



Sana'a University

**Water and**  
*Environment Centre*

# Water Conflicts Management

*Prepared by:*

**Dr. Adel M. Al-Washali**

**Pro. Abdullah M. Yaya**

**WEC contact:** Sana'a University – **P.O.Box:**13886 – **Website:** [www.wec.edu.ye](http://www.wec.edu.ye)

**A Short course with support of:**



## Contents

Introduction .....	5
Objective .....	6
Description of the course.....	6
A. General Worldwide Water Conflicts Causes.....	6
Excessive Withdrawal From Surface Water/Underground Aquifers .....	6
Pollution of Freshwater Resources (Downstream/Upstream) .....	6
Inefficient Use .....	6
Inequitable Distribution .....	6
Lack of Control, Law Enforcement and Sanctions Applied .....	7
Water Development (Hydropower Plant Construction, Infrastructure, Irrigation) and Downstream Effects .....	7
B. Situation of Yemen Water Resources .....	7
C. Legal Status of Water Ownership in Yemen .....	9
Priority of Use .....	9
Quantity of Use .....	10
Places of Use and Sharing .....	10
Water Allocation Mechanisms.....	11
Operation and Maintenance.....	11
Conflict Settlement Procedures .....	12
D. Types Water Conflicts in Yemen.....	12
Sharing Groundwater Resources .....	12
Main Reasons Resulting Conflicts Over Groundwater .....	12
Sharing Surface Water Resources.....	12
Main Reasons Resulting Conflicts Over Surface Water .....	12
E. Factors Affecting Raising of Water Conflicts in Yemen.....	13
Scarcity of Water Resources .....	13
Impact of Climate Change.....	13
Rapid Population Growth.....	14
Instability of Political Situation .....	14
Inequity Distribution of Limited Water Resources (Inadequate Allocation of Water Supply Project) .....	14
Low Enforcement of Water Law .....	15

F. Water Conflict Management.....	16
Understanding History of Conflict .....	18
Analyze Water Stakeholders.....	18
Determine Roles of Main Players and Influencers.....	19
G. Managing Processes to Resolve Water Conflict Case.....	20
H. Negotiation .....	20
Negotiation Approaches .....	20
Interests–Needs .....	21
Options.....	21
Standards and Criteria .....	21
Communication.....	22
Relationship .....	22
Agreement and Commitment .....	22
I. Negotiation Skills.....	22
Communication Skills: Active Listening.....	22
Communication Skills: Talking Clearly and Precisely .....	22
Re-framing Positions as Interests .....	23
Understanding and Perception .....	23
Open Questions .....	23
Separate the People from the Problem.....	23
J. Mediation.....	24
The Role of the Mediator .....	24
Mediation Skills and Tools .....	24
Mediation Approaches.....	25
The Evaluative Approach .....	25
The Transformative Approach .....	25
K. Consensus Building: Principles, and Procedures .....	26
L. Principles and Procedures .....	26
Dispute Regulation Mechanisms .....	27
The Current Several Challenges all Arbitrators and Mediators Face.....	29
M. Toolkit and Guidance for Preventing and Managing Land and Natural .....	30
Resources Conflict (EU-UN partnership, 2012).....	30
Actor analysis framework (Koppenjan and Klijn, 2004).....	31
Step 1 Problem Situation .....	31

Step 2 Inventory of Actors .....	32
Step 3 Problem Perceptions.....	32
Step 4a Position of Actors: A Dependency Analysis .....	32
Step 4b Actions .....	32
Step 5 Relevant Arenas .....	32
Step 6 Identify and Analyze Stagnation .....	33
Step 7 Inventory of Interaction Patterns of Actors.....	33
Step 8 Inventory of Patterns in Actors' Perceptions.....	33
Step 9 Inventory of Institutional Provisions Connecting Parties .....	33
N. The Analytical Framework is Used to Answer the Key Questions.....	33
O. Case Studies of Local Water Conflicts .....	33
P. Operationalizing the Conceptual Framework: Indicators and Questions.....	34
A: Context and Contextual Changes .....	34
B: Conflict Description and Stakeholder Analysis .....	35
C: Dispute Regulation Mechanisms .....	35
References .....	36

## Introduction

Water is an essential ingredient for human life and sustainable development, from food production and securing hygiene to supporting economic growth. Water is a fundamental and irreplaceable resource in all societies. Given its centrality to human life, it is not surprising that water management is complex and that water-related interests are frequently contested. The need of water in sufficient quantity and quality could provoke competition where interests are incompatible. It can also lead to create cooperation where common interests can be found.

Men and women use water differently according to their gender-specific roles. Women tend to have greater water needs due to their domestic responsibilities like washing family clothes, bathing children, and preparing meals. Even basic hygiene, like hand washing to reduce the transmission of disease, increases water needs at the household level.

Water management is a complex issue with far-reaching. Water-related tensions arise on different geographic scales but it is the interaction of these tensions with a number of political, socioeconomic, environmental, and cultural factors that determine whether violent conflict will result.

Conflict is most likely to occur over water when disputes involve access to water of adequate quantity and quality. Even when water supplies are not severely limited, allocation of water among different users and uses (urban residents and agriculture, for example) can be highly contested. Degraded water quality, which can pose serious threats to health and aggravate scarcity, is also a source of potentially violent disputes. Finally, when water supplies for broadly irrigated regions decline either in terms of quantity or quality, those declines can spur migrations that could politically destabilize the receiving cities or neighboring countries.

Water's importance in sustaining human livelihoods can indirectly link it to conflict. Water is a basic resource for agriculture, which is traditionally the largest source of livelihoods. If this livelihood is no longer available, people are often forced to search for job opportunities in the cities or turn to other - sometimes illicit - ways to make a living. Migration—induced by lack of water, sudden droughts and floods, infrastructure construction (e.g., dams), pollution disasters, or livelihood loss—can produce tensions between local and incoming communities, especially when it increases pressure on already scarce resources. And poverty due to livelihood loss has been identified as a common denominator of the causes of conflict in most of the civil wars that emerged in Africa, South Asia, and Latin America during the last decade (Ohlsson, 2000).

In most cases, it is not the lack of water that leads to conflict, but the inadequate way the resource is governed and managed. There are many reasons why water management fails, including lack of adequate water institutions, inadequate administrative capacity, lack of transparency, ambiguous jurisdictions, overlapping functions, fragmented institutional structures, and lack of necessary infrastructure.

Yemen has a long history of suffering from water scarcity, which laid the foundation for the agricultural rules and traditions to regulate water distribution, maintenance of the irrigation infrastructure, and dispute resolution mechanisms. Yemeni people mainly rely on traditional rules

(Urf) and other agreements to regulate the rights and restrictions with regard to water access, use and distribution.

Yemen ranks 7<sup>th</sup> on the Water Stress Index (Maplecroft, 2011). The Government recognizes the water scarcity situation and, in its National Water Strategy, ranks water only second to national security (MetaMeta Research and PAN Yemen Consult 2013). Nevertheless, this priority does not seem to have been translated into sound water management practices.

## Objective

Increase the capacity building of trainees on understanding types of water conflicts and factors affecting raising of conflicts over water resources in Yemen, be able to analyze certain water conflict cases and know how to identify stakeholders, key stakeholders and other water players. Gain skills required for negotiation and be able to plan for manage water conflict cases until reaching an agreement to rend conflicts over water resources into cooperation for water resources development.

## Description of the course

Attendees of the short course will be able to understand types of water conflicts, recognize factors affecting raising of conflicts over water in Yemen, analyze certain water conflict cases, identify stakeholders and key stakeholders and related water players, determine role of water sectors for resolving water conflict cases, and plan for managing water conflict cases until reaching an agreement.

## A. General Worldwide Water Conflicts Causes

### Excessive Withdrawal From Surface Water/Underground Aquifers

Due to rapid population growth, water withdrawals have tripled over the last 50 years, which is largely explained by the rapid increase in irrigation development stimulated by food demand in the 1970s and by the continued growth of agriculture-based economies (UN WWAP, 2009).

### Pollution of Freshwater Resources (Downstream/Upstream)

Pollution and water quality degradation are key issues affecting water use globally. More than 80% of sewage in developing countries is discharged untreated, polluting rivers, lakes and coastal areas; more than 5 billion people – 67% of the world population – may still not be connected to public sewerage systems in 2030 (UN WWAP, 2009). Moreover, due to inadequate water, sanitation, and hygiene, 1.7 million deaths and the loss of at least 50 million healthy life years occur annually (Vörösmarty et al., 2005).

### Inefficient Use

Poor irrigation practices, leakage in water delivery systems, inefficient use by industry and excessive consumption by individuals can all contribute to water stress (WBCSD, 2005).

### Inequitable Distribution

85% of the world's population resides in the drier half of the Earth; more than 1 billion people living in arid and semi-arid parts of the world have access to little or no renewable water resources (UN WWAP, 2009). An estimated 90% of the 3 billion people who are expected to be added to the population by 2050 will be in developing countries, many in regions where the current population

does not have sustainable access to safe drinking water and adequate sanitation (UN WWAP, 2009). While regional disparities might lead to potential conflict due to migration patterns in the longer run, a more relevant key factor is the inequitable distribution amongst the rural/urban and rich/poor paradigm.

### Lack of Control, Law Enforcement and Sanctions Applied

Despite the existence of various regional and international legal mechanisms on water-related issues, they have not received the support or attention necessary to resolve many of the water conflicts (Gleick, 1993). Many transboundary freshwater resources are being significantly degraded through poor and uncoordinated management (UN Water, 2008).

### Water Development (Hydropower Plant Construction, Infrastructure, Irrigation) and Downstream Effects

Water development schemes (irrigation facility, hydroelectric developments, flood-control reservoirs) often displace large local populations, have adverse impacts on downstream water users and ecosystems, change control of local resources, and result in economic dislocation (Gleick, 1993).

