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Specialist in Economic Intelligence

August 2010

About Geopolicity

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MANGING THE TIGRIS EUPHRATES WATERSHED: THE CHALLENGE FACING IRAQ

Tigris – Euphrates Watershed

1 How regional and international political economy issues have influenced water resource usage, particularly as a result of the recent conflict and crisis in Iraq?

2 A Twelve-Step Action Plan for Strategic Water Resource Management emerges from the findings, creating a clear understanding of the challenges facing Iraq.

This report presents an action framework for improving Strategic Water Resource Management (S-WRM) in Iraq. The storyline is clear. The Tigris-Euphrates (TE) watershed, which was formerly located within the domestic boundaries of the Ottoman Empire is now divided by the territories of Turkey, Syria, Iraq and effectively the Region of Kurdistan. If the Federal Constitution of 2005 were to be fully implemented, and new regional entities evolved within Iraq, then the complexity of managing the utilization of water resources would potentially increase immeasurably, with each upstream administrative division enhancing the risk that they divert water in an unsustainable way, to the eventual detriment of downstream users. This does not mean that all functions of water resource management should remain high centralized, but the report identifies increasing administrative divisions, as potential driver of riparian conflict should water stress levels increase as predicted. The arguments for a fully endorsed Riparian Agreement between the various states has never been more compelling, given the long term risks that water-related conflict might have in destabilizing regional relations even further. In identifying the core challenges faced by the sector, the report seeks to answer the following key questions. How and why relations between the Iraqi state and surrounding countries and peripheral borderland regions have shifted over time?

See inside for more….

Acknowledgment

Geopolicity would like to thank ***H.E. Abdul-Latif Rashid***, Minister of Water Resources, for his frank and honest observations regarding the challenges facing Iraq in the area of strategic water resource management as well as the contribution of ***H.E. Dr, Thamir Ghadban***, (Head) and ***Dr. Hussein Jabir*** (Senior Agricultural Advisor) of the Prime Minister's Advisory Commission (PMAC) The report is stronger and perhaps more compelling as a result of this engagement. The recent work of ***Dr. Dhia Al Bakri*** and ***Dr. Don Van Atta*** has also been invaluable.

Particular thanks go to ***Fadel El-Zubi*** (Head of Mission), ***Dr. Radhwan Aabdulhaleem*** (FAO Representation OCD) and ***Rami Samain*** from the Food and Agricultural Organisation (FAO) for policy and technical advice, collaboration and oversight support including contributions to the analysis and recommendations.

Within UNDP, we would like to acknowledge support provided by of ***Sylvia Fletcher*** and ***Maha Al-Nuaimy*** from the Governance unit alongside peer review provided by Alban Vuji, Shimon Khamo and Andy Tamas, and Madeleine Gorman for editorial support.

We also wish to thank UNICEF, UNESCO, UN-HABITAT, USAID-Tatweer, the World Bank, DFID and European Commission for information.

NOTE:

No work of this nature is going to be perfect, given the paucity of readily available information and the complexity of the issues under discussion. This work, financed by UNDP, remains the opinions of the authors only not of the UN.

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Currency Equivalents (As of March 2009)
US$ 1 = 1,145 Iraqi Dinars

Government Fiscal Year
January 1 to December 31

Acronyms and Abbreviations

BCM	Billion Cubic Meters
CWRAS	Country Water Resources Assistance Strategy
FAO	Food Agriculture Organization
GDP	Gross Domestic Product
GEF	Global Environment Facility
GoI	Government of Iraq
GoT	Government of Turkey
GoS	Government of Syria
ICID	International Commission on Irrigation and Drainage
IDA	International Development Association
IDBIRP	Irrigation and Drainage Basic Infrastructure Rehabilitation Project
IFARPID	Iraq Framework for Agricultural and Rural Policy and Institutional Development
INPIM	International Participatory Irrigation Network
IPTRID	International Program for Research in Irrigation and Drainage
IRMO	Iraq Reconstruction Management Office
ITF	Iraq Trust Fund
IWMI	Irrigation Water Management Institute
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
KM	Kilometre
KRG	Kurdistan Regional Government
MENA	Middle East and North Africa
MoMPW	Ministry of Municipalities and Public Works
Moa	Ministry of Agriculture
MoEN	Ministry of Environment
MoF	Ministry of Finance
MoH	Ministry of Health
MoPDC	Ministry of Planning and Development Cooperation
MoWR	Ministry of Water Resources
MW	Megawatts
NDS	National Development Strategy
NGO	Non Governmental Organization
PDS	Public Distribution System
SWRM	Strategic Water Resource Management
TDS	Total dissolved solids
T-E	Tigris-Euphrates
UN	United Nations
UNDG	United Nations Development Group
UNESCO	United Nations Educational, Scientific and Cultural Organization
USACE	United States Army Corps of Engineers
USAID	United States Agency for International Development
WB	World Bank
I-WRM	Integrated Water Resource Management
WRM	Water Resource Management
WHO	World Health Organization

EXECUTIVE SUMMARY

This report presents an action framework for improving Strategic Water Resource Management (S-WRM) in Iraq. The storyline is clear. The Tigris-Euphrates (TE) watershed, which was formerly located within the domestic boundaries of the Ottoman Empire is now divided by the territories of Turkey, Syria, Iraq and effectively Kurdistan. Furthermore, since 2005, the Region of Kurdistan has created another administrative division along these two great river basins. If the Federal Constitution of 2005 were to be fully implemented, and new regional entities evolved within Iraq, then the complexity of managing the utilization of water resources would potentially increase immeasurably, with each upstream administrative division enhancing the risk that they divert water in an unsustainable way, to the eventual detriment of downstream users. This does not mean that many functions of water resource management should not be de-concentrated or decentralised, but the report identifies increasing administrative fragmentation, as a potential driver of riparian conflict should water stress levels increase as predicted. The arguments for a fully endorsed Riparian Agreement between the various states has never been more compelling, given the long term risks that water-related conflict might have in destabilizing regional relations even further.

In identifying the core challenges faced by the sector, the report seeks to answer the following key questions, as a means to supporting the Government of Iraq and upstream riparian states, to identify factors that drive and constraint:

- How and why relations between the Iraqi state and surrounding countries and peripheral borderland regions have shifted over time;
- How regional and international political economy issues have influenced water resource usage, particularly as a result of the recent conflict and crisis in Iraq;
- Why recent efforts at sustainable water resource management have encountered obstacles to reform and what are the prospects for a more sustainable balance of utilization within the regional context;
- How the process of political decentralization, enshrined by the 2005 constitution and subsequent parliamentary and provincial council elections, creates opportunities for greater, more effective and efficient utilization;
- How and why legitimate central state power in Iraq has been unable to achieve traction so urgently required to place Iraq on the road to sustainable water resource management, through an integrated approach that is shaped by political, policy and institutional processes.

The main rivers of Iraq - the Tigris and the Euphrates - which cover an area of 126,900 km^2 and 177,600 Km^2 respectively, cross Iraq by their middle and lower reaches, **eventually to confluence in the river Shatt-al-Arab, before flowing into the Arabian Gulf**. The Tigris provides all the main tributaries within Iraq (Greater Zab, Lesser Zab, Adhaim and Diyala) with no tributaries sourced from the Euphrates. The arid regions along the watershed are characterized by the existence of "Wadis" in the upper reached of Iraq. More than ~90% of Iraq's water-dependent needs are met by surface water and ~80% of this water flow comes from its three neighboring countries.

Such an agreement would also necessitate serious reforms to environmental and water resource management policies and institutions across all states, with compliance perhaps

supported by a new Regional Riparian Commission, with a view to enforcing both integrated and sustainable water user policies and management procedures along the entire length of the T-E watershed. If the long term downward trend in mean average rainfall continues, when combined with the increased diversion of water for both irrigation and household water and sanitation purposes from Turkey through to Syria, Iraq and perhaps even Kurdistan, then establishing the evidence base to agree on water-balance management would be a precondition to any agreement. The 2008 agreement between Turkey, Syria and Iraq to restart the Joint Trilateral Committee is a step in the right direction, yet the sense of urgency required in the case of the T-E watershed demands a far more robust and substantive approach be adopted by the three states. The Ministry of Water Resources (MoWR) in Iraq forecasts that Iraq could experience a shortage of more than 33 billion cubic meters a year by 2015 - which is an approximate reduction of 30 per cent from current levels - if these and other exacerbating conditions remain unchanged. (MoWR, 2006)

Establishing a Basin-Wide Strategic Water Management Plan would be the main initial purpose of a strengthened Euphrates Trilateral Committee, perhaps as a permanent Commission including setting and enforcing management regimes and water quality standards. Bilateral agreements over the use of the Tigris would also be required. Yet, in order to establish a basin-wide water management plan for the Euphrates watershed, it is vital to perform rigorous water balance studies covering the entire watershed including critical historical drought and flood conditions, and exploring various water resources development scenarios, including the continued federation of the Iraqi state. To take this forward, irrigation water-demand estimation and water resources system simulations under various water resources development and hydro-climatic condition modelling needs to be undertaken.

With drought and water shortages likely to lead to water-related conflict unless a riparian agreement is reached in the short to medium term, alongside the fact that Iraq continues to allow largely free access to water for both irrigation and potable water purposes, over-consumption of a declining source would appear to set Iraq on the course for environmental disaster. Within Iraq itself, largely driven by conflict and poverty, the pricing of irrigation water does not exist and pricing of water for industrial or household production is at least twelve times lower than Egypt, which as a cross-national comparator is already the lowest in the region. A market driven water-pricing policy and metering system is required for conservation purposes, with substantial investment required by the Ministries of Water Resources and Municipalities and Public Works, the primary national institutions responsible for such a policy.

Even though the need for a riparian agreement has never been greater for Iraq, Turkey has so far resisted entering into such an agreement and the civil war and unrest in Iraq, alongside the relatively weak government, have undermined Iraq's ability to forge such an important strategic water resource management framework. Given the relatively weak position in which Iraq currently finds itself within the regional context, the need for an externally supported agreement remains a priority in its own right. Yet, with the European Union (EU) in talks with Turkey over possible succession since 2005, the role of the EU in such negotiations may be compromised and as a result, this paper argues that in the long term only the Arab League or United Nations (UN) are capable of playing such a facilitation role.[1]

[1] The UN Convention on International Water Resources alongside various international environmental protocols provides a compliance framework for all riparian states within the T-E watershed.

In terms of down-stream issues, enhancing the effectiveness of domestic water resource management will be of equal importance as agreeing trilateral or bilateral agreements with upstream riparian states. Currently, waters from the Lesser Zap, Dyalia, and the Shatt Al Arab through Karoon and Karkheh provide a substantial contribution to meeting domestic demand and resource management practices, curbing illegal usage and conservation will be policies that pay dividends over the short and longer term.

Investments made now will pay dividends in the years to come when Iraq, blessed with substantial oil revenues, would not only *(i)* have developed the capacity to sustainably manage water resources in line with any riparian management agreement; ***(ii)*** be able to implement water-pricing and other cost-recovery measures to conserve water at both the supply and demand side; and (***iii)*** have the capacity to monitor upstream water usage to check conformity with an agreed management plan. The need to lay the evidence base for such an agreement has never been greater, given that the failure to develop such a strategic and integrated approach may one day lead states into a conflict with upstream users, the destabilization impact of which could spill over beyond the immediate trilateral partners.

This report employs a Drivers of Change (DoC) approach by looking critically at the structures, institutions and agents involved in such a framework, around which major constraints and entry point can be identified. The report makes no apology for the somewhat direct nature of the analysis, and whilst a balanced view is presented, given that Iraq currently occupies the downstream position in such negotiation, the need for external support as either an interim or permanent measure will need to be carefully considered. A series of high level recommendations and entry points are presented, for consideration by incumbent authorities, within Iraq and the wider riparian community.

The report is divided into seven parts: (i) introduction, purpose, scope and methodology; **(ii)** historic drivers of strategic water resource management in Iraq; **(iii)** structural drivers; **(iv)** institutional drivers; **(v)** agency drivers; **(vi)** discussion on core drivers of change; and **(vii)** recommendations.

PART I
INTRODUCTION, PURPOSE, SCOPE & METHODOLOGY

1.1 INTRODUCTION

1. **This report presents an overview of the main Drivers of Change of Water Resource Management in Iraq using the standard Drivers of Change (DoC) Analysis**. This historical approach is intended to shed light upon water resource management in contemporary Iraq and the political and economic goals being pursued by the Government of Iraq (GoI), Iraq's neighbours and the international community. The document charts the major factors influencing Iraq's political economy within the water resource sector and, therefore, assesses these in relation to post-2003 interventions and provides an indicative set of strategic options for consideration. This report is part of a set of sector scoping reports which include the following:

Output 1: Water and Sanitation Sector Scoping Study;
Output 2: Education Sector Scoping Study;
Output 3: Health Sector Scoping Study; and,
Output 4: Strategic Water Resource Management in Iraq: Drivers of Change

2. **These outputs, which are joint outputs with the UN Agencies (UNDP, UNICEF, UNESCO, UN-HABITAT, FAO and WHO) and the Government of Iraq, provide the foundation upon which the Iraq Public Sector Modernization (I-PSM) program will support reform and modernization of these core sectors, with a review to establishing reform and modernization road maps**. This report, which is produced in parallel with the above mentioned Water and Sanitation Sector Scoping Study is intended to provide a strategic overview of Iraq's water resource management, set within a regional and national country context.

3. **The report makes an honest assessment of the water resource management system and is primarily intended as an input to support the Ministry of Water Resources (MoWR) and Ministry of Municipalities and Public Works (MoMPW) in thinking through the core strategic priorities in the current context**. Moreover, and of great significance, it also outlines the various means and measures for international and regional support in establishing a sustainable Watershed Management Agreement with Turkey, Syria and Iran, to secure acceptable supply and demand trade-offs to meet the needs of the entire Tigris and Euphrates watershed catchment areas. In the light of the recent drought and upstream utilization of water resource for irrigation purposes, poor water resource management will have a profound impact on regional instability, economic growth, environmental sustainability and poverty rates. The counterfactual of not addressing these core issues – whilst not outlined here in detail – is considerable for all consumers of water, across the entire watershed area.[2]

4. **This report aims to provide a clear understanding of the challenges of sustainable water resource management in Iraq, by identifying the core Drivers of Change (DoC), with a view to progressively removing binding constraints at the political, policy and institutional levels**. It does not claim to be exhaustive in its analysis, but rather focuses on strategic issues alone, whilst building on the focus of the GoI MoWR Water Resource Development Strategy, the GoI Five Year National Plan for Agriculture and Irrigation and the World Bank Country Water Resource Assistance Strategy of 2006.

[2] The goal of sustainable watershed management is, therefore, to align human uses of resources (e.g., forestry, agriculture, water storage and diversion, hydropower, navigation) with the available water supply to sustain watershed ecological function and human activities.

1.2 PURPOSE

5. **This exercise is intended to provide a broad assessment of the GoI's engagement in Strategic Water Resource Management (SWRM) since the turn of the century but with a particular focus on issues emerging since 2003**. Key questions to be addressed include:

- What are the major strategic constraints to sustainable water resource management in Iraq at the **political**, **policy** and **institutional** levels?
- What has been the impact of declining inflows into Iraq from the Tigris and Euphrates and from Shatt Al Arab?
- What are the prospects for negotiating a workable Trilateral Agreement between Iraq, Turkey and Syria for the Euphrates, as the forward work of the Joint Trilateral Committee established which signed a Memorandum of Understanding (MoU) in September 2009, and for bilateral agreements over the Tigris, to also include Iran?
- What policy measures have and could be adopted to support SWRM?
- What are the major entry points for improved policy and institutional governance?
- What practical recommendations can be made to support the GoI in strengthening its position with a view to negotiating an acceptable agreement with its riparian neighbours?

