homer-Dixon, "*Environment, Scarcity, and Violence",* 139.
[56] Gleick, "*Water and Conflict*", 84-85.
[57] Charles S. Gochman. "Capability-driven disputes." *Prisoners of war* (1990): 141-159.
[58] Stuart A. Bremer. "Dangerous dyads conditions affecting the likelihood of interstate war, 1816-1965." *Journal of Conflict Resolution* 36.2 (1992): 309-341.

statistical analysis of the riparian dyads provided by Toset et al demonstrates that the contiguous dyads with one or two major powers have less conflictual behavior.[59] Finally, similarly with the widely accepted assumption that the water scarcity is a key factor that contribute to the conflict,[60] the analysis demonstrates that the dyads with water scarcity have approximately four times higher risk of conflict than dyads without.[61] Although the analysis demonstrates the certain interconnection between the relevant variables, it should be taken into account that effect of a shared river juxtaposes with the effect of contiguity itself, which negatively contribute to the estimation's reliability.

One of the noteworthy condition for cooperation to emerge is indicated in terms of critical interpretation of the theory of hegemonic stability. According to Miriam Lowi, the formation of the water regime is possible only in case of a downstream hegemon; she suggests that "only the downstream hegemon has both the interest in securing its water supply through international regime formation and the power to compel cooperation", whereas "a hegemon in the upstream position does not have the incentive to engage incooperative arrangements, as these would only be seen as a constraint to unlimited future action and discriminatory use of a river's resources."[62]

As Sadoff and Grey, who put the water into more complex system of environmental, economic and other variables, Lowi and Rothmann underscore that the solution of water tensions is closely connected with the high politics. They emphasize that since the statehood, territorial and security-related issues remain unresolved the cooperative environment is unlikely to be achieved.[63] This is also supported by Priscoli and Wolf, who bring an example of Turkey, Israel and Syria to illustrate that unresolved high politics issues make water conflict more intricate.[64]

[59] Hans Petter Wollebæk Toset, Nils Petter Gleditsch, and Håvard Hegre. "Shared rivers and interstate conflict." *Political Geography* 19.8 (2000): 987.
[60] Homer-Dixon, "*Environment, Scarcity, and Violence*", 15.
[61] Toset et al, "*Shared river and interstate conflict*", 990.
[62] Miriam R. Lowi. *Water and Power: The Politics of a Scarce Resource in the Jordan River Basin*. Cambridge University Press, 1995: 10.
[63] Miriam Lowi and Jay Rothman. "Arabs and Israelis: The Jordan River." *Culture and Negotiation. The Resolution of Water Disputes. SAGE: Newbury Park, London, New Delhi* (1993): 156-175.
[64] Priscoli and Wolf, "*Managing and Transforming Water Conflicts"*, 18

One of the most remarkable contribution to this issue was made by Stefan Lindemann, who provided sophisticated framework to explain water regime formation; in particular, he applied four approaches to the Elba and Rhine water regimes to demonstrate which factors play an important role in cooperative political environment. Firstly, similarly with Lowi, he assumes that the presence of downstream hegemon is a necessary condition for water regime formation.[65] Secondly, his interest-based argument stresses that the presence of transboundary externalities (e.g. pollution) hampers the creation of the cooperative water regime; however, he believes that the negotiations can be vitalized through the balancing of asymmetric negative externalities by means of direct or indirect cost incentives. Thirdly, knowledge-based hypothesis is based on the role of so-called epistemic communities, which are defined as "network[s] of professionals with recognized expertise and competence in a particular domain and an authoritative claim to policy-relevant knowledge within that domain or issue-area."[66] By this Lindemann argue that the scientific and decision-makers convergence facilitates common interpretations, eradicate uncertainty and hereby contribute to the water regime formation. Finally, Lindemann resorts to the context-based approach, which focus on the "national and international events … [which] play an important role in determining if and when an international water regime is established"[67] (he exemplifies European integration, the end of Cold War and particular environmental disasters). To conclude, Lindemann argues that the power-based argument has the least explanatory power, whereas the context-based proves to be of the highest relevance.[68]

Rainer Durth argues that in order to establish effective cooperative regime over TRB, the presence of a high level of regional integration is required. He believes that the integrative processes foster the confidence between the actors and conceptualize the notion of equity in a way, which is conformable and appropriate for the particular riparians.[69]

[65] Stefan Lindemann. "Water Regime Formation in Europe: A Research Framework with Lessons from the Rhine and Elbe River Basins." SSRN Scholarly Paper. Rochester, NY: Social Science Research Network, 2006: 8.
[66] Ibid, 12.
[67] Ibid, 15.
[68] Ibid, 35.
[69] Ibid, 10.

It is important to refer to the concept developed by Wolf and Hamner, which depicts the indicators of water tensions possibility. First of all, they note that the riparian states should have water quantity issues caused by shifts in water supply, water demand, both of them or natural fluctuations; secondly, they logically proceed with the water quality issues.[70] In this context, it is notable to the piece by Peter Wallensteen and Ashok Swain, who demarcate the cooperative capacity of the water basins with quality and quantity problems. By using five cases of river tensions (Colorado, Rhine, Parana, Nile and Ganges), they show that the in first three river basins the cooperative frameworks managed to be established due to the quality issues as a key problem. In contrast, the latter two cooperative arrangements failed to occur in full measure as they primarily focus on the quality issues.[71] The authors argue that "the quantity issue can, most easily be formulated in zero-sum game: what country X gets is denied to country Y, whereas the issues of quality is something all may gain from, and control [in Parana case] is something that can more easily be shared."[72]

Besides water quality and quantity issues, Wolf and Hamner underscore the management of multiple use, implying that extension of the ways river is used (irrigation in addition to navigation, hydropower in addition to irrigation, etc.) can violate non-conflicting status-quo. Another noteworthy way to distort the existing conjuncture is a new political division as one emerged after the collapse of Soviet Union; hereby, the amount of international waters grown accordingly with the new borders were established in Balkans, Eastern Europe and Central Asia. Further, they emphasize that the specific geopolitical settings is another significant factor; in particular, they argue, that the regional power in an upstream position is more prone to launch projects, which can become a flash points for the conflict. The sixth condition is a difference in the riparian countries' development and the seventh is a presence of the border issues that might

[70] Aaron T. Wolf, and Jesse H. Hamner. "Trends in Transboundary Water Disputes and Dispute Resolution." In *Environment and Security*, edited by Miriam R. Lowi and Brian R. Shaw, 123–48. International Political Economy Series. Palgrave Macmillan UK, 2000: 143.
[71] P. Wallensteen, & A. Swain. "International Fresh Water Resources: Conflict or Cooperation?" In *Comprehensive Assessment of the Freshwater Resources of the World*. Stockholm: Stockholm Environment Institute, 1997.
[72] Ibid, 28.

spur the potential conflict. [73] In this context, it is notable, that Robert Mandel, cited by Wolf and Hamner, argues that "bilateral river basin disputes similarly do not display a different conflict pattern from multilateral disputes, challenging the notion that more limited (in terms of number of parties involved) river disputes are easier to resolve."[74]

The next points regard to the way water is institutionally managed within the state (national, state or sub-state level of control) and, finally, Wolf and Hamner emphasize the activism of environmental NGOs (which may radicalize the conflict) and so-called national water ethos. The latter implies that the national possess certain perception of the water, based on the factors: "mythology" of water in national history, water in political rhetoric and relative share of agriculture in comparison with industrial sector.[75]

Finally, in support to the significance of water quality mentioned above, the statistical analysis of the TFDD covered in another Aaron Wolf's demonstrates that the nations conflict primarily over the quantity and infrastructure issues (87%). In particular, despite dams, by themselves, are estimated to be neutral indicator within the conflict/cooperation scale, Wolf argues that there is a strong correlation between conflict potential, dam density and treaties. Hence, it is shown that "basins without treaties and high dam density are 29% lower in their average conflict/cooperation levels than basins without treaties and low dam density – more than twice the difference between similar densities but ignoring treaties." It is interesting that the basins with treaties display no difference between high and low dam density.[76]

It is notable that, based on this statistical analysis, Wolf, Yoffe and Giordano identify the factors, which have no role in political environment. They believe that such factors as GDP per

[73] Wolf and Hamner, *Trends*, 144.
[74] Robert Mandel. "Sources of International River Basin Disputes." *Journal of Conflict Studies* 12, no. 4 (September 9, 1992): 48.
[75] Wolf and Hamner, *Trends*, 144.
[76] Aaron T. Wolf. "Transboundary waters: Sharing benefits, lessons learned."*International Conference on Freshwater (Hrsg.): Thematic Background Papers. International Conference on Freshwater, Bonn*. 2001: 10.

capita, population density, water stress index, type of government and climate do not contribute to the conflict or cooperation in the river basin.[77]

Thus, the scholars underscore the relevance of conflict/cooperative conditions from the different perspectives such as economic specificity, geographical conditions, extent of water-related problems, source of conflicts, features of interstate relations and many others. Given this variety of the proposed factors and the fact that they belong to the different theories and concepts, the next section will systematize them according to the key propositions.

