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硕 士 学 位 论 文

中亚水资源冲突研究

**A Study on Water Conflicts in Central Asia**

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## 摘要

随着全球人口急剧增加，各国对水资源需求不断膨胀，加上水源质量下降等问题，人类和水资源关系的矛盾日益尖锐。如何合理共享水资源、实现水资源全球治理的目标，已经成为全球不同政治经济体制、社会形态国家的一个非常具有挑战性的课题。该研究旨在分析吉尔吉斯斯坦，塔吉克斯坦，乌兹别克斯坦，哈萨克斯坦和土库曼斯坦这五个中亚国家围绕着阿穆多里和锡尔加里亚两条跨国界河流所引起的水资源冲突的背景和原因。尽管该地区在全球范围内的可用水量最高，但由于各国继承了前苏联低效率的水管理做法，加上人口快速增长，对粮食和工业生产的需求持续增加，从而导致了用水量的增加。在这个地区，水资源的短缺和水基础设施的恶化，已经导致整个区域的用水矛盾，从而导致各个国家之间的水资源冲突和矛盾。本论文描述了这些水资源冲突并分析其原因，预测中亚各国之间围绕水资源发生战争的可能性，以及各中亚国家展开国际合作的可能性；本文认为国际组织在预防这些冲突能所起到重要作用。在论证和分析的基础上，本文提出了中亚水冲突可能的解决办法和建议，以实现中亚水资源国际治理目标。

**关键词：**中亚，水资源，水冲突，国际治理

## ABSTRACT

In view of growing populations and related increased demand in water and its poor quality, distribution of shared water resources has become challenging between riparian states with different political, social and economic interests around the globe. This research is on conflicts over Transboundary Rivers of Amu Darya and Syr Darya in Central Asia shared by Kyrgyzstan, Tajikistan, Uzbekistan, Kazakhstan and Turkmenistan. Despite the region's highest levels of water availability on a global scale, inefficient water management practices inherited from the Soviet Union, the need for continued increase in food and industrial production for the rapidly growing population, as well as the deterioration of water infrastructure, have led to scarcity of water throughout the region and subsequent conflicts on water use among the Central Asian countries. The paper describes the major conflicts and their causes, the likelihood of wars or cooperation on transboundary river basins between the countries of Central Asia and the role of international organizations in management and prevention of these conflicts, and proposes possible solutions and recommendations for the countries in improved shared water use.

**Key words:** Central Asia, Water resources, Water conflicts, Water management

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## LIST OF ACRONYMS

ADB	Asian Development Bank
BISA	Basin Irrigation System Authorities
CACILM	Central Asian Countries Initiative for Land Management
CPS	Country Partnership Strategies
CSTO	Collective Security Treaty Organization
CWRA	Central Water Resources Administration
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environment Facility
HGC	Heads of Government Council
HSC	Heads of State Council
FSI	Fragile State Index
ICWC	Interstate Coordination of Water Resources Commission
IFAS	International Fund for saving the Aral Sea
IMF	International Monetary Fund
IWRM	Integrated Water Resource Management
kWh	Kilowatt hours
OSCE	Organization of Economic Cooperation and Development
SCO	Shanghai Cooperation Organization
UN	United Nations
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCAP	UN Economic and Social Commission for Asia and the Pacific
UNDP	United Nations Development Programme
UN SPECA	UN Special Programme for the Economies of Central Asia
USAID	United States Agency for International Development
WEP	Water Efficiency Plan
WES	Water and energy consortium
WUA	Water Users Association

## 1. INTRODUCTION

Early in 21st century the world with a population of more than six billion people faced a serious water crisis. According to UN forecasts<sup>1</sup> and other international organizations, the situation will continue to deteriorate if no appropriate measures are taken for remedy. Throughout the history, human progress has heavily depended on access to clean water and ability of society to use the potential of water as a production source.