6. **This report utilises the standard Political Economy Analysis (PEA) approach to determining the main drivers of change in the areas of water resource management**. The PEA approach, therefore, provides the framework or 'lens' through which the various strategic options for improved management should be considered. It includes analyses of contemporary structures and institutions dealing with WRM in Iraq, regional contemporary political economy and a short analysis of reconstruction and state-building interventions since 2003. Importantly, with the adoption of the 2005 Federal Constitution, passing of the 2008 Provincial Powers Act and the 2009 and 2010 budget laws, this report also considers options for decentralised service delivery (formal, informal and customary) – within a rational framework to meet national and regional water resource management objectives.

1.3 SCOPE

7. **In delivering the terms of reference for the Iraq Public Sector Modernization (I-PSM) preparatory scoping work, in addition to the report on Water and Sanitation outlined above, it is vital to consider the various strategic management issues available to GoI in their management of the overall sector**. This analysis seeks to consolidate existing secondary information and provide an original and solution-oriented interpretation to meet the needs of the GoI, and regional actors. The approach has been, first, to review the available literature on water resource management from a political economy perspective in order to gain an appreciation of what approaches have worked in Iraq and other cross-national comparative contexts, and how they have been sustained. The final analysis, which has been enriched by findings from the other water and sanitation sector analysis outputs, highlights the scale of the challenge at hand, the insufficiency of the international intervention in this area and the potential costs of failure. The scope of the report focuses on political, policy and institutional factors only and is not intended to provide a comprehensive technical review of the sector; these have been covered by the GoI, World Bank and USAID; amongst other actors.

1.4 DRIVERS OF CHANGE (DOC) METHODOLOGY

8. **The approach adopted in the report is to assess the historical, structural institutional and agency Drivers of Change (DoC) affecting – positively and negatively – the strategic**

management of the Tigris and Euphrates Watershed. This builds on a defined international methodology, often used to identify core factors that would either impede to drive progress. Annex 1 provides an overview of the broad Drivers of Change Framework employed here.

1.5 RELEVANCE OF DOC TO STRATEGIC WATER RESOURCE MANAGEMENT

9. **It is not possible to understand existing water resource management policies, institutions and prospects for change without first understanding how the political economy of water resource management, across history, has been shaped and driven**. This report, therefore, seeks to uncover sources of and fluctuations in relations throughout recent history, to strengthen the strategic management of Iraq's National Water Resources within the national and regional context, by addressing the following core issues:

- How and why relations between the Iraqi state and surrounding countries and peripheral borderland regions have shifted over time;
- How regional and international political economy issues have influenced water resource usage, particularly as a result of the recent conflict and crisis in Iraq;
- Why recent efforts at sustainable water resource management have encountered obstacles to reform and what are the prospects for a more sustainable balance of utilization within the regional context;
- How the process of political decentralization, enshrined by the 2005 constitution and subsequent parliamentary and provincial council elections, creates opportunities for greater, more effective and efficient utilization, but also potential threats too;
- How and why legitimate central state power in Iraq has been unable to place Iraq on the road to sustainable water resource management, through an integrated approach.[3]

10. **This analysis allow us to re-evaluate the water resource management strategy adopted by GoI and other regional actors and identify viable options within the current balance of interests, as well as which are likely to be nullified by extensive opposition or, worse yet, to provoke violent resistance**. Here the principles of Integrated Water Resource Management (IWRM), adopted at the 1992 conference in Dublin, Ireland, and the lessons learned by similar regional riparian water communities (e.g. the Nile Basin and the Indus Valley) provide a solid foundation for longer-term success; assuming that a trilateral solution can be brokered (even if external oversight and monitoring are required) regarding the supply and demand for T-E waters over time – towards a generational perspective.[4]

[3] Integrated Water Resources Management is a systematic process for the sustainable development, allocation, and monitoring of water resources. The concept and principles of IWRM were articulated at the International Conference on Water and Environment held in Dublin in 1992 and in Chapter 18 of Agenda 21, a consensus document from the United Nations Conference on Environment and Development (UNCED). IWRM is a cross-sectoral holistic approach that aims to ensure the coordinated development of water, land and related resources to optimise economic and social welfare (Global Water Partnership, 2000). Strategic water resource management – advocated here – builds on the integrated approach but focuses on the particular strategic needs of the riparian states.

[4] The Tigris appears twice in the Bible. In the Book of Genesis, the Tigris is the third of the four rivers branching off the river issuing out of the Garden of Eden.

PART II
HISTORICAL DRIVERS OF CHANGE

2.1 HISTORICAL CONTEXT [5]

11. **This short section outlines a short history of strategic water resource management in Iraq, and within the wider sub-region that was once within the domestic administration of the Ottoman Empire**. In so doing, and given the political economy analysis approach adopted in this report, this section focuses on regional, religious, cultural, political, conflict, and policy and institutional issues in particular.[6]

12. **The T-E Watershed has played a pivotal role in the history and sustainment of Iraq from the very beginning of the Mesopotamian era through to the present day**. Irrigation activities within the watershed have been reported going back more than 7,500 years. Moreover, the waxing and waning of both rivers during periods of flood and drought have endowed the plains with fertile alluvial soils for agricultural production, a source of food security for those who produce and local and regional markets. Under the Ottoman Empire, both rivers were effectively domestic in reach, but with the contraction of the Ottoman Empire both rivers flowed across new territories: Turkey, Iraq, Syria and now through the Iraqi regional territory of Iraqi Kurdistan. With the Ottoman Empire shaping the initial history of water resource management, subsequent rulers and governments have sought to benefit from the huge potential these rivers provide, for economic gain, food security and employment generation. The progressive administrative fragmentation of the T-E watershed has turned this into an international, not domestic, affair.

13. **According to the Islamic Educational, Scientific and Cultural Organization (ISESCO), the value of water in Islam is also reflected in the Holy Quran, where it is recognized that "*from water every living creature was created*"**. Of particular gravity Prophet Mohammed also declared that all people should have free access to water, and this has been a recurring theme in the Islamic history of the Middle East. The Prophet declared that existing wells were to be protected by banning the digging of new wells within the vicinity of old wells, and this area was referred to as "*harim*". This application was also extended to other water sources. Moreover, the Prophet Mohammed also established religious water-related institutions declared as collective property; known as "*waqf*". In this context, many of the water resources and wells were declared as "*waqf*" and the public had full right of use. (See http://www.isesco.org.ma).

14. **ISESCO states that, in relation to water laws, Islamic principles are generally based on two facts (i) the right of thirst where all people have the right to quench thirst or to water animals; and (ii) the right of irrigation where water can be used to water land and plants.** These laws are deduced from the Holy Quaran, Sunna and Hadiths, Lima, Qiyas and customary practices as follows:

[5] This section draws extensively from: the Islamic Educational, Scientific and Cultural Organization (ISESCO), the World Bank CWRAS (2006), MoWR Water Resource Development Strategy and the GoI Five Year Plan for Agricultural development - which embrace water resource management strategic objectives.

[6] The Tigris-Euphrates river system is part of the Tigris-Euphrates alluvial salt marsh eco-region of West Asia, and is characterized by two large rivers, the Tigris and Euphrates. The rivers have several small tributaries that feed into the system from shallow freshwater lakes, swamps, and marshes, all surrounded by desert. The hydrology of these vast marshes is extremely important to the ecology of the entire upper Persian Gulf. Historically, the area is known as Mesopotamia. As part of the larger Fertile Crescent, it saw the earliest emergence of literate urban civilization in the Uruk period, for which reason it is often dubbed the "Cradle of Civilization".

(i) ***The Holy Quran***: The Holy Quran contains 500 Ayats concerning water which are reflected in Islamic water laws;

(ii) ***The Sunna or Hadiths***: It is stated that when Islam expanded across geological, hydro-geological and meteorological boundaries, divided across nation states, new problems arose in relation to management. These challenges were only partially resolved by reference to religious texts;

(iii) ***Ijma***: When community-wide consensus over how to address a particular problem is found, often through customary practices, based on the Prophet's assertion that "my people will never agree on an error;

(iv) ***Qiyas***: When deduction by analogy or legal analogy is required, this is not an accepted approach in the domain of the fundamental principles of Islam; and,

(v) ***Custom***: Customs should be fully aligned to the fundamental principles of Islam.

15. ***Islamic laws were widely used until the evolution of the Ottoman Empire***. During the period 1300-1922 A.D. water management codes and laws were based on Islamic Shariah and the orders of the Sultan. However, conflicting approaches resulted from the clash of Islamic and non-Islamic cultures and the rise of the Ottoman Empire and its neighbouring states. As a result, Islamic law was no longer able to guide the complexity of multi-cultural governance systems, and different ruling authorities and religions in relation to resource management. New laws and regulations started to emerge from 1839 A.D to address the emerging reality of trans-boundary management, and these were included in the Ottoman Civil Code for the period 1854-1876 A.D. New regulations were based on Islamic principles.

16. **Following the decline of the Ottoman Empire from the mid 1920s, Turkey established new water resource management codes known as the Turkish Civil Codes in 1926, although to a large extent other Islamic countries continued to use the Ottoman Codes**. With the further contraction of the Ottoman Empire a number of countries established water laws under the rule of foreign powers, including Algeria, Tunisia, Morocco, India and Indonesia. Other countries including Iraq, Lebanon, Jordan and Palestine continued to use Ottoman laws, supplemented by new laws premised on Islamic fundamentals. Under this new framework water resources were considered state property, with governmental approval required for resource utilization. Following the departure of colonial powers, countries such as Iraq and Jordan instituted their own regulatory and legal framework and other countries like Saudi Arabia, Yemen and Oman used Islamic Shariah as a basis for sector regulation. Since the early 19th century Egypt used local regulations for the management of water resources, Afghanistan employed customary laws and Libya, Pakistan and Indonesia developed legislation where water was once again viewed as the property of state. Iran established local laws for water use especially in relation to irrigation.

17. **According to the Strategic Framework for Managing International Watercourses in Iraq, the Lausanne Treaty of 1923 mandated the formation of joint committees between Turkey, France (for Syria) and UK (for Iraq) to resolve problems of allocation and management of water resources in the Euphrates and Tigris, including issues such as construction of dams**. The issues were to be resolved by mutual agreement, with arbitration resorted to only as the last option. The spirit of the Treaty was strengthened by bilateral protocols between Turkey and France in 1930. In 1946, Turkey and Iraq signed the Friendship and Neighbourly Relation Agreement, which obliged Turkey to report to Iraq any plans to utilize the water of Euphrates

and Tigris and also gave the right to Iraq to construct dams in Turkish territory for improving the flow of Euphrates into Iraq.

18. **In 1980 Turkey and Iraq created a Joint Technical Committee on Regional Water on the basis provided by the 1946 protocol and Syria subsequently joined the Committee**. In 1987, a bilateral Syrian-Turkey protocol resulted in Syria being assured by Turkey of at least 500 cubic meters per second of water from the Euphrates at the Syrian border. This worked out to an average annual flow of 15.75 BCM. A Syria-Iraq discussion in 1989 resulted in assurance to Iraq of 58 percent of the water resource of the Euphrates entering Syria while Syria retained 42 percent, with minimum average annual flow of 9.1 BCM into Iraq (See. Strategic Framework for Managing International Watercourses in Iraq).

Table 1 Change of Flow For Euphrates and Tigris Rivers in Billion Cubic Meters over Time

Year (1)	Euphrates River Annual Inflow (BCM) (2)	The Ratio to the Average % (3)	Tigris River annual inflow (BCM) (4)	The Ratio to the Average % (5)	Total (2+4=6)	The Ratio to the Average (7)
1990-1991	12.42	45	30.87	62	43.27	56
1991-1992	12.15	44	62.72	127	74.87	97
1992-1993	12.37	45	66.36	134	78.73	1.2
1993-1994	15.33	56	44.85	91	60.18	78
1994-1995	23.9	87	65.63	132	89.53	116
1995-1996	30.0	109	38.85	78	68.85	89
1996-1997	27.46	101	42.66	86	70.30	91
1997-1998	28.91	105	49.90	84	78.81	102
1998-1999	18.61	68	18.80	38	37.41	49
1999-2000	17.23	63	18.85	38	36.08	47
2000-2001	9.56	35	21.13	42	30.72	40
2001-2002	10.67	39	42.98	87	53.65	75
2002-2003	15.71	57	59.00	119	74.71	96
2003-2004	20.54	75	45.52	92	66.06	87
2004-2005	17.57	64	38.07	77	55.65	76
2005-2006	20.6	75	42.30	85	62.90	76.88
2006-2007	19.3	71	37.50	76	56.80	74

Source: Ministry of Water Resources

19. **With the evolution of new nation states, the trans-boundary nature of these rivers has led to designs at upstream control often to the detriment of downstream consumers and producers**. As a result, and in the light of global water resource crisis, both rivers have since the 1960s become a source of conflict and political dispute as well as prosperity and employment. The issue of '*water-rights*' became a particular point of contention for Iraq, Turkey and Syria when Turkey implemented the US$25 billion South-Eastern Anatolia Irrigation Project (GAP) public works project which aimed at harvesting the water from the Tigris and Euphrates rivers through the construction of 22 dams, for irrigation and hydroelectric energy purposes. Although it is reported that the water dispute between Turkey and Syria was more problematic, at the time the GAP project was also perceived as a threat by Iraq, given its total dependency on

upstream inflows. In due course, tension between Turkey and Iraq over the sharing of trans-boundary resources increased by the effect of Syria and Turkey's participation in the UN embargo against Iraq following the Gulf War. However, to date – although this may change – the relationship between Iraq and Turkey has never been as bad as the water dispute between Turkey and Syria.[7]

20. **A key policy for successive Governments in Iraq has been to utilise the revenue gains from oil to develop a complex (and integrated) network of irrigation canals to maximise sustainable storage and utilization**. These water-resource management developments have harnessed much of Iraq's water resources and have significantly contributed to economic diversification and growth, including generating twenty per cent of all domestic electric power and irrigating over 3 million hectares of agricultural land; equal to 10 percent of total GDP and 35 percent of non-oil GDP. In addition, a rural population of about 8 million depend on irrigated agriculture from both rivers. During the early 1980s, Iraq's agriculture contributed about 20 percent of national employment; and the quality of water supply and sanitation services was amongst the best in the region. Furthermore, success in controlling water flow also reduced the various flood risks which saved urban and rural communities from the ravages of frequent inundations (World Bank, 2006). However, in the late 1980s this eco-region was put in grave danger as the Iran–Iraq War raged within its boundaries. The wetlands of Iraq, which were inhabited by the Marsh Arabs, were completely dried out[8], and only recently have shown signs of recovery.[9]

2.2 LAND HISTORY[10]

21. **Iraq's system of land tenure and inefficient government implementation of land reform contributed to the low productivity of farmers and the slow growth of the agricultural sector**. Land rights had evolved over many centuries, incorporating laws of many cultures and countries. The Ottoman Land Code of 1858 attempted to impose order by establishing categories of land and by requiring surveys and the registration of land holdings. By World War I, only limited registration had been accomplished and land titles were insecure, particularly under the system of tribal tenure through which the state retained ownership of the land although tribes used it.

22. **By the early 1930s, large landowners became more interested in secure titles because a period of agricultural expansion was underway**. In the north, urban merchants were investing in land development, and in the south tribes were installing pumps and were otherwise improving land. In response, the government promulgated a law in 1932 empowering it to settle title to land and to speed up the registration of titles. Under the law, a number of tribal leaders and village headmen were granted title to the land that had been worked by their communities. The effect, perhaps unintended, was to replace the semi-communal system with a system of

[7] See Uzgel I., 1992. Güvensizlik Üçgeni: Türkiye, Suriye, Irak Ve Su Sorunu, Mülkiyeliler Birliği Dergisi, 162, p.47-52

[8] The drying out of marshlands of both the Tigris and Euphrates delta came about partly as a result of watercourses deviation through the building of a series of canals and dams and the Third River, implemented during the time of Saddam Hussein.