1.5 Under what circumstances is conflict/cooperation likely to occur?

This thesis aims to analyze which conditions are more likely to lead to conflict and cooperation, it is important to identify these terms more explicitly. For methodological clarity, this thesis relies on one of the widely accepted definitions of transboundary water conflict as "the manifestation of political, diplomatic or military tensions between different actors (governments and/or civilians) over the use of transboundary water resources."[78] Despite the advocates of the water war thesis often refer to the extreme manifestation of the term – armed warfare (e.g. Toset et al, Homer-Dixon), this research is based on the wider range of conflict displays.

One of the most widely used methodological approaches on this issue is Basin-at-risk scale (BAR), developed by the research team of Oregon State University (Table 1). It distributes the conflict/cooperation events on a scale from -7 to 7; hereby, -7 stands for formal declaration of war or extensive war acts, -2 and -1 imply strong and mild (respectively) verbal expressions of hostility. If the event scores 0 on the BAR scale, it stands for neutral or non-significant acts for the inter-nation situation. As for the cooperative events, it ranges from the minor official exchanges and talks (1) to international freshwater treaty (6) and voluntary unification (7). Thus, the conflict

[77] Aaron T. Wolf, Shira B. Yoffe, and Mark Giordano. "International waters: Indicators for identifying Basins at Risk (PCCP Series No. 20)." (2003): 10-11.
[78] Allouche. *Water nationalism,* 15.

conditions in terms of this thesis include the BAR events from -7 to -1; similarly, the cooperation conditions should be within the range from 1 to 7. [79]

Table 1. BAR event intensity scale

BAR scale	BAR Event description
-7	Formal declaration of war; extensive war acts
-6	Extensive military acts
-5	Small scale military acts
-4	Political-military hostile actions
-3	Diplomatic-economic hostile actions
-2	Strong verbal expressions displaying hostility
-1	Mild verbal expressions displaying discord
0	Neutral or non-significant acts
1	Minor official exchanges, talks or policy expressions – mild verbal support
2	Official verbal support of goals, values, or regime
3	Cultural or scientific agreement or support (non-strategic)
4	Non-military economic, technological, or industrial agreement
5	Military economic or strategic support
6	International freshwater treaty; strategic alliance
7	Voluntary unification into one nation

This thesis aims to analyze the applicability of the water conflict conditions, which were identified by the authors in the previous section. Hence, I arranged the majority of their arguments in the form of five sets of factors, which increase conflict probability: the configuration of power, economic and geophysical conditions, source of tensions and, lastly, interstate political environment. Each set incudes several conditions and circumstances, which are based on their ability to predict the possibility of water conflict (e.g. Wolf and Hamner), basin characteristics, which make water a likely source of rivalry (e.g. Gleick), lack of necessary conditions for water regime formation (e.g. Lindemann), statistical data analysis (e.g. Toset et al, Wolf), set of circumstances of water war (e.g. Homer-Dixon) and others. Although these arguments refer to different values of the BAR scale, they all depict the proneness to an at-least non-cooperative environment.

[79] Wolf et al, *International waters: Indicators for identifying Basins at Risk*, 5.

Thus, the conditions under which, as I hypothesize, conflicting/non-cooperative environment on the issue of trans-state waters are likely to occur is presented in Table 2:

Table 2. Conditions under which conflicting/non-cooperative environment on the issue of transboundary waters is likely to occur

Condition	Advocates
Power configuration	
Upstream position of the regional power	Lowi, Lindemann, Wolf and Hamner
Significant difference in the relative power of the riparians	Toset et al, Gleick, Wolf and Hamner
Economic and geophysical conditions	
Considerable water scarcity	Gleick, Toset et al., Wolf and Hamner
Lack of water source alternatives and high dependence of the downstream state for the particular watercourse	Gleick, Homer-Dixon
High extent to which water supply is shared	Gleick
Source of tensions	
Predominance of the quantity and infrastructure issues	Wolf; Wallensteen and Swain
Asymmetric impacts of negative externalities[80]	Lindemann
Management of multiple use[81]	Wolf and Hamner
Interstate political environment	
Generally uncooperative interactions[82] and history of antagonism	Lowi and Rothmann, Dupont, Durth, Priscoli, Wolf and Hamner, Homer-Dixon
Combination of the high dam density and low amount of signed treaties	Wolf
Weak epistemic community	Lindemann

This set of condition does not include several afore-mentioned factors, such as intrastate factors (e.g. ones provided by Wolf and Hamner) and context-based approach by Lindemann (as it depends on hardly predictable events), which, nevertheless, do not understate their relevance.

[80] e.g. pollution, reduced water volume, worsened biodiversity, etc.
[81] e.g. irrigation in addition to navigation, hydropower in addition to irrigation, etc.
[82] Particularly, low level of integration, lack of common values, unresolved Statehood, security-related and especially territorial and border issues

Importantly, that the arguments by Homer-Dixon and Toset et al are also excluded in cases when they are not supported by other scholars; this limitation is necessary due to the fact that they describes the circumstances within the range of -5 to -7 on BAR scale, which cannot be empirically tested without the accomplished armed conflict.

Hereby, in next two chapters these conditions will be applied to the conflicting/non-cooperative case study (Brahmaputra) and cooperative/non-conflicting (Irtysh) in order to provide an evidence of (in)applicability of the elaborated set of indicator. It is important that every particular condition will be considered separately from all other variables in the list and serves as only one possible evidence that the basin is prone to conflict; the elaborated set of factors by no means presupposes that all the variables should be simultaneously met for conflict to occur.

Chapter 2: The Brahmaputra case

This chapter will examine the aforementioned conditions in terms of the Brahmaputra basin case in order to test its applicability within the non-cooperative/conflicting basin. Firstly, I will start with the background information about the nature of interactions within the TBM and provide the evidences that this case can be characterized as conflicting/non-cooperative one. Further, I proceed with the analysis of every condition set (power configuration, interstate political environment, etc.), discussed in the particular sections.

2.1 The Brahmaputra river basin

Since the first settlements were founded on the banks of the Brahmaputra River, the importance of this watercourse for economic activity and everyday life became apparent. The basin of the Brahmaputra covers regions of four countries and constitutes a significant component of the interstate relations: although there are several minor cooperative initiatives between the riparian states, the watercourse has been causing heated international tensions between Bangladesh, India, Bhutan and China.

The flow of the Brahmaputra's stream is complex and meandering; this is one of the biggest Asian watercourses (~2840 km), which features by a complicated stream configuration with numerous divided branches, thousands of islands and irregular water levels. The upper river, known by its local name Yarlung Zangbo, springs from the Tibetan Plateau and flow towards the Indian state of Arunachal Pradesh. There it turns southward, crosses the border with Bangladesh, where the river conflows with two other large watercourses – the Meghna and Ganges, which altogether form one of the biggest and branching world's deltas (the Ganges-Brahmaputra-Meghna – GBM). In spite of the fact that the mainstream directly crosses the territory of the state Assam, its tributaries' basins also include the whole territory of the neighbouring Kingdom of Bhutan.

The river is actively used in numerous and many-fold ways, which vary along the stream. The main issue of the interstate concern is development of the hydropower industry in the upper

part of the river as the hydropower potential of the Brahmaputra is one of the highest in the world: the total capacity is estimated at 206 GW (to compare – the capacity of the Mekong River is about 75 GW).[83] Although the construction of hydropower plants upstream have certain advantages, such as the lack of air pollution, low power costs, long duration of the exploitation and many others, they also may cause considerable damage to the environment and the population downstream. Hence, negative hydropower risks along with endeavours such as Indian water pollution or diversion projects in China, are able to hinder the well-being of downstream states (in the form of challenging food production, worsening living conditions, economic performances, etc.) and hereby can possibly increase interstate tensions.