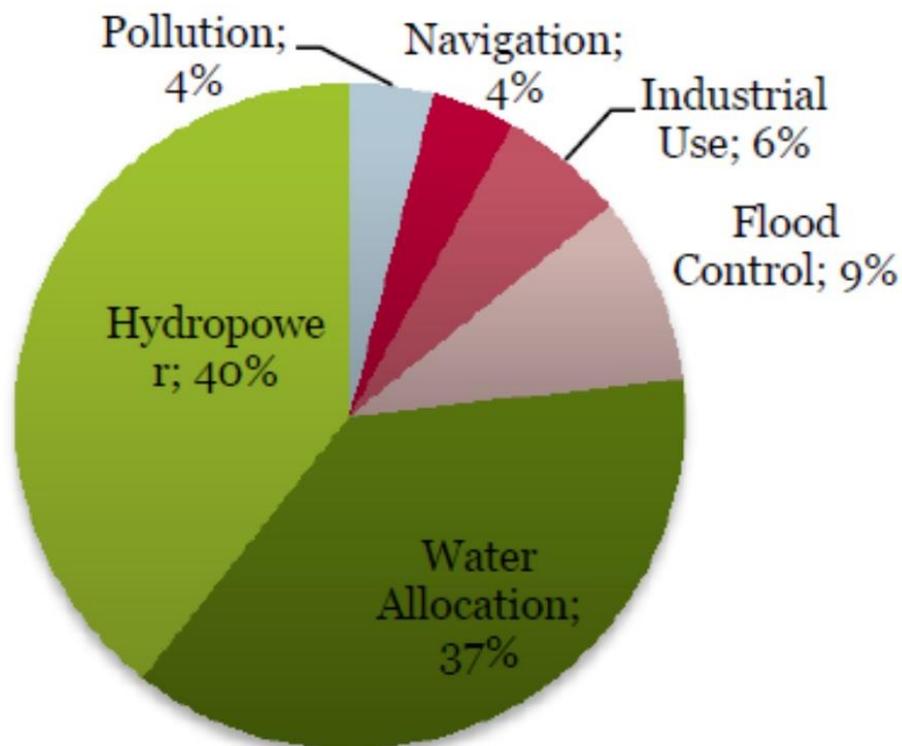


Figure (1) Primary focus of transboundary water agreement adopted during the 20th century

## B. Situation of Yemen Water Resources

The annual water consumption of Yemen is estimated as 3.4 billion m<sup>3</sup>, with a shortage of 26% which withdraws from ground water storage through more than 50,000 wells. This decreases ground water level (0-6m/year). The agricultural production represents 21% of national return, where it consumes 90% of water. This due to, farmers depend upon traditional irrigation systems (35%efficiency) without any information about the exact crops water requirements. (Yaya & Al-Weshali 2006)

Groundwater irrigated areas increased from 37,000ha in 1970 to 407,000ha in 2004, while rainfed areas shrunk from 1,200,000ha to 460,000ha in the same period (RoY, 2005). While 4 to 15 percent water saving in irrigated agriculture can be realized by improved irrigation methods, a dramatic intervention is required to reverse the increase in agricultural water consumption (MetaMeta Research and PAN Yemen Consult, 2013).

Groundwater is currently the most important water resource in Yemen, but is being overexploited. The pumping rate exceeds the rate of natural recharge causing declining groundwater levels of basins with annual average vary between (1-4) meters. Farmers near Sana'a have deepened their wells over 50 meters over the past decades, while the amount of water they can extract has dropped by two-thirds (UNDP, 2006). This raises the cost of pumping and, in certain cases, causes a deterioration of groundwater quality including seawater intrusion in the coastal plain areas. The declining water table has implications for the depth of wells required to extract water and the risk of salt intrusion (UNDP, 2006; MAI, 2012).

Other sources of water (surface water and spate floods), which also influence the recharge of groundwater, are not readily available due to highly variable annual rainfall patterns. Infrastructure has been constructed by the Yemeni government to make better use of the surface and spate flows. The Ministry of Agriculture and Irrigation (MAI) considers expansion of water infrastructure (dams) to expand agricultural production of the (spate) irrigation systems (MAI, 2012). There are currently over 50 diversion weirs and main distribution canals (Yehya and Al-Asbahi, 2005). Dykes are built on main wadis to direct spates into irrigation systems. Approximately (120,000-150,000)ha in the low lands of the country are irrigated by spate systems. There are also around of 800 medium and small dams for rainfall water harvesting in the highlands (Yehya and Al-Asbahi, 2005).

Although real time data on water availability and monitoring systems are insufficient in Yemen. The area under irrigation in Yemen is still increasing. MetaMeta Research and PAN Yemen Consult (2013) have estimated that (4-15%) water saving in irrigated agriculture can be realized by improved irrigation methods. They conclude that a dramatic intervention is required to reverse the increase in water consumption. Also, Yemeni wadis in the western and southern regions of the country contribute to considerable (spate) irrigated areas, groundwater is responsible for irrigating 27 percent of the total cropped area.

Groundwater use is increasing and, because of a lack of mechanisms on the part of the Yemeni government to allow for appropriate groundwater recharge, the water table is declining. Estimating the recharge of all kinds of subsurface flows is much more difficult than estimating abstraction, different models of different organizations result in a high variety of recharge rates, which again does not contribute to solving conflicts of groundwater management.

The overall irrigation efficiencies in Yemen are low (35-40 %), with much opportunity for improvement, while modern irrigation techniques could result in localized reduction in groundwater use, there is little evidence of a beneficial impact on the overall water balance, due to the lower recharge available (NWSSIP Update, 2008). Moreover, a caution of modern irrigation technique is the potential reduction in energy consumption for irrigating a unit of land, which may lead to an expansion of irrigated land and in turn increase the demand for water.

## C. Legal Status of Water Ownership in Yemen

According to Shari'ah, in principle water belongs to nobody, Mubah. Therefore, everyone has the right to free access to water, both individuals and communities. Water may only be owned when it is contained in a receptacle and separated from the source. Such is the case when water is contained in a well or cistern. Shari'ah for this reason does allow private ownership of water under these circumstances. As it is privately owned under these circumstances it may also be sold. Civil law, takes a similar approach to water ownership as Shari'ah. According to Article 1359 water is originally *res nullius*: of nobody and for all. Just like in Shari'ah, water may be appropriated and contained in wells, pipes etc. Containing water in receptacles is an appropriate means to sell and trade water. Contrary to Shari'ah and the Civil Code, the Constitution defines the legal status of water as property of the state, which oversees its utilization and exploitation in order to serve the common good. Article 8 makes this clear as it states: 'All types of natural resources and sources of energy, whether above ground, underground, in territorial waters, on the continental shelf or the exclusive economic zone are owned by the State, which assure their exploitation for the common good of the people.' This definition of water ownership contradicts the definitions given in Shari'ah and the Civil Code. The Constitution defines water resources as state property the use of which is regulated and organized by the State in such a manner that it serves public interest and whereas the Code and Shari'ah regard water as belonging to nobody in principle. However it becomes susceptible to private ownership when appropriated.

The Water Law seems to follow the interpretation of water ownership given in the Constitution namely, water as public property subject to administration by the State. However the Water Law also takes into account principles mentioned in Civil Code and Shari'ah. Article 4 explains that: the water is in principle permissible for all and does not possess a private ownership except by means of conveyance or acquisition or within their rule and it is the optimum to be secured by what is similar to it. Moreover, Article 5 explains that: the streams of the valleys are considered the common property of all the beneficiaries, and all the water installations and wells which are erected by the State are considered public property, and notwithstanding their ownership, they are subject to the system of registration and licensing in accordance with the provisions of this Law.' This definition of water as public property is then followed in Article 6 which stipulates that: each beneficiary of any of the water resources enjoys the right of utilization with a view not to harm these resources or the interests of the others. The State intervenes to regulate the rights and duties of utilizing the water in accordance with the provisions of this law and the bylaws and rules that execute its provisions.' These provisions show that, on the one hand, water is in principle owned by nobody as is in line with Shari'ah, whilst, water rights are subject to rules formulated by the state as is in line with the Constitution.

### Priority of Use

Shari'ah gives first priority to water for drinking and domestic purposes. Within this priority a hierarchy is present starting with water for human drinking, followed by water for animal drinking and water for domestic purposes. Denying to share water according to this hierarchy is often regarded as a sin or haram. After the priority for drinking and domestic purposes, priority is subsequently given to water for irrigation purposes.

The Water Law gives absolute priority to drinking water and domestic use in Article 20, and Article 21 formulates the hierarchy among the other uses. 'Without prejudice to Article (20), water shall be allocated for the following purposes:

- a. Supply the animals with water.
- b. Use for public utilities.
- c. Irrigation purposes.
- d. Industrial purposes.
- e. The minimum environmental requirements.

## Quantity of Use

Shari'ah considers water to be a gift from God. Wasting water is a sin or haram, whereas rationing water is considered a virtue. For this reason the community is allowed to intervene in the case of wasteful water use. For irrigation purposes the quantity of water permitted is set at a layer of water whose depth is about the height of a man's ankle.

The Civil Code again reflects Shari'ah and customs in relation to allocation. Article 1363 states that: 'sufficiency is to be determined on the basis of water use when the land was first reclaimed or, if this use rate is unknown, on the basis of use when the land began to be irrigated. In spite irrigation, the quantitative measure of the right of the upstream user is customarily established at the height of man's ankle.' Therefore, the Civil Code explains the obligation that the senior user must obtain sufficient water based on either the amount of water that was sufficient when the land was first claimed and if this is not known it should be estimated according to the needs when irrigated. And that senior rights holders have an obligation against persons who are located in the same watershed namely: 'a riparian cannot be denied his right, which is the surplus water after the senior user gets sufficient water.'

