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Building Sustainable Peace through Integrated Water Resource Management (IWRM)? Identifying the Peacebuilding Potentials of IWRM in Central Asian Regions Threatened by Transboundary Water Conflicts with a Focus on the Ferghana Valley

Julia Dietz

October 2018

Schaffung eines nachhaltigen Friedens durch Integriertes Wasserressourcenmanagement? – Identifizierung der friedensfördernen Potenziale von IWRM in zentralasiatischen Regionen, die von grenzüberschreitenden Wasserkonflikten bedroht sind, mit Schwerpunkt auf das Ferghana-Tal

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Building Sustainable Peace through Integrated Water Resource Management (IWRM)? Identifying the Peacebuilding Potentials of IWRM in Central Asian Regions Threatened by Transboundary Water Conflicts with a Focus on the Ferghana Valley

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Abstract:

[Global water resources are unequally distributed and becoming scarce due to population growth, rising water pollution and adverse impacts of climate change on the hydrological cycle. Arid regions are particularly vulnerable resulting in increasing competition between different water users in the future. Integrated Water Resource Management (IWRM) has become internationally recognised as the most promising water management approach for achieving efficiency and equity in the water sector as well sustainable development. Therefore, this paper aims to give an overview of the sustainable peacebuilding potentials of IWRM for sustainable peace in regions threatened by transboundary water conflicts. The study refers to the Ferghana Valley in Central Asia and is based on expert interviews and qualitative content analysis. Overall, IWRM cannot build sustainable peace alone, but supports peace processes and reduces the potential for conflict mainly through trust and identity building, cooperation and participation.

Key Words: [Integriertes Wasserresourcenmanagement, Nachhaltiger Frieden, Friedensförderung, Ferghana-Tal, Zentralasien]

Zusammenfassung:

Die globalen Wasserressourcen sind ungleich verteilt und werden durch das Bevölkerungswachstum, die zunehmende Wasserverschmutzung und die negativen Auswirkungen des Klimawandels knapp. Aride Regionen sind besonders stark betroffen, was in Zukunft zu einem zunehmenden Wettbewerb zwischen verschiedenen Nutzergruppen führt. Integriertes Wasserressourcenmanagement (IWRM) hat sich international als der vielversprechendste Ansatz zur Erreichung von Effizienz und Gerechtigkeit im Wassersektor sowie einer nachhaltigen Entwicklung etabliert. Diese Forschungsarbeit gibt daher einen Überblick über die friedensschaffenden Potenziale des IWRM für einen nachhaltigen Frieden in von grenzüberschreitenden Wasserkonflikten bedrohten Regionen. Die Studie bezieht sich auf das Ferghana-Tal in Zentralasien und basiert auf Experteninterviews und einer qualitativen Inhaltsanalyse. IWRM kann alleinig keinen nachhaltigen Frieden schaffen aber durch Vertrauens- und Identitätsbildung, Kooperation und Partizipation, Friedensprozesse unterstützen sowie das Konfliktpotenzial reduzieren.

Key Words: [Integrated Water Resource Management, Sustainable Peace, Peacebuilding, Ferghana Valley, Central Asia]

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List of Abbreviations

CIA	Central Intelligence Agency
EIUDI	Economist Intelligence Unit´s Democracy Index
GIZ	German Agency for International Cooperation
GNI	Gross National Income
GWP	Global Water Partnership
HDI	Human Development Index
ICWE	International Conference on Water and the Environment
IWRM	Integrated Water Resources Management
NGO	Non-Governmental Organisation
OEC	Observatory of Economic Complexity
PBSO	Peacebuilding Support Office
RBO	River Basin Organisation
SADC	Southern African Development Community
SDG	Sustainable Development Goal
TAC	Technical Advisory Committee
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environment Programme
UNDP	United Nations Development Programme
WCED	World Commission on Environment and Development
WRM	Water resource management
ZEF	Centre for Development Research

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1. Introduction

Fierce competition for fresh water may well become a source of conflict and wars in the future [1]

But the water problems of our world need not be only a cause of tensions;
they can also be a catalyst for cooperation (…). If we work together, a secure and sustainable water future can be ours [2]

1.1 Problem Diagnosis

Water, also referred to as "blue gold" is one of the most critical natural resources on planet Earth. There is no doubt that all societies are dependent upon available freshwater and adequate supply for basic needs such as cooking, drinking, sanitation or food production as well as for cultural practices, livelihoods, power generation and supporting industrial production. Water thus forms the basis of existence for all living organisms and is a limiting factor for socio-economic development all over the world. In 2010 the United Nations General Assembly, therefore, has recognised the access to clean freshwater and sanitation as a fundamental need and universal human right.

However, freshwater is a common good that is becoming scarce for humankind and nature. Less than 0.4 percent of global water resources are available for human use in rivers, freshwater lakes and accessible aquifers, while the largest amount is stored in the world oceans or bounded in glaciers, polar ice caps and permafrost. In the context of rising populations, economic growth, increasing demand for food and energy as well as water quality problems due to expanding volumes of domestic, agricultural and industrial waste, water issues are among the most significant in the 21st century. According to Global Water Partnership "(…) water issues touch all segments of society and all economic sectors"[3]. Thus, it affects the water usability for people and threatens human health, the functioning of ecosystems and increases the competition for water of adequate quality[4].

Climate change is also projected to exacerbate overall negative impacts on future water resources such as the alteration of the amount, intensity and frequency of precipitation over space and time, which directly affects the magnitude and timing of droughts, heatwaves and floods[5]. Especially semi-arid and arid regions such as Central Asia are depended on artificial irrigation for agricultural purposes and thus will suffer most under the variability of future climate conditions. However, competition for shared water resources as well

1 UN Secretary-General, Kofi Annan, March 2001.
2 UN Secretary-General, Kofi Annan, February 2002a.
3 GWP 2009, 6.
4 Kidd/Shaw 2007, 313.
5 Petersen-Perlman/Veilleux et al. 2017: 1.

as conflicts over water use are likely to increase as societies face numerous social, ecological, economic and social challenges on how to govern water in a wisely and equitable manner in changing environments.
In particular, transboundary freshwater basins are at risk of water-related conflicts. Approximately three billion people in 145 countries live in river and lake basins which cross the political boundaries of two or more nations. In total, 263 transboundary river and lake basins have been identified and account for 60 percent of global freshwater supplies[6]. They link people and groups of different states and support the incomes and livelihoods of hundreds of millions of people worldwide. Hence, they create hydrological, social and economic interdependencies between societies. With growing importance of freshwater resources, diverging national interests and different stages of development, good management of water resources is an important regional and international measure to promote cooperation and sustain peace in affected regions. According to Kim and Glaumann "the best way of managing transboundary water resources is through an integrated approach" such as Integrated Water Resources Management (IWRM)[7].
Overall, environmental-oriented peacebuilding approaches are needed to outline ways of dealing with current global water challenges and the consequences of climate and environmental variability in the future with the aim to promote sustainable peace. Due to its core principles of integration, cooperation, coordination, participation and good governance, IWRM is a potential measure that could initiate the transformation regarding water resource conflicts. Therefore, this paper deals with the question whether IWRM is likely to lead to sustainable peace in regions threatened by transboundary water conflicts and tries to identify the weaknesses and challenges, strength and opportunities as well as achievements of IWRM as peacebuilding approach and possible recommendations for adaptations.

1.2 Explanation for the Selection of the Case Study and Particular Concepts

The analysis and examination of the research interest refers to the Ferghana Valley within the Aral Sea basin in Central Asia (Figure 3). Since water seems to play a central role in the industrial and agricultural development of the area as well as the evidence of historical and current conflicts among water resources, the valley is a proper object of investigation for evaluating the potential of IWRM as peacebuilding approach.
The concept of sustainable peace comprises the aspect of positive peace and sustainable development[8]. In other words, the classical concept of peace is supplemented by a socio-ecological component as well as the inter-generational aspect. Thus, it responds to current global issues such as climate change, environmental

6 UN-Water 2008, 1.
7 Kim/Glaumann 2012, 6.
8 Brauch 2016, 210-211; Oswald Spring 2008, 120.

degradation and forms a proper framework for scientific discourse regarding environment, conflict and peace. To achieve or to contribute to a status of sustainable peace, peacebuilding approaches aim to reduce the risk of lapsing or relapsing into conflict using peacebuilding strategies as well as a contextual set of measures such as dialogue formats, capacity development[9] or women empowerment. Therefore, the potential of IWRM as peacebuilding approach will be investigated.

1.3 Current State of Research and Relevance of the Topic

In peace and conflict research there is already a comprehensive literature on causes of conflict due to political, economic and socio-cultural factors. Based on these findings, states and societies which are particularly vulnerable to different kinds of conflict were identified. However, an expected increase in climate and environmental variability will also increase the impact of environmental factors in conflicts. Notably, in arid regions, water scarcity can be a future challenge, as climate variability, its impacts and competition for available water resources can lead to regional tensions and conflicts[10]. This requires an expansion of research into the linkages between environment and conflict. Although the data basis has greatly expanded since the 1990s regarding research areas that analyse the mechanisms of environmental degradation and conflict, overall, environmental studies have not found peace issues to be relevant and vice versa. Therefore, the beginning of the coming together of these paradigms and their practices is a significant change. In addition, Peter H. Gleick and others describe in numerous scientific papers that scarce water resources can not only cause conflict but rather that their joint management can be used to inititate cooperation[11]. It is, therefore, necessary to identify peacebuilding approaches or to modify existing ones to deal with future water challenges and to enhance cooperation. For this reason, the identification of strength and opportunities as well as weaknesses and challenges of the IWRM approach can be seen as starting point for the recognition of the potential of the concept as peacebuilding approach regarding regions with transboundary water conflicts. Moreover, this work interlinks the often separately considered paradigms of the sustainable environment and sustainable peace, and their gradual but as yet incomplete engagement with each other.

The Ferghana Valley is very well studied, providing a wide range of literature on geographical, historical and socio-economic data and the impacts of climate change on the hydrological regime. Nevertheless, the Ferghana Valley is a relatively new region in the field of conflict and water management studies. As each con-

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9 According to UNDP, capacity development is defined as "the process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time" (UNDP 2009: 5).

10 Postel 2000, 942.

11 Cf. Giordano/Giordano et al. 2002; Gleick/Herberger 2008; Wolf 1998.

flict is context dependent, the research will contribute to the small but increasing amount of literature on conflict and water management in the Ferghana Valley which is available at the moment.

1.4 Thesis objectives and research questions

This paper aims to evaluate IWRM as peacebuilding approach to promote sustainable peace in arid regions threatened by transboundary water conflicts. To address this foremost objective, the following research questions have been devised:

- Which factors contribute to the disparities in the Ferghana Valley and how do future challenges and IWRM alter the current conflict-prone situation?
- Can IWRM build sustainable peace between riparian countries threatened by transboundary water conflicts and can, therefore, be seen as peacebuilding approach in affected regions?
- What are weaknesses/challenges and strength/opportunities of IWRM as peacebuilding approach in the Ferghana Valley? Are there successes to be recorded?
- Which factors would support the successful adaptation of the IWRM concept to a peacebuilding approach?

1.5 Structure of work

This chapter gave a brief overview of the global water crisis and its potential for conflict and cooperation as well as the need for peacebuilding strategies, especially in transboundary catchment areas. Moreover, it also presented the current state of research, the relevance of the topic as well as the objectives and research questions of this work. The second chapter provides the theoretical background on the concepts of sustainable peace, peacebuilding and gives information about the IWRM approach regarding its link to sustainable development, its definition, principles and main pillars of implementation. The chapter will finish by summarising the main connections between IWRM, sustainable peace and peacebuilding and explains why a peacebuilding potential of IWRM in regions threatened by transboundary water conflicts can be suggested. The third chapter gives an overview of the geographical, hydrological, socio-economic, historical and water political situation as well as climate change impacts and variability in the Ferghana Valley and describes the multi-dimensional factors of conflict in the selected region. After a description of the used methodology in chapter four, the fifth chapter presents the results of the empirical work. Then, the sixth chapter discusses the previous results and the applied methodology. Finally, the last chapter concludes the

findings, aims to transfer the results and provides an outlook by giving impulses for future areas of research.

2. Theoretical Framework

As previously mentioned, this work aims to evaluate the potential of IWRM as peacebuilding approach. Secondly, to examine the factors which contribute to the disparities between the three riparian countries (Uzbekistan, Tajikistan, Kazakhstan) of the Ferghana Valley basin and thirdly, to identify conceptual and practical constraints of IWRM as well as opportunities to adapt the concept. Therefore, the knowledge of concepts such as *IWRM*, *sustainable peace* and *peacebuilding*, as well as the regional and historical specifics of the Ferghana Valley are prerequisites.

2.1 The Concept of Integrated Water Resources Management (IWRM)

2.1.1 IWRM as an Element of Sustainable Development

The term *sustainable development* is based on the interdependence of ecological, economic and social aspects as well as on three underlying principles. These comprise the global perspective, linking environmental and developmental elements as well as the realisation of justice for future generations and people living today[12]. In 1987, the WCED final report "Our Common Future" .defined sustainable development as a "development (…) that meets the needs of the present without compromising the ability of future generations to meet their own needs"[13]. It is thus a process whose goal would be achieved if the entire world population could satisfy their needs and desire for a better life and at the same time be sure that this could also be the case for future generations. The demands of the WCED report made it necessary to reach agreements at international level. This took place in Rio de Janeiro in 1992 at the United Nations Conference on Environment and Development (UNCED) with the adoption of a global action programme – the Agenda 21. Further conferences and documents followed such as the 17 sustainable development goals (SDGs) formulated by the UN in 2015 and agreed by 193 United Nations member states.

As widely recognised, water is a crucial driver of social and economic development while it is also a fundamental factor for the integrity of the natural environment. SDG 6 – "to ensure availability and sustainable management of water and sanitation for all" is thus inseparably linked to the achievement of most

12 WCED 1987, 6.
13 WCED 1987, 8.

other goals, including food security, economic growth, poverty reduction, energy production and overall human well-being [14]. This highlights the linkages between water, development, human and environmental security. Therefore, the United Nations General Assembly has recognised the access to clean freshwater and sanitation as a fundamental need and universal human right[15]. Nevertheless, certain groups often lack an adequate supply of water due to poor infrastructure, overuse and increasing pollution of water bodies. As a result, the resilience and adaptive capacities of societies might decrease when external factors such as disputes between states, bad governance structures and climatic changes have destabilising effects on affected regions. Therefore, GWP states that a water-secure world is a prerequisite for sustainable development, which is why sustainability-oriented water management plays a central role in meeting the objectives of a sustainable future[16]. Water security is defined by UN-Water as

> "the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability[17]."