Thus, are the relations in the Brahmaputra river basin indeed non-cooperative or even conflicting? Based on the information from International Water Events Database (IWED - in terms of TFDD), 81 international events between the Brahmaputra riparians from 1990 to 2008 were examined. It is important to mention that this dataset is based on the entire GBM basin; 81 events were selected and approximately the same amount of events were excluded as they are primarily connected with the Ganges. However, as the institutional, political and even geophysical frames between these two rivers cannot be drawn explicitly, certain level of inaccuracy should be taken into account. Hence, the mean value of the considered events constitutes "0.59" on the BAR scale with the minimum BAR value "-4" (display of military power along the border in 1994) and the maximum "4" (establishment of Joint Technical Committee in 1995, Growth Quadrangle in 1996, arrangements on the Teesta river data in 2001 and 2005).[84] Although mean value does not directly indicate a conflicting nature of the events, we should take into consideration such factors as aforementioned inaccuracy, exclusion of events after 2008 and, most importantly, the fact that IWED covers primarily rhetoric and political events while omitting the institutions and treaties efficiency (especially, long-term) along with the actual actions behind the rhetoric.

[83] Muhammad Mizanur Rahaman, and Olli Varis. "Integrated Water Management of the Brahmaputra River Basin: Perspectives and Hope for Regional Development." Helsinki University of Technology, 2009.
[84] "Transboundary Freshwater Dispute Database; GBM 1990-2008." Accessed May 12, 2016. http://gis.nacse.org/tfdd/internationalEvents.php.

To support the abovementioned thesis, it should be noted that the only cooperative endeavours in the basin are far from efficient. After the disastrous floods in India, which were indirectly caused by China's failure to provide water sharing data (in 2000 and 2008), five Memorandums of Understandings (MoU) were signed (the last in 2013) between China and India.[85] However, these measures tend to be considered as not more than just a Standard Operation Procedure, rather than an actual effective instrument of water regime.[86] For instance, Selina Ho underscore that the implementation of the 2005 and 2008 memoranda has been patchy and the fact, that, in contrast with other TRBs, the Brahmaputra case features absent or very poor data sharing even on the bilateral level.[87]

Finally, it is remarkable that the advocates of water war thesis use the Brahmaputra case as a striking example of their arguments. Differently from the widely accepted thesis about the river Jordan as the most likely candidate for an actual water war, the Indian former general, Padmanabhan, argued that extreme water scarcity in China, which he claims will emerge after 2029, will be the reason for a large-scale armed conflict between India and China.[88] Thus, currently, the Brahmaputra basin is characterized by the absence of significant cooperative initiatives; although it is hard to identify this TRB as definitely conflicting to date, the basin features, at-least, a non-cooperative political environment.

2.2 Power configuration

The Brahmaputra case constitutes an interesting example of the power distribution along the riverway as it includes countries with a wide range of political, economic and military capacity. Some of the major countries' characteristics (Table 3), current geopolitical settings and a wide range of political, economic, military and diplomatic features determine the power distribution in

[85] Amit Ranjan. *India-China MoU on Transboundary Rivers"*. Indian Council of World Affairs, 2013: 1.
[86] Ibid, 3
[87] Selina Ho. "River Politics: China's policies in the Mekong and the Brahmaputra in comparative perspective." *Journal of Contemporary China* (2014): 9.
[88] General Padmanabhan, *Next China-India War*. Manas Publishers, 2014.

the basin. In this case, China comes out as only suitable choice to be defined as a regional hegemon, which, nevertheless, is disputed by India during the long history of bilateral relations. In fact, the much lower but still considerable economic and military capacity of India (see Table 3) does not allow to definitely identify PRC-India relations as a predominance of the latter over the former; what is more, India is a striking example of the situation when, according to Chellaney, even "China's nuclear armory gives no decisive edge".[89]

Table 3. Characteristics of the Brahmaputra river riparians (2015)[90]

	China	India	Bangladesh	Bhutan
Population	1,367,485,388	1,251,695,584	168,957,745	741,919
Area (sq km)	9,596,960	3,287,263	148,460	38,394
GDP	$19.51 trillion	$8.027 trillion	$577 billion	$6.383 billion
Military expenditures ($US mln)	214787	51257	2669	n.d.

Secondly, the critical interpretation of the theory of hegemonic stability, arguing that only downstream regional powers have incentives to promote cooperation, coincides with China's upstream position and non-cooperative water regime in the Brahmaputra basin; as Lowi outlines, "limitations to the discriminatory use of a river's resources" seem unfavourable in terms of China's economic interests.[91]

Hereby, we can see that the position of the regional power indeed meets the concept of hegemonic stability. However, the absence of striking and decisive difference in military power between China and India does not serve as indisputable argument in support of the significant difference in the relative power of the riparians makes the basin more prone to conflict.

[89] Brahma Chellaney. *Water, Peace, and War: Confronting the Global Water Crisis*. Rowman & Littlefield, 2015: 230.
[90] "SIPRI Military Expenditure Database". Accessed May 13, 2016. http://www.sipri.org/research/armaments/milex/milex_database;
"CIA - The World Factbook (India, Bangladesh, Bhutan, China, Russia, Kazakhstan)". CIA, 2016. https://www.cia.gov/library/publications/the-world-factbook/geos/in.html.
[91] Lowi, *Water and Power,* 10.

2.3 Economic and geophysical conditions

Given that water scarcity is an alienable component of water's conflicting potential, the numerous water-related challenges in South Asia are likely to serve as evidence of its correlation with a non-cooperative regime; however, the water availability varies considerably within the basin. In this section I consider such factors as the level of water scarcity, water management and the extent to which the river is shared. For methodological clarity, the water scarcity will be considered in two dimensions: firstly, the basin will be analyzed in terms of physical water scarcity (i.e. insufficient natural water resources to supply a demand) and, secondly, economic water scarcity (i.e. poor water infrastructure and non-efficient water management schemes).

Speaking about water pollution, the low level of industrial, agricultural and demographic (33rd position among China's provinces) along with China's certain attention to the environmental component of Tibet's development[92] helped to avoid serious contamination of the Yarlung Zangbo. However, active exploitation of the river within the densely populated Indian regions negatively affects water quality. The inland waters (and especially groundwater) in the riparian regions are seriously contaminated by fluoride and arsenic compounds;[93] for instance, the concentration of iron, manganese and cadmium in the riparian Assam state exceeds the level recommended by the World Health Organization.[94] The similar situation is typical for Bangladesh, whose environmentally unfriendly industry leads to problems such as arsenic contamination of the groundwater, extensive domestic waste dumping, etc. For example, the state capital, Dhaka, populated by 9 million people, is located on the banks of the biologically dead river Buriganga which was included into the global top-10 of the most polluted rivers.[95]

[92] "Building an Ecology-Friendly Railway Line — the Qinghai-Tibet Railway." *PRC Embassy in Nepal - Official Web Site*, 2004. http://np.china-embassy.org/eng/Features/zfbps/xzstgjhhb/t167397.

[93] Rajnarayan Indu, Sunderrajan Krishnan and Tushaar Shah. "Impacts of Groundwater Contamination with Fluoride and Arsenic: Affliction Severity, Medical Cost and Wage Loss in Some Villages of India." *International Journal of Rural Development* 1.3, no. 1 (2007): 64–93.

[94] Nabanita Haloi, and H. P. Sarma. "Heavy Metal Contaminations in the Groundwater of Brahmaputra Flood Plain: An Assessment of Water Quality in Barpeta District, Assam (India)." *Environmental Monitoring and Assessment* 184, no. 10 (November 3, 2011): 6229–37.

[95] Mir Mostafa Kamal, Anders Malmgren-Hansen, and A. B. M. Badruzzaman. "Assessment of Pollution of the River Buriganga, Bangladesh, Using a Water Quality Model." *Water Science and Technology*, Water Quality and its

The water management in all riparian countries is characterized by a considerable system inefficiency. According to Table 4, the significant improvement of, for instance, sanitation schemes were achieved, however, the current situation is still the subject of concern. Thus, India ranks only 141, 104 and 101 positions in the Environmental Performance Index (EPI) for such performances as "Sanitation", "Drinking Water Quality" and "Wastewater Treatment" respectively.[96] Similarly, even though Bangladesh water management scheme provides relatively high water access for low-income country, the management efficiency suffers from lack of institutional coordination and corruption.[97] In Bhutan the scheme insufficiency even constitutes a major water challenge as 64% of 1974 rural water supply scheme works with considerable problems, such as lack of competent water caretakers and regular maintenance.[98]

Table 4. Access to water and sanitation (% of population)[99]

	China[100]	India	Bhutan	Bangladesh
Sanitation 1990/2015	48/76	17/40	19/50	34/61
Drinking water sources 1990/2015	67/95	71/94	72/100	68/87

What is more, access to other water sources is complicated in all riparians except China. Indian and Bangladeshi regions cannot rely on the water supply from other regions due to comparable level of water contamination (for instance, from the Ganges river basin); Brahmaputra's tributaries are also the only source of water in Bhutan as the Kingdom's territory entirely lies within their drainage area (Table 5). Leaving no alternatives, the Brahmaputra is

Management Selected Proceedings of the 1st International Specialised Conference on Water Quality and its Management, 40, no. 2 (1999): 129–36.