Freshwater has become one of the main limiting factors of economic development of many countries and some regions as growth in global consumption of freshwater along with increasing levels of pollution leads to an increased number of countries with reduced availability of water resources. Climate change also contributes to escalation of water related disputes, particularly more frequent droughts and floods. All this will cause new water conflicts both local and international.<sup>2</sup>

Over 157 water agreements have been concluded since World War II between riparian countries to collaborate on issues related to joint water bodies.<sup>3</sup> However, execution of these agreements largely involves time and efforts from the international community. During this period, effective agreements on settling conflicts have been concluded on the dispute between India and Pakistan over the Indus River and between the Southeast countries on the Mekong River Basin as well as the countries involved in the Nile river dispute in Africa.

After some time, viable water agreements share some key qualities. These incorporate adaptive management structures, equal distribution of benefits, clear and adaptable rules for water management and allocation, resolution of conflicts and enforcement mechanisms.<sup>4</sup> Furthermore, the tendency demonstrates that transboundary water agreements are concluded preferring an approach which is based on needs rather than rights.<sup>5</sup> It has been critical to distinguish common benefits in such agreements. A successful example can be the agreement made between the United States and Canada in 1960 on setting up a flood control system allowing Canada to use the Columbia River waters for production of hydropower.

Proactive participation of the international community definitely contributes to promotion of collaboration between countries in water related conflicts. The Global Environment Facility, the World Bank has provided assistance in initiating agreements on water conflicts in many regions. The United Nations Environment Programme (UNEP) and the United Nations Development Programme (UNDP) as well as other UN agencies have been also largely involved in these initiatives.<sup>6</sup> Resolution of water conflicts needs years of diplomatic involvement. However, many countries achieved good levels of cooperation on shared transboundary waters which is an empowering indicator particularly during a time of

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1 United Nations Human Development Report: Beyond Scarcity: Power, Poverty, and the Global Water Crisis, 2006

2 Danilov-Danilyan, "Are water wars inevitable?", *Diplomacy Yearbook*, 2004, p 100-112

3 Wolf, Aaron T., "A long term view of water and international security," *Journal of Contemporary Water Research and Education*, Volume 142, Issue 1, 2009, p, 67-75

4 United Nations Environment Programme, *Atlas of International Freshwater Agreements*, 2002, p. 8.

5 Wolf, Aaron T., "Shared Waters: Conflict and Cooperation", *The Annual Review of Environment and Resources*, 2007, 32:241-69

6 Marsden, Simon, Brandon, Elizabeth, "Transboundary Environmental Governance in Asia: Practice and Prospects with the UNECE Agreements", 2015, p.31.

climate change that may result in increased water disputes around the world thus requiring more mediation on the international level.

## **1.1 Research Background**

Water scarcity is a worldwide challenge and water has become one of the most crucial natural resources. Over 1.2 billion of the world's population inhabits the areas with high water scarcity levels and according to the FAO forecast<sup>7</sup> this number will grow. Due to uneven distribution of water access, it caused political and economic conflicts between the nations. Mismanagement of water resources by the humanity leads to irreparable consequences for the nature as seen on the example of the Aral Sea desiccation.

The problem of water availability and sharing of water resources of Transboundary Rivers today is particularly acute in Central Asia. High hydrological dependence between the countries of the region is characterized by a large number of participants and the uneven distribution of water resources. The region is considered to be the one with one of the highest levels of water availability on a global scale. However, inefficient use of water, the lack of modern technologies, the need for continued increase in food and industrial production for the rapidly growing population, as well as the deterioration of irrigation facilities and water-saving systems, today gave rise to an acute shortage of water in both rural and desert areas, and in industrial centers and in the foothills.

The Amu Darya River, covering Tajikistan, Afghanistan, Uzbekistan and Turkmenistan, and Syr Darya River, originating in Kyrgyzstan and flowing through Uzbekistan and Turkmenistan to the remnants of the Aral Sea, are the major sources of water in the region and related tensions between the countries which may potentially escalate into an overt conflict. The tension results from uneven access to water and different purposes of its use. The upstream Tajikistan and Kyrgyzstan, energy insufficient countries, largely rely on hydropower production particularly in winter, while the downstream Uzbekistan, Kazakhstan and Turkmenistan utilize water for agriculture irrigation.