It can thus reduce poverty, increase living standards, especially for those who are most vulnerable as well as increase the integrity of natural resources. To achieve water security, a sustainability-oriented and integrated approach is necessary to replace the traditional and fragmented use, development and management of water resources[18]. A central internationally accepted and recommended approach is IWRM, which aims to achieve sustainable water management through a balancing act among social equity, economic efficiency and ecological sustainability[19]. Target 6.5 of SDG 6 thus states that by 2030 integrated water resources management should be implemented at all levels (national, regional, local), including transboundary cooperation if appropriate[20]. Hence, Lenton and Muller state that IWRM can "be considered as the water element of the broader sustainable development approach"[21].

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14 UN 1992, 7.
15 UN 2010.
16 GWP 2017.
17 UN-Water 2013, 1.
18 GWP 2017; Kim/Glaumann 2012, 6.
19 GWP 2017; Rahaman/Varis 2005, 17-18.
20 UN 1992, 7.
21 Lenton/Muller 2009, 7.

2.1.2 IWRM Principles

The IWRM concept is founded upon four basic guiding principles that were formulated through an international consultative process during the International Conference on Water and Environment (ICWE) in Dublin on February 1992 and submitted to the UNCED in Rio de Janeiro. The principles, referred to as the Dublin Principles, contributed to the recommendations in the chapter on freshwater resources in Agenda 21[22] and expressed a holistic and multidisciplinary approach to global water challenges by covering environmental, social, political, and economic issues[23].

The Dublin Principles are as follows (UN 1992):

I Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

II Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.

III Women play a central part in the provision, management and safeguarding of water.

IV Water has an economic value in all its competing uses and should be recognised as an economic good.

The *first principle* links social and economic development without compromising the protection of natural ecosystems. Moreover, it acknowledges freshwater as a crucial and scarce resource, which needs to be maintained and managed sustainably in oder to sustain life, development and the environment across the whole catchment area[24].

The first principle is underpinned by the *second principle*. In this context, the term participation means the involvement of stakeholders at all levels of social structure in the decision-making process in the planning and implementation of water projects[25]. GWP-TAC holds the view that "a participatory approach is the only means for achieving long-lasting consensus and common agreement"[26]. However, for this to occur, stakeholders from water management agencies and the general public need to recognise the effect of their actions on other water users and aquatic ecosystems and accepting the need for change to improve the effi-

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22 In Agenda 21 the chapter 18 on the protection of the quality and supply of freshwater resources states in Paragraph 8 that "Integrated water resources management is based on the perception of water as an integral part of the ecosystem, a natural resource and a social and economic good, whose quantity and quality determine the nature of its utilization" (UN 1992, chapter 18, paragraph 8).

23 Solanes/Gonzalez-Villarreal 1999, 9.

24 ICWE 1992; UN 1992, 7.

25 ICWE 1992; UN 1992, 7.

26 GWP-TAC 2000, 16.

cient and sustainable use of water resources[27]. Despite the widely held view that women play a pivotal role in the provision, management and safeguarding of water resources, particularly for domestic and agricultural purposes, their participation in decision-making processes is minimal[28]. Moreover, strong evidence indicates that gender equality contributes to sustainable development as well as sustainable use and management of water resources[29].

Therefore, the *third principle* recognises the important role of women in water management and emphasise the need to "equip and empower women to participate at all levels in water resources programmes (…)"[30].

The *fourth principle* focuses on managing water as an economic good. In the past, the economic value of water was not fully acknowledged, resulting in inefficient and environmental damaging use[31]. Therefore, the valuing of water by using economic instruments such as the opportunity cost concept[32] affects behaviour towards an efficient usage because of the recognition of water as a finite and scarce resource. However, it is vital to consider the basic human right to have access to safe water and sanitation for an affordable price, which is why the fourth principle is heavily discussed regarding the social consequences for poor people´s access to water.

Although the Dublin Principles provide a rough framework and guiding concept for integrated and sustainability-oriented water management, an officially recognised definition of IWRM was first released by the Global Water Partnership (GWP) in the year 2000.

2.1.3 Definition of IWRM

The most common and cited definition of IWRM is provided by the Global Water Partnership (GWP), which is a global action network founded in 1996 by the World Bank and the United Nations Development Programme (UNDP). The aim is to support the implementation of the Dublin Principles as well as to foster integrated management of water resources. GWP defines IWRM as "a process which promotes the coordinated development and management of water, land and related resources to maximise economic and social welfare equitably without compromising the sustainability of vital ecosystems"[33]. This definition illustrates the con-

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27 GWP-TAC 2000, 16.
28 GWP-TAC 2000, 18; ICWE 1992.
29 UNDP 2006, 13; UN-Water 2006, 1.
30 ICWE 1992.
31 UN 1992, 7.
32 The opportunity cost concept (or alternative cost) is grounded in microeconomics and is applied to scarce resources. The opportunity cost refers to the loss of potential benefit or gain from other alternatives after a decision is made. It thus attempts to ensure that scarce resources are used efficient to increase the potential benefits (Buchanan 1991, 520-521).
33 GWP-TAC 2000, 22.

cept´s focus on sustainability and thus recognises three main criteria that take social, economic and ecological conditions into account. To achieve a balance between those three components, the IWRM approach need to be viewed as the operationalisation of the four stated principles[34].

Especially regarding water scarcity and the limitation of financial resources the goal of *economic efficiency* becomes considerably important when addressing increasing water demands and the vulnerable and finite nature of water resources. Therefore it is crucial to use water efficiently as well as to ensure a strategical allocation of water to different economic sectors and users[35]. The second component of the definition refers to *social equity* in water management, which comprises the recognition of a save access to an adequate quantity of clean water as basic human right, "between women and men, rich people and poor, across different social and economic groups both within and across countries"[36]. Moreover, it includes an equitable distribution of benefits associated with water resource systems and not only to the minimum prerequisites that are included in a definition of basic needs[37]. The third element of IWRM, *environmental sustainability*, aims to protect and manage the water resources and related aquatic ecosystems "in a way that does not undermine the life-support system thereby comprising use by future generations of the same resource"[38].

2.1.4 Implementation of IWRM

To apply the agreed principles and defined goals of IWRM, strong *basin governance structures* are needed. Owing to this the IWRM approach focuses on (i) enabling an environment of suitable policies, strategies and legislation and (ii) putting in place the necessary institutions through which the policies are put into practice as well as (iii) setting up the management instruments which are required to do so[39].

To reduce the complexity, Svendson/Wester et al. distinguish between a *centralised* and *decentralised* organisational pattern for basin governance. The more common pattern is the decentralised model "in which the actions of existing organisations, layers of government and initiatives are coordinated to cover an entire river basin"[40]. The advantage of this is that it encourages cross-sectoral cooperation and secondly that it is relatively easy to "build upon established political structures rather than creating new ones"[41]. On the contrary, the costs of coordination among the different organisations are high, and decision-making

34 Lenton/Muller 2009, 7.
35 Lenton/Muller 2009, 7.
36 Lenton/Muller 2009, 7.
37 Peña 2011, 28-29.
38 GWP-TAC 2000, 30.
39 GWP 2017.
40 Svendsen/Wester et al. 2005: 15.
41 Kidd/Shaw 2007, 313.

processes can be cumbersome in the long-term perspective[42]. In comparison, the centralised model includes a single public organisation responsible for decision-making regarding basin management and can thus prevent conflicts by concentrating decision-making authority needed to resolve disagreements[43].

Despite the implementation of appropriate governance structures, it is widely recognised that *integration*, *cooperation*, *participation* and *coordination* are decisive components, when implementing IWRM into practice.

Figure 1: The five components of Integrated Water Resources Management implementation. (Source: own representation)

2.1.4.1 Integration

In the context of IWRM, *integration* means a holistic approach to water resources management that goes beyond the subject area and specific case. Integrated management thus "refers to the fact that water resources should be managed as an integral part of a nation´s social and economic development" including various interests and perceptions among the usage of water resources[44]. According to Newig and Challies "fragmented and disjointed management of water in ´sectors´ (…) is the primary barrier to sustainable water governance"[45]. Aspects to be considered in an integrated manner are different sectors of water use (domestic, agriculture, energy production), administrative responsibilities, different usage requirements

42 Kidd/Shaw 2007, 313.
43 Kidd/Shaw 2007, 313; Svendsen/Wester et al. 2005: 15.
44 Snellen/Schrevel 2004, 8.
45 Newig/Challies 2014, 440.

(human, ecological, transboundary), upstream and downstream interests, water quantity or water quality aspects. Kidd and Shaw provide a framework of 12 dimensions of integration that need to be considered in developing essential institutional arrangements for IWRM (Figure 2).

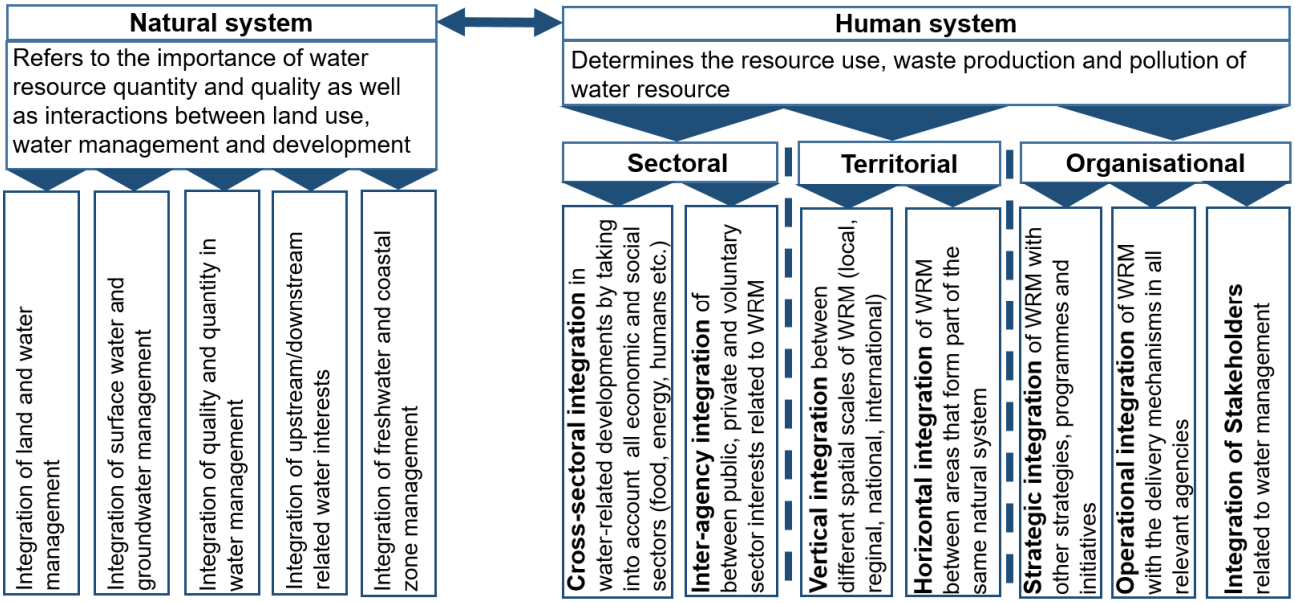

Figure 2: Integrated Water Resources Management and the 12 dimensions of integration. (Source: own representation based on Kidd and Shaw 2007, 322; GWP-TAC 2000, 23-31)

IWRM needs to manage land, water and ecosystems as interdependent biophysical complexes by generating knowledge about water-related needs of ecosystems and availability of resources within a specific catchment (natural system) and the water-impacts of human activities (human system) for ecosystems[46]. Integration thus occurs within and between these categories by taking into account the variability in time and space as well as implies that human activities must redirect in a way that satisfies both human and ecosystem needs to ensure sustainable development[47].

2.1.4.2 Coordination

Coordination is localised at stakeholder level and can be defined as the interaction of actors pursuing a common goal and managing dependencies between water use activities through more effective planning as

46 Snellen/Schrevel 2004, 23.
47 GWP-TAC 2000, 23; Snellen/Schrevel 2004, 8.

well as collaboration[48]. Thus it can be understood as the basis of IWRM´s idea of integration. According to Jonch-Clausen and Fugl coordination can also lead from fragmented and subsectoral to cross-sectoral water management[49]. However, it can be that different authorities within the catchment area keep records of available water resources and manage their utilisation without appropriate coordination among other authorities[50]. As a result of this information disorder, unproductive water losses, unequal distribution among sectors and users, uncontrolled water pollution and unsustainable water usage occur with possible adverse impacts on human-wellbeing and nature. In this context, close coordination of water use processes and involved institutions over horizontal links between different water-using sectors, and over vertical links between hierarchical levels of water governance systems must be ensured to generate a sustainable solution for all stakeholders involved[51]. The task of integrated water managers is to aggregate the often widely divergent demands on the use of water as a resource, to make them comparable and to incorporate them into the considerations of the integrated management concept.

2.1.4.3 Cooperation

Cooperation describes a voluntary arrangement in which two or more entities are working together towards a common goal to engage in a mutually beneficial exchange rather than competing among resources[52]. Besides the components of integration and coordination, cooperation (e. g. joint investments or training and skill sharing) between stakeholders plays a vital part in addressing management issues such as infrastructure development, financing of water management and allocation decisions[53]. Moreover, it helps to avoid crisis and conflict, improves the knowledge and promotes institutional capacities. Cooperation allows the formation of individual competencies which can result in the generation of most significant environmental, economic, political and catalytic benefits (see Table 1). To strengthen international and transboundary cooperation and to enhance negotiations over shared waters the "benefit sharing" approach is applied in various basins. Benefits can comprise anything that society recognises as valuable for their livelihood improvements such as economic development, food security and improvement of ecosystems. As stated by Phillips and Woodhouse, benefit sharing is a result of a cooperative effort at different levels with the idea of sectoral optimisation that in the end costs are reduced, and outputs increase lucratively for all

48 Grigg 1998, 24.
49 Jonch-Clausen/Fugal 2001, 503.
50 Sokolov 2006, 61.
51 Sokolov 2006, 62.
52 UNESCO 2013, 13.
53 UNESCO 2013, 13.

stakeholders involved[54]. In the context of shared water resources, benefit sharing may be defined as the process "where riparians cooperate in optimising and equitably dividing the goods, products and services connected directly or indirectly to the watercourse, or arising from the use of its waters"[55]. However, the implementation of cooperation is still critical in water-scarce and politically unstable regions. For example, agreements made cannot be honoured, the costs and the associated effects can be underestimated, or conflicts arise over unequal distribution of the net profit from cooperation[56].