[96] "India – Environmental Performance Index," *EPI*, 2016. http://epi.yale.edu/country/india.

[97] "Joint Report of the Independent Expert on the Question of Human Rights and Extreme Poverty." UN General Assembly, 2010. https://documents-dds-ny.un.org/doc/UNDOC/GEN/G10/154/51/PDF/G1015451.pdf?OpenElement.

[98] Tarja Ketola. "Food, Energy and Water Security Analysis Cube: Finland, Bolivia, Bhutan and Botswana as Examples." In *Burkhard Auffermann & Juha Kaskinen (editors) Proceedings of the Conference Security in Futures Security in Change, 3-4 June 2010, Turku, Finland*, 2010.

[99] "Progress on Drinking Water and Sanitation 2015 Update." *UNICEF*, 2015. http://www.unicef.org/publications/index_73448.html.

[100] China is not discussed here due to very low population density in the basin area and lack of data on particular region

hereby a vital component of the existence of both downstream states. According to Table 5, the major volume of water withdrawal is due to agriculture. In India, which has the largest arable area within the basin,[101] agriculture contributes about 50% of the overall gross domestic product and constitutes 70% of the regional labor market.[102] The river's relevance is supported by the fact that the catchment basin is home for approximately 240 million people,[103] which constitutes 19% of the Indian population. Similarly, agriculture employs almost half of the Bangladeshi population and provides one-fifth of the national GDP.[104]

Table 5. Characteristics of the Brahmaputra's catchment basin[105]

Country	Drainage area (10^3 km^2)	% of total drainage area	% of country's territory	Water withdrawal for agriculture (% of total withdrawal)
China	293	51,1	3,1	n/d
India	195	34	59,32	90
Bhutan	38,4	6,7	100	94
Bangladesh	47	8,2	32,64	88

Taking into account Gleick's thesis that conflict potential is linked to the extent water is shared, we can assume that the proportionate distribution of the catchment area can possibly contribute to the clash of interests. China, along with two downstream states, control comparable basin's shares (51.1% and 42.2% respectively); hereby the large upstream area where the conflictual projects can be implemented corresponds to the downstream large area where the wide-spread negative impacts can spur interstate tensions. Here, it is remarkable that, according to Beth Walker, the Yarlung Zangbo generates 50% of the total outflow; even though she consider it as a

[101] The drainage area of Brahmaputra is located on the territory of Arunachal Pradesh, Assam, Bihar, West Bengal, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tippura.
[102] B. Sharma. "Changing Pattern of Agricultural Productivity in the Brahmaputra Valley, Assam, India." *Indian Journal of Agricultural Economics* 62, no. 1 (2011): 139–51.
[103] *CIA - The World Factbook.*
[104] Yang Liu. "Transboundary Water Cooperation on the Yarlung Zangbo/Brahmaputra – a Legal Analysis of Riparian State Practice." *Water International* 40, no. 2 (February 23, 2015): 354–74.
[105] Rahaman and Varis, *Integrated Water Management*, 61.

volume, which is insufficient to become a source of tensions,[106] it still constitutes a considerable volume.

2.4 Source of tensions

In this section, we consider the projects leading to tensions, their impacts and ability to severely challenge the well-being of the riparians. Thus, the downstream states are mainly concerned over hydroengineering pressure represented by, firstly, eleven China's hydropower projects on the mainstream of Yarlung Zangbo. For example, the only operational plant, Zangmu dam, constructed in October 2015,[107] was already a highly controversial project at the initial stage of construction, being a subject to criticism from Indian officials, local populace and environmental organizations. It is remarkable that the proposed dams are anticipated to be one of the largest hydropower projects in the region with 30 km water conduit and a general dip of 2300 meters. Secondly, besides China's dams, Table 6 also displays the major Indian hydropower plants in the basin; overall, there are 429 existing, under construction and planned projects in India, which, if implemented, will approximate the ultimate potential of the Indian part of the Brahmaputra hydropower potential (Table 6).

Table 6. Chinese and Indian hydropower projects in the Brahmaputra[108]

Project	Region	Status	Installed capacity (MW)
Da Gu	TAR	Site preparation	640
Ba Yu			780
Jie Xu			510-560
Jia Cha			320
Leng Da			N/d
Zhong Da			480
Lang Zhen			340

[106] Beth Walker. "Saving South Asia's Water." *ChinaDialogue*, 2011. https://www.chinadialogue.net/article/show/single/en/4604-Saving-south-Asia-s-water.

[107] Saibal Dasgupta. "China Operationalizes Biggest Dam on Brahmaputra in Tibet - Times of India." *The Times of India*, October 2015. http://timesofindia.indiatimes.com/world/china/China-operationalizes-biggest-dam-on-Brahmaputra-in-Tibet/articleshow/49335741.cms.

[108] "NHPC: Six Monthly Progress Report." *NHPC – A Government of India Enterprise*, 2015. http://www.nhpcindia.com/six-monthly-progress-report.htm.
"Mountains of Concrete: Dam Building in the Himalayas." *International Rivers. International Rivers, 2008.* Accessed April 5, 2016. https://www.internationalrivers.org/resources/mountains-of-concrete-dam-building-in-the-himalayas-3582.

Motuo		Proposed	38000
Daguaiwan			49000
Dadugia			43800
Zangmu		Completed	510
Rangit	Sikkim		60
Tista Low Dam –III	West Bengal		132
Tista Low Dam-IV	West Bengal		160
Tista Stage-V	Sikkim		510
Subansiri	Arunachal-Pradesh	Proposed	2000

Thirdly, another contradictory project is the South to North Water Diversion plan, which presupposes to move 45 billion cubic meters of water annually to the western Chinese provinces by 2050. This is a part of the ambitious hydroengineering endeavor aimed to fight water scarcity by linking the country's four major waterways: the Huanghe, Yangtze, Huaihe and Haihe.[109] Although diversion plan is not officially launched yet, it constitutes one of the major concern of the downstream countries since it is expected to considerably reduce the water volume downstream.

Hence, the Brahmaputra river tensions are built primarily upon the infrastructure and quantity issues. Although water pollution (especially by arsenic) is an important issue in terms of water availability, the contamination is chiefly caused by the domestic environmental policy downstream and therefore does not play an important role in interstate tensions (except minor ones between India and Bangladesh). Moreover, the multiple river use can serve as evidence to support arguments by Wolf and Hamner: China uses both diversion and hydropower projects as a bargaining tool as in 2013 when the go-ahead for three more dams was expected to diplomatically counterbalanced by announcement that diversion projects are not planned to be started for the present.[110] Hereby, it is logical to assume that the implementation of both diversion and hydropower projects can seriously move the non-cooperative environment toward more conflicting one.

[109] Mark Christopher. "Water Wars: The Brahmaputra River and Sino-Indian Relations." *Case Study. Newport, RI: US Naval War College, Center on Irregular Warfare and Armed Groups* (2013).
[110] Biba, *Desecuritization in China's behavior*, 39.

Finally, Lindemann's thesis about asymmetric impacts of negative externalities is suitable to the Brahmaputra riparians as well. According to the research by Kattelus et al, GBM "shows the largest variability in vulnerability between the different riparians, with India and Bangladesh having the highest and China having the lowest levels…" (among other TBMs in South Asia).[111] Indeed, the negative impacts such as reduced water volume, hampered flow leading to biodiversity risks, contamination and unstable water level regime cannot considerably challenge the well-being of TAR due to, firstly, unidirectional water flow and, secondly, unproportional population and industrial density.

2.5 Interstate political environment

Many authors such as Lowi, Rothmann, Dupont, Durth, Priscoli, Wolf and Hamner accentuate the importance of the generally uncooperative relations (along with the history of antagonism provided by Homer-Dixon) for the possibility of water conflict's emergence. It is remarkable that the notion that border and territorial disputes have the most conflicting potential among other type of uncooperative interactions is entirely applicable in South Asia.