The destruction of economic and inter-governmental relations between the former Soviet republics of Central Asia led to an extensive drop in production and reduced extraction of fuel resources. Well-functioning water reservoirs and delivery of fuel and energy resources began to falter. Central Asian states faced with the problem of solving issues of joint use of the region's water resources, which in the past were managed from a single center. Changes in the political and economic situation in the region led to the fact that sovereign states have begun to use water resources primarily in their own national interests.

## **1.2 Literature Review**

Due to the fact that the global crisis of freshwater coupled with the existing high demand in fresh water cannot be addressed through high technology solutions like water desalinization, dams, diversions, and the international community had to take into account the possibility of international wars over these insufficient resources. Although this thesis overviews particularly the transboundary resources of the Syr Darya and Amu Darya rivers as a main source of conflict among the Central Asian countries, the literature reviews the freshwater resources in general - as a source of cooperation or a conflict.

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<sup>7</sup>FAO, "Coping with water scarcity. Challenges for the XXI century", 2007

### 1.2.1 Water Wars

Some scholars, like Starr, Cooley, Bullock, Remans, and Darwish concluded that fresh water is not only a source of conflict, but as “the resource which will bring combatants to the battlefield in the 21st century.”<sup>8</sup> As fresh water has no substitute, 263 international watercourses of the world are habitat to about 40% of the total populace, producing around 60% of fresh water,<sup>9</sup> have been causing numerous national local and international conflicts.

The literature gives many reasons, apart from the exceptional scope of demand, for the hypothesis arguing that shared water resource are most likely to lead to war but not to collaboration. One of the theories says that rivers disregard any political borders. The International Peace Research Institute of Oslo, which has significantly progressed in determining a connection between scarceness and dispute, states that the possibility of armed conflict raises when rivers pass borders more than create borders resulting in tensions between upstream and downstream riparians.<sup>10</sup> It can be seen now in a case between Syria and Turkey in the Middle East. In 1998, both states were on the edge of war due to the dispute over shared waterways. Nowadays Syria blames that Turkey is interfering in water flows from its side on purpose. Peter Rogers, a water specialist from Harvard University believes that in such case the downstream riparian will start presenting its upstream neighbor like an enemy. In this scenario, tensions among citizens raise and water related issues start coupling with previous discontents including ethnic conflicts. Similar situations are found in the Middle East, between Egypt and Ethiopia, Pakistan and India, Lesotho and South Africa.<sup>11</sup>

Shared water resources have manifold and differing needs on their utilization which may become a sign of a fierce conflict. For instance, since 1975 there has been an ongoing conflict between India and Bangladesh. The dispute relates to Farakka Barrage built by India on the Ganges River turning away water flows from Bangladesh. There has been an increased tension between China and India over the last years when China decided to divert water from the shared Brahmaputra River. In 1998, as already discussed above, Syria and Turkey were on the edge of war when because of Turkey's plan on dam construction on the Euphrates River.

A water and climate expert Dr. Gleick<sup>12</sup> in his study indicated the regions where conflicts on shared waters are likely to occur. According to him Central Europe, Middle East,

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<sup>8</sup> United Nations Environment Programme, *Hydropolitical Vulnerability and Resilience Along International Waters: Europe*, 2009, Chapter 1, p.5

<sup>9</sup> Skillington, Tracey, "Climate Justice and Human Rights", 2016, p.210

<sup>10</sup> McCaffrey, Stephen C., John S. Murray, Melvin Woodhouse, "Promoting Equity, Cooperation and Innovation in the Fields of Transboundary Waters and Natural Resources", p.197

<sup>11</sup>

Rogers, Peter, "The Value of Cooperation in Resolving International River Basin Disputes," *Natural Resources Forum* 17, no. 2 (1993): 117.