Table 1: Types of river-related cooperation and possible benefits (Source: own representation based on Sadoff and Grey 2002: 393)

Dimension	Type of cooperation	The challenge	The benefits
Environmental	Type 1: Increasing benefits *to the river*	Degraded water quality, wetlands, and biodiversity	Overall environmental sustainability; improved water quality; biodiversity; soil conservation
Economic	Type 2: Increasing benefits *from the river*	Increasing demands for water, poor water/land management and development	Improved water resources management for energy and agriculture; recreation; flood-drought management
Political	Type 3: Reducing costs because *of the river*	Tense regional relations and political impacts	A policy shift to cooperation and away from dispute/conflict; from food and energy self-sufficiency to a food and energy security across borders
Catalytic	Type 4: Increasing benefits *beyond the river*	Regional fragmentation	Integration of regional infrastructure, markets and trades

2.1.4.4 Participation

Participation of different actors such as planners, users and political decision-makers from the national level down to the municipality, or from the level of a catchment up to the basin level, plays an overriding role in IWRM. For this research work, participation is broadly defined as activities such as workshops, meetings,

54 Woodhouse/Phillips 2009, 6-7.
55 Woodhouse/Phillips in press, cited in SADC 2010, 1.
56 Soliev/Wegerich et al. 2015, 2741-2742.

debates, in which the public and stakeholders encountered in water resources management are engaged and can influence the definition of policy concepts, investment decisions and the management of water resources[57]. This process may be active by consulting or actively involving people in planning and decision-making, or passive by the transmission of information[58]. Also, participatory processes promote awareness of water-related issues, create a sense of self-responsibility and increase transparency and openness, under which the likelihood of decisions conflicting with public interests are minimised[59]. Participation is expected to enhance water resources management by the overlapping of three different mechanisms[60]:

I *Providing space for deliberation and consensus building* for better quality decisions by bringing together stakeholder with different interests and positions, leading them to learn from each other to reach agreements.

II *Mobilizing and developing human and social capital* for better quality decisions and their implementation by bringing together a variety of knowledge and skills provided by participants resulting in more creative and effective plans and strategies.

III *Raising the legitimacy of decisions* to facilitate their implementation by decisions and strategies made through transparent, democratic and accessible processes that have included various representative stakeholder groups.

Proponents for participation in IWRM argue that a shift from a top-down management model[61] towards a bottom-up model is necessary, where marginalised groups at the lower end of the scale of power get engaged and have a chance to assert themselves against the interests of influential persons to advocate their interests[62]. Nevertheless, several challenges in realising the expectations of participatory projects can be identified such as higher financial costs due to extra required personnel resources, delays in decision-making through a higher time demand, asymmetrical power relations between participants or dealing with corruption, unstable political conditions and undemocratic orientation[63].

57 Carr 2015, 394.
58 Carr 2015, 394.
59 Sokolov 2006, 63.
60 Carr 2015, 395-296.
61 A top-down management model in the water management context is a process in which decisions are made by a selected group of influential specialist who are decoupled from people who live and work in the basin.
62 Carr 2015, 399-400.
63 Carr 2015, 400.

2.1.5 Interim Summary

The IWRM approach involves knowledge and skills from various disciplines as well as from diverse stakeholders to elaborate an implement equitable, efficient and sustainable solutions regarding water and development problems at all levels. Furthermore, IWRM aims to join and integrate sectoral demands (e. g. agriculture, industry, energy production, municipality), ground and surface water, upstream and downstream interest on multiple scales and level with the aim of sustainable water governance (Figure 2). Thus, IWRM is a holistic tool for managing water resources by balancing social and economic needs, and at the same time ensuring the protection of ecosystems for future generations with the overall aim to improve the conditions in the catchment basin. As such, IWRM relies on coordinated action, cooperation and partnering as well as participatory planning to foster information-sharing and exchange. Moreover, it aims to bring stakeholders together to set policy and to improve water governance structures by building up the necessary water governance structures and institutional frameworks such as River Basin Organisations (RBOs). Nevertheless, it must be stated that no universal design for IWRM implementation exists. IWRM must involve consideration of different regional aspects and characteristics to establish correct management strategies, political institutions and workable financing arrangements.

2.2 Sustainable Peace and Peacebuilding

This subchapter presents the two concepts of *sustainable peace* and *peacebuilding*. In contrast to the classical concept of peace, the concept of sustainable peace focuses on the socio-ecological dimension of justice and hence aims to support environmentally oriented values in particular. At the same time, sustainable peace is based on the central notions of war, peace and conflict, which is why these terms are briefly described for a systematic introduction to the concept.

2.2.1 Sustainable Peace

2.2.1.1 War and Peace

War is a situation or process of openly and generally armed hostile struggle between two or more organised agents of a state or non-state groups[64]. The aim is to take control of a government, to take power in a region

64 Fearon/Laitin 2003, 76.

or territory, or to use violence to change government policies in the interest of achieving the desired end by accepting the death of many fighters and uninvolved persons[65].

The concept of peace in the sense of respect for human dignity, equality of the sexes and ethnic groups as a symbol of non-violent coexistence and cooperation between cultures and religions is very young but nowadays incorporated under international law. Nevertheless, peace is a process undergoing perpetual change, which is why the maintenance involves constantly renewed dedication and peacebuilding strategies. To cope with the complexity and multidimensional nature of the term peace, a classification of the peace concept into *negative peace* and *positive peace*, according to Galtung is used. Negative peace means the absence of war and physical violence and can thus be seen as a minimal requirement of peace[66]. A positive peace complements this understanding by the absence of structural and cultural violence and is complemented by goals that go beyond the state of non-warfares such as societal cooperation, possibilities of participation and development or codetermination[67]. However, positive peace "recognizes the possibility of violence, war, and discrimination, but promotes institutions for justice, democracy, tolerance, care, and solidarity"[68].

2.2.1.2 Conflict

For the context of this work, conflict is related to transboundary water basins and is defined as "verbal, economic or military hostile actions between stakeholders over internationally shared water resources"[69]. Conflicts can occur at multiple levels within a basin, from individual irrigators to urban versus rural uses or users located in different political jurisdictions[70]. Nevertheless, it must be considered that conflicts within a basin can also have their origin in socio-economic, ethnic, religious factors and do not necessarily correlate with water resource issues. A conflict must not per se be regarded as the direct opposite of peace. For instance, social conflict in terms of mass mobilisation and civil strife can build opportunities for beneficial change in processes of governance or the distribution of resources, land and wealth[71]. The aim of conflict resolution is therefore not to avoid any disputes, but to deal with them constructively and non-violently. Furthermore, conflicts are seen as dynamic processes that can be caused or intensified by various factors. For a

65 Fearon/Laitin 2003, 76; Fox 2014, 2.
66 Galtung 1969, 182.
67 Galtung 1969, 183.
68 Oswald Spring 2008, 115.
69 Petersen-Perlman/Veilleux et al. 2017: 2.
70 Wolf 2004, 1.
71 Homer-Dixon 1994, 6.

peaceful conflict resolution, it is, therefore, indispensable to know the causes of the conflict and then to transform these factors in a targeted manner.

2.2.1.3 Factors for Conflict

In peace and conflict research, there is comprehensive research material on key factors that are considered crucial for the escalation or de-escalation of conflicts. The knowledge about these factors provides a better understanding for assessing the conflict situation of selected case studies.

In this respect, the *form of government* and *governance structures* are essential factors. Fearon and Laitin hold the view that democratic and autocratic regimes are less prone to disputes than "anocratic", which means partially democratic regimes[72]. For instance, oppositional forces in democracies are allowed to represent other interests, while in autocracies such as dictatorships, divergent opinions are suppressed, so that the escalations of conflicts can be prevented. Anocracies are usually weak regimes, characterised by lacking resources to be successful autocrats or containing an unstable mix of political forces, so they tend to be more susceptible to conflict[73]. Regardless of the political orientation, states with relatively weak governance structures are more prone to conflict than states with strong governance structures because of their potential to the effective preservation of state´s monopoly on the use of force. Another crucial factor is the *economic development* measured at economic variables such as the per capita income as they proxy grievance regarding state administrative, military, and police capabilities[74]. A low level of economic development thus increases the susceptibility of societies to conflict. This may be because a low per capita income is accompanied by weak governance structures so that the capacity of states to solve problems is also lower and tensions can arise between and within countries[75]. *Population growth* is another factor for conflict, as confirmed by the research findings of Fearon and Laitin[76]. They suggest that states with a larger population are at higher risk of conflict. This finding is supported by Collier and Hoeffler as well as Urdal as they found out that the risk of conflict increases proportionally to a country's population due to rising heterogeneity and shortage of land and other resources[77]. The *conflict history* within a state or between riparian states is also considered as an important factor. Especially countries on whose territories wars or armed conflicts have

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72 Fearon/Laitin 2003, 85.
73 Fearon/Laitin 2003, 85.
74 Fearon/Laitin 2003, 80.
75 Fearon/Laitin 2003, 81.
76 Fearon/Laitin 2003, 87.
77 Collier/Hoeffler 2004, 581; Urdal 2005, 426.

recently taken place tend to run a higher risk of conflict due to the adverse impacts of earlier conflicts on the political stability, economic development and change of regime[78].

Regarding water-related aspects, *upstream and downstream trade-offs*, as well as *environmental scarcity*, can be stated as factors for potential tensions. According to Petersen-Perlman/Veilleux et al. transboundary water conflicts are likely to occur through clashing upstream and downstream interests[79]. Especially upstream actions that are perceived as creating adverse impacts downstream such as water quality problems, inadequate water quantity and timing issues lead to trade-offs between riparian nations and disputes over shared waters[80]. Also, freshwater is with 2.5 percent of global water resources a rare commodity. Due to population growth and increasing pollution from agriculture and industries, it can lead to over-exploitation of usable water. As a result, the regenerative capacity is exceeded, and the resource becomes scarce. Furthermore, the consequences of climate change can cause freshwater scarcity, particularly in arid regions, where precipitation, evaporation and snow melting patterns change and drinking water becomes more saline[81]. The interrelationship between population growth, environmental degradation, resource scarcity and unequal access to water resources in combination with political and economic factors can cause competition for water and thus give rise to conflictual tensions or destabilisation of states[82]. However, by assessing the interrelations of conflict and environment, it must be noted that they relate to empirical data from the 1980s to the turn of the millennium. Thus, both climate change and increasing environmental degradation are phenomena that did not previously exist to this extent. Therefore the precise relevance of environmental factors for the conflict potential cannot be predicted at this point. Finally, poor *water management* can be seen as a trigger for conflict. According to Carius/Dabelko et al. adequate water institutions, infrastructure and administrative capacities, transparency, monitoring as well as centralised institutional structures are needed to balance competing interest over water allocation and managing water scarcity[83]. Also, Abukhater states that conflicts over water are "not simply a matter of water shortages, but rather the lack of equitable agreements that govern the allocation of disputed water resources (…)"[84]. This indicates that equity is at the core of water-related conflicts and need to be considered when managing shared water resource to create peace between stakeholders.

78 Collier/Elliott et al. 2003: 83-84.
79 Petersen-Perlman/Veilleux et al. 2017: 3.
80 Petersen-Perlman/Veilleux et al. 2017: 1
81 Oki/Kanae 2006, 1071.
82 Homer-Dixon 1994, 7-10, 36.
83 Carius/Dabelko et al. 2004: 61.
84 Abukhater 2013, XV.

2.2.1.4 Conflict and Cooperation over Shared Water Resources

The range of factors stated above shows that the interdependencies which lead to conflicts are very complex and diverse. However, it must be noted that despite the existence of conflicts over water, interactions over water resources are largely cooperative. In this context, Wolf developed a transboundary freshwater dispute database to collect data about cooperation and conflicts over shared water resources and thus highlights the evidence of international cooperation rather than international conflict over water[85]. From 1814 to 1998, approximately 300 treaties have been negotiated to deal with issues of water management, flood control, hydropower projects, or allocation for different uses in transboundary basin, while 47 violent conflicts over shared waters are documented in this timespan[86]. An example to illustrate the impact of water in fostering cooperation rather than conflict emerges from the Treaty between Lesotho and South Africa. In this case, water provided an incentive for peace and cooperation as these two states were able to find a consensus on the shared water resources which respected both of their needs. Water was delivered to South Africa to increase their economic potential, while Lesotho got financial assistance to build its economy[87]. Even if international disputes over water-related issues do not typically cause violent conflict, they often have led to interstate tensions and hampered development, which can impact the stability at the national and regional level[88]. However, the UNEP estimated in this context that "conflicts associated with natural resources are twice as likely to relapse into conflict in the first five years"[89]. Moreover, various authors assume that the prevalence of water conflicts will increase in the future as new environmental stressors, for instance, climate change, emerge and placing new pressure on already limited water resources[90].

2.2.1.5 The Concept of Sustainable Peace

In the previous chapter, it was shown that environmental and climate change as well as increasing scarcity of resources have consequences for people and can exacerbate existing disputes such as distribution conflicts. If such aspects are not dealt with politically, socially and non-violently, it seems questionable whether a durable peace and ecologically compatible shaping of the future is possible in regions with resource-related conflict potential. A concept that starts at the interlinkages of peace, security and the environment

85 Wolf 1998, 258.
86 Pacific Institute 2017; Wolf 1998, 258.
87 Abukhater 2013, 15.
88 Carius/Dabelko et al 2004: 61; Wolf 1998, 261.
89 UNEP 2005, 19.
90 Homer-Dixon 1994, 39; Subramanian/Brown et al. 2014, 825.

is that of *sustainable peace*[91]. The innovative element of this concept is the combination of the traditional concept of peace with ecological aspects and the aim of achieving sustainable development in the affected region[92]. Hence, the concept reacts to current problems such as environmental degradation and scarcity as aggravating factors of conflict and helps to analyse and evaluate them. The sustainable peace concept is used in chapter 3 when dealing with the conflict potential in the Ferghana Valley, where tensions over shared water resources are one main factor of conflict.

In particular, the concept of positive peace meets the understanding of sustainable peace, since both concepts encompass similar conceptions such as the realisation of human and environmental security, equity, human rights, democracy, structural stability, gender equality and participation opportunities[93]. The term is thus clearly differentiated from the negative peace concept, in which peace is merely a state of non-war, and is extended by a socio-ecological dimension. In addition to the component of positive peace, the term *sustainable* supplements the concept by the intergenerational dimension of justice and includes the view that all people and states have equal rights today and in the future, for instance in the use and conservation of resources. The concept of sustainable peace is also based on a procedural understanding and shows the need for a continuous peacebuilding process. Hence, the core question of sustainable peace research is how a transition from a conflict-prone and environmentally harmful to sustainable development can be created without opening up new environmental burdens or new areas of conflict such as water allocation disputes through the deficient implementation of a new water management system.

2.2.2 Peacebuilding

The term *peacebuilding* first emerged in 1976 through the work of Johan Galtung who described the different approaches of peacemaking, peacekeeping and peacebuilding. It can be seen that peacemaking and peacekeeping are concepts which tend to focus on measures to create a negative peace, while peacebuilding attempts to "remove causes of wars and offer alternatives to war in situations where wars might occur" to create positive peace[94]. Therefore, the creation of peacebuilding structures by addressing the underlying causes of conflict and supporting capacities for a transformation towards more sustainable, peaceful relationships and structures of governance is necessary to avoid a relapse into conflict[95]. For this reason, peacebuilding aims to achieve dialogue and reconciliation between the conflicting parties, which can also

91 Oswald Spring 2008, 120-121.
92 Brauch 2016, 211; Oswald Spring 2008, 120-121.
93 Annan 2002b; Oswald Spring 2008, 121.
94 Galtung 1976, 298.
95 UNEP 2005, 52.

be sustained in a divided society. Thus, effective peacebuilding should include measures dealing with the four dimensions – socio-economic development, good governance, reform of justice and security institutions as well as the culture of justice, truth and reconciliation[96].