As explained before, the Water Law specifies that traditional rights are subject to registration with the Authority. These rights are preserved as far as the use is in line with the purpose and the quantity of use does not change. For the other rights, the amount of water use and the purposes are specified in the license and regulated in Article 37, where it says that: 'no beneficiary may exceed the quantities or the purposes of use or any other technical specifications and determined by the Authority. He must also abide by the conditions specified in the license, and the bylaw shows the detail necessary for execution accordingly.'

## Places of Use and Sharing

It is of significance to determine whether water can be used whenever and wherever by the rights' holder. This issue will shed light on whether water can be relocated.

As a consequence of Shari'ah regarding water as a servitude to the land, an individual cannot take water to other land if his action causes harm. This viewpoint is supported by Article 1372 of the Civil Code: 'a person is not allowed to draw water to irrigate land which has no right if such drawing harms those who have a water right.' Therefore, surface water in principle has to be used to irrigate the land where it is located and may not be relocated.

Article 50 of the Water Law stipulates the requirements for transferring water from one wadi to another:

- a. 'That the process of conveyance does not lead to damages in the requirements of drinking and household uses, whereby there is no future negative effect on the quantity and quality of the water in the zone or the basin from which it was conveyed.

b. That the water is conveyed for the purpose of drinking and household uses in the basin receiving the water.

c. That the water stored in the zone or basin to which it is conveyed, is insufficient to meet the requirements due to scarcity of the water or its unsuitability for drinking after suspension of all other uses.

d. Consultation and coordination with the local authorities, basins committees, and actual beneficiaries of the basin from which it is conveyed.

e. If, as a result of conveying the water, damage occurs to existing interests of the beneficiaries (the holders of the right of utilization), such damage shall be compensated according to principles of fairness and for one time.

In all the cases, in the event of numerousness of the sources from which they can be conveyed, and the proximity of the economic cost for conveyance from them or from some of them, to the cost of conveyance from one source only, due consideration shall be given to drawing the required quantities of water.'

## Water Allocation Mechanisms

Water in the informal setting, such as under Shari'ah or customary law, is allocated according to time-shares or by making openings alongside the water channel. What is taken into account with assigning time-shares or deciding on the size of the openings are the contribution each individual or groups has made in the construction, operation and maintenance of the water source and its infrastructure. Normally, the person designated to operate the water source is assigned to hold a record of the entitlements to the water source. However, the allocation mechanisms of times shares and openings do not include limits on the amount of water extracted from the source.

As explained, the Water Law does set limitations on the amount of water extracted and the purposes for which it will be used by the permit system it sets in place. According to Article 37: 'no beneficiary may exceed the amounts or purposes spelled out by the Authority (NWRA) in the permit and must comply with all the terms.

Spelled out in the license. The Authority is, therefore, the authority that decides, after sufficient consideration of the possible consequences, how much water is allocated to the different areas. It is then the task of community-based organizations to manage the resources given in an equitable way in line with the requirements of the permit.

## Operation and Maintenance

Shari'ah includes several provisions on the sharing of operation and maintenance costs of water infrastructure, which are codified in the Civil Code. Article 1367 for instance states that: 'a water channel owner must operate and repair it so as to remove the harm, which may occur to the land in which it passes through. If the channel owner refuses, then the landowner may undertake and pay for the repairs then claim the expenses. The law also regulated issues of compensation to Intermediate Land, the right of the intermediate land to benefit from the passing structures (canals or pipes) provided a share of the cost is paid.'

Also in operation and maintenance the Water Law focuses on community-based participation. Community based organizations, such as the WUG, have the responsibility to create their own rules

and regulations when it concerns operation and maintenance. These are then found lawful when registered with the Authority.

### Conflict Settlement Procedures

In dealing with water conflicts there are two possible settlement procedures, either via the judiciary or via arbitration. Moreover, there are two types of arbitration systems: legal arbitration and custom or tribal arbitration. In the event of conflict over water, both parties may agree to conflict resolution through legal arbitration. The custom arbitration consists of several levels through which parties can proceed, commencing with arbitration at the village level and ending at the level of the tribe.

For conflict settlements according to Water Law, traditional arbitration can also be used. Parties can bring their case before the village aqil. If there is no settlement at this stage, the next step would be to bring the case before the area sheikh or court.

## D. Types Water Conflicts in Yemen

### Sharing Groundwater Resources

Historically, for groundwater rules are not specified, though in several cases a distance rule is used, which in the water law is specified as a distance of at least 500m between wells. In some cases some new informal rules have been developed, for example regarding the purpose for which the water may be applied, who is allowed to use it, and embargo zones.

### Main Reasons Resulting Conflicts Over Groundwater

- ✓ Conflicts for preventing digging of new well without adequate separating distance from another well or nearby a natural spring that may cause stooping its water;
- ✓ Conflicts on selling wells water to tankers to prevent tankers to transport water to outside local areas;
- ✓ Conflicts on the joint running of the shared wells: who is first, how to compensate for power outages and how to pay for the cost of maintenance and repairs?

### Sharing Surface Water Resources

Surface (otherwise known flood) water, there are restrictions concerning the distribution of water, but they are in many cases outdated as they do not accommodate for the presence of permanent structures (check dams) and the impact of these structures on groundwater recharge and hence the availability of drinking water.

### Main Reasons Resulting Conflicts Over Surface Water

Conflicts on profiting from seasonal flood water for spate irrigation between sample water users

- ✓ Conflicts between sample farmers and powerful landlords who divert flood water stream to irrigate their own land;
- ✓ Conflicts between upstream and downstream communities when big water structure located in upstream block flood water to reach downstream areas;
- ✓ Conflicts between upstream farmers on over exploration of groundwater resources.

## E. Factors Affecting Raising of Water Conflicts in Yemen

### Scarcity of Water Resources

Water conflict is generally thought of as the result of biophysical, or natural, scarcity. When there is not enough to go around, certain actors will take measures to ensure that they get theirs. But scarcity is not only biophysical. Scarcity may, in fact, have environmental conditions and social constructions including regulations, institutional initiatives, and perceptions.

The opening of the country for the import of modern drilling and groundwater withdrawal technology in the 1970s coupled with a significant increase in population growth, encouraged the use of groundwater resources for agricultural, industrial purposes and domestic use. The Yemeni government's water policies in the period after the 1970s constituted an important element in the patronage politics that secured Saleh's power position for the following 30 years. The groundwater development enabled farmers to raise incomes, whilst the subsidy policies allowed the government to "consolidate its alliances with many important interest groups" (Ward 2000).

### Impact of Climate Change

Water scarcity in Yemen which has been exacerbated by climate change, may be a critical factor underlying the country's instability, and prolonging and worsening its conflict. Fuel prices, closely linked to the price of water in Yemen, helped spark the protests in 2014. Scarcity has made the humanitarian situation in Yemen, especially its cities, much worse since the beginning of the conflict. Yemen is among the most water-stressed countries in the world, brought on by regional drought, a naturally dry climate, and failed attempts at management. The broader Middle East drought has had far-reaching effects, and Yemen has been particularly effected. Like other unstable situations in the region, climate change may be an exacerbating factor in the country's instability, not a primary cause, and to what extent is uncertain. In a landscape of rising populations, severe unemployment, political instability, an active and influential terrorist organization, outside interests, and dwindling water and food resources, a changing climate is likely making matters worse.

The IPCC, while highlighting a need for more climate data on West Asia in their 2014 report, has recognized an increase in average temperatures and a slight decrease in annual precipitation. A World Bank report from 2014, which depicts a regional drying trend over the past few decades, actually predicts a slight increase in precipitation for Yemen in the future, but this increase will be offset due to evaporation from increased temperatures. There is also no evidence that population growth will slow down, lessening any benefit from future precipitation. In a region with little precipitation to begin with, small changes can have big impacts. Yemen's climate was dry before climate change, and it seems to be getting drier with climate change. For centuries, Yemenis have lived in a very delicate balance with their arid surroundings. Yemeni farmers have long relied on traditional methods of obtaining and managing their naturally scarce water resources. With the introduction of deep tube wells, aquifers could be tapped at an unprecedented rate. This change led to a massive growth in cultivated farmland; increasing 1000% between 1970 and 2004. The groundwater level has not been replenished at the same rate as withdrawal, with freshwater withdrawals making up 168% of the total renewable water resources.

## Rapid Population Growth

Yemen has had one of the highest population growth rates in the world in recent years, growing by nearly 25% from 2006 to 2014. This massive growth has put a strain on an already stressed water supply. An extra five million people need food and water, and there has been no equal increase in economic growth. A high youth population is understood as a major contributing factor to political unrest across the Middle East, and Yemen is no exception. Roughly 60% of Yemen's population is under the age of 24. This statistic, combined with large unemployment and significant water insecurities, set the stage for unrest.

The growth in population and increased water usage in Yemen coincided with the development of a cash economy in Yemen, which led to farmers relying more heavily on water-intensive cash crops. Qat, a mild stimulant chewed by many in Yemen, is a cornerstone of the Yemeni economy. A report from 2010 estimated that "Qat production now accounts for 37 percent of all water used in irrigation" and makes up roughly 6% of Yemen's GDP. However, Qat does not fill the stomachs of hungry Yemenis. With fewer edible crops being grown domestically, access to food drops in step. With more water being used up by agriculture, there is less to drink. Many have predicted a severe crisis in Yemen, with some even predicting the country being completely dry by 2015, and others predicting that the capital Sana'a will be dry by 2020.