[9] Turkey, Syria and Iraq primarily share the T-E Watershed, with many Tigris tributaries originating in Iran. Since the 1960s and in 1970s when Turkey began the GAP project in earnest, water disputes have regularly occurred in addition to the associated dam's effects on the environment. In addition, Syrian and Iranian dam construction has also contributed to political tension within the basin, particularly during drought.

[10] The section is taken from the US Library of Congress on Land Tenure and Agrarian Reform in Iraq.

ownership that increased the number of sharecroppers and tenants dramatically. A 1933 law provided that a sharecropper could not leave if he were indebted to the landowner. Because landowners were usually the sole source of credit and almost no sharecropper was free of debt, the law effectively bound many tenants to the land.

23. **The land tenure system under the Ottomans, and as modified by subsequent Iraqi governments, provided little incentive to improve productivity, with most farming conducted by sharecroppers and tenants who received only a portion of the crop**. Any increase in production favoured owners disproportionately, which served as a disincentive to farmers to produce at more than subsistence level. For their part, absentee owners preferred to spend their money in acquiring more land, rather than to invest in improving the land they had already accumulated.

24. **On the eve of the 1958 revolution, more than two-thirds of Iraq's cultivated land was concentrated in 2 percent of the holdings, while at the other extreme, 86 percent of the holdings covered less than 10 percent of the cultivated land**. The pre-revolutionary government was aware of the inequalities in the countryside and of the poor condition of most tenant farmers, but landlords constituted a strong political force during the monarchical era, and they were able to frustrate remedial legislation.

25. **Because the promise of land reform kindled part of the popular enthusiasm for the 1958 revolution and because the powerful landlords posed a potential threat to the new regime, agrarian reform was high on the agenda of the new government, which started the process of land reform within three months of taking power**. The 1958 law, modelled after Egypt's law, limited the maximum amount of land an individual owner could retain to 1,000 Dunums (100 hectares) of irrigated land or twice that amount of rain fed land. Holdings above the maximum were expropriated by the government. Compensation was to be paid in state bonds, but in 1969 the government absolved itself of all responsibility to recompense owners. The law provided for the expropriation of 75 percent of all privately owned arable land. (US Library of Congress)

26. **The expropriated land, in parcels of between seven and fifteen hectares of irrigated land or double that amount of rain fed land, was to be distributed to individuals**. The recipient was to repay the government over a twenty-year period, and he was required to join a cooperative. The law also had temporary provisions maintaining the sharecropping system in the interim between expropriation and redistribution of the land. Landlords were required to continue the management of the land and to supply customary inputs to maintain production, but their share of the crop was reduced considerably. This provision grew in importance as land became expropriated much more rapidly than it was being distributed. By 1968, 10 years after agrarian reform was instituted, 1.7 million hectares had been expropriated, but fewer than 440,000 hectares of sequestered land had been distributed. A total of 645,000 hectares had been allocated to nearly 55,000 families, however, because several hundred thousand hectares of government land were included in the distribution. The situation in the countryside became chaotic because the government lacked the personnel, funds, and expertise to supply credit, seed, pumps, and marketing services – functions that had previously been performed by landlords. Landlords tended to cut their production, and even the best-intentioned landlords found it difficult to act as they had before the land reform because of hostility on all sides. Moreover, the farmers had little interest in cooperatives and joined them slowly and unwillingly.

Rural-to-urban migration increased as agricultural production stagnated, and a prolonged drought coincided with these upheavals. Agricultural production fell steeply in the 1960s and never fully recovered.

27. **In the 1970s, agrarian reform was carried further. Legislation in 1970 reduced the maximum size of holdings to between 10 and 150 hectares of irrigated land (depending on the type of land and crop) and to between 250 and 500 hectares of non-irrigated land**. Holdings above the maximum were expropriated with compensation only for actual improvements such as buildings, pumps, and trees. The government also reserved the right of eminent domain in regard to lowering the holding ceiling and to dispossessing new or old landholders for a variety of reasons. In 1975 an additional reform law was enacted to break up the large estates of Kurdish tribal landowners. Additional expropriations such as these exacerbated the government's land management problems. Although Iraq claimed to have distributed nearly 2 million hectares by the late 1970s, independent observers regarded this figure as greatly exaggerated. The government continued to hold a large proportion of arable land for political reasons, which, because it was not distributed, often lay fallow. Rural flight increased, and by the late 1970s, farm labor shortages had become so acute that Egyptian farmers were being invited into the country.

28. **The original purpose of the land reform had been to break up the large estates and to establish many small owner-operated farms, but fragmentation of the farms made extensive mechanization and economies of scale difficult to achieve, despite the expansion of the cooperative system**. Therefore, in the 1970s, the government turned to collectivization as a solution. By 1981 Iraq had established twenty-eight collective state farms that employed 1,346 people and cultivated about 180,000 hectares. In the 1980s, however, the government expressed disappointment at the slow pace of agricultural development, conceding that collectivized state farms were not profitable. In 1983 the government enacted a new law encouraging both local and foreign Arab companies or individuals to lease larger plots of land from the government. By 1984, more than 1,000 leases had been granted. The current land policy in Iraq has changed little since the Iran-Iraq and Gulf Wars, although ongoing discussion around the creation of free trade zones indicates the beginning of a more progressive policy.

2.3 RECENT HISTORY

29. **Alongside the Iran-Iraq war of the 1980s, since 1990, Iraq was locked in conflict with the international community following the invasion of Kuwait**. Both the first and second Gulf Wars (1990 and 2003), alongside strict sanctions and the oil for food program have severely undermined the ability of the Iraqi state to maintain a balance in regional relations, therefore under-serving water resource management concerns effectively since the early 1990s. Furthermore, since 2003 Iraq has undergone regime change, as a result of the process of de-Ba'athification, and to a large extent the ruling and intellectual classes have been displaced from public service. This period has seen a massive downsizing in Iraq's political standing within the region, including its economic influence, and the corresponding lack of investment in water resource related infrastructure has undermined the entire water resource management system. Moreover, given Iraq's attention since 2003, alongside recent droughts, it is logical to assume that in the interim upstream riparian states have likely seized the opportunity to maximise investments in irrigation infrastructure. As such, downstream flows have reduced considerably with profound implications for Iraq's long-term water security.

30. **In 2008, Turkey, Iraq and Syria agreed to restart the Joint Trilateral Committee (JTC) on water to support improved water resources management, although to date no meaningful discussion has taken place**. Turkey, Iraq and Syria signed a memorandum of understanding on September 3rd, 2009, in order to strengthen communication within the Tigris-Euphrates Basin and to develop joint water-flow-monitoring stations. On September 19th, 2009, Turkey formally agreed to increase the flow of the Euphrates River to 450-500 cubic metres per second albeit only until October 20th, 2009. In exchange, Iraq agreed to trade petroleum with Turkey and help curb regional terrorist activity. Whilst this agreement has not been sustained, it demonstrates the importance of reciprocity within the region; something that will change again if and when Iraq finds itself as one of the leading economies in the region. Trading oil for water may be a feature of future regional relations, and an important bargaining tool.

2.4 CONFLICT HISTORY

31. **Whilst none of the riparian states have ever gone to war over water resources, relations have frequently been tested and the risks of major conflict in the future should not be ruled out.** According to Patrick Wrigley (2009), the recent contrast of flooding in Istanbul and drought in Iraq shows a stark reminder of the disparity between these two countries. He states that in 1990, president Saddam Hussein demanded that Turkey increase the water flow through to Iraq to 700 cubic meters per second. The Turkish president at the time, Yildirim Aktuna, declined the request, which led to the suspension of a security protocol between the countries. More recently he quotes an official in Iraq's Ministry of Water Resources telling the al-Sabah newspaper '*that the Ilisu dam would reduce the waters of the Tigris River by 47% and deprive the northern Iraqi city of Mosul of 50% of its summer water requirements*.' (Wrigley, 2009).

32. **Moreover, According to the United Nations Food and Agriculture Organization, Iraq had its worst cereal harvest in a decade in 2009, with yields falling to less than a third of the average for the last ten years**. The government in Baghdad has, therefore reasons to press hard for Turkey and Syria to release more water from the Tigris and Euphrates rivers, both of which sources are located in Turkey's eastern mountains. Although an interim agreement for water sharing was reached on September 19 at a Strategic Cooperation Council meeting in Istanbul, the issue continues to strain bilateral relations between Turkey and Iraq. Furthermore, conflict between Turkey and Kurdistan is ongoing, underlining the importance of external mediation at an early stage to limit the risk that water becomes a defining feature of negative regional relations.

2.5 HISTORICAL DRIVERS OF CHANGE

33. **Understanding the long and complex political-economy history that has been built up around these two rivers is not the task of this report, although many of the historical core drivers of change have been identified below**. Clear drivers of change, over the course of human engagement in the T-E watershed, appear to include:

- Upstream users have preferential rights of access, development and policy;
- Periods of flood and drought have shaped water resource management practices;
- Land policy has been driven by external interests and the command economy;

- Increasing population-resource pressures;
- Territorial boundary changes as a result of state contraction and political decentralization;
- Regional conflict, including between Turkey and Kurdistan, and occupation by external powers;
- History of occupation leading to a legacy of external and domestic laws;
- Water stress;[11]
- Increasing upstream investments in Irrigation development;
- Big dam projects are a particular driver of political tension, as they seek to control hegemony over water supply down stream;
- General societal modernization and development which leads to increased per capita consumption of water and water-related products;
- Trade relations also determine bargaining power, with Turkey being Iraq's largest export partner and Iraq, coming in at the fourth-largest trading partner for Turkey;
- Cultural and religious traditions of free-access to water, still prevailing in the present time; and,
- Weaknesses in one or more riparian country leading to increased resources exploitation by others.

[11] Professor Malin Falkenmark of the University of Linkoping, Sweden, developed the concept of Water Stress. According to her calculations, countries having more than 2,000 cubic meters (m3) of fresh water available for all uses per person, per year were in the Water Abundance Zone, while those having less than 500 m3 per capita were in the Water Stress Zone. Ranking eight Middle Eastern countries in terms of per capita water availability in 1991, Falkenmark found only three with adequate supplies: Turkey (4,600), Iraq (4,400), and Lebanon (3,000). Syria (1,300) and Egypt (1,200) were in an intermediate position. Already under severe water stress were the Palestinians (165), Israel (300) and Jordan (300). Figures for post 2003 Iraq are currently not available (Falkenmark, 2000.)

PART III
STRUCTURAL DRIVERS OF CHANGE

3.1 INTRODUCTION

34. **In recent years the trajectory of water resource accumulation has favoured Turkey in particular, through the GAP project and other investments.** The GAP project has become a key component of the ruling Justice and Development Party's plans to quieten the predominantly Kurdish south-east of the country. As a result, both Iraq and Syria, and Kurdistan for that matter, find themselves in a challenging structural context. Therefore, critical to understanding the interplay between regional structures, and those within Iraq at the central, regional, sub-national, private and traditional and customary level is vital to understanding how the institutional (rules of the game) environment effects strategic water resource management. This section, therefore, provides a very short overview of relevant structures.

3.2 GEOGRAPHY AND CLIMATE

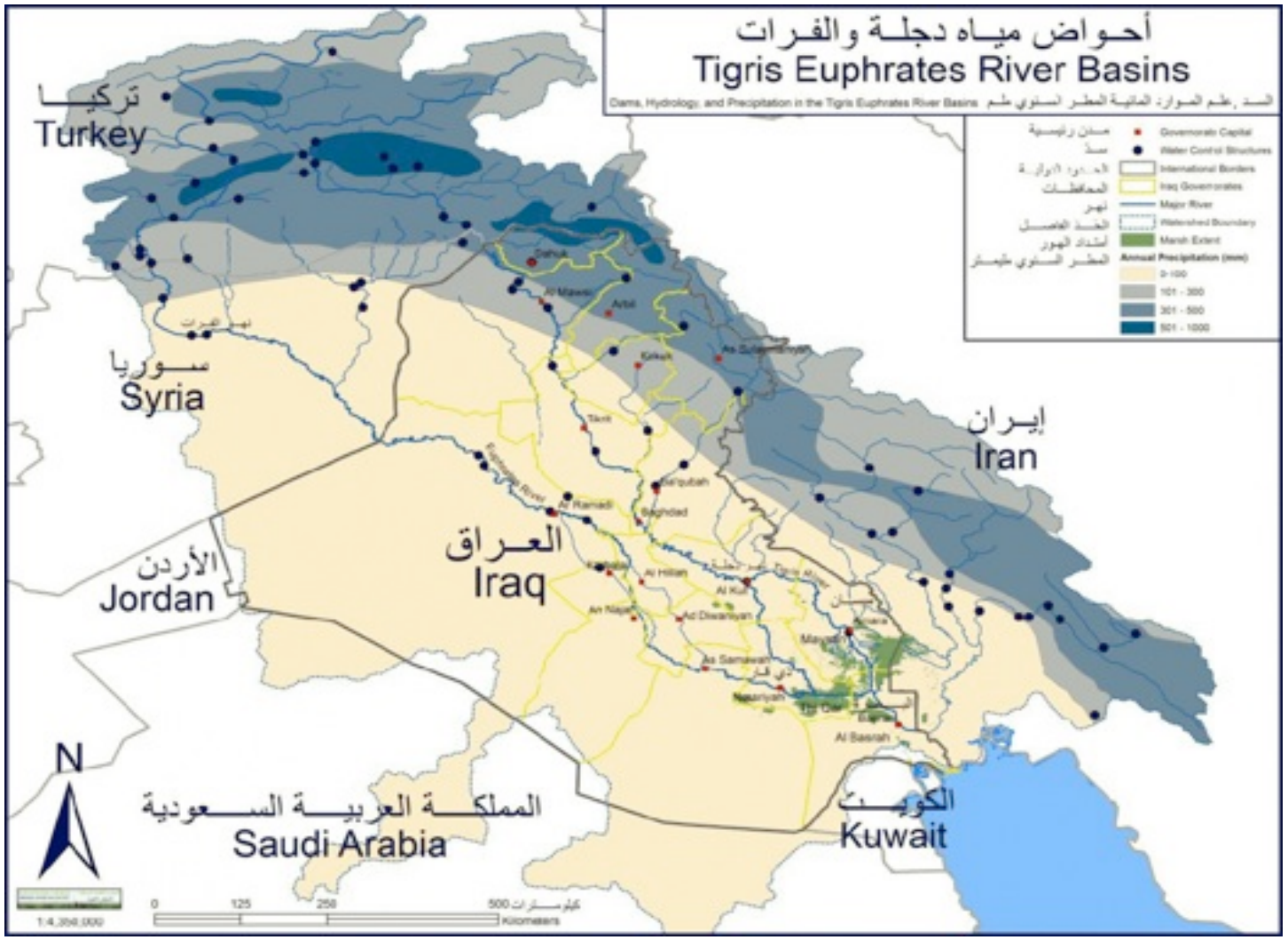
35. **Iraq is located at 33°00′, N 44°00′E. Spanning 437,072 km² (168,743 sq mi), it is the 58th-largest country in the world**. It is comparable in size to the US state of California, and somewhat larger than Paraguay. Iraq mainly consists of desert, but near the two major rivers (Euphrates and Tigris) are fertile alluvial plains, as the rivers carry about 60 million cubic metres (78 million cu. yd) of silt annually to the delta. The north of the country is mostly composed of mountains; the highest point being at 3,611 metres (11,847 ft) point, unnamed on the map opposite, but known locally as Cheekah Dar (black tent). Iraq has a small coastline measuring 58 km (35 miles) along the Arabian Gulf. Close to the coast and along the Shatt al-Arab there used to be marshlands, but many were drained in the 1990s.The local climate is mostly desert, with mild to cool winters and dry, hot, cloudless summers. The northern mountainous regions (Kurdistan region) have cold winters with occasional heavy snows, sometimes causing extensive flooding. Most of Iraq has a hot arid climate. Summer temperatures average above 40°C (104°F) for most of the country and frequently exceed 48°C (118°F). Winter temperatures infrequently exceed 21°C (70°F) with maximums roughly 15 to 16 °C (59 to 61 °F) and night-time lows occasionally below freezing. Typically precipitation is low, most places receive less than 250mm (10 in) annually, with maximum rainfall during the months of November to April. Rainfall during the summer is extremely rare except in the very North of the country. (See http://en.wikipedia.org/wiki/Iraq and Map 1 below).