The UN Secretary-General argued in his 2001 report on prevention of armed conflict that "effective conflict prevention is a prerequisite for achieving and maintaining sustainable peace, which in turn is a prerequisite for sustainable development"[97]. Therefore, comprehensive and collaborative negotiation and mediation strategies are incremental parts of the peacebuilding process. In particular, cooperation forms a fundamental component by striving for trusting partnerships between conflicting actors, in which communication mediation should also take place in a non-violent manner. Moreover, the creation of democratic institutions, where the protection of human rights and freedom is guaranteed, poverty alleviation and the improvement of regional capacity to prevent and manage crises through political and not military means are perquisites for peacebuilding and following for sustainable peace[98].

There are different political, social, economic, cultural and ecological approaches to peacebuilding processes. Nevertheless, the environment has unique qualities for contributing to peacebuilding, as nature knows no political boundaries and provides useful impulses for solutions and collaborations which can have cross-border effects[99]. As the work of Carius suggests, environmental problems have proved to be one of the few issues on which hostile groups can maintain a dialogue in the long-term[100]. Since there is a common dependence on transboundary resources such as water, a dialogue on shared environmental problems can take place even if the political situation between riparian countries is tense and other approaches to conflict resolution have failed[101]. Overall, the strengths of peacebuilding lie in the stimulation of participatory and collaborative processes at the societal and international level, as well as encourage the creation of a common regional identity[102]. However, the peacebuilding process should not focus solely on environmental issues, since Carius states that tensions regarding socio-economic and political interests can still occur[103]. For instance, more efficient irrigation systems can reduce water scarcity problems, while aggravating disputes on the local level regarding the displacement of traditional and culturally shaped systems.

96 UNEP 2005, 52.
97 Annan 2002a, 5.
98 Oswald Spring 2008, 113.
99 Carius 2006, 63-64.
100 Carius 2006, 63.
101 Carius 2006, 62, 64.
102 Carius 2006, 63.
103 Carius 2006, 64-65.

2.3 IWRM and its Linkages with Sustainable Peace and Peacebuilding

The conflict potential of water is always faced with a particular cooperation potential. The hydrological cycle connects various stakeholders, regions and nations, which share the impacts of water use and water pollution across national borders. These dependencies on the same water resource could be used to generate sustainable peace among the parties involved. Furthermore, statements by Carius suggest that water resources can be used to create a common identity in a regional context[104]. This identity building, in turn, has the potential to strengthen confidence and willingness for cooperation between the conflicting parties, beyond the water issue and cultural, ethnic and administration borders. Hence, peacebuilding measures and strategies such as treaties, the creation of dialogue and cooperation initiate and support the needed processes to secure a sustainable peace in regions marked by clashing interests and tensions.

Comparing the concept of sustainable peace and IWRM as water management approach, they contain similar aspects and objectives such as the creation of cooperation, coordination and participation opportunities as well as the creation of justice between people living today and future generations. Both concepts try to contribute to sustainable development by focusing on environmental protection and ecological sustainability. Moreover, just as in the IWRM approach, the participation of women and equal conditions play an important role in peacebuilding and for sustainable peace. A joint report by several UN organisations (UNEP, UN Women, PBSO, UNDP) from 2013 supports this assumption and underlines the importance of women, especially at the interface of natural resources, conflict and peacebuilding[105]. Thus, "more equality in the access to and management of natural resources [land, forest and water] could enable women to support their families more effectively, contribute to community decision-making and work against distortions in the control of natural resources that could trigger conflict"[106].

Due to the similarities of the approaches, IWRM might have a peacebuilding potential in regions threatened by transboundary water conflicts. In his book "Water as a Catalyst for peace – Transboundary Water Management and Conflict Resolution", Abukhater (2013) provides implications for recognisable interlinkages between IWRM and sustainable peace. Accordingly, water management and related allocation policies are recognised to build up the basis for long-term cooperation and trust between the parties by implementing strong institutions, participation and optimal water allocation processes founded on the principle of equity[107].

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104 Carius 2006, 63.
105 See UNEP/UN Women et al. 2013.
106 UNEP/UN Women et al. 2013: 10.
107 Abukhater 2013, 2.

3. The Ferghana Valley: An Overview

To contextualise the tensions and to get a deeper understanding of the causes of conflict, this chapter includes a description of the study area and gives a brief overview of the geographical, hydrological, socio-economic, historical and water political situation as well as climatic changes in the Ferghana Valley. However, this chapter is not aimed at covering all aspects and details of the ongoing conflicts but enables to capture and evaluate the IWRM concept with regard to its peacebuilding potential in the selected region.

Table 2: Overview and comparison of key figures of Uzbekistan, Kyrgyzstan and Tajikistan (Sources: Economist Intelligence Unit 2016; UNDP 2016, 198-201; Borthakur 2017, 335; World Bank 2017a; CIA World Factbook 2018)

	Uzbekistan	**Tajikistan**	**Kyrgyzstan**
People & Society			
Total population (2017 est.)	29,748,859	8,468,555	5,789,122
Ferghana Valley total state territory [%]	60 %	25 %	15 %
Ethnic majority [%]	Uzbek: 80 %	Tajik: 84 %	Kyrgyz: 73 %
Ethnic minority [%]	Russian: 5.5 %, Tajik: 5%, Kazakh: 3%	Uzbek: 13.8 %, Others: 2%	Uzbek: 14.6 %, Russian: 5.8 %, Dungan 1.1 %, Others: 5.3 %
Socio-economic conditions			
HDI[108] (0 - 1)	0.071 (high)	0.627 (medium)	0.664 (medium)
GNI[109] [US$]	5,748 US$	3,097 US$	2,601 US$
Youth unemployment rate (age 15 - 24) [%]	17.5 %	15.6 %	15 %
Political situation			
EIUDI [110] (0 - 10)	1.95	1.89	4.93

[108] The Human Development Index "integrates three basic dimensions of human development. Life expectancy at birth reflects the ability to lead a long and healthy life. Mean years of schooling and expected years of schooling reflect the ability to acquire knowledge. And gross national income per capita reflects the ability to achieve a decent standard of living" (UNDP, 2016, 3). The higher the value, the higher is the human development.

[109] The Gross National Income is a measure of a countries income and is the sum of a nation´s gross domestic product and the net income it receives from overseas (UNDP 2016, 201).

[110] The Economist Intelligence Unit´s Democracy Index is based on 5 categories (electoral process and pluralism; civil liberties, the functioning of government; political participation, and political culture) and 60 indicators within these categories. Each countries score is ranked on a scale of 0 to 10, ranging from authoritarian regime (0-4), hybrid regime (4-6), flawed democracy (6-8) and full democracy (8-10) (Economist Intelligence Unit 2016).

3.1 Geographical Location, Water Resources and Climate

3.1.1 Geographical Location

The Ferghana Valley is a triangular intermountain basin located in southeast Central Asia and is shared between Kyrgyzstan, Tajikistan and Uzbekistan. The valley is approximately 300 kilometres long, up to 170 kilometres wide and covers a flat area of 22.000 square kilometres. It is enclosed by the extensive Tian Shan mountain ridges of Kurama and Chatkal in the northwest of Uzbekistan, by the Ferghana Mountain in the northeast and is bordered in the south by the Turkestan and Alay ranges.

3.1.2 Water Resources and Climate

In contrast to the steppe shaped Central Asian landscape, the Ferghana Valley owes its fertility and agricultural usability to two rivers – the Naryn and the Karadarya which arises in the Tien Shan Mountains of the Kyrgyz Republic. The Karadaya (flow of 3.9 km^3) joins the Naryn (flow of 13.8 km^3) in the Ferghana Valley, near the Uzbek city Namangan, and forms the Syr Darya, which is the longest transboundary river in Central Asia with a length of 3,019 km and a mean annual flow of 37 km^3 [111]. Within the Ferghana Valley, approximately 30 small mountain rivers are considered as transboundary tributaries to the Syr Darya (Figure 3). Most rivers originate in the Tien Shan mountain range in Kyrgyzstan and are fed by snow and glaciers melt as well as summer precipitation[112].

The annual rainfall underlies regional and seasonal variability and varies from 100mm precipitation in the west to 170 mm in the pre-mountain zones[113] of which 16 percent occurs in March and only 6 percent in July and August[114]. The average temperature in the valley is 13.1°C, ranging from 2.5°C in January and 27°C in July with possible absolute minimum and maximum of –27°C and +44°C[115]. Owing to the precipitation patterns as well as the close relationship of temperature, glacier melt and discharge, the water flow regime can be classified into two main hydrological seasons, a flood period during the summer months and a low-water season in the winter months[116].

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111 Wegerich/Kazbekov et al. 2012: 548.
112 Alford/Kamp et al. 2015: 1; Pak/Wegerich et al. 2014: 232.
113 The data of the annual precipitation within the Ferghana Valley can vary between authors. For instance, according to Reddy/Muhammedjanov et al. (2012, 823) the annual precipitation varies from 109 mm to 502 mm per year.
114 Wegerich/Kazbekov et al. 2012: 550.
115 Reddy/Muhammedjanov et al. 2012: 823; Wegerich/Kazbekov et al. 2012: 550.
116 Wegerich/Kazbekov et al. 2012: 550.

The total amount of water is not equally distributed within the valley, which is why significant disparities in water availability between the riparian countries occur. Hence, it varies from an average of 5,000 m^3 per person annually in the upstream countries such as Kyrgyzstan and Tajikistan to approximately less than 300 m^3 in the downstream countries such as Uzbekistan[117].

Also, the high annual evaporation rate with 1133 mm to 1294 mm throughout Ferghana Valley, exceeds the annual amount of precipitation and can thus exacerbate adverse impacts of already existing unequal water distribution[118].

Overall, the climate in the valley can be classified as arid with dry continental conditions. However, in the future, the climate in Central Asia and following in the Ferghana Valley will change with consequences for humans and the environment. Climate change scenarios for Central Asia indicate an increase in surface air temperature of 3°C to 5°C by 2080 as well as an accompanying increase of aridity due to higher evaporation and reduced soil moisture[119]. As result droughts and heat waves are more likely to occur. Moreover, the amount of precipitation is projected to decrease slightly by ~ 1 mm per day till 2050[120] with a stronger decrease in the southwestern parts of Central Asia, where the Ferghana Valley is located[121].

Nevertheless, increasing temperature has an adverse impact on snowmelt and glaciers, the primary source of water for the Syr Darya and its tributaries. The monitoring data indicate a reduction of glaciers by 32 percent in the Northern Tien Shan, 29 percent in the Western Tien Shan Mountains and till 2100 a mean reduction for Central Asian glaciers by 55 - 75 percent[122]. Thus, in the short-term the runoff of meltwater will increase, while in the long term by 2050 the Syr Darya will be reduced by approximately 5 percent as a result of the loss of glaciers, rising temperatures, increased evaporation and reduced surface runoff[123].

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117 Alford/Kamp et al. 2015: 1.
118 Reddy/Muhammedjanov et al. 2012: 823.
119 Lioubimtseva/Henebry 2009, 967.
120 The range of precipitation projections produced for Central Asia are still uncertain. Other authors such as Radchenko/Dernedde et al. (2017, 718) assume an increase in precipitation (13 - 30 mm per month), especially in the cold period between October and April.
121 Lioubimtseva/Henebry 2009, 967.
122 Bolch 2007, 10; Khromova/Dyurgerov et al. 2003: 4.
123 Zoi environmental network 2009, 64.

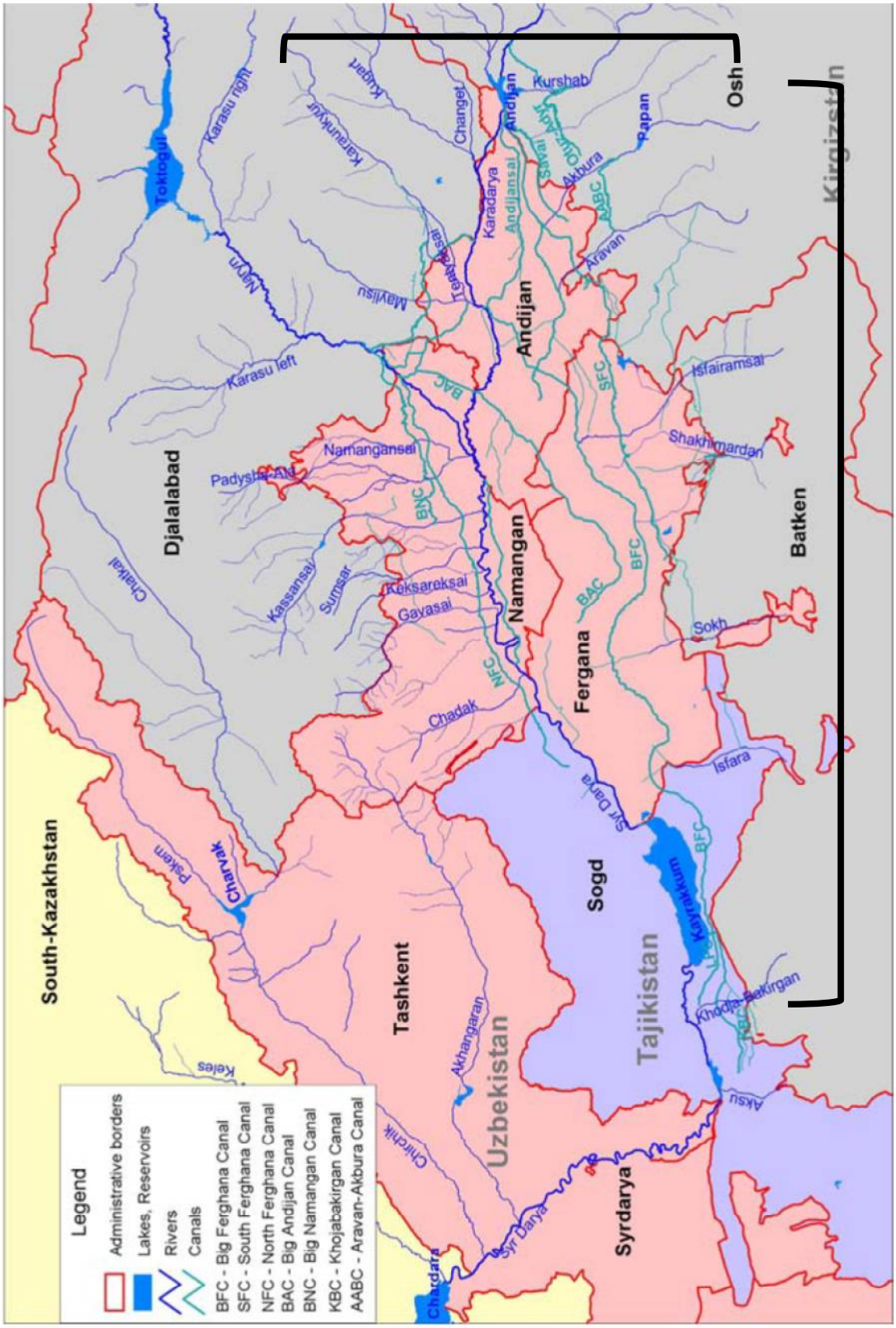

Figure 3: The geographical location of the Ferghana Valley and its hydrology. The black border has been added to facilitate the localization of the valley. (Source: Wegerich/Kazbekov et al. 2012: 549.)