<sup>12</sup> Gleick, Peter H., "Water and Conflict: Fresh Water Resources and International Security." *International Security*, 1993, p. 79-112.

and some countries of Central and South Asia are prone to water conflicts. Rivalry on water and agricultural production in Central Asia resulted in local and state conflicts. Collaboration between the governments fails to address the disputed issues on the system of water management which could be beneficial for each country.

Despite political tensions between the leadership of countries of Central Asia, no military conflict has ever occurred between the states apart from the civil war in Tajikistan and some domestic, ethnic and border skirmishes among Uzbekistan, Kyrgyzstan, and Tajikistan. Although there have not been state wars, the countries have not collaborated on shared waters. The issues of water conflict in the region have a long history and the country leaders failed to tackle the issues of transboundary waters and conflict prevention. President of Uzbekistan Islam Karimov cautioned upstream Tajikistan and Kyrgyzstan in 2012 that their attempts to construct hydropower plants on the Syr-Darya and Amu-Darya Rivers might result in a war. He stated that new dams could undersupply the downstream states which are in need for water for irrigated agriculture and negatively affect the economy and harm environment.<sup>13</sup> Tajikistan and Kyrgyzstan dispute their need in hydropower use to develop the economic well-being of the countries. Karimov supports the opinion of Wolf stating that differing and complicated demands on shared waters utilization may bring to a war that manifold and conflicting demand on the utilization of water resources can result in war. In his view, the United Nations only as a reputed and weighty international organization is empowered to initiate discussions between the countries which share transboundary waters as any dispute can potentially transform to an escalating issue causing relations to fall apart, and if provoked sufficiently would not only burst confrontation but wars.<sup>14</sup>

This allegation is grounded since international law is not capable to address conflicts on shared transboundary waters efficiently (same as in the case with Central Asian countries). Moreover, there are no enforcement tools ensured by the international law to avoid water conflicts. The United Nations adopted in 1997 the Convention on the Law of Non-Navigational Uses of International Watercourses which encouraged the countries that disputes over water resources would be resolved using proposed legal framework. The Convention sets basic norms and regulations for collaboration of countries which share transboundary river basins in terms of water resource utilization and management.<sup>15</sup> The Convention was supported at the General Assembly by over 100 states and in 1997 it was adopted. Nevertheless, the Convention had been endorsed only by sixteen member states by 2008. The document needed endorsement by nineteen more states to come into force. Therefore, no general agreement has been enforced overseeing transboundary waters. India and Pakistan like some other countries concluded separate agreements administering their collaboration on the shared basin. Nevertheless, in many cases such agreements lack sufficient legal provisions. Another issue with existing treaties is that many do not account for long term impact of climate change on water availability. Therefore, it is required to regularly review water allocations. However, the most worst is that there are no agreements at all for majority of basins.<sup>16</sup> Due to that reason, even though this Convention has not been

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<sup>13</sup> Lillis, Joanna, EurasiaNet.org, 7 September 2012, <http://www.eurasianet.org/taxonomy/term/2906>.

<sup>14</sup> Ibid.

<sup>15</sup> Wikipedia.org, Convention on the Law of the Non-Navigational Uses of International Watercourses [https://en.wikipedia.org/wiki/Convention\\_on\\_the\\_Law\\_of\\_the\\_Non-Navigational\\_Uses\\_of\\_International\\_Watercourses](https://en.wikipedia.org/wiki/Convention_on_the_Law_of_the_Non-Navigational_Uses_of_International_Watercourses).

<sup>16</sup> Ibid.

enforced, it still offers a general mechanism to refer to in international water disputes for the countries concerned.