Hence, one of the most significant bones of tensions between India and China is commonly thought to be the mutual claims over the two regions: China's territory Aksai Chin, claimed by Delhi, and, what is important here, India's Arunachal Pradesh, claimed by PRC. It is important that conflict experienced its ups and downs; started with border clashes in 1962, it gradually shifted to the more restrained interactions during the normalization of relations in 1970-97. However, both countries have never given up their claims; moreover, some scholars argue that they are currently reinforcing them in a more direct manner.[112]

[111] Mirja Kattelus, Matti Kummu, Marko Keskinen, Aura Salmivaara, and Olli Varis. "China's Southbound Transboundary River Basins: A Case of Asymmetry." *Water International* 40, no. 1 (January 2, 2015): 129.

[112] Ashok Kapur. *India and the South Asian Strategic Triangle*. Routledge, 2010.

Even though both countries awarded each other the "most favoured nation" title in 1984 and currently experience the stable growth of bilateral economic relations, many authors such as Smith,[113] Malik,[114] Mojan[115] tend to emphasize the continuing regional rivalry and mutual perception as opponents in the struggle for the status of regional hegemon. Even in seemingly enhancing economic ties, the frequent skepticism, mainly from the Indian side, emerges as a negative trade balance, China's competitively low priced products are perceived as a serious obstacle to fair interactions.[116] At the same time, the mutual perception is far from equal; thus, explaining China's condescending behavior, Selina Ho argues that "while China looms large in Indian foreign policy considerations, to China, India is important but does not occupy the same level of significance in China's foreign policy agenda. China regards India as a regional power while it sees itself as a global power."[117]

As for China-Bangladesh relations, it should be noted that the latter economically and politically is caught between two regional leaders and therefore tend to strike a balance between Beijing and Delhi. For instance, in the case of water-related disputes, Bangladesh is concordant with India's resistance to the Chinese's projects in the Brahmaputra; nevertheless, it was PRC, who openly supported Dhaka during its tensions with Delhi over the Ganges river sharing in the 1970s.[118]

Speaking about water agreements within the basin and Wolf's observation that basins with dams and without treaties are very distinctive in terms of conflict potential, it is noteworthy that, according to TFDD, among nine full-fledged treaties in GBM, only two refer to the Brahmaputra. These are the Statute of the Indo-Bangladesh Joint Rivers Commission (1972) and

[113] Jeff M. Smith. *Cold Peace: China–India Rivalry in the Twenty-First Century*. Lexington Books, 2013.
[114] Mohan J. Malik. "China-India Relations in the Post-Soviet Era: The Continuing Rivalry." *The China Quarterly* 142 (June 1995): 317–55.
[115] Raja C. Mohan. *Samudra Manthan: Sino-Indian Rivalry in the Indo-Pacific*. Brookings Institution Press, 2012.
[116] Musarat Javed Cheema. "China and South Asia Relations: A New Perspective." *South Asian Studies* 30, no. 1 (January 2015): 49.
[117] Ho, *River Politics*, 13.
[118] Mohan, *Samudra Manthan, 51*.

the Agreement on ad hoc sharing of the Teesta waters (1983);[119] it is significant that both treaties are signed only by Bangladesh and India and were inked long before the launch of the contradictory infrastructure projects.

Finally, speaking about Lindemann's epistemic communities, it is important that they are not only thinly presented in GBM, what is even more, they are subject to other interstate tensions. According to Beth Walker, the downstream concerns over reduced water volume are not based on reliable hydrological data. She argues that the popular narrative in China's official statements[120] that both dams and even diversion projects will not considerably reduce the river outflow downstream are not baseless; however, she asserts that this myth, fueled by mass media and lack of actual data, urges India to perform its position in a more conflictual manner.[121] At the same time, China bares no lesser responsibility for the weak understanding and poor scientific cooperation between the parties involved due to inefficient and irregular data sharing. For instance, the timetable for flood-monitoring data provision on the Brahmaputra had not changed for more than a decade;[122] what is more, according to Chellaney, China is the only riparian, which provides hydrological information for fee.[123]

Thus, the South Asia case can serve as an indirect evidence that the aforementioned conditions are affiliated with the non-cooperative basins. The only exception is the arguments that identify the proneness to military conflict since there is methodological impossibility to empirically analyze the future conflict. In order to provide more convincing evidence of the hypothesis, in the next chapter the same conditions will be applied to the non-conflicting case.

[119] "International Freshwater Treaties Database - IFTD." *Oregon State University*. Accessed May 15, 2016. http://www.transboundarywaters.orst.edu/database/interfreshtreatdata.html.
[120] Biba, *Desecuritization*, 38.
[121] Walker, *Saving South Asia's Water*.
[122] Wang Yan. "China-India Water Cooperation Tough without Border Resolution." *ChinaDialogu*, 2013. https://www.chinadialogue.net/article/show/single/en/6525-China-India-water-cooperation-tough-without-border-resolution.
[123] Chellaney, *Water*, 134.

Chapter 3: The Irtysh case

This chapter will cover the applicability of the conditions list in the case of the Irtysh, which can be considered as an opposing example of political environment over the water issues in comparison with the Brahmaputra case. Given that the previous chapter demonstrates that the majority of the elaborated conditions coincide with the conflicting nature of the case, the opposite example is intended to sift out those factors which will be found to be applicable in the non-conflicting case as well and hereby show its invalidity as a conflictual condition. Similarly with the structure of the previous chapter, I will firstly present an overview of the interstate interactions within the basin. Further, I will scrutinize the applicability of conditions on the Irtysh case and proceed with the comparative analysis with the Brahmaputra case.

3.1 The Irtysh river basin

Historically, the Irtysh river basin was arena of interactions between the numerous tribes, nations and civilizations, living on its riverbanks. For a long time the river was the area of the Mongol and Turkic people's inhabitation and even was connected with the downfall of the Western Turkic Khaganate, which was defeated at the Battle on Irtysh in 657.[124] Later, the basin area was divided between the ever-changing riparians such as Russian and Qing Empires, Djungaria, which founded multitude towns on the riverside. Nowadays, the basin is still shared between several countries and, due to its active exploitation, constitutes a considerable element of interstate interactions.

The Irtysh's headwater springs from the Altai Mountains on the border between Mongolia and China (where it is known as the Black Irtysh). After flowing through the territory of Xinjiang it crosses China-Kazakhstan border, there it flows through the lake Zaysan towards the territory of Russia, where it conflows with the Ob' river. It is noteworthy that the Irtysh is not only the major

[124] Nicola Di Cosmo. *Military Culture in Imperial China*. Harvard University Press, 2009: 184.

tributary of the Ob'; moreover, it is the longest tributary in the globe – its lengths constitutes 4248 km (with Ob' – 5410, which is the second longest Asian watercourse).

The river is actively used by all riparians (except Mongolia, which is not considered in detail here due to insignificant water share); what is more, in contrast with the previous case, the nature (but not the extent) of river exploitation does not alter considerably throughout the stream owing to lesser climate and relief variety. First of all, the necessity to bring water to adjacent water scarce regions urges PRC and Kazakhstan to carry out diversion and irrigation projects (e.g. Irtysh–Karamai and Irtysh–Karaganda Canals). Secondly, the issue of reduced water volume is often affiliated with the hydropower plants; the dam building and construction of the large-scale reservoirs in the territory of China, Kazakhstan and, to much lesser extent, Russia is one of the reason of continuing watercourse shallowing. Thirdly, during the last decades the situation with water pollution has worsen dramatically;[125] for instance, Kazakhstan's part of the river is severely polluted by copper and zinc, which more than hundred times exceed the permitted concentration.[126] Finally, due to the fact that river is navigable for the major part of its stream, the watercourse is well-known as cross-regional water route and also as convenient area for fishing industry.[127] Since the former three types of projects can threaten the economic performances, environmental situation and living standards in the neighbouring states, they have already cause an according diplomatic actions; however, whereas some of them are still a subject of concern, on some issues the constructive and successful negotiations have been promoting the formation of cooperative water regime.