A recent study finds that the likelihood of armed conflict "is enhanced by climate-related disaster occurrence in ethnically fractionalized countries. This study's findings seem to mirror the situation in Yemen and strengthen the claim that climate disasters such as drought can contribute to violence, especially in ethnically divided countries. The study also notes several other contributing factors, such as poverty, weak governance, and a history of conflict that are also present in Yemen.

## Instability of Political Situation

Historically, water conflicts are not new in Yemen. There have been instances of local and tribal water conflicts going back decades, though more so before the 1970s. As climate change places additional strains on water security, however, conflict over water could increase in likelihood. In rural Yemen, identity is very much connected to land and water rights, and conflicts over these rights could be the spark for larger tribal disputes. It is therefore no surprise that the pressure is being felt locally from the lowering water supplies. The Yemeni government has made attempts to address water issues, but these attempts have mostly failed. In the late 1990s and early 2000s the Yemeni government implemented, "at least five demand management measures: increases in the diesel price (that were rapidly overtaken by inflation); elimination of credit subsidies for agriculture; modification of the fruit and vegetable ban; regulation and taxation of groundwater; and projects to support increased water productivity in agriculture. Despite these measures, the Yemeni government lacked an effective tool to implement and enforce them.

## Inequity Distribution of Limited Water Resources (Inadequate Allocation of Water Supply Project)

Tehama basin is very different comparing with the others Yemeni basins from the side of nature of agricultural activities that depend mainly upon spate irrigation and from the side of behavior and relationships between farmers. Depending over spate irrigation in the existing of inappropriate spate irrigation network caused degradation of the nature of downstream areas especially in the Wadis

where the powerful player located at the upper stream areas. In addition, the fable management of the water sectors unit offices in Tehama provoke farmers towards conflicts over the distribution water during flood seasons. The amount of water conflicts among farmers of Tehama as in Wadi Zabid and Wadi Seham threaten the agricultural production at downstream areas and the groundwater resources at the upper stream areas. In plus of that came the negative effects of diesel shortage to increase the poverty and push many small farmers to abandon their lands and chose to immigrate. The inequity distribution of floodwater among Wadis different areas is greatly affected the livelihoods of downstream farmers. Where, farmers at upper stream areas profit floodwater with amounts encouraged them to made changing to their cropping pattern by introducing high water requirements crops as banana at Wadi Zabid and tobacco at Wadi Seham.

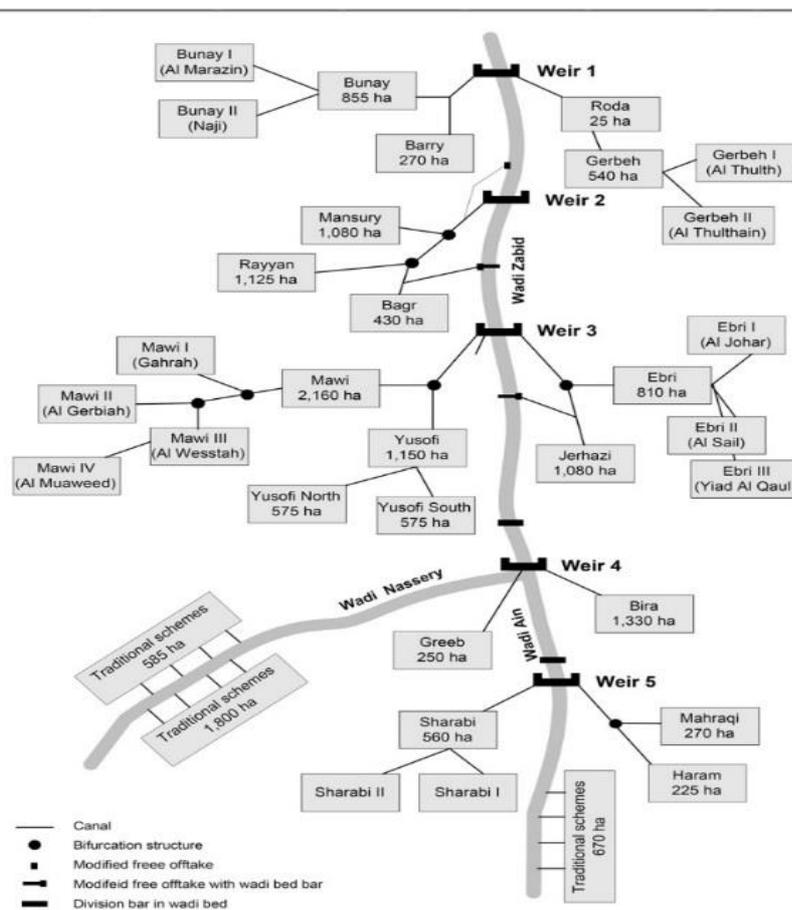


Figure (2) Shows the different division structures in Wadi Zabid & Ain

### Low Enforcement of Water Law

Water management and water governance assessments often focus mainly on the beginning of the policy process. There may be attention for public participation, formulating goals, rules and standards and the process of decision-making but hardly any attention for implementation and enforcement. A lack of enforcement will hamper the effectiveness of water management and governance and may in the end lead to conflicts and decreasing legitimacy, just as can be seen in the Yemen case.

Especially in cases that parties desire clarity as to their rights and duties, because they want to protect their interests and want to know who is accountable for achieving the goals set, enforceability will be an important issue. The same applies in cases where vulnerable values (water and ecosystems and the rights of vulnerable groups) are at stake. If vulnerable values are at stake, their role should be recognized, their interests should be sufficiently protected and enforcement mechanisms should be available. In the Yemen case, we see that parties rely on different rules (traditional and modern water rules) when they request enforcement. These - sometimes contradictory - rules hamper enforcement, due to fragmentation and a lack of legitimacy, which in the end may lead to a 'pick and choose what suits you best' behavior. Important with regard to enforcement are the available remedies to achieve the objectives.

## F. Water Conflict Management

Conflicts over water resources management in Yemen are highly contextual. The south of Yemen is sociocultural, economically, geographically, climatically very different from the north. The enormous variety of socio-cultural institutions framing local norms and values and driving local behavior results in a wide variety of conflict settlement arrangements. To analyze these processes and the roles of the stakeholders it is, therefore, necessary to focus on the specific characteristics of the stakeholders in the specific context.

What also is very important here, in relation to the stakeholder analysis of table, is that because of the limited capacity of the national institutions, the real implementing power of supplying or protecting water resources is at the local users, at field level (Hübschen, 2011). Numerous causes prevent people to access the legal system for conflict settlement. Resolving water conflicts thus mostly happens at this level, between the local water users, and often based on traditional mechanisms outside the courtroom (Hübschen, 2011).

Furthermore, the public and the private are in practice very much intertwined. Sheiks hold public office while at the same act as private agents (e.g., drillers and irrigators). This mix between public and private roles can create conflicts of interests, provide private agents access to public resources, can contribute to increasing inequitable distribution of assets, and decision-making over water resources management (Hübschen, 2011). To simplify a conflict setting we can assume that in most cases there is a conflict between two coalitions (which can be a single person or a heterogeneous group of people with shared or complementary goals and perceptions); an accusing coalition and an accused coalition. The first accuses the latter of intruding on its right to a water resource (in terms of quantity and/or quality). Both coalitions have certain interests and goals, perceptions of the problem, and resources and power (or powerful friends) to steer the conflict process. In this perspective it is important that the context of the conflict (institutions, legislation, property rights, socio-economic and political context) is important in how far it influences the characteristics (motivations, perceptions, resources and power) of the coalitions.

Before dealing with conflict, one must know when conflict occurs; preferably at the very first instance it occurs. There is a need to be able to identify conflict at the earliest possible point or, at least, address the root of the conflict when negotiating or mediating.

The duration of any conflict consist of an escalation period and a de-escalation period. Circulation life of any conflict from its start until its termination pass through the following steps:

1) Sources of Conflict

- ✓ Communication
- ✓ Values
- ✓ Emotions
- ✓ History
- ✓ Structure
- ✓ Needs
- ✓ Interests

2) Manifestation/s of Conflict

- ✓ Conflict as perception
- ✓ A belief or understanding that one’s own needs (water) or values incompatible with someone else’s.
- ✓ Conflict as feeling
- ✓ Involves an emotional reaction to a situation or interaction that signals a disagreement of some kind
- ✓ Conflict as action
- ✓ What we do to express our feelings, articulate our perceptions and get our needs met in a way that has a potential for interfering with someone else’s ability to get his or her needs met.

3) Conflict Resolution

- ✓ Expression:

Need to deal with anger, hurt, tension, frustration, sadness, fear etc. a person in conflict may be feeling.

Required listening, ventilation, acknowledgment, validation or some means of expressing releasing the feelings and energy associated with a conflict.

- ✓ Outcome:

Concerns about arriving at a satisfactory outcome. A solution that addresses a person’s interests.



Figure (3) Understanding conflicts

## Understanding History of Conflict

**'If we are to be effective in handling conflict, we must start with an understanding of its nature'.**

Bernard Mayer,

The Dynamics of Conflict Resolution

It is important to insert water conflicts in a wider context, since they are not isolated from other developments, but occur in the context of climatic, demographic, cultural and economic change, as well as transformations in information technologies, global governance, social conventions and the globalizing flows of capital and (to a lesser extent) labour (see O'Brien and Leichenko, 2000). The water system supports key societal functions, such as – in the Yemen case – mainly domestic and agricultural water use, including irrigation. Knowledge of this system refers to knowledge of the natural processes, but also knowledge of the properties of the infrastructure depends on its societal functions. These functions often change in time, as we see with the Qat production in Yemen leading to changes in the requirements of the water system.