3.2 Socio-Economic Conditions

3.2.1 Society

The Ferghana Valley is one of the most densely populated areas of Central Asia with nearly 12 million inhabitants and a density on average of 360 persons per square kilometre up to 550 persons in some places. The valley is marked by cultural heterogeneity and consists mainly of Uzbeks, Kyrgyz and Tajiks as well as a substantial population of Russians, Dungan and others (Table 2). However, the population is not equally distributed, which, combined with high population growth, lead to a regionally intensified overpopulation[124].
Furthermore, the HDI shows disparities between the development stages of all three riparian countries, which leads to social tensions in the long-term. Thus, Uzbekistan is characterised as a country with high human development, while Tajikistan and Kyrgyzstan are classified as medium developed countries (Table 2). Moreover, the GNI shows that Kyrgyzstan is the poorest country in the region followed by Tajikistan, while Uzbekistan the most prosperous country (Table 2). Furthermore, the youth unemployment rate of total labour forces ages from 15 to 24 is relatively high (Table 2). As a result of the poor integration of the youth into the economy, high poverty rates as well as the impending lack of prospects, mass migration to Russia was triggered[125]. Increasing restriction and stricter immigration policies have forced migrants to return to their home countries without a source of income, access to adequate health and education services nor reintegration into the labour market[126].
The represented religions are limited to a minor number of Orthodox Christians but mainly to Islam, which is the predominant religion throughout Central Asia. Since the 1990s the Ferghana Valley has been considered a hotspot of Islamic extremism. For instance, in the year 2000 the Kyrgyz city of Batken bordering Tajikistan was invaded by Muslim extremists, and again in 2005, armed religious extremist attacked city offices and a prison in the Uzbek city of Andijan[127].

3.2.2 Economy

The Ferghana Valley is a major producer of cotton, fruits and vegetables as well as hydropower in the region. Due to the mountainous relief, the upstream countries of Tajikistan and Kyrgyzstan are rich in water re-

124 Borthakur 2017, 341.
125 Inter-Agency Regional Analysts Network 2017, 2-3.
126 Inter-Agency Regional Analysts Network 2017, 5.
127 Borthakur 2017, 345.

sources, but poor in oil, gas and coal and thus rely on hydropower for their energy supply[128]. Hydropower supplies in 2014 accounts for 97.1 percent of Tajikistan's electricity and 91.3 percent in the Kyrgyz Republic, which is used for both domestic and export[129]. However, the hydropower resources experience seasonal variability, leading to excess summer supply and winter shortages, which is why these countries aim to expand hydropower production[130]. In contrast, downstream countries such as Uzbekistan are dependent on water inflow from the upstream countries to maintain their agricultural land under arid conditions by ensuring summer irrigation supplies. The primary sources for irrigation are the rivers Naryn, Karadarya and the Syr Darya as well as the small tributaries on the left slope of the Ferghana Valley (subchapter 4.1.2). Crop production is a central component of the valley's economy and accounts for approximately 90 percent of total water withdrawal in the Syr Darya basin[131]. Uzbekistan holds 4.3 million hectares of land being irrigated out of 7.4 million hectares and is thus the leading producer of crops within Ferghana Valley[132]. Winter wheat and cotton are the predominately cultivated crops. Uzbekistan is the World's fifth largest cotton exporter in 2016/2017 with a total export of raw and non-retail pure cotton garn of 484 million US$ in 2015 which is equivalent to 13.6 percent of total annual exports[133].

3.3 Conflict History

The states of Ferghana Valley, as well as the two other states of Central Asia (Turkmenistan and Kazakhstan), share a common history of being united under the socialist-oriented Soviet Union from 1922 to 1991. During the Soviet Union era, water management, monitoring of construction projects for hydropower and agricultural purposes as well as the coordination of infrastructure, were centralised and coordinated by the Ministry of Land Reclamation and Water Management in Moscow[134]. In the 1960s, the Soviet authorities initialised irrigation development projects by the construction of large dams, reservoirs, canals and pumps with the aim to convert desert areas into arable land to improve the economy and addressing food and cotton fibre security[135]. However, the one-sided economic development led to water scarcity, environmental depletion and degradation in the long-term, which is why quotas, protocols and treaties among the riparian countries were adopted and River Basin Organisations (RBO) were created to ensure adequate coordination

128 Alford/Kamp et al. 2015, 1.
129 World Bank 2017b.
130 Alford/Kamp et al. 2015, 1.
131 Alford/Kamp et al. 2015, 1; Frenken 2013, 41.
132 ICWC data 2011, cited in Alford/Kamp et al. 2015, 1.
133 OEC 2015; Statista 2018.
134 Dinar/Dinar et al. 2007: 293.
135 Dinar/Dinar et al. 2007: 90.

and cooperation. Thus, for instance, in 1986 an Syr Darya RBO was founded to oversee plans approved by the Soviet Ministry[136]. Also, a *Treaty Concerning the Regime to the Soviet-Afghan Frontier* was signed between the central Asian states and Afghanistan in 1958, which established water-related environmental and ecological standards, prevention measures against pollution as well as data and information exchange mechanisms[137].

After the collapse of the Soviet Union in 1991, the authorities in Moscow determined that the Ferghana Valley need to be divided into three separate nations, although they have been within the territory of one state throughout history. As a consequence, ethnic-related conflicts arose due to the fragmentation of people of the same religion and related language group into minorities within each other territories[138]. Hence, violent conflicts such as the *Tajikistan Conflict of 1997-1998*, where Uzbeks minorities tried to gain more autonomy in the northern part of Tajikistan or the *Second Osh-Jalalabad Conflict of 2010* between the Kyrgyz and Uzbeks in the Osh-Jalalabad region in Kyrgyzstan, caused tensions between the riparian states within Ferghana Valley. These tensions were reinforced by increased economic competition and disputes over the national resources such as arable land and water. Through the independence of the central Asian republics, financial aid from Moscow was ceased, and the individual states focused on their economic development by maximising its water allocation to meet the increasing demand (irrigated agriculture downstream and hydropower upstream) without reference to regional needs or transboundary water cooperation[139]. Without the presence of central planner authorities, Kyrgyzstan increased winter discharges of water from their dams to meet its winter power demand and started to reduce summer releases to store water for the next dry winter season[140]. As a result, the downstream counties suffered under irrigation water shortages during the summer season and occasionally flooding in winter due to larger amounts of water, causing agricultural losses[141]. Thus, the downstream riparians became increasingly dependent on adequate water withdrawals of their upstream neighbouring countries, which increased the potential for conflict[142]. To prevent violent conflicts, in 1998, the *Syr Darya Basin Agreement* was adopted by the governments of Kyrgyzstan, Uzbekistan, Tajikistan and Kazakhstan. This barter agreement ordered to discharge water during the summer month so that agricultural land in Uzbekistan could be irrigated and in return, the downstream countries transferred

136 Dinar/Dinar et al. 2007: 293.
137 Dinar/Dinar et al. 2007: 294.
138 Sari 2013, 8, 16.
139 Dinar/Dinar et al. 2007: 289.
140 Abbink/Moller et al. 2005: 1.
141 Abbink/Moller et al. 2005: 1.
142 Dinar/Dinar et al. 2007, 210.

electricity, coal and gas to Kyrgyzstan during the winter month[143]. Nevertheless, conflicts over water resources occurred, mainly due to non-compliance with the agreement requirements, since no specific volume of water to be released in exchange for a given amount of coal nor how water has to be stored during the wet years and released during dry years was determined. A conflict worth mentioned here is a development dispute between the central Asian republics in 2012, where Uzbeks cut natural gas deliveries to Tajikistan in relation over two Tajik hydroelectric dam projects which were suggested to have adverse impacts on downstream water supply[144]. Since then till 2017 no other disputes over water resources are listed in the Pacific Institute Water Conflict Chronology[145].

3.4 Political Situation

After the dissolution of the Soviet Union and with the independence of Kyrgyzstan, Uzbekistan and Tajikistan the forms of government have developed in different directions. According to the Economist Intelligence Unit´s Democracy Index (EIUDI), Kyrgyzstan can be regarded as the most democratic country in Central Asia with a relatively high level of democracy compared to Tajikistan and Uzbekistan (Table 2). The democratic structures of Kyrgyzstan are mainly based upon a violent revolution in 2010, resulting in a regime change as well as in a constitution, which constrained the power of the president. Nevertheless, conflicts are likely to occur due to increasing social dissatisfaction and the inability of the government to control the different interests in the country[146]. In contrast, the authoritarian regime and repressive police state of Uzbekistan is seen as a stable country due to the power of the government to curtail freedom of expression, religion and the possibility to impede rising conflicts through not legally conformant procedures. According to Peimani, Tajikistan can be classified as unstable, because of persistent economic problems, regional disparities, underdevelopment, poverty and clan politics[147]. Also, the expansion of Islamic groups such as the Hizb ut-Tahrir in Tajikistan reinforces the inter- and intrastate instability, since they weaken the government by advocating a regional fanatic Islamic state[148].

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143 Abbink/Moller et al. 2005: 1; Dinar/Dinar et al. 2007: 210.

144 Pacific Institute 2017.

145 However, newspaper articles such as the Forbes article "Will Central Asia Fight over Water Resources?" from Feb 6, 2017 (Shahbazov 2017) or the News Deeply article "Climate Change Leaves Women Farmers in Central Asia Fighting for Water" from Sep 1, 2017 (Arnold 2017) indicates that tensions are still present and conflicts are possible to occur. Nevertheless, no violent conflict occurred since the Second Osh-Jalalabad Conflict in 2010.

146 Peimani 2009, 3.

147 Peimani 2009, 4.

148 Peimani 2009, 4.

3.5 Multi-Dimensional Causes of Potential Conflict in the Ferghana Valley

The Ferghana Valley is particularly vulnerable to conflicts due to two key components: (i) tensions due to the clash of economic interests over shared water resources and (ii) tensions between ethnic groups triggered by social aspects as well as various ecological, ethnic, economic, social and political factors. Thus it becomes clear that the potential for conflict in the valley is based not only on water-related factors such as water scarcity with subsequent changes in water access and availability but also on social and ethnic inequalities between and within the riparian states. The causal network (Figure 4) serves to illustrate the interdependencies between the underlying conflict factors.

(i) However, one main reason for conflict is the discrepancy between economic interests and the ensuing competition for water. The desire of the upstream countries to promote hydroelectric power in winter collides massively with the interests of the downstream countries, which have to store water for irrigation in summer. The collapse of the Soviet Union and the independence of former Soviet states have intensified these upstream and downstream trade-offs, as central planning authorities and financial resources for a controlled expansion of the economy were lacking. Furthermore, Kyrgyzstan, Tajikistan and Uzbekistan are among the poorer countries in a global comparison. In combination with an increasing population and high unemployment rates, this poverty leads to migration flows to Russia as well as integration problems of the labour force into the own economy. These discrepancies between social and economic development show severe inequalities within and between the neighbouring states. This circumstance increases dissatisfaction within the population, which leads to conflictual tensions between disadvantaged groups and has a potential for political destabilisation. To counteract these processes, each state tries to promote its economic development, usually without taking into account the needs of their neighbouring states, which merely strengthens the competitive relationships. Furthermore, the for this development urgently needed water resources are becoming scarcer, in particular, because of water pollution and increased withdrawals due to an increase in demand and climate change impacts. With increasing scarcity, the possible withdrawal rate decreases, which has a negative impact on the general water availability and access to usable water. This increases competition among states for the resource and consequently the general potential for conflict over shared waters. Overall, the conflict factors stated in subchapter 2.2.1.3 – economic development, upstream and downstream trade-offs, environmental scarcity and population growth – can be found here, which in the specific case of the Ferghana Valley can be supplemented by the conflict factor of social inequality and societal dissatisfaction.

(ii) Secondly, conflicts on the basis of ethnicity exacerbate the transboundary water dispute in the Ferghana Valley, as they increase people's willingness to use violence. These ethnic-related tensions are triggered by the formation of Islamic structures in the area as well as historically substantiated factors such as the demarcation of ethnic groups and the formation of autocratic regimes after the dissolution of the Soviet Union. As mentioned in subchapter 2.2.1.3 the political situation regarding the form of government and governance structures can be decisive whether a conflict breaks out or not. Moreover, Borthakur states that the cultural heterogeneity makes the Ferghana Valley more prone to conflict due to the presence of various ethnic groups who live nearby in combination with the insecurity and fear of marginalisation and territorial acquisition by other groups[149]. As consequence of adverse socio-economic conditions, social inequalities as well as the political and ethnic situation, Islamic groups such as the Islamic Movement of Uzbekistan or the Hizb ut-Tahrir in Tajikistan are gaining widespread support and popularity as the minorities are searching for personal security and social safety in religion. Moreover, social tensions intensify tensions between ethnic groups as the problem of overpopulation causes higher demand for labour and natural resources such as water or land, which exacerbates competition for control of these resources[150].

Overall, the conflict situation in the Ferghana Valley is highly complex and comprises several interrelated factors. It can be said that the ethnic, social and economic disputes between the three countries of Ferghana Valley increase the potential for conflict in the region and that both intra-state and inter-state conflicts are possible today and in the future.