Researchers and specialists on scarcity of resources also believe that environmental changes may lead to water conflicts.<sup>17</sup> Homer-Dixon's theory specifies how such changes may have social impact that subsequently turns into conflict. He concluded that "environmental scarcity" represents one of the reasons and contributing factor to water conflicts. Homer-Dixon created a theory of environmental scarcity explained by "environmental change, growing population and uneven social allocation of resources".<sup>18</sup> In addition, he gives explanation that environmental change represents a decline in water quantity, when the water resource depletes and is not renewable. The environmental scarcity in Central Asia is explained by the Aral Sea crisis, resulting from overuse of the Syr Darya and Amu Darya Rivers which was initiated by the Soviets and continued up to date.

Interstate wars can escalate after some time if a riparian state feels constrained in implementing its goals and revenues. For example, in Central Asia, interstate conflict may raise more at the national level than locally. Nevertheless, the interstate conflicts among farmers along the transboundary waters should be prevented. Considering that existing water agreements of the region are obsolete and not efficient in avoiding such conflicts, a third party mediation is needed to boost collaboration of the states in efficient water management.

Finally, to explain because of what the probability of water wars is higher than collaboration on international waterways is due to continuously expanding trend of 'Water Securitization' in the world's water-scarce regions. If countries regard water as a high priority for their economic well-being or even survival, the issue frequently gets securitized. As opposed to classic security theories focusing on the material substance of a security danger which may include military capacity, allocation of power, and polarity, the theory of the Copenhagen School analyzes when players change a specific matter to an issue of security. Such an approach allows applying exceptional measures, e.g. violence, for the sake of security.<sup>19</sup> Water has gotten securitized since international law interprets water as property. Although water has long been regarded as commodity, any individual or a nation in whole requires it for existence. Consequently, in Turkey and Israel researchers' battle to get essential water information since it is kept confidential by the governments. Central Asian countries also have a tendency to securitize water for various reasons. Not only these countries must supply water to the total 69 million population to cover their essential needs, however, they are concerned as well about economic growth, the need handle ethnic disagreements and social unrest, environmental damage and growth of population."<sup>20</sup> In

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<sup>17</sup> Homer-Dixon, Thomas F., "Environmental Scarcities and Violent Conflict: Evidence from Cases." *International Security*, 1994, p. 5-40.

<sup>18</sup> Ibid.

<sup>19</sup> Barbosa, Luciana M., "Reflections on the securitization of water resources, considering the cases of the Nile River and Aral Sea Basin: an analysis of human security", <http://files.isanet.org/ConferenceArchive/f1603b06ca614a6399e8a9b1bc8af557.pdf>

<sup>20</sup>

Mosello, Beatrice, "Water in Central Asia: Prospect of Conflict or Cooperation?" (Working Master's Thesis, Graduate Institute of International and Development Studies, Geneva, 2008), 151. 30 Ibid., 153.

many cases, and Central Asia is not an exception, the downstream states are economically and militarily powerful compared to the resource-rich upstream riparians. As a result, when the upstream riparians 'catch' the water flowing to the downstream states the latter utilize their entire influence (i.e. force). Subsequently, securitization of water-connected matters will further contribute to escalating the risk of disputes.

### 1.2.2 Water Cooperation

Those who oppose the argument reject any relationship between scarceness of water and war. The following basic factors supporting the notion that conflicts on shared transboundary waters will apparently lead to collaboration but no war.

The first argument is related to history. As per the authors of the International Crisis Behavior dataset, which represents a methodical compilation of worldwide conflicts – there has no ever been a war battled because of water resources.<sup>21</sup> Though there were numerous conflicts in the past like on the Jordan River or in Darfur; or the 1920s conflict in California - the Owens Valley inhabitants destroyed the Los Angeles water pipe when they got to know that all volume of water which was intended for their farms' use was diverted to the San Fernando Valley under development. These are the main cases of water wars. Historic review of water disputes demonstrates how water became as means, yet not being the primary reason of bursting of a battle on water resources.<sup>22</sup> Despite the fact that under this criterion there has not burst any war between states because of water, an adequate proof exists proving common waters have brought on substantial worldwide insecurity with more severe hostility.