It is importance to have adequate knowledge of the impact of these changes to be able to show and explain the impact of these changes to several actors' involved. Furthermore, a river basin approach is required to analyze and manage upstream consumption and downstream availability to be able to identify sources for conflicts, but also to identify conflict solutions. Insight is also required into the impact of investments in water resources development on water availability. In many places, just as in Yemen, water is currently over-allocated and heavily polluted, i.e., more claims have been issued than existed in the past.

## Analyze Water Stakeholders

A stakeholder analysis (also called stakeholder assessment or mapping) is of particular relevance given the complexity and political nature of the water management. It helps to determine the positions, levels of influence and power of different actors, their inter-relationships, and the channels through which influence occurs.

An extensive stakeholder analysis is necessary for understanding the political economy of water conflicts in Yemen. The stakeholder analysis is the process of identifying and analyzing stakeholders, and in many instances it is used to plan for stakeholder participation in water management (see Huntjens, 2011). There are a great number of methodologies concerning stakeholder analysis with a wide range of complexity (see e.g., Rietbergen-McCracken et al., 1998; NETSSAF, 2008, CAP-NET, 2005). For this study an assessment will be conducted regarding: who are the actors, what are their perceptions with regard to the problems at hand and possible solutions, what are their interests and how do the actors relate to each other, with a specific focus on values and principles?

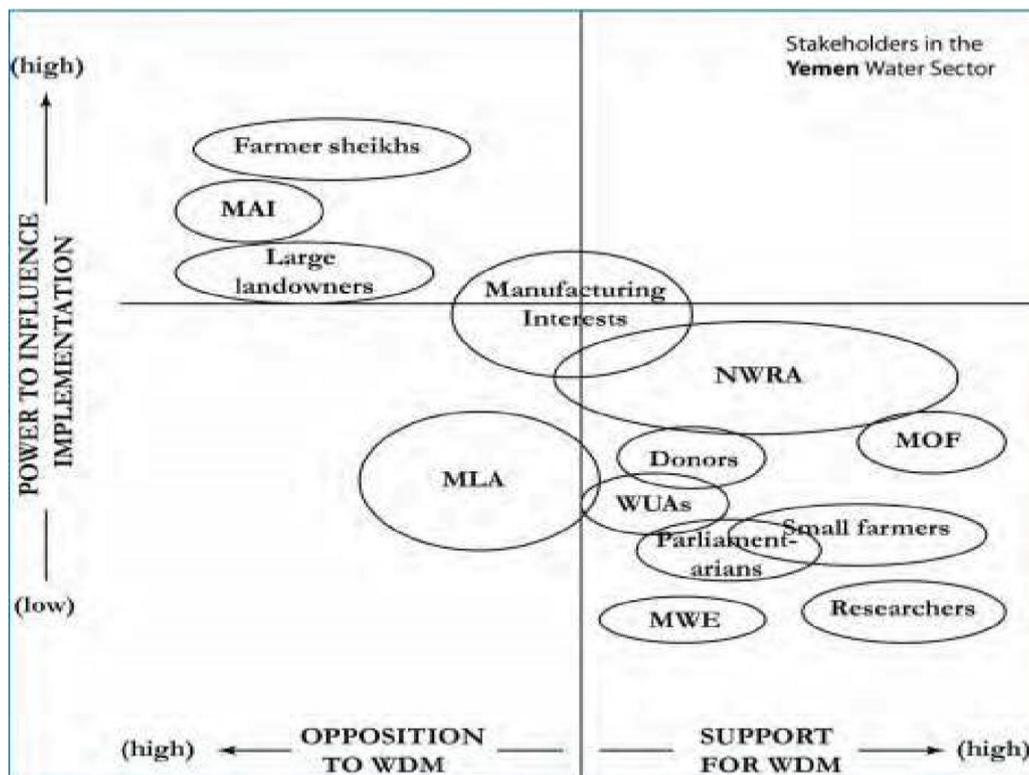


Figure (4) Stakeholder analysis Yemen (irrigation) Water Sector in relation to Water Demand Management (WDM)

### Determine Roles of Main Players and Influencers

If conflicting parties are unable to settle the conflict, a third party can be invited to settle the conflict. Due to the pluriform of legal institutions, this third party can be a state actor (courts, judges, etc.), tribal and customary institutions (sheikhs, wise elderly, etc.), or religious actors (religious leaders). A distinction needs to be drawn between non-violent water conflicts, which relate to the access and use of water, and water conflicts that became violent resulting in the loss of life. Non-violent water conflicts are approached differently under traditional and formal law than the latter. According to a participant of the consultation workshop, conflicts over water alone are not considered to be important enough to unite a tribe and organize a response against the perpetrator. It only becomes an issue for the whole tribe if people are killed in the conflict.

Generally, the customary and traditional rules govern the resolution of water-related conflicts. Tribal conflict resolution includes mediation and arbitration practices. The practices are bound by certain protocols with different levels of sophistication. Sheiks are key tribal figures that should have the knowledge of the traditional rights and skills to lead such processes. However, the capability of the local traditional leaders to deal with the conflicts is deteriorating. They either lack knowledge, or their involvement in patronage systems prevents them from operating in the service of their community.

Almost all of the water-related civil court cases concern illegal drilling cases identified by the branches of the NWRA. Actual water conflicts are seldom brought to civil court for a number of reasons. Firstly, generally speaking faith in the fairness of the courts is limited, due to corruption and the politicization of officials. In addition, although traditional arbitration is also costly to conflicting parties, the cost of settling a conflict in through judicial means is in many cases considered to be too

high, which prevents people from seeking justice through the legal system. Consequently, most of the cases are resolved within the local communities according to local traditions, as these are familiar to and relatively more affordable for a large group of people.

Water-related conflicts involving killings and are brought before the criminal court, provides an indication for the occurrence of water conflicts in Yemen. According to an unpublished estimate, based on the criminal court cases, each year 2,500 people die as a result of a water-related conflict. Approximately one-third of the cases brought before the criminal court (and thus involve killings) are water-related cases. Increasingly non-traditional mediators are involved in dispute resolution. These are governmental actors (NWRA specialists, court judges in an advisory role, district authorities), relatives of the conflicting parties, and local NGOs. Where government actors are called in to mediate in disputes, the actors are mainly municipal or district authorities or the NWRA. The roles of these governmental actors are, however, sometimes contradictory and never decisive. The authorities play an advisory role, but limited capacity (financial, personnel, knowledge, policy instruments, authority and legitimacy) restricts their impact. A judge might provide advice, in the situation when the cause of a conflict (such as deep-well drilling) is out of the scope of the tribal dispute settlement system. A judge may, however, interpret the Shari'ah to reach a solution acceptable to both parties, based on for example analogies in the Shari'ah.

## G. Managing Processes to Resolve Water Conflict Case

Water Conflicts can be resolved in various ways:

1. Force: a decision imposed by force on one or more of the parties,
2. Adjudication: a decision rendered by an authority, state, institution, Court of Law, or Special Master. Some states assign a "Special Master" who will act as a judge or arbitrator in water disputes,
3. Negotiation: a decision requiring an agreement among the parties.

## H. Negotiation

A variety of skills and techniques are taught: communication skills, different approaches of managing conflicts effectively, tracing needs and real interests, moving from positions to interests, how to deal with intense emotions, re-framing, open questions, and so on.

Negotiation, Mediation, and Other Processes (1992) define negotiation as "communication for the purpose of persuasion." Negotiation is a process in which parties to a dispute discuss possible outcomes directly with each other. Parties exchange proposals and demands, make arguments, and continue the discussion until a solution is reached, or an impasse declared.

### Negotiation Approaches

In negotiations there are three approaches to resolving the dispute, each with a different orientation and focus – interest-based, rights-based, and power-based – and they can result in different outcomes (Ury et al., 1993).

#### a) INTEREST-BASED NEGOTIATION

This approach shifts the focus of the discussion from positions to interests. Because there are many interests underlying any position, a discussion based on interests opens up a range of possibilities

and creative options, whereas positions very often cannot be reconciled and may therefore lead to a dead end. The dialogue on interest should be transparent, in order for the parties to arrive at an agreement that will satisfy the needs and interests of the parties.

#### b) RIGHTS-BASED NEGOTIATION

When negotiations between parties fail, the parties may then attempt to resort to what they consider to be their rights. This means appealing to the court (local, national, or international) and will result in a legal process in which the law is the dominant feature.

#### c) POWER-BASED NEGOTIATION

Resorting to threat or even violence as a way of communication for the purpose of persuasion is called power-based negotiation. The principles of the interest-based model can be used in any type of negotiations: from buying a car to resolving a conflict between the United States and Mexico over water, and from buying a company to dealing with the selection of a site for building a wastewater treatment plant. Negotiation based on “rights” or “power” fall under the “adversarial, distributive, or competitive model,” where the parties try to get the best deal for themselves at a cost to the others. A gain for one side means a loss for the other.

### Interests–Needs

Interests are needs (food, shelter, security, and so on), desires, aspirations, fears, hopes, and concerns. Positions are what we want and demand. The interests are the reasons behind the position. In negotiating on the basis of interests, parties will need to:

- Distinguish between positions and interests
- Move from positions to interests
- List all the interests according to priority
- Think of positions as only one of many solutions to the problem.

### Options

This is the range of outcomes that the parties agree to consider during the negotiations. Options are outcomes that can enlarge the pie and create value with little or no extra cost to the parties. In developing the options use the following criteria:

- Use brain storming among the parties to generate a list of options.
- Look to the interests in order to generate a broad range of options to choose from.
- Include options that will answer both parties’ needs and interests.

### Standards and Criteria

Objective standards and criteria can be used in the negotiations to enable both parties to perceive the process as fair and legitimate. Objective standards and criteria include:

- Market value of an asset or a resource
- The law regarding the matter being discussed
- Precedents
- Opinion of an expert
- Priority of human water consumption over other users (in water issues).