Thus, the analysis of IWED data on the Irtysh-Ob' basin (IOB) does not show a striking difference with the Brahmaputra case; moreover, the number of indicated events is much lower. Nevertheless, among sixteen selected events, eleven have positive value on the BAR scale (two neutral and three negative) with the mean value "0.8", minimum value "-3" (China's launch of

[125] V. A. Vasilenko. "The Ob-Irtysh basin: Socio-economic problems." *Regional Research of Russia* 4.3 (2014): 198-205.
[126] James R. Lee. *Climate change and armed conflict: Hot and cold wars*. Routledge, 2009: 29.
[127] Vasilenko, *The Ob-Irtysh basin.*

diversion project in 2000) and maximum value "4" (Integration of the Russian and Kazakh electricity grids in 1999). It is remarkable that some of the conflicting events at the same represents a certain degree of political coherence within the basin: for instance, in 2000 Russia and Kazakhstan initiated joint actions aimed to stop China's diversion project (-1 on BAR scale).[128] Thereby, IWED data on the IOB tends to present the Irtysh basin as more cooperative case; however, we should take into account the limitations of IWED mentioned in the previous chapter and also the high level of comparability with IWED results on the Brahmaputra case (0.8 and 0.68 respectively).

What is important here is that some scholars emphasize the cooperative nature of the IOB water regime, based on the events beyond IWED time limits. Thus, according to Sebastian Biba, the water-related interactions in the North Asia are unprecedented in China's water politics. He emphasizes that PRC's involvement into the Kazakhstan-China Joint Commission (KCJC) in 2001 is unparalleled cooperative step and argues that "…it appears unlikely that these actions will be repeated along its southern transboundary rivers any time soon".[129] Even more, the efficiency of KCJC was demonstrated in 2011, when it significantly contributed to the implementation of join China-Kazakh hydropower project of the river Horgos southward to the Irtysh basin.[130] Later, China and Kazakhstan adopted agreement on the water quality issues; importantly, that in next year, both parties re-emphasized their willingness to keep ahead implementing their obligations.[131]

Although there is no comprehensive basin treaty, PRC signed the Treaty on rational use and transboundary waters protection with Russia in 2008 (which, nevertheless, does not focus on the particular river).[132] What is significant, the existing drawbacks of PRC-Kazakhstan and PRC-

[128] TFDD "Transboundary Freshwater Dispute Database; IOB 1996-2006." Accessed May 15, 2016. http://gis.nacse.org/tfdd/internationalEvents.php.
[129] Sebastian Biba. "China Cooperates with Central Asia over Shared Rivers." *China Dialogue*, 2014. https://www.chinadialogue.net/article/show/single/en/6741-China-cooperates-with-Central-Asia-over-shared-rivers-.
[130] Xiuli Han. "Approaches to Investment in Chinese Transboundary Waters." *Water International* 40, 1 (2015): 80.
[131] Biba, *China Cooperates with Central Asia*.
[132] Arthur Dunn. "The Irtysh River in Hydropolitics of Russia, Kazakhstan and China." *European Dialogue*, 2013. http://www.eurodialogue.eu/eu-central-asia/The-Irtysh-River-in-Hydropolitics-of-Russia-Kazakhstan-and-China%20.

Russia treaties coincide as, according to Han, the adopted treaties in both dyads lack obligational mechanisms and based on the notification tools, rather than prior permission or accent;[133] hence, the common problem setting is an additional factor bringing Kazakhstan and Russia closer together. Thus, taking into account the existing skepticism over the basin-wide cooperation in IOB (claimed by, for example, Sebastien Peyrouse[134]), the bilateral water relations and overall rhetoric remain at-least non-conflicting and even continue to develop in more cooperative manner.

3.2 Power configuration

The power potential of the Irtysh riparians is resembling to the Brahmaputra case; both basins include the small upstream country (Bhutan and Mongolia), the strong downstream state (India and Russia) and less powerful but still considerable countries (Kazakhstan and Bangladesh). In terms of military expenditures, both downstream dyads are comparable; in terms of GDP Kazakhstan insignificantly drops behind Bangladesh, whereas Russian GDP constitutes less than a half of Indian one (Table 7). Similarly with the previous case, the hegemon here is also undoubted; although Russia has significant weight on international arena and, even more, actively promotes its own perception as a strong global power, there is no evidence that the power balance between Moscow and Beijing is shifted toward the former. In reality, China excels Russia in the multitude of characteristics; however, the status of definite hegemon in the bilateral relations is not used explicitly (primarily due to rhetoric of the currently friendly Russia-China relations).

Table 7. Characteristics of the Irtysh river riparians (2015)[135]

	China	Kazakhstan	Russia
Population	1,367,485,388	18,157,122	142,423,773
Area (sq km)	9,596,960	2,724,900	17,098,242
GDP	$19.51 trillion	$430.5 billion	$3.471 trillion
Military expenditures ($US mln)	214787	1902	66421

[133] Han, *Approaches to Investment*, 75.
[134] Sebastien Peyrouse. "Flowing Downstream: The Sino-Kazakh Water Dispute." *The Jamestown Foundation - China Brief* 7, no. 10 (2007).
[135] *SIPRI Database; CIA The World Factbook.*

Thus, since the relative power of the riparians and upstream position of the hegemon coincide in both non-conflicting and non-cooperative cases, it cannot serve as an evidence to applicability of the thesis of hegemonic stability theory. Even though there is no existing rhetoric on possibility of the armed conflict over the Irtysh river (especially in the form of war between Russia and China), the Homer-Dixon's argument that the war is possible if there is a military stronger downstream power does not present much validity.

3.3 Economic and geophysical conditions

This section will cover such factors as both dimensions of water scarcity, importance of the particular watercourse and the extent of water distribution. Firstly, although Xinjiang, which the Black Irtysh flows through, is an arid region, the water availability is high on per capita basis (5000 m^3). However, the existing prognoses argue that the situation with water availability will likely change for worse in long-terms due to the unfavourable climate (therefore, higher water consumption) and, what is more important, the extensive population growth caused by the resettlement policy to the western provinces.[136] As for Kazakhstan, the water resources for the economic purposes are estimated as sufficient (15,9 km^3);[137] according to Table 8, the access to water resources remains on the relatively high level. However, the quality of these resources are a subject of a certain concern: the Asian Development Bank characterizes the existing treatment facilities and distribution network as unsatisfactory and requiring rehabilitation.[138] In general, whereas the improved water availability in Kazakhstan experiences considerable challenges (especially, the lack of effective technologies and water management), the situation is far from critical and bare a little resemblance with the Brahmaputra riparians: indeed, Kazakhstan shows much better performances in EPI than India or Bangladesh (e.g. these countries rank 59, 101 and

[136] "Hydropolitical Vulnerability and Resilience along International Waters: Asia." *UNEP Report*, 2009: 97.
[137] PROON Report. "Kazakhstan's water resources in the new millennium." (2004): 22.
[138] T. Bayarsaihan and D. McKinney. *Past Experience and Future Challenges Cooperation in Shared Water Resources in Central Asia*. Asian Development Bank Workshop Paper. Almaty, 2002: 13.

140 respectively in the "Water treatment" performances).[139] The similar situation is typical for Russia where the quality is worsened by contamination with phenol, petrochemicals, nitrogen compounds, iron, etc. and basin resources misallocation.[140] At the same time, both downstream countries lack any alternatives of water supply as the Irtysh is the only sizeable source of drinking water in Kazakhstan's Pavlodar region[141] and the inalienable basis of the household water system in Russia's Omsk region.[142]

Table 8. Access to water and sanitation (% of population)[143]

	China	Kazakhstan	Russia
Sanitation 1990/2015	48/76	96/98	73/72
Drinking water sources 1990/2015	67/95	94/93	93/97

Speaking about Homer-Dixon's thesis that this particular river should be highly important for the national well-being for conflict to occur, it is notable that the riparian regions in Kazakhstan and Russia are home for about ten million people. For the former, the plants on the eastern Kazakhstan rivers generates up to 80% of the country's electricity,[144] whereas the Russian experts emphasize its significance for the oil products transportation from Omsk to Arctic ports.[145]

Finally, the extent to which Irtysh's water is shared is much less than in the Brahmaputra case. According to Table 9, China controls less than one percent of the basin, while the most considerable river's parts belong to the downstream states. What is more, only 27,3% of the Irtysh outflow is formed on the Chinese territory[146] (comparing to the 50% of the Yarlung Zangbo).