36. **With its 115 billion barrels (1.83×1010 m3) of proved oil reserves, Iraq ranks fourth in the world behind Saudi Arabia, Canada, and Iran in the amount of Oil reserves; yet the United States Department of Energy estimates that up to 90% of the country remains unexplored.** These regions could yield an additional 100 billion barrels (1.6×1010 m3). Iraq's oil production costs are among the lowest in the world, but only about 2,000 oil wells have been drilled in the country.

37. **National irrigation structures manage 85 billion cubic meters of storage in seven major dams, including (i) Dokan Dam (ii) Darbandekhan Dam (iii) Hemrin Dam (iv) Mosul Dam (v) Haditha Dam (vi) Dohuk Dam and (vii) Udhaim Dam**. Construction of two new dams at Bakhma Dam on the Upper Zab and Badoosh Dam on the Tigris are already underway. In total, according to the MoWR a total of 85,000 Kms of draining networks and 43,000Kms of irrigation streams are being developed. See http://en.wikipedia.org/wiki/Iraq and Map 2 below.

MAP 1 IRAQ WITHIN THE REGIONAL CONTEXT

MAP 2 THE TIGRIS – EUPHRATES RIVER BASINS



Source: Iraqi Marshlands Organisation

3.3 GEOLOGY AND HYDROGEOLOGY

38. ***Geology***: Northern and northeastern Iraq geologically is part of the extensive alpine mountain belt of the Near East. The Taurus-Zagros belt developed during the collision of the Afro-Arabian continent with the Eurasian continent (the latter including a number of microplates and island arcs) that culminated in the Miocene-Pliocene.

39. **The Taurus-Zagros belt includes two main zones: the folded zone (Border Folds, see above) and the thrust zone**. The thrust zone forms the suture zone of the collided plates and occurs as a narrow strip in the extreme north, just outside the border between Iraq and Turkey, and in the northeast, along the border between Iraq and Iran. The folded zone is much wider (~200 km) and can be subdivided according to the intensity of folding into two main parts: the imbricated folds zone, which consists of a relatively narrow zone of intensely faulted and thrusted large folds near the thrust zone border, and the simply folded zone, which is much wider and consists of smaller and less disrupted folds. The simple folds are further subdivided into two subzones: the high mountain zone, which consists of a series of relatively large mostly asymmetric anticlines separated by narrow synclines, and the foothill zone, which consists of a series of relatively small and narrow anticlines separated by wide synclines (Ameen, 1992).

40. **The Taurus-Zagros thrust zone mainly consists of the oldest formations, from Ordovician to Cretaceous, with occurrence of carbonatic and clastic rocks as well as igneous and metamorphics**. In the folded zone Triassic to Pliocene units outcrop, mainly sedimentary rocks, with a predominance of limestone and dolomite limestone. These formations are very significant, because of the intensive karst phenomena and the large volume of potential groundwater storage. Recent Quaternary deposits (alluvium, terrace, colluvium) fill the valleys and follow the main riverbed in the northern and central part, and cover the older Tertiary formations in the plains. (FAO, 2010)

41. ***Hydrology***: Significant surface water resources occur in the northern part of North Iraq. The major perennial rivers are the Tigris (which runs at or near the south-western border), the Great Zab, the Small Zab (both in a NNE-SSW orientation) and the Diyala (at the south-eastern border of the region). In the northern part of the study area the main tributaries are perennial, however the river run-off reduces towards the south. Ultimately, on the plains, all tributaries (wadis) are ephemeral and dry out regularly by the end of springtime. The main wadis in the south (Erbil area) are Wadi Kurdara and Shahrasor and Wadi Bastora. It is important to note that almost all the major rivers crossing the study area have their origin outside it, namely in Turkey (the Tigris and the Great Zab) or in Iran (the Small Zab and the Diyala), thus their entire watershed covers broad regions outside the study area. Only the Small Zab has a catchment area that extends, for a limited portion, beyond the Northern Iraqi border.

42. **The average discharge of the Great Zab at the Eskikelek gauge station registered over the period 1970-1973 was of 313 m3/s. Daily river flow varied from 118 m3/s to 2439 m3/s.** Data from the Altun Kupri station on the Small Zab shows an average discharge of 290 m3/s (period 1970-1972), with a minimum of 82 m3/s and maximum of 1 265 m3/s. Two dams control the Small Zab (Dokan Lake) and the Diyala River (Darbandikhan Dam) in the central part, and their main purpose is to generate hydropower. The construction of the large Bekhma Dam on the Great Zab was not completed. Water from the Dohuk Reservoir and from the numerous

impoundments constructed on the smaller rivers is used for traditional irrigation schemes (gravity channels) or for water supply. (Source, FAO, Working Paper No. 13)

3.4 REGIONAL CONTEXT

43. **The three riparian states might be seen as the regional structural context within which any strategic water resource management framework will be derived, although for the purpose of this paper, Iraq might usefully be included here also**.

i. ***Republic of Iraq***: Iraq is a country in Western Asia spanning most of the North-Western end of the Zagros mountain range, the eastern part of the Syrian Desert and the northern part of the Arabian Desert. Officially Iraq is defined under the current Constitution as an Islamic, democratic, federal parliamentary republic, although outside of Kurdistan, Iraq essentially remains highly unitary. Iraq is bordered by six countries: Jordan to the west, Syria to the northwest, Turkey to the north, Iran to the east, and Kuwait and Saudi Arabia to the south. Iraq has a narrow section of coastline measuring 58 km (35 miles) on the northern Arabian. Two major rivers, the Tigris and Euphrates, run through the centre of Iraq flowing from northwest to southeast. These provide Iraq with agriculturally capable land and contrast with the steppe and desert landscape that covers most of Western Asia. The Turks remember Iraq as a part of the former Ottoman Empire.

ii. ***Republic of Turkey***: Turkey, which succeeded from the Ottoman Empire and was formally founded in 1923, is a parliamentary representative democracy, and a secular country. Turkey's constitution governs the legal framework of the country, setting out the main principles of government as a unitary centralized state. Turkey is bordered by eight countries: Bulgaria to the north-west; Greece to the west; Georgia to the north-east; Armenia, Azerbaijan (the exclave of Nakhchivan) and Iran to the east; and Iraq and Syria to the south-east. There are at least seven dams in the Euphrates' headwaters in Turkey and Syria, yet there are no water treaties among the three nations. Turkey refuses to sign international agreements on water use including the 1997 UN Convention on the Law on Non-Navigational Uses of International Watercourses. Iraq is one of the most significant trading partners with Turkey (Source; EC Europa Trade, 2008)

iii. ***Republic of Syria***: Syria, a Presidential Single Party Republic, borders Lebanon and the Mediterranean Sea to the west, Turkey to the north, Iraq to the east, Jordan to the south, and Israel to the south-west. There is a long running and deep-rooted disagreement between Turkey and Syria over Hatay Province with most Syrians holding the view that this land is historically Syrian and was illegally ceded in the late 1930s to Turkey by France - the mandatory occupying power of Syria. The Turks remember Syria as a former Ottoman Turkish villayet. Syria has signed a number of water-related treaties with Turkey in 1989 (regarding water sharing over the Euphrates) and in 1994 with Lebanon (over the Orontes River) and with Jordan in 1987 regarding water-sharing over the Yarmouk river.

44. **Table 2 below provides a number of cross-national comparators for Iraq and its neighbours, in relation to population numbers, land area and per capita incomes.** This shows

the economic dominance of Turkey at the present time, from a per-capita income point of view, and highlights the relative poverty of both Syria and Iraq as a result of recent conflict.

Table 2 Cross National Regional Comparators

Country	Population	Area	Per Capita Income (US$) (2009 Est.)
Iraq	31,234,000	438,317 km^2	3,655
Turkey	72,561,312	783,562 km^2	13,138
Syria	21,906,000	185,180 km^2	2,767
Iran	74,196,000	1,648,195 km^2	11,202

3.5 TRADE RELATIONS

45. **Prior to the implementation of sanctions, Turkey was one of Iraq's major trading partners, with total trade between the two countries valued at about US$3 billion per year**. Currently, according to EC Europa Trade Statistics, Turkey was Iraq's second most important import partner, with 20.6 per cent of total export trade in 2008, with Syria being the most important import partner at 27.6 per cent. With regards to exports between the riparian states, Turkey was the seventh major export partner with 2.6 per cent and Syria was the ninth, with 2 per cent in 2008. So, in terms of total trade (import and exports) Syria was 10 per cent of total Iraqi trade, Turkey 8.3 per cent, and South Korea was 5.7 per cent in 2008. South Korea has been a major investor in water resource related technology.

46. **According to Jones, V.C (2004) there was also a brisk transit business, from which Turkey received approximately US$1 billion per year by trucking goods to Iraq from Turkish ports.** Estimates of Turkey's cumulative losses from the economic sanctions range from US$20 to US$60 billion. However, sanctions have not been a total loss for Turkey, as Turkish firms reportedly won export contracts under the OFFP valued at US$340 million in 2002, making Turkey Iraq's seventh-largest supplier under the U.N. program. Illicit trade in diesel fuel reportedly flourished along the Turkish border with Iraq during the implementation of sanctions, involving as many as 500 trucks per day at its peak. The smuggling was done using specially modified trucks that would carry food from Turkey into Iraq, and would pick up deeply discounted fuel products for the return trip. Turkish authorities made intermittent attempts to crack down on the illegal smuggling, mainly at times when the black market threatened its own economic or security interests. However, because the oil sales also provided revenue to Turkey's impoverished southeastern region, Turkish officials sometimes ignored the illegal trade. Similar illicit trade took place between Iraq and Syria. (Jones, V.C. 2004)

3.6 ECONOMY

47. **Understanding the structure of Iraq's macro-economy is also vital to understanding the drivers of growth, employment and demand for water resources**. Over the short to medium term the macro-economic outlook for Iraq remains potentially volatile, even though world oil prices have increased markedly in 2010. Since 2004 the share of oil to GDP has averaged over 60 per cent, oil equals ~98 per cent of formal exports and composes ~96 per cent of total budget revenue. Whilst average daily production is estimated at 2.4 million barrels per day (MBPD) in 2009, 600,000 bpd of this total is due to be provided to fuel the domestic market (at virtually no cost) and capacity to scale up production remains limited over the short to

medium term. The recent signature of oil contracts (a consortium of Anglo-Dutch Oil and Malaysia's Petronas) will likely increase production substantially in the years ahead. This will have implications for domestic demand for basic commodities, including water.

48. **GDP growth rates are highly correlated with global oil prices and production. As a result, and coming from a low base in 2003, real economic output benefited greatly from artificially high oil prices**. GDP growth rates of 46, -0.7, 6.2, 1.5 and 9.8 per cent have been registered for 2004, 2005, 2006, 2007 and 2008 respectively. **Table 3** below summarizes key macro-economic data for Iraq, highlighting both positive and negative trends. On the positive side fiscal surpluses have been achieved since 2004, real GDP growth rates have stabilized, the exchange rate has been stable, debt repayment with Paris Club and non-Paris Club creditors has been successful[12], per capita incomes have substantially improved, oil exports have gradually increased, consumer prices have fallen even though fuel subsidies have been largely removed and government debt has decreased from US$101.9 billion in 2007 to US$31.8 billion in 2009. On the negative side, the current account balance is now in deficit and cuts in planned expenditure have increased substantially and levels of unemployment, whilst substantially offset by public sector staffing, remain potentially destabilizing.

Table 3: Basic Macroeconomic Situation, Actual, Forecast and Projected

	Prelim	Prelim		Projected			
	2006	**2007**	**2008**	**2009**	**2010**	2013	Source
Real GDP (% change)	6.2	1.5	9.8	6.9	6.7	6.7	(b)
GDP per capita (US$	1,720	2,109	3,085	2,673	2,957	3,823	(a)
GDP (US$ billions)	49.5	62.4	93.8	83.5	94.8	131.6	(a)
Oil Exports (in mbpd)	1.4	1.59	1.8	2.0	2.1	2.7	(a)
Oil Revenues as % of GDP	60.3	60.2	65.3	54.7	55.4	57.3	(a)
Consumer Prices (% change)	**64.8**	**4.7**	**12.0**	**10.0**	**8.0**	**5.0**	(a)
Current Account (% of GDP)	**13.6**	**17.3**	**15.1**	**0.0**	**4.8**	**9.8**	**(a)**
Exchange Rate	1467	1255	1,176	1,176	--	--	(a)
External Debt (US$ billions)	97.9	101.9	31.8	33.2	34.7	33.1	(a)
Assets Held Abroad (DFI) (US$ billions)	8.6	12.6	19.8	8.5	2.0	-	(a)
Unemployment (%)	17.6	17.5	18.3	-	-	-	(c)
Total Public Expenditures (US$ billions) [13]	34.3	38.4	66.1	70.9	77.3	97.5	(a)

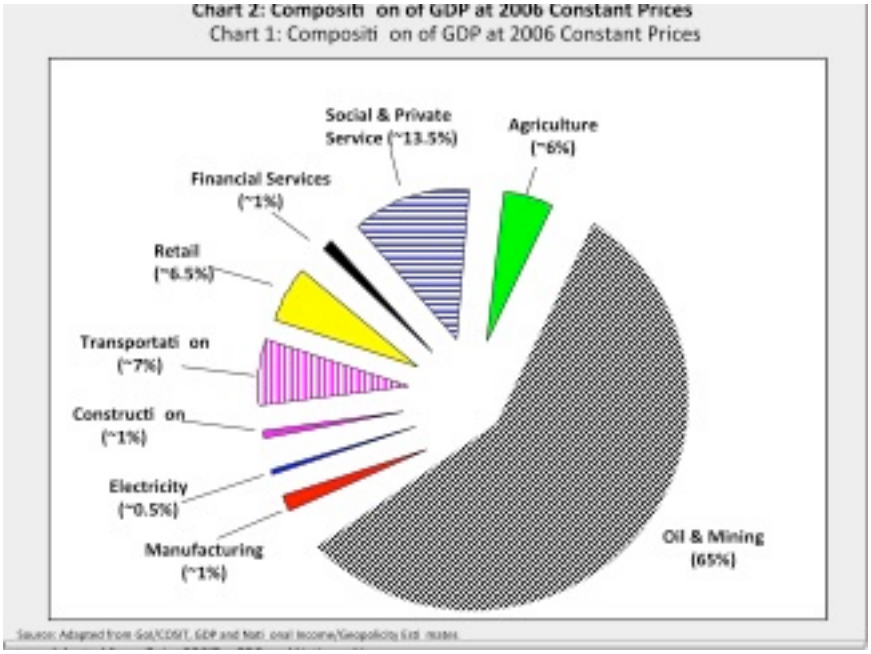
Sources: (a) IMF Country Report, December 2008 (b) Word Economic Outlook, IMF, April 2009 (c) COSIT Labor Survey

49. **Declining oil revenues alongside incremental increases in oil production, a salary increase in 2008, high security and safety net costs and the doubling of public sector employment since 2003, negatively impact spending in education, health and other sectors such as water resource management.** The fiscal deficit in 2009 is expected to be between 15-17%, assuming drawdown of the DFI and oil price stability at around US$50 per barrel. Over the medium term (3-5 years) with oil prices improving alongside increased production a path towards fiscal sustainability will begin to emerge assuming prudent expenditure policies are put in place. Currently, as of March 2010, Brent Crude oil futures are just below US$70 per barrel.