## Communication

This refers to all the means by which the parties communicate with each another, including spoken words, level and tone of speech, body language, and any other means that parties use to signal to one another. This is important because part of the message is not just the words, but also in the manner in which it is delivered.

## Relationship

This refers to the interpersonal and intergroup dynamics between all the parties to the negotiation. Proper consideration of these elements requires that one:

- Separate the people from the substance;
- Consider that there are differences in the way in which people in other cultures value interpersonal relationships as a precondition to holding negotiations.

## Agreement and Commitment

An agreement should be specific, realistic, operational, clear, and understood by all parties. It should be specific as to who will do what, how, when, and where.

In the agreement the parties should commit to what they have agreed. Before signing an agreement one should ask:

- Does the agreement anticipate future contingencies, to avoid surprises and disappointments that may result in motivation not to uphold it?
- Do we have the authority to sign this agreement?
- Does the other side have the authority to sign this agreement?
- Do we want a tentative agreement, subject to final approval?
- Do we want an interim agreement that covers only part of the issues and leaves the rest for a further and final agreement?

# I. Negotiation Skills

## Communication Skills: Active Listening

This is one of the most important and difficult skills for a negotiator and a mediator. Active listening as a skill and technique are taught to, and applied by, negotiators and mediators to enhance their effectiveness during the process. Active listening means stopping our inner voices, and truly listening to the other person. Listening will enable you to hear important information, and learn a great deal about the other party.

## Communication Skills: Talking Clearly and Precisely

Effective negotiation is also making sure that whatever you said was understood in the way that you meant it to be. You have to speak clearly, phrase your sentences carefully, make sure that the other party listens to you, and check with the other party to make sure that they understood you correctly. Send messages that are comprehensive, and explain where you are coming from, your needs, hopes, and fears. While talking you have to assess if the other party is listening, and how they hear/receive your message.

## Re-framing Positions as Interests

Re-framing is a way of giving feedback, and showing that you listened and understood what the other party said. It is restating and capturing the essence of what the other party said. Typically, parties start the negotiation process by stating their position, and their conclusion of what to do based on it. If the one party opens the negotiation in this manner, that is, by stating a position, it is very helpful to re-frame it as an interest. It helps the parties to identify their interests, and move from position to interests.

## Understanding and Perception

The negotiation process is influenced by our perceptions and our interpretation of reality. Perceptions are influenced by personal experience, emotional state of mind, and cultural background. Perception, as shown in Akira Kurosawa's film *Rashomon* (1951), varies from one individual to another; we know that four different people who witnessed the same murder may give four totally different accounts of what happened. The negotiator and mediator have to keep eye contact, listen carefully, and make sure that they understood exactly what the other party said.

## Open Questions

Questions are an essential skill for the negotiator and mediator. When asking a closed question, we get "yes" or "no" for an answer. Often these types of questions are also leading questions "Would you agree that . . ." "Didn't you think that it was unfair . . ."

The closed questions, and the leading ones, do not provide us with the essential information we need at the negotiating table and they tend to close down the discussion.

"Do you want to buy this property?" will provide us only with a "yes-no" answer, which does not include all the important information regarding the intention/ability of the buyer.

"What are the problems that concern you?" is a question which will provide us with important information as to how they feel about it, what are their concerns, their plans, and so on.

## Separate the People from the Problem

It is important to understand the other party's point of view, needs, interests, and concerns. One does not have to agree with the other point of view, just understand that it is legitimate to have a different point of view, needs, and concerns. One has to separate the people from the problem. Removing the person usually does not remove or solve the problem. However, trying to separate the person from the problem is not always practicable. There are societies in which personal relationships have a very high value, and separating the two is difficult.

The approach to resolving cultural and identity-based conflicts is a combination of interest-based negotiation and the process of dialogue and consensus building. The "third party" would help to identify the parties to the negotiation and decide who the participants will be; conduct a conflict assessment by identifying the major issues and interests of the parties; and identify the reasons and motivation for participating and resolving the conflict. Because the process is voluntary, one has to:

- Understand the needs of the parties to participate.
- Build confidence in the process among the parties.
- Design the process as one that is open and honest.

- Provide equal access to data and information to all parties in order to build confidence in the process and the participants, facilitate their dialogue, assist in generating many creative options, and come to a consensus on the best option(s) and a solution acceptable to the parties.

To reach an innovative solution, trust has to be gained. Trust makes it possible to open up consideration of the other party's perspective, needs, and interests. Sharing information, discussing concerns, talking about needs, and developing ways of thinking together will create a cooperative mode for a joint problem-solving negotiation process.

## J. Mediation

Mediation is a process that employs a neutral/impartial person or persons to facilitate negotiation between the parties to a dispute in an effort to reach a mutually accepted resolution. Mediation is a process close in its premises to negotiation: "mediation is an assisted and facilitated negotiation carried out by a third party" (Goldberg et al., 1992).

The mediator's role is multiple: to help the parties think in new and innovative ways, to avoid the pitfalls of adopting rigid positions instead of looking after their interests, to smooth discussions when there is animosity between the parties that renders the discussions futile, and in general to steer the process away from negative outcomes and possible breakdown towards joint gains.

### The Role of the Mediator

The mediator should consider the following to be part of her/his task:

- Help to coordinate the meetings.
- Introduce the parties.
- Explain the process to the parties.
- Set the agenda and rules.
- Create a cease-fire between the parties.
- Open communication channels.
- Gain the confidence and trust of the parties.
- Gather information and identify obstacles.
- Allow the parties to express feelings and vent emotions.
- Help the parties to identify and understand their interests and priorities.
- Help the parties with brainstorming creative options and solutions.
- Help in defining acceptable objective criteria.
- Help the parties understand the limitations of their demands through what is known as "a reality test."
- Help in evaluating alternatives.
- Allow the process to move forward according to the needs and pace of the parties.
- Help in crafting the agreement.
- Help in validating the agreement by the courts (if there is a court that has jurisdiction).

### Mediation Skills and Tools

- Listening skills, active listening
- Strong negotiating skills (because mediation is facilitated negotiation)
- The ability to create trust among the parties

- The ability to identify the issues of the dispute
- Patience, endurance, and perseverance
- Thoughtfulness, empathy, and flexibility
- Common sense, rational thinking
- A likeable personality
- Experience, education, training
- Neutral, impartial
- Problem-solving skills, creativity
- Ability to reframe the parties views in softer terms and summarize what was said
- Good people skills
- Asking open-ended questions.

## Mediation Approaches

There are several approaches to mediation. The mediator needs to adopt one of these approaches, or a combination, depending on the specifics of the case and the nature of the parties, as well as his/her own beliefs, experience, and expertise.

### The Evaluative Approach

Evaluative mediation is a process where the mediator is the one who provides guidance as to the appropriate grounds for settlement, on the basis of the law or her/his experience and knowledge in a specific field of expertise. The mediator's creativity and knowledge are used in order to help the parties navigate towards a settlement. In the evaluative approach the mediator tries to help the disputants to view realistically the strength and weaknesses of their case and claims. The mediator offers solutions, and even tries to predict the likely outcome in court, in case the mediation process fails.

### The Transformative Approach

This approach in mediation is a process in which the mediator's role is to help and assist the parties to reach an agreement. The transformative approach to mediation, as described by Folger and Bush in *The Promise of Mediation* (1994), views conflict as an opportunity for solving problems through transformation.

Folger and Bush believe that conflicts store the potential for valuable transformation in two aspects: empowerment of the parties, and recognition. The potential effects of this approach may be valuable in the long run, both for the parties and for society. This approach provides and enhances moral growth and the ability to handle disputes in a cooperative way in the future.

The mediator may help the parties to identify and analyze their interests, and gain greater clarity about their goals, resources, options, and preferences. This will help them reach effective decisions, and develop a better and more efficient outcome. A transformative/facilitative mediator leaves the responsibility with the parties. The mediator assumes that the parties are best placed to know what is right for them and have the ability and good sense to reach the most suitable outcome regarding their situation.

## K. Consensus Building: Principles, and Procedures

“Consensus building” relates to a decision and agreement reached by all the identified parties who have a stake in the outcome and decision. Through this process, the stakeholders create new and more efficient options to resolve the issue at hand. Special approaches to deal with emergency conditions such as floods, and droughts, will be developed to encourage cooperation, and avoid potential conflicts.

The consensus-building process is suitable for issues of planning, and environmental and social issues, among parties who will be affected by the decision. Consensus building is a process that seeks a unanimous agreement over one or more disputed subjects. It is an effort to bring together groups who are stakeholders in an open controversy on a basic policy issue and priorities. It is an effort to arrive at decisions in which the interests (or part of them) of all the parties involved are met. All the interested parties have to participate on a voluntarily basis, be supportive of the process, and make it work.

The desire to reach a resolution to the dispute is an important starting point, an attitude vital for the progression of a process so complex. It manifests the willingness of all the participants to make efforts towards reaching a resolution, even though the parties know that at a later stage there may arise the need for some compromise. Parties who are interested or affected by the outcome should choose the representatives who will participate in the process.

## L. Principles and Procedures

The facilitator (or group of facilitators) of the process is a neutral third party who manages the process, conducting it in a way that will empower the parties and enable them to resolve the dispute at hand. The facilitator has to set a realistic schedule and deadlines, which are essential throughout the process. Each deadline should be focused and strive towards consensus.

The facilitator identifies all the relevant parties to the dispute, invites them, and ensures that they all will have input into the process. Bringing all the stakeholders together in order to make such an effort is a major part of the process, an attitude that brings new energies into a situation. The process is for a purpose, and people need a reason to participate in the process; the knowledge that they will be heard and that their needs and interests will be met (at least partially) will cause them to commit to the process.