[139] *EPI*
[140] V.P. Rodkin. "Osnovnye ecologicheskie problemi reki Irtish I puti ih resheniya v Omskoy oblasti [Main environmental problems of the Irtysh and their solutions in Omsk region]." Proceeding of V scientific conference, Barnaul, 2010: 174.
[141] Sievers, Eric W. "Transboundary jurisdiction and watercourse law: China, Kazakhstan, and the Irtysh." *Tex. Int'l LJ* 37 (2002): 5.
[142] Rodkin, *Osnovnye ecologicheskie problemi*, 174.
[143] *UNICEF*.
[144] Ibid.
[145] Oksana Boyarkina. "Political contradictions in water triangle Russia-Kazakhstan-China." In *The Second International Conference on History and Political Sciences*. 2014: 135.
[146] *PROON Report*, 22.

Table 9. Characteristics of the Irtysh basin[147]

	China	Kazakhstan	Russia	Mongolia
Basin Area, km^2	13,900	743,800	2,192,700	200
% of drainage area	0.47	25.21	74.31	0.01

Hereby, the lack of alternative water sources and exclusive importance of the river are relevant in both the Irtysh and Brahmaputra cases; however, the non-cooperative case features the higher extent of water scarcity than the non-conflicting case. Another explicit distinction between two cases is a lesser extent to which water is shared in the non-conflicting one, which evidences the argument by Peter Gleick.

3.4 Source of tensions

As section will cover the most problematic issues in the basin and their impacts on the riparian communities, I will start with the identifying the major points of interstate agenda. First of all, as the basin is surrounded by arid area, the diversion projects were planned since the 1960s. The Soviet experts was elaborating the large-scale diversion of the water to the Kazakh and Uzbek steppes ("anti-Irtysh), which however was not constructed;[148] later, the less ambitious project, Irtysh–Karaganda Canal was launch to feed the central Kazakh regions. However, the major concern is so-called Project 635 or Irtysh–Karamay–Ürümqi Canal, which aims to divert water toward petroleum industry in Xinjiang; what is more, the existing estimation predict that in the near future the withdrawal from the Irtysh can reach 50% of the flow.[149] In addition, the diversion projects are supported by three constructed dams on the Irtysh tributaries, aims to supply the canals and produce energy.

It is expected that the diversion can possibly lead to the considerable shallowing; in particular, Kazakhstan is concerned over the possible water level drops, which could block the

[147] *IFTD*, 71.
[148] V. A. Skornyakov, , and I. Ye Timashev. "The Possible Environmental Impact of the Anti-Irtysh and Problems of Rational Nature Management." *Soviet Geography* 21, no. 10 (December 1, 1980): 638–44.
[149] Vasilenko, *The Ob-Irtysh basin*, 201.

electricity production in Bukhtarmin, Ust-Kamenogorsk and Shulbinks hydropower plants. If the projects be used at full power, Kazakhstan and Russia can lost significant river ports; nowadays, the latter already receive two km^2 less than in the past,[150] which led to the reduction of the navigable period and hereby hindered delivery from Omsk refinery to the northern ports.[151]

The reduced water volume is able to exacerbate tensions over the quality of water. However, similarly with the Brahmaputra case, where the pollution problem is discussed between India and Bangladesh, the contamination of the Irtysh is limited by two downstream states. Even more, Kazakhstan and Russia manage succeed to effectively cooperate on this issue: for instance, in 2007 the mercury discharge in Pavlodar was simultaneously neutralized by joint efforts of both countries.[152]

What is more, the situation is exacerbated by the asymmetric distribution of negative impacts, which are caused by following reasons: firstly, it is unidirectional nature of the watercourse; secondly, the different basin areas (see Table 9) and thirdly, the variety in climate conditions and water availability per capita. Due to its beneficial position, PRC is guaranteed to avoid the negative externalities impacts within Xinjiang, which leave much less incentives for Beijing to cooperate.

3.5 Interstate political environment

Starting with the general overview of the tone of the bilateral interactions with China, it is important to note that the similarity of power configuration between two cases make the nature of interactions resembling as well. Hence, the Sino-Kazakh relations, established in 1992, are complementary: Kazakhstan needs Chinese investment, technological and financial assistance, products of light industry, foodstuff, while China needs energy sources, which Kazakhstan can

[150] Sievers, *Transboundary jurisdiction*, 4.
[151] Vasilenko, *The Ob-Irtysh basin*, 202.
[152] Alina Poroh. "*Basseynoviy podhod v upravlenii transgranichnimi vodotokami Rossii I Kazakhstana: sostoyaniye problem I perspective [Basin approach in the management of Russia-Kazakh transboundary rivers: the problem and its prospects]*" Volgograd State University bulletin 4, 1 (2009): 88.

provide (currently PRC possess controlling interest of some Kazakh oil companies).[153] Sebastian Biba, while also emphasizing China's interests in Kazakh oil and gas reserves, also underscores that China tends to treat its eastern neighbor in cooperative manner due to Astana's help in fighting with "three evils" (separatism, extremism, terrorism) and ensuring border security.[154]

Although the relations between Beijing and Moscow are built upon the different level of mutual perception, many of the core issues resemble China-Kazakh agenda. As Kuchins argues, "…Russian policy toward China over the past 15 years … has been driven mainly by pragmatic considerations, resulting in a gradual rapprochement and thickening of the relations".[155] As it was officially proclaimed, the Russia-China relations reached their "highest point ever" in 2011, gradually evolving from "good-neighborly relations" to "strategic partnership". Nevertheless, being the important partners in terms of promotions of resembling ideas on international arena, weapon and resources trade, etc., it is still hard to avoid the rhetoric of ambivalent relations between two states. According to Bobo Lo, "at no stage of in the two countries' common history has there been a period of unalloyed good relations"; he argues that China is still widely perceived from the standpoint of "China threat", supported by asymmetric economic benefits and envy to economic success.[156] Thus, we can witness resembling, but much more cooperative political environment in the Irtysh case. Despite both India and Russia are involved into currently ambivalent and historically even antagonistic relation with China, the latter, in contrast with the former, is hardly characterize as a considerable political rivalry and, what is most important, lack territorial disputes. Kazakhstan is also incomparable with its counterpart in the South Asia dyad (Bangladesh), as China perceives it as an important partner, which have capacity to contribute to China's national interests.

[153] S. K. Pandey, "Kazakhstan's Multi –Vector Foreign Policy and India." India-Kazahstan: perspectivy strategicheskogo partnerstva: materialy mezhdunarodnogo seminara [India-Kazakhstan: the perspectives of strategic cooperation: international seminar proceedings] Almaty: KaziSS, 2011.
[154] Biba, Personal Correspondence.
[155] Andrew Kuchins. "Russia and China: the ambivalent embrace." *Current History* 106. (2007): 321.
[156] Bobo Lo. *Axis of Convenience: Moscow, Beijing, and the New Geopolitics*. Brookings Institution Press, 2009: 2-3.

Speaking about dams and treaties density, the Irtysh case features much smaller amount of the hydropower plants and relatively higher amount of agreements. Total number of PRC and Kazakhstan's dams on the Irtysh is two times lesser than those built in the Brahmaputra basin by China only (at the same time, the capacity of dams in GBM is higher than dams in Central Asia). In addition, China has an agreement with Moscow and several treaties with Astana (including the established KCJC), which considerably distinguish it from the Brahmaputra case.

Finally, there is not enough evidence to speak about the very strong epistemic communities in the region. Whereas Russia and Kazakhstan are involved into the active and comprehensive set of activities such as monitoring, flood passage, protection of waters and liquidation of environmental accidents, protection of biodiversity, the scope of KCJC remains very modest (joint researches and monitoring). Even more, it features unequal approaches to the basin problems as Kazakhstan has to touch upon China's water allocation projects very carefully. [157]

3.6 The Brahmaputra and Irtysh cases: comparative analysis

Thus, the analysis of the non-cooperative and non-conflicting cases shows that many of the elaborated conditions are valid in both basins; at the same time, there are several factors, which proved to be preliminarily relevant as conflict conditions. Importantly, that although some variables coincide in both cases, their different extents along with their complexity, which was not initially taken into account, require additional research on the applicability of these conditions.

Hence, none of the power configuration factors show considerable difference between two cases and thereby cannot serve as a conflict indicator (Table 10). The hegemon's position and the relative weight of the riparians on the international arena are analogous; in fact, it fully support Lindemann's argument that the power-based factors have the least explanatory power in the TRB issues.[158]

[157] *River Basin Commissions and Other Institutions for Transboundary Water Cooperation*. UN, 2009: 47.
[158] Lindemann, *River Basin*, 35.