[12] UAE cancelled Iraq's outstanding debt and most commercial debt was renegotiated between 2004 and 2006. This left an outstanding debt of US$5.2 billion by the end-2007; down from US$21.9 billion. Old debt was swapped (with an 80 percent discount) into a twenty year bond. By end-2007, Iraq's total external debt amounted to US$103 billion, or about 165 percent o f GDP. The debt-to-GDP ratio could be reduced to a third of that figure in 2009 if agreements with all non-Paris club creditors were completed along terms similar to the 2004 agreement with Paris club creditors.

[13] IMF adjusts government expenditures to include the O&M and security costs associated with donor financed projects.

50. **Identifying the sources of growth is important to inform both revenue and expenditure management priorities, and agriculture in particular is likely to emerge as a key sector of employment and growth, with implications for water resource related financing**. Due to declining oil prices and overseas development assistance, the exact composition of GDP in 2009 remains difficult to predict and even less is known about Gross National Product (GNP). However, over the past 4 years the oil revenue share of GDP has been in the order of 60 per cent (it was 65% in 2004) although this is likely to decline in 2009. According to the 2006 COSIT GDP and National Income Report, social and private services (general government etc.) contribute ~13.5 per cent of GDP, Agriculture ~6 per cent, retail ~6.5 per cent, transportation ~7 per cent, with electricity and manufacturing totalling less than 1 per cent each.



3.7 ETHNO-LINGUISTIC RELATIONS

51. **The territory comprising Iraq was known in Europe by the Greek name 'Mesopotamia', which means the 'Land Between the Rivers'**. Iraq has been home to successive civilizations since the 6th millennium BC and the region between the Tigris and Euphrates rivers has been identified as the cradle of civilization. Iraq has been the center of the Akkadian, Assyrian, Babylonian, Hellenistic, Parthian, Sassanid and Abbasid empires, and part of the Achaemenid, Roman, Rashidun, Umayyad, Mongol, Ottoman and British empires.

52. **It is generally assumed that 75%–80% of Iraq's population is Arab with the other major ethnic groups being the Kurds at 15%–20%, the Assyrians, the Iraqi Turkmen and others (5%), who mostly live in the north and north-east of the country**. The Iraqi population also includes small pockets of Armenians, Circassians, Chechens and Iraqis of African descent. Both Arabic and Kurdish are official languages and Assyrian and South Azeri are official languages in areas where the Assyrians and Iraqi Turkmen are located respectively. Armenian and Persian are also spoken, but to a lesser extent. English is the most commonly spoken European language. The ethnic

make-up of Kurdistan is diverse and includes Ethnic Assyrian Christians, Iraqi Turkmens, Arabs, Armenians, Yezidis, Shabaks and Mandeans next to the Kurdish majority.

53. **Ethno-linguistic relations have been a source of conflict over many centuries, and although this appears to be a secondary issue to political interests, it has certainly been a key driver of nationalism and identity**. In the case of Kurdistan it has been the source of conflict with Turkey and Iraq, although the passing of the 2005 Federal Constitution finally gave legal federal autonomy to the Region of Kurdistan. Figure 1 below provides an approximate grouping of ethno-linguistic backgrounds by geographic area showing the complex tapestry of lineage backgrounds. Of particular importance to water resource management, both the Tigris and Euphrates pass through the region of Kurdistan before entering non-Kurdistan Iraq. In the future, as Kurdistan's development begins to take shape, it will be vital to make sure that strategic water resource management is based on standard international management practices around the T-E Watershed itself, to protect both up and downstream users rights.

Figure 1 Approximate Ethno-linguistic Groupings in Iraq

3.8 WATER AND SANITATION

54. **In comparison to irrigation, demand for water supply and sanitation is a comparatively small component in the water balance – but a priority one. Iraq's water and sanitation sector is currently unable to meet much of the population's needs**. After years of chronic under-investment and inadequate maintenance due to conflict and sanctions, around six million people, 4.5 million of whom live in rural communities, currently do not have access to safe drinking water. Of these, nearly 2.5 million people are accessing their water from a river or streams/water ditches, putting them at very high risk of contracting waterborne diseases (UNICEF Press Release 2009). Iraqi sector statistics suggest that the estimated percentage of population served with treated water supply services in Iraq (excl. KRG) is around 70%. The estimates for urban population and rural population are, respectively, 74%, and 48% (WATSAN 5-Year Policy Plan 2010-2014,). However, the Iraqi Household Socio-Economic Survey of 2007 indicates that over 24 million Iraqis, or 80%, do not treat their water before drinking it. Water was chemically treated for only 735.000 of the country's 30.097.000 citizens, representing merely 2.5% of the population. (World Bank, IHSES 2007). According to a recent survey by Brookings Institution, in February 2009, only 45% of Iraqi's population had access to safe drinking water (Brookings Iraq Index 2009). Finally, geographical disparities between provinces are also pronounced (UN Integrated Concept Note, 2009).[14]

55. **Estimated percentage of population served with through sewerage public network in Iraq (excl. KRG) is around 26.8%, another 50% is served through septic tanks, 7.1% covered drain, 15.1% opened drain [IHSES 2007]**. According to the MoMPW, only 17% of wastewater is treated before being discharged into the environment. As a result of catastrophic pollution of surface waters, insufficient water treatment and dilapidated distribution infrastructure, water quality is a major problem. Testing for drinking water contamination from coliform bacteria during the first 36 weeks of 2009 in all 18 governorates shows that over 16% of governorates have over 13% of samples contaminated [UN Integrated Concept Note, 2009]. Unsafe drinking water and unhygienic sanitary practices have increased incidences of waterborne diseases at an alarming rate, and are responsible for malnutrition, morbidity and mortality of infants and children under five. It is estimated that water and sanitation related diseases are responsible for about 25 percent of all deaths of children in Iraq. (World Bank, Iraq Emergency Water Supply, Sanitation and Urban Reconstruction Project, PID 2004)

3.7 STRATEGIC RESOURCE PLANNING FRAMEWORK[15]

56. **There is little doubt that over the course of the past one hundred years, accelerating since the Iran-Iraq war of the 1980s, Iraq's water resource management system has been in steady decline, with national and regional conflict negatively impacting water resource management.** Kuwait, Iran, Turkey, Syria, Jordan and Saudi Arabia border Iraq. The country slopes from mountains over 3,000 meters (10,000 ft.) above sea level along the border with Iran and Turkey to the remnants of sea-level marshes in the south-east. Much of the topography is mostly broad plains; reedy marshes along Iranian border in the south with large flooded areas. The mountains in the northeast are an extension of the alpine system that runs eastward from the Balkans into southern Turkey, northern Iraq, Iran, and Afghanistan, terminating in the

[14] 17. The MoMPW is created and operates under Law No. 165, "On Municipal Administration", enacted in the year 1964, and amended ten times between 1974 and 1979.
[15] See World Bank Water Resource Strategy and MoWR Water Resource Development Strategy.

Himalayas. Average temperatures range from higher than 48°C (120°F) in July and August to below freezing in January.

57. **Iraq's climate is subtropical and semi-arid**. Rainfall distribution is temporally and spatially uneven. Rainfall occurs between October and May with the highest precipitation levels between December and February. Average annual rainfall is estimated at 154 mm, but ranges from less than 100 mm in the south (60 percent of the country) to 1,200 mm in the north-east mountainous region. The mountainous region receives appreciably more precipitation than the central or southern desert region and, as a result, rain fed agriculture is practiced only in the more temperate north-east of the country. In the plains, where a substantial percentage of the population lives, there is very little rainfall and agriculture is, therefore, dependent on irrigation. While the winters are cool, summers are hot resulting in a high rate of evaporation in the Southern plains - 10 to 17 mm per day in the summer.

58. **Table 1 below provides a broad breakdown of surface water received by source country for both the Tigris and Euphrates rivers**. The picture is clear; only 32 per cent of surface water from the Tigris originates inside Iraq, with even less, only 3 per cent of the Euphrates, sourced from within Iraq. Turkey constitutes 56 and 88 per cent of the Tigris and Euphrates respectively with Syria sourcing 9 per cent (Euphrates) and Iran 12 per cent (Tigris). Iraq is, therefore, incredibly vulnerable to the development plans and aspiration of upstream states, perhaps also now including future development in Kurdistan as well.

Table 1 Surface Water Received by Country of Source (%)

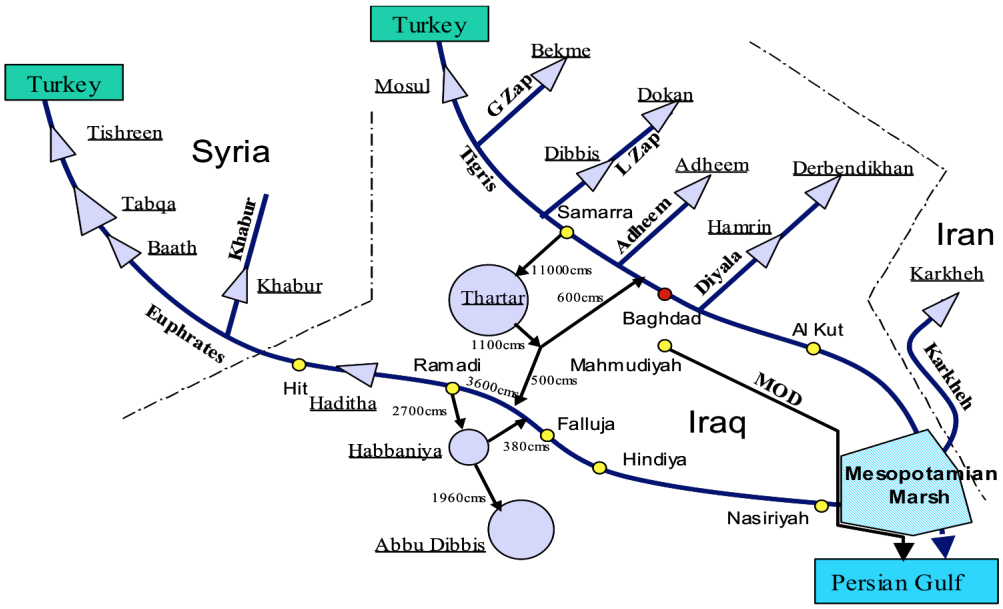
	Turkey	Syria	Iran	Total Outside Iraq	Inside Iraq
Tigris	**56%**	**-**	**12%**	68%	32%
Euphrates	88%	9%	-	97%	3%

Source: Ministry of Water Resources (MoWR)

59. **Theoretically the T-E watershed currently provides Iraq with an abundance of water resources, although with Turkey and Syria continuously developing irrigation projects, along side limited water resource investment in country, Iraq may one day face major supply shortages**. Both rivers originate in the eastern mountains of Turkey and enter Iraq along its north-western border with Turkey and Syria. The two rivers transcend the country, the Euphrates flows for about 1,160 km and the Tigris for 1,415 km, and they confluence just north of Basra. Downstream from their confluence, the river Shatt al-Arab provides a tidal channel that flows 180 km before joining the Arab Gulf. Both rivers drain into a large draining canal, also known as the third river. [16] Figure 2 below provides a map of the major (existing) reservoir systems in Iraq across the T-E watershed, highlighting the significance of agreeing a riparian agreement, and the importance of upstream flow-security and management to the future ecology of the entire Mesopotamian Marshlands.

[16] The Main Outfall Drain (formerly called the Saddam River) functions as a main out-fall drain. Running between the Tigris and Euphrates rivers, it can collect drainage waters from more than 1.5 million hectares of irrigated agricultural land stretching from north of Baghdad right down to the Gulf. The length of this major outfall drain, which was completed in 1992, is 565 km, with a design discharge of 210 m³/s. The outfall drain exits out of the plains between the two rivers through a siphon under the Euphrates river in the Nasiriyah area and outfalls into Shat Al-Basra, another man-made canal, which itself outfalls into the Gulf. This main outfall drain is one of the most significant drainage channels to be constructed in the last fifty years and will ensure that much of the drainage water will be able to reach the sea without polluting the main watercourses.

Figure 3 Major Reservoir Systems of the T-E Watershed



Source: M. Kavvas et al 2007.[17]

60. **The Euphrates and Tigris watersheds provide massive opportunities for irrigation-based agriculture and for power generation amongst other uses**. The Euphrates watershed area (579,314 km2) encompasses areas of Iraq (49 percent), Turkey (1 percent), Syria (17 percent) and Saudi Arabia (13 percent); within Iraqi territory the river is fed only by seasonal run-off from the wadis. The Tigris watershed area (371,562 km2) encompasses parts of Iran (47 percent), Iraq (38 percent), Turkey (14 percent), and Syria (0.3 percent). (UNEP, 2001) Within Iraq the Tigris River receives water from three main tributaries, the Greater Zab, Lesser Zab, and Diyala, which originate in the mountains of eastern Turkey and northwestern Iran and flow in a southwesterly direction until they meet the Tigris. The two rivers converge in southern Iraq where the great alluvial plains of the Tigris and Euphrates river system comprise more than a quarter of Iraq's surface area, in which topographically, the region is extremely flat. Under natural conditions, the region was a rich wetland and subjected to annual flooding (World Bank, 2006).

[17] See M.Levent Kavvas, Richard Z.Q. Chen, Michael L. Anderson, Noriaki Ohara, Jaeyoung Yoon Hydrologic Research Lab, Dept. of Civil & Environmental Engineering, University of California, Davis, California 95616, USA, A Study of Water Balances over Tigris-Euphrates Watershed.