149 Borthakur 2017, 336.
150 Borthakur 2017, 341.

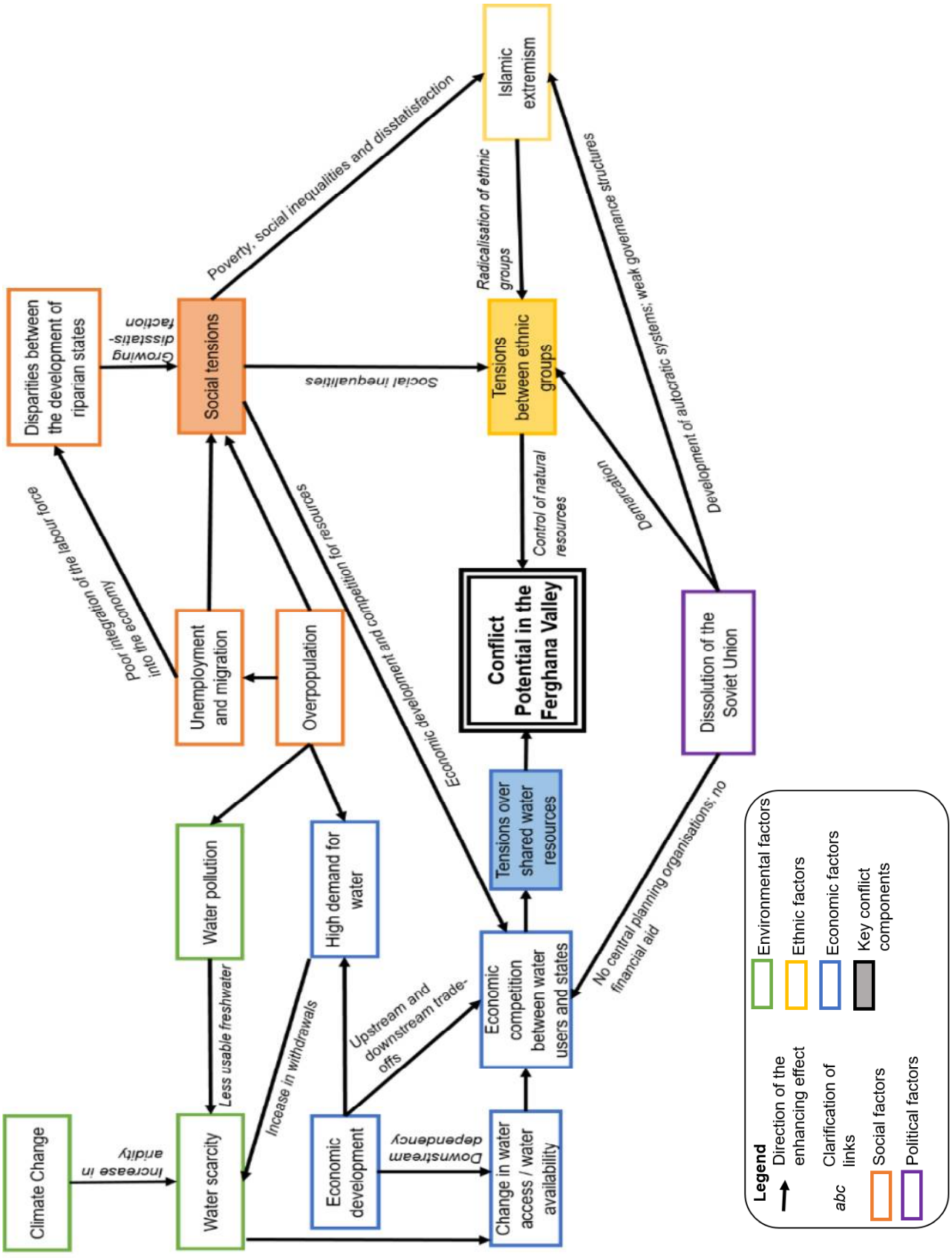

Figure 4: The causal network of the multi-dimensional causes of conflict in the Ferghana Valley. (Source: own representation based on the results of chapter 3 and the expert interviews)

4. Methodology

4.1 Introduction

The study methodology consists of a range of qualitative methods to achieve the stated objectives. The methodological procedure can be subdivided into three main phases:

The *first phase* involved a literature review as well as internet-based research to obtain theoretical background information on the concept of IWRM, sustainable peace, peacebuilding and the key linkages between the three components. Moreover, data was collected about the Ferghana Valley and the geographical, hydrological, socio-economic, historical and water political aspects to get a deeper understanding of the sources of tensions and the potential for conflict. Main sources of information included reports and publications from international organisations such as the United Nations (UN-Water, UNESCO, UNEP), Global Water Partnership and World Bank reports. To obtain reliable information about the Ferghana Valley, sustainable peace and peacebuilding, hydro political literature, as well as papers from the field of conflict and peace research, were used.

The *second phase* of research consisted of five semi-structured expert interviews with a pre-developed interview guide to collect qualitative data to understand the case related weaknesses/challenges and strength/opportunities of IWRM as peacebuilding concept to build transboundary and sustainability-oriented peace. While data acquisition and a community-based assessment in the Ferghana Valley was not possible due to resource constraints, the interview partners are situated in Germany and include experts from the field of water management, conflict research and development aid.

In the *third phase*, all interviews were transcribed, coded and then analysed.

4.2 Data Collection Instrument: The Expert Interview

Qualitative research methods are predominantly used to explore, describe, or explain new or under-researched areas since a higher degree of flexibility and openness is required[151]. The literature review has illustrated that while the theoretical framework of IWRM and causes of conflict in the selected region have been well studied, the peacebuilding potential of IWRM with its focus on Ferghana Valley has not yet been sufficiently investigated in science. Therefore, a qualitative method is suitable to generate information about weaknesses/challenges, strength/opportunities, previous achievements and recommendations of

[151] Leavy 2014, 2.

IWRM as peacebuilding approach. As the necessary information could not be sufficiently obtained by literature review, qualitative expert interviews were conducted to supplement information to the available written sources.

Expert interviews are a particular form of qualitative interviews and are considered to be one of the most frequently used methods in empirical social research[152]. However, they do not differ from other qualitative interview approaches in their systematic procedure. According to Flick, an expert is a person with specific capacities in a certain field of activity which represents a group of specific experts[153]. In accordance with Mack/Woodsong et al., the main reasons for interviews include (i) the opportunity to get interpretative perspectives and experiences of certain experts on the given research problem and (ii) to produce findings that were not determined in advance[154]. Furthermore, the method is characterised by active communication and interaction of researchers with participants by asking follow-up questions or listening attentively to responses[155].

4.3 Sampling and Interview Procedure

To obtain valid research results, the selection of interview partners was based on stakeholder diversity (scientific institutions, consulting institutions, government-related bodies, river basin organisations, NGOs) as well as their working area and expertise in the field of transboundary water management, peace and conflict research or related experiences in Central Asia and the Ferghana Valley. As soon as potential interview participants were identified, the first contact was established via email, including an introductory letter about the topic of interest and a guideline of the interview. Although attempts were made to include a wide range of stakeholders during the sampling process, feedback received was very limited and contacted representatives of national and international NGOs, as well as representatives of RBOs, were found to be unavailable for interviews. In total, five interview partners were selected for the expert interviews (Table 2).

The first interviewee Dr Benjamin Pohl was selected due to his expertise in global environmental change and its significance for conflict as well as foreign-, security-, and development policy. Moreover, Dr Benjamin Pohl is working on topics of water cooperation in Central Asia. The second participant is Dr Volker Frobarth. He is the Director of Portfolio of the German Federal Foreign Office in Afghanistan and the former Director of the Transboundary Water Management Programme in Central Asia, which started in 2009. Dr Alisher Mirza-

152 Leavy 2014, 3.
153 Flick 2009, 165.
154 Mack/Woodsong et al. 2005: 1, 30.
155 Mack/Woodsong et al. 2005: 33, 42, 116.

baev was the third interviewee and was able to contribute personal experiences as he grew up in the Ferghana Valley. He is also an expert on climate change, land degradation and sustainable land management in Central Asia. The fourth interviewee is Prof Dr Bernd Klauer from the Helmholtz Centre for Environmental Research. He is the head of the Working Group Social Science Water Research and an expert in the field of environmental and sustainability politics, the EU-Water Framework Directive and could gain insights into conflict and water management research in Jordan. The last participant is Dr Caroline Milow, an expert in water governance in Uzbekistan as well as the present Director of the Transboundary Water Management Programme in Central Asia.

Table 3: Information about the interview partners

Interview Partner No.	Name of interview partner	Name of Institution [Form of Stakeholder]	Interview focus
IP 01	Dr Benjamin Pohl	adelphi GmbH [private research and consulting institution]	Conflict research
IP 02	Dr Volker Frobarth	German Agency for International Cooperation (GIZ) GmbH [government-related body]	IWRM implementation
IP 03	Dr Alisher Mirzabaev	Centre for Development Research (ZEF) [research institution]	On-site experience, drought management
IP 04	Prof Dr Bernd Klauer	Helmholtz Centre for Environmental Research (UFZ) [research institution]	Water management
IP 05	Dr Caroline Milow	German Agency for International Cooperation (GIZ) [government-related body]	IWRM implementation

The selected qualitative method aims to identify subjective perspectives of the interviewees and to interpret the results to derive general knowledge as well as to reconstruct the reality[156]. Semi-structured interviews are suitable for this purpose, as they "can make better use of the knowledge-producing potentials of dialogues by allowing much more leeway for following up on whatever angles are deemed important by the interviewees (…)"[157]. To assure that the objectives of this research were addressed appropriately and to provide a reference framework, an expert interview guideline has been developed. The interview guide has a directive function with regard to excluding unproductive topics by providing a clear set of instructions and questions[158]. It was based on the following questions:

156 Leavy 2014, 2-3.
157 Brinkmann 2014, 286.
158 Flick 2009, 167.

- What are the linkages between environment, conflict and peacebuilding?
- How can IWRM contribute to sustainable peace in arid regions threatened by transboundary water conflicts?
- Which differences do the interview partners identify as a reality that constrains or enhance IWRM as peacebuilding approach for sustainable peace?

The question catalogue has been structured into an introductory section, including descriptive questions about the participant´s field of research. The main section continued with more precise issues regarding the weaknesses/challenges and strength/opportunities of IWRM as peacebuilding approach in Ferghana Valley, the practical relevance of certain IWRM components for conflict resolution, reasons for future vulnerabilities and recommendations for improving the IWRM approach in the selected region. The concluding part gave room to ask questions in return as well as to address formal issues. The order of the questions was not binding since the course of the conversation should be as close as possible to a natural communication process. To allow the informants the freedom to express their views in their terms, mostly open-ended questions were used.

All interviews were held via telephone and were audio-recorded with a dictation machine. Telephone interviewing comprises several advantages such as better interviewer uniformity, greater standardisation of questions, greater cost-efficiency and most important, better opportunities for interviewing people who live far from the interviewer. The interview results were paraphrased and categorised in tables. Since all interviews (except interview IP 03) were conducted in German, the literal quotes were translated by the author.

4.4 Data Analysis: Qualitative Content Analysis

All interviews were transcribed with the help of *easytranscript*, a free program for scientific transcription. Nuances of accents, certain emphasis, use of fillers as well as non-verbal communication were not written down as it was not considered relevant to answer the research question. Also, grammatical errors have been corrected. The methodological research approach of this thesis is the *qualitative content analysis* according to Mayring[159].

The qualitative content analysis is a classical and widely used evaluation method of qualitative research and serves to structure the content of large quantities of written data material such as transcripts of interviews[160]. Moreover, the method aims to work out and summarise specific topics, contents and aspects from

[159] Cf. Mayring 2000.
[160] Mayring 2000, 2.

the material under previously defined classification criteria[161]. At the same time, these aspects form the structure of a category system. In accordance with Mayring, the procedure was as follows: First of all, main categories were formed deductively from the transcribed material, the research question and the interview guide. Subsequently, root categories and subcategories were inductively[162] developed[163]. The entire category system was then defined, tested and modified in continuous feedback loops. Finally, the entire material was encoded with the revised category system.

These four main categories have been developed to obtain information on the subject matter of the study:

- Weaknesses and Challenges
- Strengths and Opportunities
- Achievements
- Recommendations

To present the factors that restrict IWRM as peacebuilding approach, the category *weaknesses and challenges* deals with general and IWRM related weaknesses/challenges as well as future developments and their negative impacts on a sustainable peace process. The category *strengths and opportunities* comprises the information given in the interviews on IWRM related factors that contribute to sustainable peace within the region such as the IWRM pillars of implementation or possibilities to cope with future challenges. The category *achievements* summarise current technical, political and social achievements gained through IWRM in the Ferghana Valley to present the successes of IWRM projects. The main category *recommendations* includes the possibilities mentioned in the interviews to adapt the IWRM approach in Ferghana Valley to build sustainable peace. Thus it provides recommendations for future IWRM projects as well as socio-economic and political requirements to reduce vulnerability but enhance resilience to future challenges with the aim to support a continued peaceful situation.

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161 Mayring 2000, 4.

162 In the inductive approach, the categories are not created before the material has been examined, but are derived directly from the material without referring to previously used theoretical concepts (Mayring 2000, 3.).

163 Mayring 2000, 4.

5. Empirical Results

5.1 Weaknesses and Challenges

The interview partners identified a total of six general problems that restrict IWRM in its peacebuilding potential – Islamic extremism; ethnicity, religion and mentality; social tensions; economic and political challenges as well as environmental and agricultural problems. These factors are not directly related to the IWRM concept but limit the success of IWRM as a peacebuilding approach through external influences specific to the Ferghana Valley. Moreover, the stated factors increase the potential of future conflicts and thus represent a threat to sustainable peace in the region. Furthermore, three directly to the IWRM approach related weaknesses and challenges could be identified – the concept complexity, sectoral integration problems and challenges related to IWRM measures. Also, climate change and the socio-economic development are future challenges in the Ferghana Valley with likely adverse impacts on sustainable development.

5.1.1 General Weaknesses/Challenges

Islamic extremism is described as a factor not to be underestimated. Although radical Islamic movements were largely driven out of the Ferghana Valley, a rapid escalation of the current situation is conceivable mainly due to the high population density and the associated problems such as unemployment and resource scarcity[164].

IWRM faces challenges regarding *ethnicity, religion and mentality*. Prof Dr Klauer emphasises that water is not the main component of conflict and ethnicity or religiosity are dominant factors which superimpose the water issue. Such political, religious or ethnic tensions create communication barriers between the conflicting parties and, as a result, lead to inefficient and unequal water use, which can reinforce existing disputes[165]. The conflict potential is also increased by the multitude of local identities since each district has its dialects, costumes, traditions and family clans, which leads to different values and mentalities within the region[166]. These differences can be seen in the lack of a common understanding of sustainability, which makes the implementation of IWRM measures as well as a peaceful coexistence more difficult[167].

The interviewees also identified *social tensions* which are strongly linked to *economic challenges* as factors that could hinder the process towards sustainable peace. Firstly, people's dependence on water for down-

164 IP 02; IP 03
165 IP 04
166 IP 05
167 IP 05

stream irrigation, combined with poor water management, leads to unequal distribution between water users[168]. These trade-offs give rise to conflicts, particularly at local level. For example, some farmers have stronger pumps and withdraw water from their neighbours or the water stored in winter is drained for upstream energy production, which in some cases can lead to floods and mudflows downstream with massive economic damage to localities, infrastructure and the livelihoods of the population[169]. Another component which needs to be considered when discussing the challenges in the Ferghana Valley is the high population density and the economic focus on agriculture[170]. As a consequence, the available land is scarce, and the economic vulnerability increases as large parts of the population depend on jobs in the agricultural sector[171].