Table 10. The applicability of the power configuration conditions

Power configuration		
Condition	The Brahmaputra	The Irtysh
Upstream position of the regional power	present	present
Significant difference in the relative power of the riparians	present	present

However, we can assume that the sequence of the riparians matters in terms of proneness to conflict. Hereby China does not strive for cooperative engagement with the major power, when their parts of basin are directly bordering and, presumably, the negative impacts can be more evidently associated with one single upstream country; in the case of Irtysh, Kazakhstan serves as a buffer between more explicit tension between Russia and PRC. Despite it contradicts to the observation by Toset et al that major powers have less conflictual behavior, it is logical to assume that the conflicting potential between the bordering major powers can be explained by lesser capacity to leverage the downstream states and make it agree with China-initiated water regime.

The next set of factors proved to be more diverse in terms of the hypothesis testing (Table 11). Both the Irtysh and Brahmaputra are the major, highly important and hardly irreplaceable source of water in their regions, whose proneness to conflict cannot be thereby explained by the variable "Lack of water source alternatives and high dependence of the downstream state for particular watercourse". In contrast, the different extent to which water is shared hypothetically influences on the upstream state's ability to expand the contradictory projects and simultaneously larger negative downstream effects due to the larger area to run the risks.

Although considerable water scarcity and poor water development are witnessed in both cases, IOB suffers from these to a much lesser extent than its southern counterpart. Indeed, both problems are subject to concern in Russia and Kazakhstan, but due to comparable difference in the population density and relatively more advanced extent to which these factors are present, these variables have limited but still certain explanatory power. Here China serves as a highly

appropriate choice for case study as both Xinjiang and Tibet are characterized by alike lack of water problems, however, since the former is expected to be more inclined to water scarcity, more profound researches here is required.

Table 11. The applicability of the economic and geophysical conditions

Economic and geophysical conditions		
Condition	The Brahmaputra	The Irtysh
Considerable water scarcity	present	Present (but much lower)
Lack of water source alternatives and high dependence of the downstream state for particular watercourse	present	present
High extent to which water supply is shared	present	absent

Speaking about source of tensions, none of the factors shows its validity (Table 12). However, we can assume that they can be more relevant if the conflict and cooperative potential is be considered more profoundly between the downstream states; although both downstream dyads tend to avoid tensions, they are involved into the negotiations over the larger number of negative externalities, which can reveal the additional explanatory factors. Moreover, one could assume that the variables "asymmetric impacts" and the entire set "extent to which water is shared" can show different result when considered together (especially, regarding the upstream state). Indeed, smaller China's riverside area and population in Xinjiang are prone to fewer number of the contradictory project, but, at the same time, decrease the number of China's citizen, which are potentially suffered from the projects and hereby serve as an additional incentive for PRC to cooperate. Therefore, the important reservation should be made in regards of the factor "extent to which water is shared" as its cooperative potential is presumably higher in case when the upstream state has small river's share and simultaneously the impacts of negative externalities is not dispersed asymmetrically.

Table 12. The applicability of the source of tensions conditions

Source of tensions		
Condition	The Brahmaputra	The Irtysh
Predominance of the quantity and infrastructure issues	present	present
Asymmetric impacts of negative externalities	present	present
Management of multiple use	present	present

The "interstate political environment" set shows the diverse explanatory powers of the factors (Table 13). Whereas Aaron Wolf's observation on treaties and dams density proved its validity, the weakness of Lindemann's epistemic community is witnessed in both cases. However, similarly with the arguments above, China tends to be more proactive in terms of forming the epistemic community in the Irtysh case, which therefore can serve only as a limited argument in support of this factor applicability.

Finally, although two cases differ in terms of generally cooperative interactions, the specialization is required since it embraces too many relevant factors within. Here it is important to point out that some particular factors (such as the presence of border issues, which is especially emphasized by Wolf and Hamner)[159] indeed show the explicit difference in two cases. In support to the argument aforementioned, the sequence of the riparians and the tone of their interactions with China can be also an important factor as the extent of, for instance, China-Kazakh cooperation in general significantly exceeds China-Bangladeshi one.

Table 13. The applicability of the interstate political environment conditions

Interstate political environment		
Condition	The Brahmaputra	The Irtysh
Generally uncooperative interactions and history of antagonism	present	absent (specification is required)
Combination of the high dam density and low amount of signed treaties	present	absent
Weak epistemic community	present	Present (but stronger)

[159] Wolf and Hamner, *Trends*, 144.

Conclusion

The thesis analyzes the validity of the different conflict indicators, which are pointed out in the existing literature, by applying them to the cases of the Brahmaputra basin (which is considered as non-cooperative/conflicting) and the Irtysh basin (non-conflicting/cooperative). Hence, the set of conditions, including eleven factors, was elaborated; it was hypothesized that the presence or absence of every particular condition (being considered isolated) within both cases would serve as an evidence of (in)validity of their correlation with the proneness to conflict in transboundary river basins.

Thus, the comparative analysis of two cases demonstrates that the selected conditions vary in terms of their capacity to serve as an indicator for a conflict-prone transboundary river basin. The analysis of the non-cooperative and non-conflicting cases outlines several elaborated conditions, which proved to be valid in both basins. In particular, none of the factors from the power configuration and source of tensions sets show considerable difference between the two cases; similarly, the indicator "lack of water source alternatives and high dependence of the downstream state for particular watercourse" is found to be relatively equal in the Irtysh and the Brahmaputra basins. Hereby, the lack of difference between the respective factors in both cases demonstrates that they can hardly serve as conflict indicators.

At the same time, other factors such as considerable water scarcity and the weakness of epistemic community illustrate the limited explanatory power. Indeed, the important reservation should be made that these conditions are not so strongly expressed in the Irtysh as in the Brahmaputra case. Although it serves as a certain evidence of the initial hypothesis, a more comprehensive and in-depth research regarding these variables is required.

Although such variables as "generally uncooperative interactions and history of antagonism" differ in the two cases, the certain correlation between the cases and too general definition does not allow to explicitly identify this condition as a conflict indicator. Finally, two factors – extent to which water is shared and Wolf and Hamner's observation on the conflictual

potential of the high dams and low treaties density display explicit difference between the two cases and hereby can serve as an indicator of the conflict-prone international basins.

Importantly, some of the selected factors were assumed to have more explanatory power when considered from a different angle. For instance, in regards to the sets "source of tensions" and "economic and geophysical conditions", it is assumed that a smaller basin's area, controlled by the upstream state, is more likely to be a cooperative indicator if the negative externalities is not shared asymmetrically. Another example is an assumption that sequence of the riparians can provide an additional explanatory capacity to the factors, which are related to the power configuration within the basin and the general tone of the interactions between the riparian states.

Therefore, although the diversity of the scrutinized factors does not allow to build up a single theoretical framework, a certain generalization is possible. As emphasized by Stefan Lindemann and supported by this thesis, power-related factors have the least explanatory power among others. The alike conclusion is also correct for the factors related to the source of tensions; similarly, the conditions within economic and geophysical set proved to have a limited capacity to explain proneness to conflict. However, one could assume that these two sets of factors can have more considerable explanatory power while considered in an integrated way, which might be tested in further researches. Indeed, it is logical to suppose the correlation between, as mentioned above, the extent to which the watercourse is shared with asymmetric distribution of the negative externalities or, for example, causality between the level of water scarcity and the type of contradictory projects.

China proved to be an appropriate choice for the case study due to the wide and diverse experience in issues, related to the transboundary rivers. What is more, the co-existence of the conflictual and cooperative political environment is caused by the amalgamation of the growing river resource demand, increasing water scarcity within China and the necessity to maintain stable periphery along its border. Therefore the analysis of the selected conditions can be enhanced by applying them to other transboundary basins such as Mekong, Salween, Tarim, etc, which might

be covered in further researches. Presumably, other basin examples might be more revealing due to the potentially different extent of contraposition between the non-cooperative/conflicting and cooperative/non-conflicting case.

It is also remarkable that further researches can significantly contribute to this issue by a consideration of the factors, related to the intrastate political environment, which was not covered in the thesis. In particular, it can include such variables as activism of environmental NGOs, the mechanisms of the institutional water management within the state and "national water ethos", which were emphasized by Lindemann, Wolf and Hamner.

Thus, the thesis does not provide a single theoretical approach, which can be used to definitely reveal the proneness to conflict in transboundary river basins; instead, it emphasizes the many-sided nature of the issue and points out the particular factors which can explain or even contribute to the probability of the interstate tensions to occur. Thus far, scholars do not agree on whether international waters are more prone to conflictual or cooperative regime; however, since they are a vital component of interstate relations, it is apparent that understanding their potential to foster tensions is necessary for a stable and cooperative environment.

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