Table 3 storage capacity of dams and reservoirs in Iraq			
Name of dam	**River**	**Storage with normal level billion m3**	**Energy produced by hydroelectric station (Megawatt)**
Mosul dam	Tigris	11,11	750 main dam, 60 organization's dam. 200 pumped storage
Dokan Dam	Lesser Zab	6,8	400
Darbandikhan Dam	Diyala	3,00	240
Himreen dam	Diyala	2,45	50
Haditha Dam	Euphrates	8,28	660
Dohuk Dam	Royar Dohuk	0,047	-
Al-Udaim dam	Al-Udaim River	1,5	27 being constructed
Tharthar Reservoir	Tigris	85,39	35.81 billion cubic meters dead storage.
Habaniya Reservoir	Euphrates	3,31	
Total ex (Tharthar)		33.14	

Source: Ministry of water Resources (2009)

61. **From both rivers, the World Bank reports that a range of 59-75 BCM constitutes the annual water resources available to Iraq**. However, since the 1970s, the inflow of the Euphrates to Iraq has averaged 19-21 BCM and constitutes 30 percent of Iraq's water resources, although flows have varied widely between years (10 BCM-50 BCM). The average flow since major upstream development began in Turkey and Syria in the early 1970s has been lower than the average of 30-35 BCM in the preceding period (1932-1970). The Tigris contributes, on average, 48 BCM. Of this, two thirds (about 33 BCM) originates outside Iraq with 27 BCM (55 percent) originating in Turkey, and 6 BCM in Iran (12 percent). (See http://siteresources.worldbank.org/INTWAT/Resources/Iraq.pdf)

3.8 STRUCTURAL DRIVERS OF CHANGE

62. **Understanding the structural drivers of change is vital to recognising that many of the core factors affecting any riparian agreement can be understood through analysis of different structural strengths and weaknesses**. Clear structural drivers of change appear to include:

- The absence of Riparian Agreement between the various partners, including the presence of a clear international alliance (Arab league or the United Nations) makes the management of this important trans-boundary resource problematic at best. At worst, it threatens the long term stability of the region;
- Iraq's structural position at the heart of the arid realm, but as the last downstream riparian state, means that water resources remain critical from both security and environmental futures;
- Iraq's oil dependency means that economic diversification is likely to remain a primary policy priority of GoI in the years to come;
- Through projects such as the GAP project, upstream riparian neighbours are strengthening their economic position within the region;
- Future oil revenues for Iraq are likely to mean that in the medium to longer term, Iraq's economic might will strengthen its ability to agree an equitable use of water resources for

Iraq, Iraqi Kurdistan and perhaps Syria. As a result, Turkey would do well to negotiate an acceptable water regime earlier rather than later;

- Future budget surpluses in Iraq will allow considerable investment in water resource management infrastructure and institutions and, whilst this will increase water use efficiency and limit environmental problems, it also means that the tendency to build large dams will continue as it did in the 1970s. However, if future investments will be directed as well to supporting modification of present agricultural patterns in favour of lower-water consumption crop development in water stressed lands, and higher-yield crop development in water-rich lands of Iraq, this tendency may be curbed;
- Given that agriculture employs approximately 25 per cent of the existing wage labour, investment in irrigation and agriculture will benefit the various riparian communities directly, and also domestic agricultural markets;
- Future trade relations between Iraq, Turkey and Syria will increasingly be determined by water on one side, and oil on the other;
- Rain fed agriculture in the non-watershed parts of Iraq will continue to face high levels of unemployment unless non-agricultural means of production are urgently developed. Balancing income disparities will likely require clear redistributive policies;
- Ethnic interests appear not to have been a particular driver of water-related conflict thus far. However, caution should be exercised to deter potential adverse developments in that direction; and,
- Lack of data and information on water flows, water quality, salinization and water-logging problems, and water pricing, undermine conservation efforts and policy prioritization. [18]

[18] On average, water production in Iraq is 327 litres/capita/day, which is a very high figure, if compared to an average of 150 litres/capita/day in developed European countries. Domestic water tariffs are extremely low, at 0.034 US$ /m3, while the cost per m3 of water produced, treated and delivered to the customer is reported by the MoMPW as being about 1000 times higher than its price. Domestic water in Iraq is heavily subsidized, with revenues covering 2-3 percent of the costs of operation and maintenance of the water and sanitation systems.

PART IV
INSTITUTIONAL DRIVERS OF CHANGE

4.1 INTRODUCTION

63. **In recent years the trajectory of water resource accumulation has favoured Turkey in particular, through the GAP project and other investments.** To understand the capacity of the various governments in strategic water resource management it is useful to understand the institutional environment within which resource management is being shaped, both at the state and non-state level. This short section, therefore, outlines the major institutional drivers of change with a focus on how war and conflict have shaped the institutional agenda.

4.2 MIX OF INTERNATIONAL AND NATIONALLY DRIVEN FRAMEWORKS

64. **Iraq has been invaded by external powers over the entire course of its history, leading to a complex mix of externally driven legal and institutional arrangements, combined with a number of domestic legacy laws from the 1960s to the present.** Existing laws are substantially influenced by the Ottoman period, British mandate, the period of Scientific Socialism, and since 2003, and external influence largely driven by the US. Since 2003, this includes the adoption of a new constitution in 2005 delivering Iraq as a federal and not unitary state. However, to all intents and purposes Iraqi Kurdistan remains a state within a state – with its own nation state institutional structures - and the rest of non-Kurdistan Iraq effectively still operates as a unitary state from a fiscal and administrative point of view. The 2008 Provincial Powers Act, Provincial Elections in 2009, the 2009 budget law and recent moves by the Council of Representatives to decentralise central mandates in water and sanitation run counter to the traditions of Iraq's fiscal and administrative history. However, if the public finance management and procurement laws are not amended, then it appears that the decentralisation agenda will not have the enabling environment to succeed, as envisaged by the constitution. In the long run, the balance of power between the centre and periphery – driven by centripetal (those wishing to centralise) and centrifugal (those wishing to decentralise) forces – will need to reflect the political economy of Iraq as a nation state. Moreover, within this framework, there are strong arguments for maintaining the strong central mandate of the MoWR vis a vis water resource management issues to bolster negotiations with upstream riparian neighbours, whilst rapidly decentralising domestic water and sanitation functions of MoMPW to the provinces. It is also advisable to maintain centralized control over sector policy and other regulatory institutions, to include creation of a national economic regulator and at the same time consider developing the WATSAN service delivery through the creation of public water utilities to support application of commercial principles in the service delivery. Here, national traditions would do well to borrow from regional experience so that the new institutional framework is driven by a modernizing agenda.

4.3 NON-IRAQI REGIONAL INSTITUTIONS

65. **The three riparian states provide the regional structural context within which any strategic water resource management framework will be derived, although for the purpose of this paper, Iran might usefully be included given its 12 per cent contribution to Iraq's water resources**. ***Republic of Iraq***: In Iraq, the Ministry of Water Resources (MoWR), Ministry of Municipalities and Public Works (MoMPW) and Ministry of Environment are responsible for water resource management and water and sanitation respectively, although the Ministry of Health has a mandate for monitoring water quality standards, as does Baghdad Municipality. The Lausanne Treaty of 1923 mandated the formation of joint committees between the UK (for Iraq), France (for Syria) and Turkey. Iraq and Turkey singed a Friendship and Neighbourly

Relation Agreement in 1946, which gave the right of Iraq to construct dams on Turkish soil to improve management. On the basis of the 1946 protocol, a 1980 Joint Technical Committee was also established between Iraq and Turkey, with Syrian-Iraq and Syrian-Turkey agreements also signed in1987 and 1989 respectively. ***Republic of Turkey***: In Turkey, both centralised Ministerial structures (Ministry of Agriculture and Rural Affairs, Ministry of Energy and National Resources, Ministry of the Environment, Ministry of Public Works and Resettlement and the State Planning Organisation) alongside special agencies and projects offices (such as the GAP) are responsible for water-related issues, in addition to the Prime Minister's Office. ***Republic of Syria***: In Syria, the Ministries of Irrigation, Environment, Agriculture and Agrarian Reform have water-related mandates alongside a number of other budget entities.

66. **Table 4 below provides a number of cross-national comparators for Iraq and its neighbours, in relation to population numbers, land area and per capita incomes.** This shows the economic dominance of Turkey at the present time, from a per-capita income point of view, and highlights the relative poverty of both Syria and Iraq as a result of recent conflict.

Table 4 Cross National Regional Comparators

Country	Population	Area	Per Capita Income (US$) (2009 Est.)
Iraq	31,234,000	438,317 km^2	3,655
Turkey	72,561,312	783,562 km^2	13,138
Syria	21,906,000	185,180 km^2	2,767
Iran	74,196,000	1,648,195 km^2	11,202

4.4 NATIONAL INSTITUTIONS[19]

67. **Administrative structures of governance in Iraq continue to reflect the strong centralist approach to governance and economic planning ideology**. As a result, no administrative decentralisation has ever been meaningfully delivered in modern terms and all sub-national ministry structures remain in effect out-posted departments of the various central Ministries. A particular facet of this structural arrangement is the separation of financing and planning functions across the entire administration that has wider implications for policy and budget management.

68. **The current structure of government – outside of Iraqi Kurdistan - is effectively unitary not federal with all financial and administration functions provided by central ministries.** Under the Provincial Powers Act for governorates not incorporated into a region (i.e. Kurdistan), governorate councils have been elected, as have provincial governors, however, meaningful fiscal nor administrative decentralisation has so far taken place to allow governorates to actually govern, although the Council of Representatives (CoR) has recently passed a number of ministry level laws, including the abolishment of the MoMPW; although implementation of the law appears unlikely. Furthermore, although article 115 of the Constitution gives the governorate a

[19] Iraq is a developing parliamentary democratic Republic with a strong centralist and socialist legacy, underpinned by a mix of European Civil Law and Islam. Historically, Iraq's fiscal and administrative arrangements draw heavily from both Ottoman and British Rule and since the late 1950s from a strong soviet economic ideology too. External intervention has therefore had profound implications for fiscal and administrative relations and therefore the balance of power between centre and periphery.

priority on disputed issues between Federal and governorate legislation related to shared authorities, this is hard to enforce in reality.

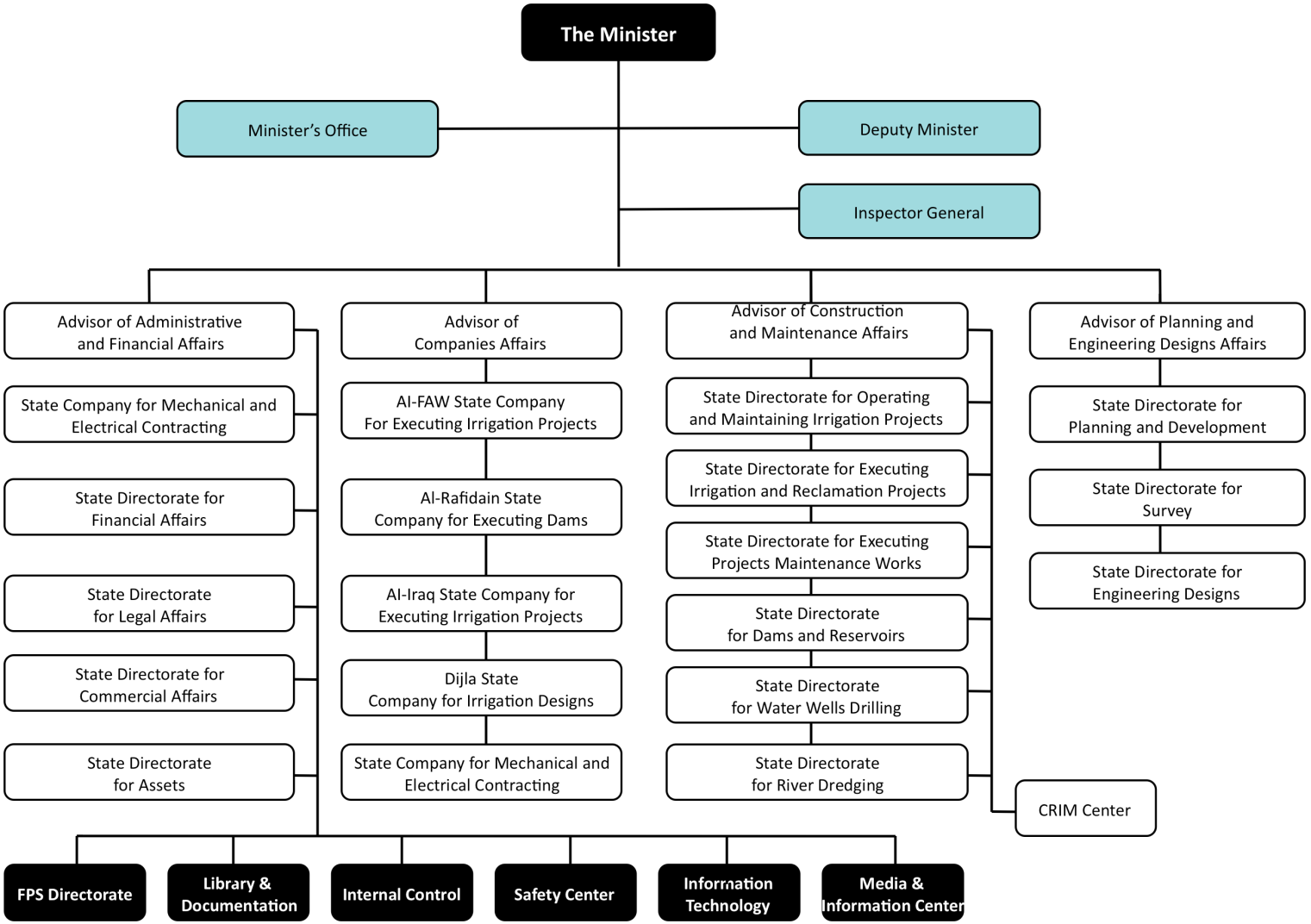
69. **For administrative purposes Iraq is divided into a federal Government (legislative, executive and judicial branches), regions (made up of one or more governorates, although Kurdistan is the only legally defined region and regional government) and eighteen governorates, three of which are in Kurdistan**. Central government is comprised of 36 ministries, constitutional bodies, independent bodies, central government agencies and various commissions. There are also more than 195 state-owned enterprises (15 oil-related, 12 transport-related, 34 construction-related, 38 industrial, 15 chemical, 20 consumer, 22 electrical and 39 others) whose restructuring or liquidation may need eventually to be considered. Ministries with the most central mandate in relation to Water Resource Management include the MoWR (water resources), MoMPW (Water and Sanitation), MoA (agricultural development), Ministry of the Environment (MoE) and Ministry of Planning and Development Cooperation (MoPDC).[20]

70. **On the fiscal side, with British ruled central government transfers to provincial leaders overturned after 1958, all revenues belong to central government and have been used mainly to fund centrally administered programmes**. Traditionally, transparency and accountability in fiscal resource transfers have been limited and outside of Iraqi Kurdistan no formal inter-governmental transfer arrangements have been either developed or executed. This often led to the over-centralisation of expenditures and large horizontal (geographical) and vertical fiscal imbalances. Yet, in spite of numerous attempts to foster decentralisation Iraq has however remained a remarkably centralised state; as evidenced by existing fiscal (revenue and expenditure) relations. The current de facto revenue sharing arrangement with Kurdistan is perhaps an exceptional break in this tradition, as would be the development of formal inter-governmental fiscal transfers with the governorates based on agreed sub-national block grant formula. To a large extent, administrative arrangements continue to be shaped by the policy of fiscal-centralism and the structuralist policies of the 1970s, In spite of the 2009 and 2010 budget law and 2008 Provincial Powers Act.

71. **The first Irrigation Office in Iraq was established in 1918, and it thereafter became the Ministry of Irrigation in 1969 and evolved further into the MoWR in 2004**. One of the core drivers of institutional reform within Iraq since 2003 has been the strong role played by the current Minister of Water Resources. The MoWR has, therefore, been through continuous reform and restructuring since 2003 although (see the 2004 MoWR organisation chart below), to accommodate a massive increase in public employment, the MoWR has massively increased public sector staffing, rising from approximately 11,000 employees in 2006 to more than 25,000 in 2010. This staffing increase has not necessarily been driven by the Ministry, but rather the challenging security context, and will have a profound implication on fiscal and human resource management arrangements for decades to come. The organisation chart for the MoWR is provided in Figure 3 below, reflective of administrative reforms of 2004.

[20] MoWR replaced the Ministry of Irrigation.