After the collapse of the Soviet Union, political challenges with a certain conflict potential arose in the independent states. Dr Pohl holds the view that, "in the political disintegration it is hardly realistic to maintain such ambitious cooperation in the area of resources (…) as the Soviets have established there [Ferghana Valley] through the infrastructure". Dr Milow notes that the success of IWRM highly depends on the political will of those responsible, as water can also be used as a means of political pressure when there are issues between the riparian states. The shared water resource would therefore not be seen as a possibility for peacebuilding but would lead to tensions. Dr Pohl nonetheless argues that water has only an indirect potential for conflict, as it just triggers problems in a socio-economic or institutional context which in turn directly causes conflicts. This assumption is supported by Dr Mirzabaev as he states that water is not a natural cause for conflicts in the Ferghana Valley, but the interplay between natural resources and the political situation create tensions which just can be reinforced by water issues. Another aspect is the very complex and difficult border demarcation in the region which creates tensions at the borders between farmers, border patrols, family clans and ethnic groups[172].

Factors that can adversely affect the economic development and livelihood of many people are environmental and agricultural problems that promote overexploitation of resources and limit their availability. These include soil degradation due to salinisation because of artificial irrigation and contamination with pesticides as well as the contamination of groundwater by overburden dumps from uranium mining and mercury lakes resulting from gold mining[173]. According to Dr Frobarth, approximately 25 km3 of untreated agricultural wastewater is discharged annually into dry areas for evaporation and contaminates the soil and ground-

168 IP 01; IP 03; IP 04
169 IP 01; IP 02; IP 05
170 IP 02
171 IP 01; IP 02
172 IP 01; IP 02; IP 05
173 IP 02; IP 04

water. Moreover, people are becoming more vulnerable to flood events in the Syr Darya basin caused by both, winter spills from dams and leaking glacier lakes[174]. Another factor worth mentioning is the loss of ecosystems due to interventions by hydropower stations and dams in their natural functioning[175].

5.1.2 IWRM Approach Related Weaknesses/Challenges

Dr Pohl and Prof Dr Klauer share the opinion that the IWRM approach is too theoretical, abstract and *complex* so that the gap between claim and reality is too wide and thus IWRM is not suitable for practical peace work on site. Moreover, it needs to be considered that the concept is not generally applicable but always requires context-dependent adaptation as each river basin has its specific characteristics in the population, local situation and priorities which need to be taken into account[176].

Although IWRM places great emphasis on integration and *sectoral integration*, the focus in the Ferghana Valley is on the water sector without taking related sectors such as energy, agriculture and transport into account[177]. As a result of this separation, the IWRM measures alone are not suitable for building sustainable peace, hence, solutions must also be developed in other sectors to reduce the conflict potential[178].

With regard to *IWRM measures*, Dr Milow points out that "IWRM is too technical for conflict resolution in many ways". Generally, a high level of technical know-how and financial resources is required to implement IWRM measures, which is a challenge, especially in the poorer countries of the world, as they would be dependent on international donors[179]. Moreover, some measures such as capacity development are a long-term process and therefore need personnel, time and financial resources and are not suitable for short-term conflict interventions[180].

5.1.3 Future Developments

Climate change is expected to alter the hydrological cycle in the valley by shifting the high seasonal precipitation into spring[181]. Additionally, the amount of precipitation is forecasted to increase locally in Ferghana Valley, while the north and west of Central Asia will become more arid[182]. Due to the general rise in tempera-

174 IP 03
175 IP 04
176 IP 02; IP 04
177 IP 01
178 IP 02; IP 03
179 IP 01; IP 05
180 IP 02
181 IP 02; IP 05
182 IP 02

ture, glaciers are melting and will increase water inflow in the short term, although, in the long-term, less water is predicted to be available[183]. As a result, the hydrological cycle will depend on precipitation in the future [IP 03]. However, while Dr Pohl is convinced of future water scarcity, Dr Mirzabaev believes that there will be dry and humid years in the next 20 years, but the impact of climate change on water flow will be relatively small. Dr Frobarth shares this view, as the glacier melt accounts for only about 4 percent of the water flow and thus has hardly any influence on water availability. Nevertheless, water is a contested resource due to climate change and increasing demands, which is why competition will exponentially grow if there were no more water resource[184].

The Ferghana Valley is the most densely populated area in Central Asia, and it is estimated that the population continues growing due to higher birth rates, especially in rural areas due to religious believes and cultural aspects[185]. As a result, the unemployment rate is expected to increase with possible negative impact on the *socio-economic development* and following sustainable peace processes[186].

5.2 Strength and Opportunities

Although some factors limit the success of IWRM as a peacebuilding approach in the Ferghana Valley, the interviewees have also identified seven strengths and opportunities – cooperation, coordination, River Basin Organisations, participation, the creation of identity, water as the impetus for dialogue as well as efficient water resource management.

Moreover, the expert interview participants assessed the current conflict situation in the selected region and concluded that the conflict potential in the future is rather low. This is in particular due to the political stabilisation of Kyrgyzstan and the inauguration of the new Uzbek President (since 2016), who explicitly strives for transboundary cooperation with his neighbouring countries[187]. Although since the Osh conflict in 2010 there have been no violent conflicts between the states and the political situation is developing positively, there are still debates on how water and land should be governed [IP 03]. Furthermore, local disputes between people close to the border and inequalities between lower and upper neighbouring states lead to ten-

183 IP 05
184 IP 03
185 IP 01; IP 05
186 IP 01
187 IP 01; IP 02; IP 03; IP 05

sions[188]. Nevertheless, the situation in the Ferghana Valley is currently de-escalating, which simplifies the implementation of IWRM measures and the creation of sustainable peace[189].

5.2.1 Pillars of IWRM Implementation

Cooperation is an important keyword in the field of peacebuilding as it brings stakeholders together and allows them to work towards a common goal and share its benefits. In Ferghana Valley, the potential for cooperation is relatively high since the countries have already been connected and thus the incentives for cooperation are stronger[190]. Especially in the agricultural water sector, the reduction of conflict potential through better cooperation is possible[191].

Another factor that can reduce conflict potential and contribute to sustainable peace is *coordination*. For instance, transboundary coordination can reduce droughts in summer and floods in winter by exchanging information of annual water and agricultural planning in the region, reservoir storage capacities and warnings of natural disasters[192]. Thus, the resilience of the population and economy against extreme events can be increased. To simplify these processes, the Basin approach has been used in Central Asia since 2009. This means that the water sector is managed uniformly across national borders to guarantee a common basis of knowledge and data transfer[193]. For this, *River Basin Organisations* (RBO) are indispensable. As a transboundary institution, RBOs are responsible for water management at all levels, exchanging data, making forecasts and providing decision-makers with information, making them essential for preventing conflicts in the water sector[194]. In Central Asia, each water ministry has a committee that decides on the annual water distribution, which is then implemented in a regional and local context by the two RBOs of the Syr Darya and Amu Darya[195].

Participation activates all stakeholders involved by bringing them together in different formats. So it is possible to bring them into contact with governmental institutions as well as to enable them to represent their priorities and to develop a common plan. This is useful to give them a voice and right of codetermination so that opposition and conflicts can be minimised[196].

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188 IP 02; IP 04; IP 05
189 IP 02
190 IP 01
191 IP 02
192 IP 01; IP 02
193 IP 05
194 IP 02; IP 05
195 IP 05
196 IP 01; IP 02; IP 05

5.2.2 Support of Sustainable Peace

In order to bring stakeholders or conflicting parties together, water issues can serve as an *impetus for dialogue*. Therefore, the "solution of water problems is a door opener to other areas"[197] and can initiate cooperation, for instance, with representatives from disaster protection or nature and biodiversity conservation[198]. This is mainly because water problems are more tangible and communicable, making it easy to get into a conflict-free exchange and helps justifying dialogue formats on other topics[199]. In this way, for instance, joint energy and water projects can promote dialogue between states[200].

The results of some expert interviews showed that IWRM could go beyond water issues and promote sustainable peace by *creating a common identity* on the local level[201]. According to Prof Dr Klauer and Dr Pohl, people who are connected to a river or canal course can be united by sharing water, caring and exchanging information about it[202]. Also, the same economic activities and the associated lifestyle (e. g. irrigation farming in the Ferghana Valley) can be used to shape the identity of people and different cultural elements in the long term[203]. At the national level, mainly political decisions such as the introduction of a uniform alphabet or certain linguistic policy concepts in Soviet times shape the common identity of the people[204].

5.2.3 Chances of IWRM to Cope Future Challenges

Another strength of IWRM as peacebuilding approach is to cope future challenges in the Ferghana Valley by *efficient water management* through modern irrigation systems. Although Central Asia will have sufficient precipitation and water storage capacities in the future to reduce water losses caused by climate change, efficient water and reservoir management is still necessary to minimise losses and maintain overall availability in the future[205]. Furthermore, the efficient management of water resources will provide the opportunity to feed the growing population by the expansion of agricultural production and the creation of jobs, as sufficient resources would be available for other sectors, such as energy production and industry expansion[206]. As

197 IP 04
198 IP 02
199 IP 01; IP 04
200 IP 04
201 IP 01; IP 04
202 IP 01; IP 04
203 IP 03
204 IP 03
205 IP 02; IP 03
206 IP 05

a result, the economic development would be enhanced. The need for redistribution is illustrated by the fact that around 90 percent of water resources are currently used in agriculture[207].

5.3 Achievements

The successes in the Ferghana Valley comprises – Infrastructure development, better predicted water availability, RBOs and treaties, dialogue formats and capacity development.

5.3.1 Technical Achievements

Infrastructure development was the main technical achievement and includes the enhancement of water efficiency through the rehabilitation and equipment of agricultural infrastructure with safety systems against mudslides which could increase the water availability for the agricultural sector by 60 percent[208]. Moreover, according to Dr Frobarth, "the greatest success is that a *better predicted water availability* exists from which (…) a total of about 500,000 people in different river basins benefit"[209].

5.3.2 Political Achievements

In the political field, the *River Basin Organisations* and various *treaties* can be rated as successes generated by IWRM. Thus, Water Consumer's Associations[210] can now maintain themselves and have the know-how to repair water channels, distribute water, and all members pay their membership fees and have the same technical conditions (e. g. pumps) [IP 05]. In general, regional RBOs serve as a platform for dialogue on water management and are increasingly used in the region[211]. Other factors that can reduce the conflict potential are agreements and treaties on a transboundary level which regulate the water runoff as a substitute for lack of regulations on the national level[212].

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207 IP 05
208 IP 02; IP 05
209 IP 02
210 Water Consumer's Associations are local to regional nongovernmental and non-profit organisations which connect farmers involved in irrigated agriculture within a certain area in Central Asia.
211 IP 02
212 IP 01

5.3.3 Social Measures

Social measures comprise *dialogue formats* and *capacity development* measures. While Dr Pohl has the opinion that cooperation and dialogue formats implemented do not work well, Dr Frobarth and Dr Milow share positive experiences with River Basin Days and Water Conferences as the impetus for political processe. Successfully implemented capacity development measures include a network of Central Asian scientists involved in remote sensing, modelling, forecasting and knowledge sharing, as well as the introduction of an IWRM curriculum at the Academy of Public Administration so that IWRM can be included into future decision-making[213]. In addition, capacity building measures are already implemented in various regional and transboundary projects[214]. Farmers, in particular, participate in training seminars and are very open-minded, as they hope to increase their harvest and income through the use of modern methods[215].

5.4 Recommendations

Based on the identified weaknesses/challenges, strength/opportunities and successes of the IWRM approach, recommendations for the Ferghana Valley can be derived. They serve to adapt the IWRM as a peace-building approach and include measures to improve living conditions and to reduce the potential for conflict to achieve sustainable peace. The obtained recommendations relate to future IWRM projects, socio-economic development, suggestions at the political level and are divided into nine subcategories – ecological and technical recommendations, educational work and dialogue formats, integration, diversification of the economy, the creation of employment opportunities, the introduction of economic measures and principles, water diplomacy and the improvement of political relations.

5.4.1 Future IWRM Projects

Ecological recommendations include the improvement of drought management as it can counteract the conflict potential from water scarcity[216]. This can be supplemented by the introduction of less water-consuming crops to conserve existing water resources[217]. However, the efficiency and appropriateness of current agricultural farming methods need to be questioned and adapted to future challenges[218]. To reduce the risk of

213 IP 05
214 IP 01
215 IP 05
216 IP 03
217 IP 05
218 IP 04

floods, the stream course should be less regulated, and open spaces need to be created to contain the water masses[219].

The *technical recommendations* include in particular the rehabilitation, maintenance and redesign of the water infrastructure by introducing modern, energy-efficient measures such as drip irrigation or sprinklers and equipping it with protection systems as well as the introduction of better treatment plants to be able to recycle the waste water appropriately [220]. Furthermore, dams and glacier lakes should be maintained and technically adapted to absorb larger amounts of water through glacier melt in the short-term to reduce the risk and damage by floods[221]. This also includes better management of dams to increase the ecosystem performance by ensuring a constant minimum flow rate or rinsing pulses to flush away sediments[222].

According to the experts, *educational work* and *dialogue formats* are indispensable for future IWRM projects, as they have low opportunity costs and are feasible without large financial resources, as well as increase people's awareness of future challenges and solutions (e. g. the economical use of water in cities; training for farmers on how efficient land management works)[223]. This can help to illustrate the connection between water, environmental protection and increasing economic development as well as to explain the benefit of cooperation to local people to convince them to participate in IWRM projects[224]. The development of training programmes for administrative and ministerial employees also contributes to the promotion of cooperation at the national level, as they can use the knowledge gained to help improve the water sector[225]. Nevertheless, a continuous reflection of the goals and possible solutions in IWRM projects with all stakeholders is necessary to promote future improvement[226]. On the national level and in cooperation between governments, it should be determined whether the focus continues to be on water management and how the funds should be distributed in the future to generate the greatest benefit for all stakeholders[227].

Moreover, a cross-sectoral approach must be supported by the *integration* of other aspects such as energy, food security, sanitation, domestic households[228]. According to Dr Mirzabaev, improvements in these sectors are necessary to provide incentives for changes in the water sector and not vice versa. To strengthen IWRM

219 IP 04
220 IP 02, IP 05
221 IP 03
222 IP 04
223 IP 01, IP 05
224 IP 02; IP 05
225 IP 05
226 IP 04
227 IP 01
228 IP 03; IP 05

as a peacebuilding approach, the aspects of negotiation, facilitation and mediation must also be included in the concept framework[229].

5.4.2 Future Socio-Economic Development

To make the economy and population in the Ferghana Valley more resilient to future developments and to reduce the merging conflict potential due to scarce water and land resources, the *diversification of the economy* is an essential component. One way to increase financial value added is to shift agricultural production from cotton and wheat monocultures to diversified profitable crops such as fruits and vegetables[230]. Another possibility is to diversify the economy by developing a tourism sector or by expanding the value chain through industrial production and manufacturing located in the region[231]. This can also help to create urgently needed income, training and *employment opportunities*[232].