After all the parties have been identified, there is a need for an agreement between all the relevant parties to enter a process of consensus building. The facilitator writes a draft describing the main issues of the conflict as understood by him/her from the interviews.

The draft should be an analysis of the interests as they relate to a specific category or issue. This allows the parties to view the issues, and avoid dealing with them on a personal level. The facilitator should help the parties to design a flexible process, one that will meet their special needs and circumstances, and enable changes to be incorporated into the process.

By getting responses and objections from the parties, the facilitator may evaluate whether entering a process of consensus building is right at that stage.

If there are many parties involved, each group should choose a representative for the process. It is important that the representatives be acceptable to all the parties involved, have the confidence of their groups, and are empowered to make decisions on behalf of that group at a later stage.

The facilitator(s) should ensure that all parties have equal access to relevant information, equal access to relevant experts, and resources to enable them to participate. The facilitator(s) should help the parties to develop strategies and proposals to assist them in resolving their differences. They have to research techniques that were used by others facing similar challenges, and mediate and reach resolutions to as many issues as possible. The team can create an advisory group or a consultation process to assist in exploring and developing options and creative solutions to address the needs of the parties.

In a consensus-building process, some of the meetings may be open to the public while others may not. Regulations for the participation of the public should be formulated. The representatives are accountable to their public and constituencies, and should make sure that they represent their needs and interests and provide them with information on a regular basis.

In conducting a consensus-building discussion, it is the facilitator's role to create the terms for a constructive discussion to take place. It is his/her role to establish the norms of active listening, to help the parties create trust, and to educate the parties to use collaborative negotiation skills. Revealing the interests of all, respecting the interests and needs of the other participants, may lead to mutual gain, and make the process a beneficial one. It is also important that each of the parties will be allowed as much time as necessary to reach their decisions, and that the group is not allowed to apply pressure that may lead to a decision being taken that some may regret.

In some cases, there is a need to establish subcommittees to deal with specific issues that need to be investigated by a specific expert, while the group continues with the overall process. As the process progresses, it is important that one approved draft is initiated, which will be at the center of final discussions over negotiated issues in order to make sure that all the participants had thought them over.

All participants should be committed to implementing the agreement and creating a mechanism of effective monitoring to deal with problem that may arise in the near and distant future. While reaching final decisions, it is important to ensure that each of the participants can "live with" the proposed agreement and that it can be "sold" to their constituencies.

In forming a consensual agreement, the goal is to reach an agreement that all the parties think the most satisfactory, but over 90 percent approval may be considered a very successful consensus-building process. In order for a consensus to be reached and accepted, 80 percent of the participants or stakeholders should agree on the outcomes. Less than 80 percent approval of the agreement is no longer considered a consensual agreement and is a majority decision.

## Dispute Regulation Mechanisms

### 1. Property rights

The identification of responsibilities and authorities with respect to water starts with the determination of property rights. Four traditional types of ownership are identified in literature:

(1) private property, (2) common property, (3) state or public property and (4) no property (*res nullius*). In the Yemen study, we see that several property regimes apply at the same moment, which may be a cause for conflicts. Property rights are not absolute; they often include restrictions on the use of property by owners. These restrictions become more extensive in modernized and societies or modern water legislation. It has been argued that bottom-up organized common property arrangements have already existed for drainage and irrigation, oftentimes for centuries. The same is also true for Yemen.

To restrict property rights, the public domain requires centralized or decentralized powers to assign responsibilities and to organize policy processes. In the Yemen study, we have identified a mix of allocation mechanisms for authority and responsibilities, which may also be a cause for conflicts.

## 2. Financing water management

Empowerment with financial means is also part of a sustainable water governance system. Depending on shared values and principles the financing water management is based upon, conflicts may be more expected or more easily solved. We can think of cost recovery through a solidarity principle, which means that the costs of water policy are recovered from the national budget or budgets of decentralized authorities. We can also think of cost recovery through a profit principle, which means that those who have an interest in water services and the profits that arise therefrom, also pay for it.

## 3. Participative capacity

Participation is important to enable all water uses to have an equal opportunity to become expressed and recognized. Decentralization and strong local communities are seen as a favorable condition for participation.

## 4. Regulations and agreements

Regulations and agreements are the link between content and implementation and serve as a translation of service level agreements in rules, regulations, agreements and procedures. The appropriateness of rules and agreements depends strongly on the context of a certain case, as well as on cultural, historical, political, institutional and economic circumstances (developing/developed countries, rural/urban areas, religion, political/philosophical traditions), the legal traditions (common/civil law/traditional/indigenous law systems), the governmental organisation (centralized/decentralized/river basin management approach), the parties involved, the leading values and principles, the relevant and local water system characteristics, the actual water problem that has to be solved and last but not least, the intention of the parties. The main assessment criterion of regulations and agreements is legitimacy.

## 5. Engineering and Monitoring

The design and management of the existing infrastructure may not be suitable to fulfil the societal functions. For instance, the capacity of irrigation canals may be insufficient, as is the case in Yemen. The way existing infrastructure will be improved, may also lead to conflicts. To avoid conflicts in the future, improvements are preferably determined by the responsible authorities

and agencies, after consultation of stakeholders, and based upon the trade-offs between (competing) societal objectives.

## 6. Conflict prevention

Conflict prevention asks for identifying potential economic, social and political benefits of cooperation. The concept of “Water valuation for water dispute resolution” shows the advantages of “benefit-sharing” rather than “water-sharing”. This approach involves thinking about water in terms of its value, rather than just in terms of its quantities, quality and ownership. The parties can use this approach to negotiate the best water allocation and discuss benefit sharing. Offering compensation in case a reallocation of water is necessary, and may even diminish the risk of conflicts. Also in the Yemen study, it became clear that a lack of compensation measures, fragmented regulation and a lack of legitimacy are causes for the conflicts at stake.

## 7. Conflict resolution

If conflicts do occur, parties need an independent mediator, arbiter or judicial authority to solve the conflict and determine who is able to force parties to act in conformity with the final ruling. Conflicts can be solved in a proper way if stakeholders have formulated mutually accepted rules and procedures that prescribe how to handle or follow procedures in the case conflict of interests arise in water governance and management.

The main stakeholders in water conflicts are the rural and predominantly agricultural water users. As wealth is important in the development of water resources, the poor (and women) are unequally affected by the created water shortages. In all the cases, women do not have any specific rights when it comes to water, but carry major responsibilities, both domestically and in relation to income generation. Farmers in general have very little knowledge of the existence of official authorities and law that govern water use. Their immediate concern is with the diesel fuel costs and its availability in the market. The price of oil will likely become more important in determining water access.

The current lack of the rule of law creates opportunities for individual sheikhs and other powerful individuals to garner wealth through claiming new land and water resources without being confronted by local resistance. Newcomers were perceived to enter the areas and start using, diverting and drilling water for multiple purposes, which affected the prior use of existing (downstream) communities. Most respondents felt that they are increasingly oppressed by a system of corruption in which local elites, external powerful actors, and governmental officers are in control over water. The relations between the private and public spheres are very complex, as many private individuals hold public offices at the same time. This complexity is enlarged by the pluriform of regulatory and legal institutions (state, tribal, customary, and religious). Overall, stakeholder constellations and their power relations in Yemen water conflicts are highly dynamic.

### The Current Several Challenges all Arbitrators and Mediators Face

✓ Local leadership is based on personal leadership capacity, rather than formal authority. This can cause rapid shifts in authority and power constellations when, for example, old leaders pass away.

✓ In most cases there is no clear leadership, also because leadership configurations are still in the process of resettling local power.

✓ In many areas there is no single leadership strong enough to take authoritative decisions. This not only has implications for the leadership within a tribe (with regard to water issues), but also in a context where there is little trust; finding a mutually trusted mediator or arbitrator can be difficult.

✓ An important condition for conflict resolution is that the third party is perceived as legitimate by both parties in order to settle the conflict.

✓ A main challenge, therefore, is how to garner a critical mass of local stakeholders to support a decision of a third party mediating the conflict.

Conflict resolution is mostly the outcome of processes of negotiation, mediation and conciliation that are rooted in an in-depth understanding of the conflict resolution traditions, geo-hydrological, social-economic, cultural and political conditions. The ability to come to sustainable agreements is, therefore, largely influenced by the mediator or arbitrator's knowledge of these subjects.

## M. Toolkit and Guidance for Preventing and Managing Land and Natural

### Resources Conflict (EU-UN partnership, 2012)

To improve capacity for land and natural resource management (NRM) and conflict prevention, the EU partnered with the UN Framework Team in late 2008. The aim of this partnership was to develop and implement a strategic multi-agency project focused on building the capacity of national stakeholders, the UN system, and the EU to prevent land and natural resources from contributing to violent conflict. Six UN agencies, programs or departments have been involved, including UNDESA, UNDP, UNEP, UN-HABITAT, DPA and PBSO. The partnership is also designed to enhance policy development and program coordination between key actors at the level of country offices.

The first outcome of this project is an inventory of existing tools and capacity within the UN system and a set of four Guidance Notes on addressing NRM and conflict prevention. These Guidance Notes cover: (i) Land and Conflict (ii) Extractive Industries and Conflict (iii) Renewable Resources and Conflict, and (iv) Strengthening Capacity for Conflict-Sensitive Natural Resource Management. The report provides a useful overview of conflict over renewable natural resources that drive, reinforce or compound other stress factors (see below).