Figure 3 Organizational Structure of the Ministry of Water Resources
Approved by Governing Council, Memo No 921 on 8 March 2004



72. **MoWR is comprised of a number of State Directorates and State-Owned Enterprises that are charged with implementing water resource related project**. The total number of staff in the MoWR equals approximately 25,000 employees, and these are split between the central Ministry, SOEs and directorates. The Minister of Water Resources mentioned that this staffing number could be reduced by a third if the civil service law provided such an enabling framework. According to the GoI's Water Resource Development Strategy, MoWR's main activities include:

- Managing surface and groundwater resources in Iraq;
- Constructing and operating dams, reservoirs and various water-related infrastructures;
- Determining-allocating water resources for irrigation project, industry and domestic use;
- Dredging rivers, canals and drains;
- Inter-ministerial coordination to support a comprehensive approach;
- Developing and implementing riparian agreements;
- Maintaining relations with relevant international water management bodies;
- Conducting studies and research;
- Mitigating floods and managing droughts, Restoring Iraq's Marshlands; and, large land reclamation projects. Source: MoWR (2009)

4.5 SUB-NATIONAL INSTITUTIONS

73. **Outside of national structures, the region of Iraqi Kurdistan is currently divided into three governorates, although the Regional Government claims a further four, however currently only three are formally under the control of the Kurdistan Regional Government.** The governorates wholly under the Kurdistan Regional Government are Al Sulaymaniyah, Erbil and (Dahuk). Other governorates outside of Kurdish Regional authority include Al Anbar, Al Basrah, Al Muthanna, Al Qadisiyah, An Najaf, At Ta'mim, Babil, Baghdad, Dhi Qar, Diyala, Karbala', Maysan, Ninawa, Salah ad Din, Wasit and districts. Governorates are organised into districts (*qada'a*), sub-districts (*nahiyas*) and villages. Jurisdiction over various matters of state continues to be defined by a mix of Islamic and European Civil law.

74. **Even though the Provincial Powers Act of 2008 has not been implemented, and in spite of arguments for the decentralisation of water and sanitation services, currently most national structures are merely directorates of the parent Ministries**. Under the PPA, the following functional roles were anticipated to be provided by the Governorates:

Table 5 Water Related Laws from the 2008 Governorates Law

Proposed Unit	Function	Legal Text
Agricultural Unit (Article 8, 9th)	To support agricultural and irrigation services, at the District level.	Article states: (8) Ninth: Monitor and organize the utilization of public lands within the geographic location of the district, and endeavour to develop agriculture and irrigation.
Land Use Planning (Article 8, 9th)	Manage land use, support agriculture and irrigation	Monitor and organize the utilization of public lands within the geographic location of the district, and endeavour to develop agriculture and irrigation.
Water Resources and Irrigation Unit	As Above	As Above

4.6 PRIVATE SECTOR INSTITUTIONS

75. **The over-centralization of economic policy decision-making led to the crowding out of the private sector by state-owned enterprises, alongside land reforms in the 1950s and 1970s which saw private property owners replaced by a smallholder system.** Under-investment in private market-related support left the smallholder system substantially under-capitalised and without essential production infrastructure and inputs. In addition, large public investment programs in irrigation storage and the creation of more than 200 state-owned enterprises, perhaps dealt a defining blow to the role of the private sector with government now providing all water-related management services, including water and sanitation. There appears to be little to none end-user involvement in this sector, from both policy formulation and delivery perspectives. However, if the entire watershed system were to be looked at in detail, it would show a huge number of small to medium enterprises, producers, traders, input and output agents plying a viable livelihood out of irrigated agriculture, fishing, trading and illegal and perhaps even illicit activities. Outside of watershed management issues, the water and sanitation sector operates through the public service, although anecdotal evidence suggests that private operators levy fees on water usage, similar to the electricity network. Finally, and partially as a result of the irreversible water quality provided through the public networks, private water bottling companies are beginning to emerge all over Iraq in what is likely to be a double digit growth industry.

76. **The extent to which the informal, illegal or illicit economy exists related to water resource management and trading is impossible to quantify**. However, it seems logical that as a result of conflict and war, combat and coping economies are likely to have increased substantially. More work probably needs to be done on this subject to determine the scale of such activity, its benefit to users and its potential long-term negative consequences. Finally, government levies an insignificant tax on domestic water users, and as a result, households are not paying the full price of provision by far. Clearly, a key facet of the private sector is not just private sector companies, but also end users. From both a water conservation and cost-recovery perspective, the absence of a market-based water-pricing policy and metering system undermines the role of the state in regulating water demand, and improving on quality provision.

4.7 FINANCING INSTITUTIONS

77. **One of the key drivers of policy, planning and budgeting within the sector relates to the arrangements of financial institutions, which remain highly centralised in nature, often to the detriment of the sector**. The public procurement and public finance laws remain highly centralised and the Ministry of Finance (MoF) is responsible for the recurrent budget (wages and non-wage recurrent) and the Ministry of Planning and Development Cooperation (MoPDC) is responsible for formulating the capital budget, with the MoWR (for water resources) and MoMPW (for water and sanitation). From a public finance management point of view, it will be essential to bring recurrent and capital cost functions together, and also eventually to migrate the planning functions from the MoPDC into the MoWR and MoMPWs. Moreover, as part of the planned reform and modernization of governance in this area, particularly in the area of WATSAN, a core driver of fiscal institutions and relations will be the creation of public water utilities around which water pricing will be used to support cost recovery and conservation.

78. **At the level of market-based finance for agricultural development, the domination of state-owned banks and inputs provided by the Ministry of Agriculture and Trade have all the hallmarks of a command economy**. The MoA continues to finance an agricultural loan initiative, as part of the Prime Minister's Agricultural Initiative. However, a number of privately owned commercial banks and Micro Finance Institutions (MFIs) are beginning to the enter the market, and in addition to local money lenders, it is highly likely that private access to finance is a significant if not unreported input to the sector as a whole.

4.8 TRADITIONAL AND CUSTOMARY INSTITUTIONS

79. **Whilst little has been written about traditional irrigation and customary practices in recent history, there is expected to be strong community village-based systems that build and maintain Karez, Qanats (a form of subterranean aqueduct), river diversions, wells and other water-related structures.** It would also be expected, that war and conflict, as well as scarcity and relative poverty have driven coping strategies in the use of water resources, and this issue deserves to be studied in great detail, including issues related to corrupt management where the weakness of the central state might have encouraged unlawful revenue sharing. Clearly, a far clearer understanding of the role of traditional and customary water management systems is required, so that the current service delivery model can be inclusive and participatory.

4.9 PLANNING (2010-2014) PRIORITIES

80. **GoI strategic goals for the water resource management sector, which include irrigation, industrial and household usage, have been outlined in the 2007 NDS and other Ministry strategic plans.** Yet, and in spite of gains in strategic planning, there is no overarching policy and strategy framework that binds the sector together; to support cross-sectoral coordination from a policy point of view, no sector-wide approach, and no integrated-riparian framework. However, the Strategic Plans of the MoWR are a positive step towards this direction and the Five Year Plan prepared by the Ministry of Planning and Development Cooperation (MoPDC), MoWR and MoA outlines major strategic goals for the sector (2010-2014). Strategic priorities in the area of water resource management are outlined below:

i. ***Water Storage Capacity***: To increase the volume of water storage by 33 billion cubic meters as a result of constructing 9 large dams throughout the duration of the 2010-2014 plan, including the Bakhma dam that will take three years after the plan to build with a capacity of 14.4 billion cubic meters and a power capacity of 1500 Megawatts;
ii. ***Water Collection***: Water collection in the western desert and eastern area by building 14 small dams in addition to dams in Kirkuk;
iii. ***Land Reclamation***: Total annual average reclamation of 800 thousand Donums. The cost of each Donum will be 4 million Dinars, requiring the allocation of 3.2 trillion Dinars annually. GoI proposes to allocate reclaimed lands to the governorates so that the total target area will be 4.005 million Donums (out of 7.196) in the 18 governorates;
iv. ***Reclaiming the major water resources***: To include Eastern Euphrates, Western Euphrates, Eastern Gharraf, Eastern Tigris in order to maintain water quality;
v. ***Operating and maintenance of existing works***: including irrigation and drainage networks for about 126 thousand kilometres and more than 200 irrigation and drainage schemes needing continuous maintenance; and,
vi. ***Sustainable development of existing groundwater***. Measures to enhance the sustainable use of ground water resources are currently being strengthened.

81. **The strategic priorities through the MoPDC, MoWR and MoA Five Year Plan lack a solid focus on policy and institutional constraints to delivery**. The Prime Minister's Advisory Commission (PMAC) has, however, been working on such a framework, although the results have still to be finalised. In the absence of such a framework, core issues related to upstream riparian management, improved institutional capacities (formal and informal), the framework for improved water-user participation, improved coordination towards a sector-wide approach, rationalization of structures and decentralization have been overlooked.

4.10 INSTITUTIONAL DRIVERS OF CHANGE

82. **Understanding the institutional drivers of change is vital to determining strategic water resource management capability**. Drivers of change include:

- To a very large extent conflict and war have had a profound impact on the ability of the state to manage water resources effectively and the laws and institutions that govern the sector reflect 'old' ways of doing business;
- Lack of a clear supporter in the international community – either through the Arab League, United Nations or European Union have weakened Iraq's ability to negotiate an acceptable riparian agreement;
- Conflict and war have also driven environmental degradation, through direct destruction of infrastructure and lack of finance to maintain existing structures;
- The worsening water balance in Iraq reflects both drought and the lack of leverage Iraq has been able to have over water policies and usage in upstream riparian states;
- The legal framework for the sector – covering MoWR and MoMPW continues to reflect the legacy of the 1960s-1980s and even though the MoWR has just been through institutional restructuring, a massive increase in sector staffing has blurred much of the potential possible from such re-organization;
- The impact of war on citizens has been massive, and state-subsidies and increases in public sector staffing have been used to secure the socio-economic transition to peacetime. In the longer term, concerns over social welfare provision will need to be replaced by drivers related to conservation and cost recovery.
- The absence of a market-based water-pricing policy continues to drive poor water conservation and undermines the ability of the state to recover core operating costs;
- Upstream users continue to have preferential rights of access, development and policy;
- The absence of a well-defined National Water Resource Management Policy framework, linked to a clear sector-governance strategy continues to impede progress in many areas;
- The Constitution and Provincial Powers Act have created an extremely uncertain – politically driven - decentralization agenda which threatens to undermine the logical governance arrangement for the sector as a whole;
- Lack of adequate financing undermines maintenance of existing structures and the modernization of the sector as a whole;

- In the area of domestic water institutions, conflict and war have put on hold many core institutional reforms – such as the creating of public water utilities and instituting a sustainable pricing policy;
- Lack of end-user analysis and a clear policy on public participation continues to drive poor water conservation, weak non-state water governance institutions and also leads to a supply driven and not demand driven resourcing framework; and,
- Weak monitoring arrangements drive the lack of relevant sector specific data, undermining knowledge of the main water quality, conservation and investment challenges faced by the sector as a whole.

PART V
AGENCY DRIVERS OF CHANGE

5.1 AGENTS OF CHANGE

83. **The agents of change in this most important sector deserve disaggregation, so that the drivers of change can go beyond structural and institutional spheres**. This is particularly important given that the impact of war, conflict and coping have shaped and driven many of the existing water resource management practices within the sector. The costs of conflict have, therefore, not only affected structural relations along the riparian-chain, as well as within the state of Iraq, but also the institutional values and practices that exist in current day Iraq. Much of this analysis is perhaps a little theoretical, given lack of information on this issue, but the framework provided below is intended to facilitate greater discussion on this important issue.

84. **Institutions and agents have been shaped by a combination of factors including: the legacies of pre-war structures, wartime transformations and adaptations, 'post-war' shifts in the political economy and international financial flows and policies**. Iraq can, therefore, be characterised as a context of institutional multiplicity involving a hybrid mixture of state/non-state, formal and informal, and legal/statutory and customary institutions and agents.

5.2 CLASS RELATIONS AND DE-BA'ATHIFCATION[21]

85. **Since 2003 the process of De-Ba'athification, largely aimed at securing regime change, alongside a shift towards an increasingly pro-Kurdish and Shiite leadership class, whilst in many ways a step forward, have also dealt a heavy blow to management and leadership arrangements within the government of Iraq as a whole**. The almost wholesale departure of the previous ruling classes, at all levels of government, have displaced the management and leadership competency that once saw Iraq as a regional leader in governance in the 1970s and 1980s. When combined with the doubling of public sector staffing – to provide a safety net for citizens and to quell the insurgency – the overall capacity of core state mandates (MoWR and MoMPW) has in many ways gone backwards, not forwards. When combined with civil service management arrangements and laws that undermine merit-based recruitment, whilst limiting the ability of Ministers to weed out staff unfit for public service – the sector is characterized by weak human resource management capacities and the domination of recurrent over capital investments. The new ruling classes, political and administrative, will therefore require substantial training and capacity building support, but only once the functional structures of institutions have been reformed and modernized to reflect a more progressive service delivery model. This would also need to include a clear policy over public and private roles in service delivery, something that is lacking at this point in time.

[21] De-Ba'athifcation led to the banning of all members of the top four tiers of the Ba'ath Party from the new government, as well as from public schools and colleges, and in the process it blocked many experienced people from participation in the new administration. Thousands were removed from their positions, including doctors, professors, school teachers, bureaucrats and professionals with a background in water management. According to the Council for Foreign Relations, Paul Bremer, the U.S. administrator of Iraq, issued two sweeping orders in May 2003: one outlawed the Ba'ath Party and dismissed all senior members from their government posts; the other dissolved Iraq's 500,000-member military and intelligence services. In November 2003, Bremer established a Supreme National De Ba'athification Commission to root out senior Ba'athists from Iraqi ministries and hear appeals from Ba'athists who were in the lowest ranks of the party's senior leadership. The party's foremost leaders--some 5,000 to 10,000 individuals--were not permitted to appeal their dismissals.

5.3 TRADITIONALIST VERSUS MODERNIZING WORLD VIEWS

86. **A particular point of concern within Iraq is the coexistence of both conservative and liberal world views within government, often in the favour of the later**. As a secular society, and one that championed women's rights and scientific socialism in the 1970s, the process of regime change and democratization in Iraq has created competing political classes and interests. Moreover, given that sub-national structures have been enabled through a process of progressive political decentralisation, often against the will of the executive classes in Government, laws driven by the Council of Representatives (CoR) have often failed to be implemented. Moreover, as the government remains a coalition of various interest groups, the new political leadership has been unable to forge consensus on core issues such as economic policy, regional relations, foreign policy and the need for reform and modernization and rationalization of the public service. Moreover, the new elite classes, particularly those with a pro-Western background, have so far failed to build sufficient linkages throughout the state to create a unified world view that would allow consensus over policy and institutional values. Finally, the increasing role of religious interest in political life could lead to a more conservative society, with perhaps more conservative views over the need for change, in this context.

5.4 THE IRAQI DIASPORA[22]

87. **The conflicts in Iraq since the 1980s have led to a massive Iraqi Diaspora, one of the largest in the world, and has in its own right led to a massive brain-drain in virtually all sectors of society**. According to Wikipedia, around 2 million Iraqis live in Syria, 1 million in Jordan, 450,000 in the UK, 250,000 in Israel, 203,000 in Iran, 150,000 in Egypt and a further 250,000 between Germany and Sweden, amongst other communities. Lebanon, the UAE, Yemen, Turkey and Australia are known to have Iraqi communities numbering from 60,000 to 100,000. Therefore, and given that many of the Iraqi Diaspora are both highly interconnected to global labour markets and highly skilled in many areas, a period of peace in Iraq and economic prosperity driven by oil futures would allow progressive return, to the betterment of both public and private sectors. It is to be expected, that many within the Diaspora have substantial skills in economic development and water resource management related areas and as such a policy of return would likely precipitate a modernizing influence over government, should the enabling conditions emerge. The creation of a Senior Executive Service, supported by lateral entry programs aimed partially at the international Diapora, as advocated by the Iraq Public Sector Modernization (I-PSM) program, could lead to a sea-change in governance capacity over the medium term.