The nationwide *introduction of economic measures and principles* such as benefit sharing, value-based water sharing and the full cost recovery principle, will contribute to the stabilisation of water-related economies and gives incentives for cooperation. Thus, making the people aware of the shared benefits can increase their motivation for further cooperation[233]. Furthermore, the introduction of value-based water sharing can increase overall regional welfare by selling water from places with lower water prices to places where water has a higher price[234]. This can be supplemented by the Full Cost Recovery Principle, which means that the actual water consumption in agriculture must be paid by volume and not by area size whereby water wastage can be reduced and public costs incurred can be adequately covered[235].

5.4.3 Political Recommendations

The legislative recommendations include the implementation of *water diplomacy* as it is, according to Dr Milow, a more flexible concept and thus more suitable for conflict resolution. Dr Frobarth emphasis that "IWRM and water diplomacy should ideally be parallel processes" and complement each other[236]. Furthermore, it is advisable to *improve political relations* and integration between the riparian countries by forcing the adoption of modern methods and by strengthening cohesion through, for example, the removal of

229 IP 05
230 IP 01; IP 04; IP 05
231 IP 01
232 IP 01; IP 03; IP 05
233 IP 02
234 IP 03
235 IP 05
236 IP 02

trade barriers or restrictions on entry[237]. Nevertheless, countries around Central Asia such as Afghanistan and China should also be included in water policy decisions, as they are also part of the same river systems[238]. Moreover, Dr Pohl recommends implementing political feedback systems and public platforms to offer people the opportunity to protest or express dissatisfaction so that appropriate action can be taken to reduce conflicts.

6. Discussion: The Potentials of IWRM as Peacebuilding Approach

6.1 Discussion of Results

Overall, the interviewees provided relevant information regarding the research interest. Due to their different expertise in the fields of water management, IWRM implementation and conflict research, different areas could be considered. The results of the expert interviews regarding strength/opportunities and successes have shown that IWRM has the potential to promote positive developments towards a sustainable peace in the Ferghana Valley. Therefore, technical innovations for the water infrastructure can reduce conflicts due to future water shortages. Furthermore, cooperation, participatory formats and information exchange in the water sector strengthen co-determination and equal rights for the stakeholders involved and promote dialogues between conflicting parties. Cooperation can also bring economic advantages. Moreover, through the use and management of a shared water resource or a connection by a river course or canal, it is possible to support the common identity of the population across administrative, cultural and religious borders, which promotes trust between the parties to the conflict. These are essential foundations for a sustainable peace process which can even have an impact beyond the water resource. Another important point is that IWRM measures, partially, counteract future challenges of climate change and socio-economic development by improving water management efficiency to prevent water scarcity and to feed a growing population. Nonetheless, future challenges will be much more diverse and require solutions to unemployment, environmental pollution or biodiversity loss and cannot be solely addressed by IWRM. For these reasons, the experts warn against overestimating the possibilities of the IWRM approach in order to build sustainable peace. Nevertheless, it can make a direct contribution to a sustainable peace process if other measures such as negotiation, moderation and mediation strategies are complemented[239].

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237 IP 03; IP 05
238 IP 03
239 IP 05

Nevertheless, a distinction must be made between the effectiveness of IWRM measures for a sustainable peace process at national/regional/transboundary and local level. While IWRM can be used to build peace at the local level (e. g. between farmers), a more extensive range of conflict causes are more important and overshadow the water problem in the national context. According to Barquet, this occurs due to environmental issues being less relevant than socio-economic and political factors (e. g. a lack of political will or high unemployment)[240]. It can, therefore, be concluded that IWRM is not necessarily able to resolve transboundary water conflicts. Thus the conclusion is that IWRM does not automatically contribute to sustainable peace and that the peacebuilding effect is strongly context-dependent. Regarding the Ferghana Valley, many challenges and sources of conflict exist independently of water (Figure 4). Therefore, environment-related factors cannot be regarded as the sole cause of conflicts. This also makes it challenging to grasp the peacebuilding potentials of IWRM as an environmental approach. As a result, it is difficult to identify the influence of the IWRM as a peacebuilding measure and its contribution to sustainable peace. Furthermore, the IWRM approach is often described as too theoretical, complex, resource and time-consuming to be profitably applied in the field of peace work. IWRM has very high requirements, which make the implementation into practice challenging. According to GWP, for example, full integration is not possible because too many aspects have to be considered[241]. Also, further specification of the IWRM approach on-side and flexibility is needed due to the different regional conditions. However, the technically oriented view of the IWRM concept can be critically questioned, since the approach does not specify this in concrete terms, but rather opens up a vast scope for measures ranging from capacity development, participatory workshops, implementation of good water governance structures, measures for better transparency and gender equality.

The experts' recommendations include both, educational and technical aspects and illustrate the importance of the interaction of these components. Thus, the most important recommendations for the Ferghana Valley include the increase in efficiency and modernisation of the water infrastructure to minimise water losses. Moreover, further development of educational programmes and dialogue formats are recommended as they promote cooperation, raise awareness of future challenges and point out possibilities for coping with them. Greater integration of other sectors such as energy and food security into IWRM's considerations also seems sensible due to the highly interconnected conflict situation. There is a growing recognition that a movement is needed away from a sector-by-sector approach towards a nexus concept that "considers the interactions between water, food and energy while taking into account the synergies and trade-offs that

240 Barquet 2015, 15.
241 GWP-TAC 2000, 26.

arise from the management of these three resources"[242]. The importance of this nexus concept is supported by current scientific discourse regarding the connection of water, food and energy issues[243]. Although the recommendations cover a wide spectrum, they cannot be regarded as a comprehensive catalogue of measures for sustainable peace, but serve as impetus for further discussions.

Overall, the findings indicate that IWRM cannot generate a sustainable peace process alone but can provide support by reducing the potential for conflict based on water[244]. Therefore Dr Milow emphasises that the Water diplomacy approach suites better as peacebuilding approach in the Ferghana Valley. According to Hefny, Water diplomacy is a branch of diplomacy and is about "dialogue, negotiation and reconciling conflicting interests among riparian states"[245]. Water diplomacy thus

> „seeks negotiated solutions informed by science and technology to help resolve problems of water allocation and competing needs (…) by [using] diplomatic techniques of negotiation, mediation and intercultural communication (…) to transform the potential risks of competing demands and even conflict over water into forms of cooperation that extend beyond water and economics"[246].

IWRM and Water diplomacy could be parallel processes, which hold in combination, new potentials for peacebuilding through natural resources.

If the research interest and the procedure of this research are critically reflected, it can be said that the conclusion on the contribution of the IWRM approach to sustainable peace is significant. Although IWRM cannot be defined as a peacebuilding approach, it can certainly support sustainable peace processes in the Ferghana Valley and reduce local conflict situations. Nevertheless, the scientific significance is limited due to the small number of interview partners and the limitation on one case study. To make the results more generalizable and transferable to other regions, further case studies in other contexts have to be analysed and compared.

6.2 Critique of Methodology

The previous discussion has shown that the empirical analysis was able to generate new insights into IWRM as a peacebuilding approach for sustainable peace through guided expert interviews.

Each interview could be used as a source of knowledge, and therefore it was possible to supplement the information from existing written sources. Although the mix of methods provides a wide range of qualitative

242 Reinhard/Verhagen et al. 2014: 5.
243 Cf. Allan/Keulertz et al. 2015; Smajgl/Ward et al. 2016.
244 IP 01; IP 03; IP 04
245 Hefny 2011: 20.
246 Hefny 2011, 20, 25.

data, more interviews with different stakeholder groups (NGOs, RBOs, local households) on all levels would have had to be conducted to obtain a representative assessment. Although some interview participants work in the field of water management, IWRM implementation on side and conflict research, they cannot represent the perceptions of those directly affected. In other words, their knowledge of certain issues or future developments is limited to their subjective experiences and background knowledge. As a result, their views must be reflected and supplemented by further interviews with stakeholders from the Ferghana Valley to guarantee representativeness of the statements and feasibility of the measures. It should also be pointed out here that the evaluation and the process of interpretation of the statements are also subjective, although attempts were made to be as open and biased as possible. Furthermore, the selection of respondents should have been more oriented towards knowledge in the areas of IWRM and the situation in the Ferghana Valley to be able to obtain more profound statements on the potentials. Moreover, the selection of the case study can be critically questioned and checked for its suitability. Since there are many non-water-related conflict factors in the Ferghana Valley and the situation is currently de-escalated, the example may not be apparent enough to investigate the peacebuilding potentials.

The applied empirical method was well suited to generate new knowledge about the subject of the study. The chosen guideline questions were very broadly based so that in addition to the evaluation of the thematic focus of IWRM, peacebuilding and sustainable peace, a picture of the general weaknesses/challenges, strengths/opportunities and measures in the region that are not related to IWRM can also be obtained. A major challenge, however, was to concentrate on the thesis' objectives in the diversity of the thematic areas and to establish links to the research interests.

Methodological difficulties also arose during the data collection. Some of the statements, measures and suggestions made by the interviewees have not been firmly questioned, and thus some results cannot be described sufficiently precise. Although the interview guidelines were a helpful tool, some questions could have been asked in more detail. For example, the possibilities of the IWRM pillars for peacebuilding and the mechanisms behind them could have been discussed in more detail. Furthermore, questions concerning the role of women in sustainable peace processes could be added, as it is an essential component of the IWRM and peacebuilding concept. Moreover, the analysis of the interviews showed that some terms were not differentiated (such as conflict/tension/dispute or building/suppor- ting/promoting sustainable peace) which may have affected the interview answers.

The evaluation in the form of a qualitative content analysis was successfully carried out. The creation of categories made it possible to structure the evaluation and to sort and summarise the statements. A great challenge arose in the formation of categories since not all statements could always be clearly assigned to a

root- or subcategory, as sometimes the statements were relevant in relation to two different categories. A particular challenge was to filter out the most important and relevant information in relation to the research interest and not to lose sight of the interrelationships.

7. Conclusion and Outlook

7.1 Summary of Findings

This paper reviews whether IWRM can build sustainable peace. Therefore, the potentials of IWRM as a peacebuilding approach in a region threatened by transboundary water conflicts are analysed to conclude contributions to sustainable peace. The selected case study area is the Ferghana Valley in Central Asia which comprises the three countries of Kyrgyzstan, Tajikistan and Uzbekistan and is prone to conflicts based on water as well as socio-economic and ethnic factors. The analysis is based on a conflict evaluation as well as expert interviews and was carried out using a qualitative content analysis in four categories – weaknesses/challenges, strength/opportunities, achievements, recommendations. The prevailing situation of water scarcity due to climate change, water pollution and inefficient water use, as well as tensions due to ethnic, socio-economic factors and inequalities in access to water resources, call for peaceful solutions at the interface of natural resources, sustainable development, politics and conflict management.

The evaluation of the data showed that IWRM has no transboundary peacebuilding effect in the Ferghana Valley, but in conjunction with measures in other sectors, it has the potential to support sustainable peace processes and reduce the potential for conflict based on water. According to the interviewees, IWRM can stimulate positive developments, particularly at local level, by improving trust between conflict parties, strengthening cooperation and offering technical solutions to concrete water management problems. Also, the approach reacts to future climate and socio-economic developments and helps to increase the resilience of the population against extreme events. One of the limits of the approach is to promote political dialogue beyond the local context and water issues so that the contribution to a sustainable peace remains sectoral and locally limited. However, the experts gave several socio-economic, political and IWRM project related recommendations to counteract those problems and to support sustainable peace. First and foremost, the experts called for educational programmes, and training offers to raise awareness regarding the economic value of scarce resources in the basin, benefits of equal participation and cooperation as well as conflict prevention.

The attempt to transfer the results to a more general context were proved to be unsuitable. Due to the context-dependence and an insufficient number of interview partners, no general conclusion can be drawn about the peacebuilding potentials of IWRM for sustainable peace in the Ferghana Valley. Nonetheless, the results of the analysis do not lose their significance, but rather underline the existing potential of this approach as well as the need for further research. Therefore, IWRM can be seen as an innovative approach to sustainable peace when it comes to strategies for dealing with local and global flashpoints including climate change, degradation of existing water resources and conflicts over water. Although the approach has the potential to contribute to sustainable peace, it varies depending on the context of the conflict and cannot be assumed automatically.

7.2 Outlook for Future Areas of Research

Natural resources such as water or land are not the only cause of conflicts but can exacerbate existing ones. Threats through environmental, climate change, resource scarcity and degradation problems increase the risk of conflict escalation and show the relevance of connections between conflict, peacebuilding and the environment. Research at the interface of environment and conflict is not yet sufficient, which requires a stronger inter- and transdisciplinary view in peace and conflict research, political science, diplomacy and natural sciences to gain insights into how a sustainable peace can be shaped, for instance, using environmental management approaches. Therefore, still a considerable need for research in the field of integrated water resource management to better understand how it can contribute to peace and trust building. If the level of knowledge and with it the available data material increases, IWRM projects, which support a sustainable peace process could be initiated more easily. Therefore, the following sections present further suggestions and questions that could be of relevance and interest for further research projects.

As only experts from German institutions were interviewed, another suggestion for future research would include a more diverse choice of interview partners from the local, regional, national and transboundary level in Central Asia. In addition, IWRM promotes a participatory decision-making process, which is why all water users and in particularly marginalised groups must be involved. Therefore, further investigations and interviews on-side are recommended to evaluate the perceptions and awareness of the local rural population, authorities and NGOs on conflict potentials, current and future water-related issues and their view of IWRM as a peacebuilding approach. In this context, it could also be clarified whether the effectiveness of IWRM as a peacebuilding approach varies at different levels (local, regional, national and across borders) and between rural and urban regions.

Although the study area is already relatively large, IWRM and its peacebuilding potentials should still be evaluated in other countries or transboundary river basins in order to be able to assess the general validity of the results. Since the situation in the Ferghana Valley appears to be stable, a recommendation would be to examine other transboundary river basins in Central Asia or the conflict situation and development in neighbouring countries such as Afghanistan and China. However, care should be taken in the selection process to ensure that the conflicts to be investigated are based more on water resources to simplify and clarify the investigation.

Although there are indications that IWRM can go beyond the resource of water and open doors to other areas as well as contribute to the creation of a common local identity for the population, the question arises: What mechanisms are behind these empirical observations? Can IWRM also ensure a sustainable peace process and rapprochement of the conflicting parties in other sectors and thus go beyond the water issue? In this context, water diplomacy could be an integral part and complement the IWRM approach with negotiation, mediation and intercultural communication measures. However, how both approaches can be profitably combined or run in parallel processes has still to be investigated.

Furthermore, the technically oriented view of the IWRM approach can be critically questioned. Despite the involvement of education-oriented measures such as dialogue formats or training for people, technical and thus often expensive measures seem to be moved into the focus of IWRM implementation on-site. Therefore the question arises: Why is IWRM perceived as a technical approach and what problems and benefits does it pose?

In consideration of the importance of gender equality and women's empowerment in natural resource management, IWRM and peacebuilding, the role of women in the water sector should be further explored and the benefits in promoting sustainable peace processes be identified. That raises the question: How do women in the Ferghana Valley participate in peace work and what opportunities are there for the creation of a sustainable peace within the region?

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