The next argument says that common benefits prevail over factors causing water disputes. Even though independent countries are naturally prone to their unilateral use of water resources, at last, even the most powerful riparian countries who commonly using water resources are forced to collaborate with their less stronger riparians.<sup>23</sup> Due to strong interdependencies between the riparian countries and subsequent overheads of noncooperation favors most to collaboration.<sup>24</sup> Country independence which throughout the history has thwarted hydro political collaboration is confronted by the growing interdependence of economies on the global level.<sup>25</sup> Countries prefer economic collaboration on the regional level to increase the turnover of goods and services throughout the countries. As water plays a crucial role in economics, the collaboration has also extended to the shared international waterways. Riparian countries can collaborate on a large project, like a dam, as

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<sup>21</sup>

Brecher, Michael and Jonathan Wilkenfeld, "International Crisis Behavior Datasets: Version 9," University of Maryland – International Crisis Behavior Project, 2009.

<sup>22</sup>Gleick, P.H. and M. Palaniappan, "Wetter or Not", 2014, [https://www.nrdc.org/sites/default/files/wat\\_14111701b.pdf](https://www.nrdc.org/sites/default/files/wat_14111701b.pdf), p.91.

<sup>23</sup>

Elhance, Arun P., *Hydro–Politics in the 3World* (DC: United States Institute of Peace Press, 1999), ix

<sup>24</sup> Ibid.

<sup>25</sup> Ibid.

both sides would benefit from the initiative. Droughts and floods are able to put a state in chaos. Through construction of a dam on a common waterway, in case of droughts the accumulated amount of water might be discharged downstream. Therefore, Tajikistan and Kyrgyzstan experience extreme deficiency of electric power for sufficient supply of population and industries during winter period. A hydropower plant is capable to substantially cover the consumption needs and in addition to control the downstream water discharge, bringing benefits to agriculture of the downstream riparians.<sup>26</sup> The growing interdependence of our global connections has contributed more to cooperation rather than to war. Therefore, in typical environment, and particularly if nations experience water scarcity, the only coherent decision which is largely accepted in the literature is collaboration. Though only seven small clashes have been observed on transboundary waters,<sup>27</sup> the concerned riparians have concluded more than 3,600 water agreements. Therefore, this argument alone could favor more to collaboration than war. Moreover, 'water peace' scholars say if participating countries make water agreements based on cooperation principles they become efficient for a long term. The literature brings two successful cases institutional resiliency are being the Mekong Committee established in 1957 and contributed to data exchange between the riparians even during the Vietnam War. The second example is the Indus River Commission that remained in place despite two subsequent wars between Pakistan and India.<sup>28</sup>

Another argument that collaboration on common transboundary waters is more likely rather than war is because war is economically has no sense. According to some scholars and politicians, war but not water is costly. For instance, Israel being a riparian country is fully financially and militarily capable to lead a war. This example demonstrates how hydropolitical hostility incurs significant expenditures and losses. This country is a militarily solid downstream riparian which took over the territories of the upstream riparian for the purpose of control of the shared waterways. However, later Israel understood that additionally to the human losses, financial and political expenditures of their aggression kept on expanding only, reducing the possibility of cost-efficiency and long-term resolution of this initiative in relation to Israel's water challenges.<sup>29</sup> Compared to Israel, majority of different countries experiencing scarceness of water have much less political and economic resources, therefore, initiating a war for other countries' resources is not a feasible alternative.

Finally, there is a strategic reason that peace will prevail over war on water assets. The most vocal advocate of water war concept Thomas Homer-Dixon who established that environmental tension and fierce dispute are interconnected said that wars over water resources will not happen everywhere. According to him and water peace researchers, the most likely scenario for aggression is when the downstream country is largely reliant on

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<sup>26</sup> ICID Position Paper, "Role of dams for irrigation, drainage, and flood control," 1998, p.8. [http://www.icid.org/dam\\_pdf.pdf](http://www.icid.org/dam_pdf.pdf).