## Step 2 Inventory of Actors

- Which actors are actively involved in the problem?
- Which actors possess hindrance or realization power, in the sense that they have authority or other resources that play a role in the emergence or solution of the problem situation?
- Which actors have the knowledge, insights, and ideas that can contribute to the enrichment of the problem formulation, i.e. that can be considered for the solutions?
- Which actors have an interest in finding a solution to the problem situation? Which actors can be expected to be involved at any particular moment?
- Which actors are not likely to participate, but are affected in some way by the problem or the approach to it?

## Step 3 Problem Perceptions

- What standards do actors use to assess the situation?
- What is their perception of the existing and/ or expected situation? What is the crux of the problem? To what degree and in what sense are there gaps in the actors' perception? How do they determine these?
- In their view, what are the most important causes of the problem situation?
- What influencing techniques/means do they distinguish with regard to the problem situation and its causes?
- What images do actors hold about aspects such as problem, causes, solution, other actors and developments in the environment
- To what degree do these perceptions differ? / What obstacles could be caused by differences in perception?

## Step 4a Position of Actors: A Dependency Analysis

- What means do different actors have at their disposal? (i.e., types of resources and the significance of these resources to other actors: financial, production, competencies, knowledge, legitimacy resources)
- How important are these means and can they be acquired elsewhere?
- Is there unilateral or mutual dependency?
- Are actors critical, dedicated and/ or comparable?

## Step 4b Actions

- What actions have they undertaken?
- What impact have these actions had?
- What does the actor want to achieve with regard to the problem situation?
- Why do these actors pursue these objectives with regard to the problem situation?
- What costs and benefits for the actor are related to the problem situation or the suggested directions of solutions?
- Strategies: Go-alone/ conflictual/ avoidance/ cooperative/ facilitating strategies

## Step 5 Relevant Arenas

- Where are the decisions made that are important to the initiative/ policy game that is analyzed?
- Who are the most important actors in the policy game and what subsets can be recognized?
- Which actors interact in which context?
- What decisions are made at which locations?
- What are the backgrounds of the actors?

- What organizational arrangements exist to structure the interaction of these actors?
- How coherent are these groups of actors?

### Step 6 Identify and Analyze Stagnation

- Is there stagnation in the game?
- What is the nature and structure of the stagnation?
- Which actors are involved in the stagnation?
- Are these blockages or stagnation?
- To what extent is the stagnation cognitive c.q. social by nature?

### Step 7 Inventory of Interaction Patterns of Actors

- Which actors interact frequently and which infrequently?
- Which actors have a varying contact pattern and which do not?
- Which actors are central and peripheral in the network given their contact pattern?

### Step 8 Inventory of Patterns in Actors' Perceptions

- What perceptions do actors hold with regard to problems, solutions and their environment?
- To what degree do these perceptions correspond to those of other actors?

### Step 9 Inventory of Institutional Provisions Connecting Parties

- What formal rules and juridical procedures apply?
- What informal rules can be distinguished?
- What meeting and consultation procedures or other organizational constructions exist in the network that structure the policy game?

## N. The Analytical Framework is Used to Answer the Key Questions

1. What is the interest of stakeholders involved in the emergence of water-related conflicts?
2. Which conflict solutions (formal and traditional) are used for preventing or resolving conflicts in land and water management?
3. Are these solutions part of existing practices being used or of new arrangements being established?

## O. Case Studies of Local Water Conflicts

### ➤ Sana'a

Case 1 - Shahik dam: villagers of Shahik vs. villagers of Tan'im

#### Overview of the conflict

This case is located in Bani Seham greater tribal area, where the Government built a dam in 1985 without any social impact study. Competition over water started in 1998 when a flood filled up the area behind the dam. Eventually, fighting started and some people were killed and others injured. The conflict was resolved and the parties agreed to share the water. However, the Government did not play a role in this agreement.

Case 2 - Arrowdah: villagers of Ber Julah against grape farm owner

#### Overview of the conflict

In 1985 a newcomer to the area of Arrowdah established a grape farm. In 1990 land adjacent to his land was flooded. He diverted part of the flood to his land. However, the flood passed to lower lands in the direction of other farms in the town of Arrowdah. The act of the new owner was considered

hostile by the downstream land owners, since this act violated the traditional arrangements and the ownership rights of the downstream landowners to use the flood in that area.

Case 3 - Bani Matar: villagers of Al Kharabah, Mahiab, Bait Awad and Bait Habes against villagers of Jalal

Overview of the conflict

The dispute arose between inhabitants of Karabt Muhaeb over the waterstream Gayel Muheab. Karabt Muhaeb consists of two villages: an upper and lower village, between which the water stream flows. The conflict started when the people of the upper village started to dig holes and wells near and in the course of the stream to irrigate their fields. Apparently, this resulted in the disappearance of the surface water flow to the lower village. Fighting between the two villages erupted and the problem remains unresolved.

➤ Taiz

Case 1: Bani Yusof: villagers of Qihaf vs. Person 93

Overview of the conflict

At the end of 2012, Person 93 from the Uqf village, located opposite to Qihaf with the wadi in the middle, started drilling a well higher in the valley only 220 meters away from the Qihaf well. He dug three wells and could not find any water. He subsequently attempted to dig another well only 170 meters away from the Qihaf well. The citizens of Qihaf buried the new well. Abjuljabbar Mokred, a teacher, and representing the Qihaf villagers, filed a complaint at the security authority and paid for soldiers to come and deal with the situation. The security did nothing and Uqf continued to dig the well. Eventually, the villagers of Qihaf ran down the valley and buried the new well. Person 93 and his men shot them. Mokred reported the situation to the prosecution, but he said there was no response and no action was taken to the digging of the new well.

➤ Houdeidah

Case 1: Person 81 versus local farmers along the Debashiya canal

Conflict description and stakeholder analysis

Debashiya Irrigation System (DIS) is located immediately upstream of Waqir and was completed in 2005. It was built to overcome WIS's technical deficiencies as a result of which a whole area previously entitled to water rights could not irrigate. In theory, DIS should irrigate 1,000ha. Yet, to date the new canal irrigates a much smaller area than it was intended, because a powerful landowner is preventing floodwater from reaching downstream farmers who previously had access to the floods from a traditional earthen canal but who were neglected by the WSIP.

## P. Operationalizing the Conceptual Framework: Indicators and Questions

Based on the analytical framework, operationalize the identified key parameters (context and contextual changes, stakeholder dynamics, legal and regulatory framework) through the questions below. These questions are used during the desktop research and the local fieldwork, thus providing guidance in obtaining the relevant data.

### A: Context and Contextual Changes

How are the conflicts embedded in the local physical, socio-economic, political and legal-institutional structure, which lessens, intensifies, shapes and distributes the conflict?

- What are the most important rules and mechanisms with regard to accessing/ allocating surface and groundwater for: drinking water purposes, agricultural use (cattle, crops, and qat), industry and water for tinkering (selling of water to cities)?
- Is the formal legal framework conducive to conflict prevention and solution?
- Do women or other vulnerable groups have different rights?
- Which actors play a role in defining the allocation mechanisms?
- Which actors play a role in the allocation in practice (e.g. license for water use, day-to-day operation)
- Who is enforcing the water allocation mechanisms and how does this work?
- What have been the main changes in the last 10 years (physical, political, economic, legally, military)?
- Have the formal and informal rules changed (with regard to the allocation of water and resolution) as a consequence of these main changes?
- Are the traditional/ local rules still in place and did new local rules come up?

## B: Conflict Description and Stakeholder Analysis

What are the characteristics of the water conflicts in selected case studies in Yemen?

- How have people dealt with these changes in the way they have constructed their livelihood? Which groups gained and lost access to water in the last 10 years (2003-2013), and why? Did the problems result in conflicts with others? Or did the conflict erupt without relation to major changes? Describe the development of the conflicts.
- Describe the main cases where obvious degradation of the resource did *not* trigger a response. What prevented the potential conflict from escalating?
- *What are the interests of state and non-state actors in the conflicts?*
- Who are the KEY actors?
- What are their main activities in last five years
- What means (authority, weaponry, power, money, knowledge) do they have available to carry out these activities?
- Why do they pursue what they are doing?
- What is their role in establishing water access?
- What is their role in conflict prevention/ resolution?

## C: Dispute Regulation Mechanisms

What is the influence of policies and legal instruments in conflict prevention and solution? Which remedies are sought and why?

- With regard to the above mentioned conflict(s): Which remedies are sought and why?
- Which remedies are not tried and why?
- Were Islamic mediators involved? why/ why not?
- Were the traditional mediators involved? why/ why not?
- Were other parties involved in the dispute settlement?
- Was the case brought to court? why/ why not?

- Was the conflict solved?
- Are judgments effectuated in practice?
- What are solutions to the conflicts according to the interviewee? What would work?

## References

1. Trainer's Manual on Conflict Resolution: A Foundation Course Understanding, Negotiating and Mediating Conflicts, Centre for Humanitarian dialogue (hd), European Union, March 2017.
2. The Political Economy of Water Management in Yemen: Conflict Analysis and Recommendations, Ministry of Foreign Affairs of the Netherlands, The Hague Institute for Global Justice, June 2014.
3. ALTERNATIVE DISPUTE RESOLUTION APPROACHES AND THEIR APPLICATION IN WATER MANAGEMENT: A FOCUS ON NEGOTIATION, MEDIATION AND CONSENSUS BUILDING, UNESCO-IHP.
4. Conflicts over Natural Resources in the Global South – Conceptual Approaches, CRC Press/Balkema is an imprint of the Taylor & Francis Group, 2014.
5. Water and Conflict, A Toolkit for Programming, USAID.
6. Water Conflict, resources management, and resolution: Trust, Tools, Technology, and Politics by Stephen Gasteyer, Department of Sociology, Michigan State University, 2009.
7. A Storm Without Rain: Yemen, Water, Climate Change, and Conflict, The center for Climate and Security Research Fellow, By Collin Douglas. (Website).