<sup>27</sup>Yoffe, Shira B., Wolf, Aaron T., "Water, Conflict and Co-operation: Geographical Perspectives," [http://www.transboundarywaters.orst.edu/publications/geographical\\_perspectives/](http://www.transboundarywaters.orst.edu/publications/geographical_perspectives/).

<sup>28</sup> Ibid.

shared river basin and in addition to that plays a dominant role in the region.<sup>30</sup> The upstream riparian would not be interested in initiating an aggression as it already has control over the water resources and it is incautious for an economically and politically less powerful country to act like this. Under these criteria, it is difficult to find a site for a water war. Therefore, supplying the argument in support of water peace which has more probability than war.

Although there are many literature sources giving a complete analysis of factors causing conflicts or contributing to collaboration, they appear to neglect that a number of political and social disputes are usually interrelated with water conflicts which makes challenging the separation of the water factor as the major variable for fierce dispute and collaboration.

Based on the literature reviewed herein, the water is related to all aspects of life, economy, wars and peace building. Although there are no doubts that water is being disputed among Central Asian countries, in this case no typical formula exists for resolution of this dilemma, because numerous other urgent and fundamental disputes play a role here too. In order to prevent a war among the Central Asian states regardless if it is because of control of natural resources, ethnic tensions or takeover of territories, an involvement of third parties like the United Nations, the World Bank and alike must define and resolve all reasons of dispute, without just focusing on the water dispute alone.

### **1.3 Motivation and Research Questions**

In reference of the research work that many experts and policy makers have already done on water issues in Central Asia, the objective of the paper is to examine the state of water resources in Central Asia and their impact on the relationship between regional states, to describe main water conflicts between the countries of Central Asia and to propose possible solutions for those conflicts as well as offer recommendations for improving the joint water use through integrated management of Central Asian region's water resources. It is aimed at proposing feasible options which would result in peaceful and sustainable provisions through increased regional cooperation. This thesis suggests that addressing water issues through improvement of water infrastructure and management projects along with strong cooperation at the national and regional levels can ultimately result in increased incomes, poverty reduction, sustainable development, shared prosperity, and political stability throughout the region.

In order to follow this objective, three research questions are specified and be answered throughout the study.

*Research question 1: What are the main water conflicts between central Asia countries and what are the potential solutions for those conflicts?*

*Research question 2: What is more likely - a war or cooperation among the Central Asian states?*

*Research question 3: What are the roles of the regional and international communities to solve the conflicts?*

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<sup>36</sup> Shlomi, Dinar, "Beyond Resource Wars: Scarcity, Environmental Degradation, and International Cooperation", Chapter IV, 8 "Conflict and Cooperation along International Rivers: Scarcity, Bargaining Strategies, and Negotiation", 2011, p.156-200.

For the purposes of accomplishing the set tasks, specific literature, articles, publications available in libraries of Xiamen University, the Tajik Academy of Sciences, database, development indicators and reports of reputable institutions like UN (including Tajikistan's UNDP water and energy programme), the Organization of Economic Cooperation and Development (OSCE), the World Bank and others, as well as Internet sources have become available for further research. Apart from these materials, the staff of the Tajik Academy and UNDP's project on Integrated Water Resource Management in Tajikistan and Central Asia was kind to provide their insights during my interviews on the existing water crisis in the region.

#### **1.4 Structure of the Thesis**

The paper is composed of four chapters. *Chapter 1* gives an introduction to the meaning of water, discusses existing literature on Central Asian and worldwide water related issues, particularly on the probability of wars or cooperation on water resources, and also sets out motivation and research questions. Major causes of water conflicts in Central Asia are presented in *Chapter 2* including historical causes and consequences of lack of cooperation in the region on transboundary water management resulting, as an example, in the disastrous shrinking of the Aral Sea. *Chapter 3* describes the existing mechanisms to solve water conflicts in Central Asia including lessons learned, challenges ahead, and recommendations to the states concerned and the international community. Finally, *Chapter 4* presents conclusion on the subject.

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