5.5 AGRICULTURAL LABOR

88. **According to COSTI and the UNDP Human Development Report Agricultural labor has been reported to range between 16-25 per cent of all employment in Iraq, thereby constituting the largest single employment sector in the country**. The 2007 COSIT Household Survey shows that 8.4 per cent of all household heads depend on Agriculture as their main source of income and employment and as such the strategic management of water resources is vital to both employment and agricultural futures. Yet, given the mechanisation of agricultural production under Saddam Hussein, and with an estimated 49,000 tractors in Iraq (WDI

[22] The Iraqi Diaspora refers to native Iraqis who have left for other countries as emigrants or refugees, and is now one of the largest in modern times, being described by the UN as a "humanitarian crisis" largely due to the US invasion and occupation of Iraq.

Database) agricultural labour has traditionally enjoyed a relatively modern production process, at least up until the 1980s. The COSIT survey provides a reasonable breakdown of employment and incomes by sector but a dedicated agriculture-specific labour market survey has not been conducted since the war, and is urgently required.

5.6 GENDER

89. **A particular facet of Iraq, in the context of the Middle East, has been a rather unique gender balance in political and economic life, as a result of a strong development policy and the impact of male labor drain as a result of war**. According to UNIFEM, It was in the early years of secular Ba'athist socialism and early in Saddam Hussein's rule that women's status and rights were formally enshrined in legislation and treaties. In 1970, a new constitution nominally made Iraqi women and men equal under the law (although family law continued to favour men). Under Saddam Hussein, women's literacy and education improved, and restrictions on women outside the home were lifted. Women won the right to vote and to run for political office, and they could drive, work outside the home and hold jobs traditionally held by men. Before 1991, female literacy rates in Iraq were the highest in the region, Iraq had achieved nearly universal primary education for girls as well as boys, and Iraqi women were widely considered to be among the most educated and professional women in the Arab world.

90. **Before 1991, Iraqi women had the highest rate of employment in the Arab Region, constituting 23 percent of the country's work force**. Women's actual economic contribution in the informal economy, especially in the agriculture sector, was believed to be even higher. The majority of working women were mid-level professionals, mainly in the public sector. Under economic sanctions, women's share in public sector employment - which provided relative economic security - increased as men left in search of better opportunities in the private or informal sectors. Home-based income-generating activities for women also increased as a result of the deteriorating standards of living in general. The general rise in unemployment, however, meant that by 2002, women comprised only 19 percent of the national workforce.

91. **In the area of managing scarce water resources, even though over 85-90 per cent of Iraq's water is used for irrigation purposes, both water and sanitation management practices have a very domestic management focus**. The functional role of both women and men in managing water resources is clearly vital to long term success, and water-related user associations and community management groups would be primary vehicles to expanding public participation in this important area. Negative practices, in relation to resource management, conservation, pollution control and traditional management control can be mitigated through the creation of local community-based structures.

5.7 AGENCY DRIVERS OF CHANGE

92. **Understanding which agents are for and against reforms and modernization in this important sector is vital to securing gains in strategic water resource management**. Based on the rather crude analysis presented above, the core drivers of change at the agency level would appear to include:

- Many years of conflict and war have led to the displacement of millions of Iraqi's from daily political and economic life, undermining the fabric of society and contributing

towards a brain-drain of significant proportions, driving downwards capacity for governance in this important sector;

- The formal process of de-Ba'athification led to the systematic removal from power of an elite class who had ruled Iraq since the late 1970, leading to a competency vacuum within the transitional and current administration. No Ministry or sector has been untouched by this policy;

- The new elite classes in Iraq, many supported by the international community, whilst influential in many ways have so far failed to establish the basis for reform and modernization of vital aspects of the water resource management sector;
- There is a clash between traditionalist (often with religious backgrounds) and modernizers, at all levels of administration, the impact of which has still to play out;
- The creation of one of the world's largest Diaspora communities is likely to be the major driver of change once the political and security transitions are complete, and once oil-related revenues provide a pull factor for domestic labour markets;
- The high level of agricultural and water-related labour in Iraq, as a per cent of national employment, makes this sector the most significant sector for private sector reforms, the impact of which will diversify growth and increase national self-sufficiency;
- Gender relations, forged from a progressive, secular and liberal world view in the 1970s and 1980s, alongside a reduction in male public sector staffing as a result of war, make women a vital partner in water-related management reforms, conservation and agricultural labour;
- The Regional Government of Kurdistan, given its strong linkages across all three riparian states, make it a vital partner in future negotiations with regards to strategic water resource management issues; and,
- The Minister of Water Resources, like his counterparts in Turkey and Syria, are strong champions of reform around which a sustainable riparian agreement could one day be forged, assuming that Turkey understands the long-term importance of striking an agreement in the near term, to minimise the potential risk of long-term water stress and risks of riparian-state conflict.

PART VI
DISCUSSION ON CORE DRIVERS OF CHANGE

6. DISCUSSION ON CORE DRIVERS OF CHANGE

93. **This short discussion identifies the core drivers of change – positive and negative - that once identified can be used as entry points to influence strategic reform and modernization in the water resource management sector.** This section builds on the drivers identified above.

6.1 HISTORICAL DRIVERS

94. Perhaps the main historical driver of water resource management change has been the transgression from a domestic river under the Ottoman Empire to a river increasingly divided by the creation of new states; now including Turkey, Syria, the Iraqi Region of Kurdistan and Iraq. If Iraq had been successfully changed into a Federal system to include other regions, and then to have decentralised water resource management functions to these new entities, then the overall bargaining power of Iraq as the ultimate downstream riparian would have been vastly eroded. Additional drivers include war and conflict, which have led to the destruction of vital infrastructure and water management systems and the drying up of the Mesopotamia Marshlands, and alongside poorly implemented command economy driven land reforms, population pressures, and periods of great floods and drought, these drivers have substantially shaped the water resource management system of today. As a result, the upstream riparian states have preferential rights of water access, development and policy and through projects such as GAP, which has been implemented during a period of conflict in Iraq, Iraq has lost control of its ability to negotiate an acceptable water balance across the Tigris and Euphrates watershed.[23]

95. **The History of occupation by foreign powers has also led to a legacy of external and domestic laws in the area of water resource management, although there is little doubt that poor water management policies and institutions in Iraq have merely exacerbated reduced flow from upstream**. Moreover, increasing water stress within the region as a result of drought and population/land use pressures, upstream investments in irrigation infrastructure alongside conflict between Turkey and Kurdistan are all significant factors shaping the current situation. The shrinking of the Euphrates in particular is a crisis that threatens the very roots of Iraq's identity, not only as the land between two rivers but as a nation that was once the largest exporter of dates in the world, that once supplied German beer with barley and that takes patriotic pride in its expensive Anbar rice. (Robertson, Campbell, 2009). Upstream, big dam projects are a particular driver of political tension, as they seek to control hegemony over water supply downstream. Of course, these upstream investments also stem from general societal modernization and development that is leading to increased per capita consumption of water. Trade relations also determine bargaining power, with Turkey being a significant export partner and Iraq, coming in at the fourth-largest trading partner for Turkey. Within Iraq, the culture and religious traditions of free-access to water, weak institutions and lack of a clear policy on water pricing drive the exploitative use of waters.

[23] The shrinking of the Euphrates, a river so crucial to the birth of civilization that the Book of Revelation prophesied its drying up as a sign of the end times, has decimated farms along its banks, has left fishermen impoverished and has depleted riverside towns as farmers flee to the cities looking for work. (Robertson, Campbell, 2009)

6.2 STRUCTURAL DRIVERS

96. **The absence of Riparian Agreement between the various partners, including the presence of a clear international alliance (Arab league or the United Nations) makes the management of this important trans-boundary resource problematic at best. At worst, it threatens the long-term stability of the region**. However, whilst Iraq has the right to be concerned about upstream water usage, at the same time, urgent water resource management reforms needed to improve practices and conservation in Iraq are clearly lacking; an issue that upstream riparian states frequently cite. In the long run, increased wealth across the riparian states will drive two major dynamics: (i) greater demand for per capita consumption and (ii) the need for improved water-balance and water conservation initiatives. Within Iraq, oil will be a key driver of future consumption for water and agricultural products, and on the other side continued oil dependency guarantees that economic diversification remains a policy priority of GoI in the years to come.

- **Future budget surpluses in Iraq (as a result of higher oil prices and increased production) will allow considerable investment in water resource management infrastructure and institutions and whilst this will increase water use efficiency and limit environmental risks, it also means that the appetite for large dams will continue as it did in the 1970s**. Moreover, given that agriculture employs between 16 and 25 per cent of the existing wage labour, investment in irrigation and agriculture will benefit the various riparian communities within Iraq directly, and should also buoy domestic agricultural markets. On the foreign policy side, future trade relations between Iraq, Turkey and Syria will be increasingly determined by water on one side, and oil on the other, perhaps creating a rich ground for benefits on all side. At the structural level, with Kurd and Sunni areas covering the north, any underserving of southern largely Shia interests could fuel political tension, and efforts to develop an equitable demand user framework is vital in this regard.

- Rain fed agriculture in the non-watershed parts of Iraq will continue to face high levels of unemployment unless non-agricultural means of production are urgently developed. Balancing income disparities will likely require clear redistributive policies, and given the role of the CoR in terms of oversight, efforts to evolve the current weak management systems into a governance framework that promotes efficient and equitable access will be a key driver for stability. To this end, and perhaps surprisingly, ethnic interests appear not to have been a particular driver of water related conflict, they remain secondary to territorial and governance issues. Finally, the paucity of data and information on water flows, water quality, salinization and water-logging problems and lack of water pricing undermine conservation efforts and policy prioritization. Institutional constraints are also, therefore, to be considered structural drivers of poor management practices in the Iraq context.

6.3 INSTITUTIONAL DRIVERS

97. **Outside of historical and structural drivers of change, strengthening Institutional reforms must remain a critical priority for both the GoI and upstream riparian states**. An initial observation: to a very large extent conflict and war have had a profound impact on the ability of the Iraqi state to manage water resources effectively and the laws and institutions that govern the sector reflect 'old' ways of doing business. The adoption of a reform and modernization agenda is vital both to improved performance and also to the legitimacy of the GoI in its discussion with Turkey and Syria. In this regard, at the global institutional level, the lack of a

clear supporter in the international community – either through the Arab League, United Nations or European Union - have weakened Iraq's ability to negotiate an acceptable riparian agreement alongside other factors.

98. **The legal framework for the sector – covering MoWR and MoMPW continues to reflect the legacy of the 1960s-1980s and even though the MoWR has just been through institutional restructuring, a massive increase in sector staffing has blurred much of the potential possible from such re-organization**. Moreover, and in spite of an internationally supported and CoR driven agenda of decentralization, the sector remains as centrally controlled as it has since the 1970s. The impact of war on citizens has been massive, and state-subsidies and increases in public sector staffing have been used to secure the socio-economic transition to peacetime. In the longer term, concerns over social welfare provision will need to be replaced by drivers related to conservation and cost recovery. In this regard, the absence of a market-based water-pricing policy continues to drive poor water conservation and undermines the ability of the state to recover core operating costs, which in turn inhibit much needed capital investment.

99. **The worsening water balance in Iraq is reflective of the current drought, poor water and land management policies and the extremely weak domestic institutional environment, both within the MoWR and MoMPW.** These problems appeared to be mirrored in both Iraqi Kurdistan and Iraq. The absence of a well-defined National Water Resource Management Policy framework, linked to a clear sector-governance strategy, continues to impede progress in many areas. In terms of governance mandates, the Constitution and Provincial Powers Act have created an extremely uncertain – politically driven - decentralization agenda that threatens to undermine the logical governance arrangement for the sector as a whole. Yet, much of this is to be expected, given the level of violence and conflict Iraq has been through, although the next administration will need to drive a reformist agenda – focused on strengthening governance institutions – to allow a costed service delivery approach to be adopted.

100. **Given Iraq's fiscal reality, lack of adequate investment financing has undermined the maintenance of existing structures and the modernization of the sector as a whole**. In the area of domestic water institutions, conflict and war have put on hold many core institutional reforms – such as the creating of public water utilities – an approach which is standard even within the immediate region. Lack of end-user analysis and a clear policy on public participation continues to promote poor water conservation and, absent non-state water governance institutions, lead to a supply and not demand driven resourcing framework. Furthermore, weak monitoring arrangements drive the lack of relevant sector-specific data, undermining knowledge of the main water quality, conservation and investment challenges faced by the sector as a whole.

6.4 AGENCY DRIVERS

101. **Brain-drain, internal displacement and the creation of one of the World's largest per capita Diaspora communities, outside of Palestine, alongside the policy of de Ba'athification have had a profound impact on sector governance**. When combined with the creation of war, combat and coping economies the challenges facing rebuilding positive agency relation will be a challenge in its own right. Many years of conflict and war have led to the displacement of millions of Iraqis from daily political and economic life, undermining the fabric of society and contributing towards a brain-drain of significant proportions, driving downwards capacity for governance in this important sector. The formal process of de-Ba'athification led to the

systematic removal from power of an elite class who had ruled Iraq since the late 1970s, leading to a competency vacuum within the transitional and current administration. No Ministry or sector has been untouched by these changes.

102. **The new elite classes in Iraq, many supported by the international community, whilst influential in many ways have so far failed to establish the basis for reform and modernization of vital aspects of the water resource management sector**. Moreover, there is a clash between traditionalists (often driven by religious interests) and modernizers, at all levels of administration, the impact of which has still to play out. However, modernization is urgently required given the high level of agricultural and water-related labour in Iraq, as a per cent of national employment, making this sector the most significant sector for private sector reform, the impact of which would both diversify growth and increase national self sufficiency.

103. **Gender relations, forged from a progressive, secular and liberal world view in the 1970s and 1980s, alongside reduction in male public sector staffing as a result of war, make women a vital partner in water-related management reforms, conservation and agricultural labour**. Furthermore, as this research outlines, the Regional Government of Kurdistan, given its strong linkages across all three riparian states, make it a vital partner in future negotiations with regards to strategic water resource management issues. Finally, the Minister of Water Resources, like his counterparts in Turkey and Syria, are strong champions of reform around which a sustainable riparian agreement could one day be forged. The agency structures for driving change, therefore, exist if the overall structural and institutional constraints outlined above can be progressively removed. Table 7 below provides a summary of the core drivers of change, related to strategic water resource management in Iraq, and across riparian boundaries.

Table 7 Major Drivers of Change in Strategic Water Resource Management in Iraq

Historical Drivers	Structural Drivers	Institutional Drivers	Agency Drivers
• Upstream users have preferential rights of access, development and policy; • Periods of flood and drought have shaped water resource management practices; • Land policy has been driven by external interests and the command economy; • Increasing population-resource pressures; • Territorial boundary changes as a result of state contraction and political decentralization; • Regional conflict, including between Turkey and Kurdistan, and occupation by external powers; • History of occupation leading to a legacy of external and domestic laws; • Water stress; • Increasing upstream investments in Irrigation development; • Big dam projects are a particular driver of political tension, as they seek to control hegemony over water supply down stream; • General societal modernization and development which leads to increased per capita consumption of water and water related products; • Trade relations also determine bargaining power, with Turkey being Iraq's largest export partner and Iraq, the fourth-largest trading partner for Turkey;	• The absence of Riparian Agreement between the various partners, including the presence of a clear international alliance (Arab league or the United Nations) makes the management of this important trans-boundary resource problematic at best. At worst, it threatens the long term stability of the region; • Iraq's structural position at the heart of the arid realm, but as the last downstream riparian state, means that water resource remains critical from both security and environmental futures; • Through projects such as the GAP project, upstream riparian neighbours are strengthening their economic position within the region; • Iraq's oil dependency means that economic diversification is likely to remain a primary policy priority of GoI in the years to come; • Future oil revenues for Iraq are likely to mean that in the medium to longer term, Iraq's economic might will strengthen its ability to agree an equitable use of water resources for Iraq, Iraqi Kurdistan and perhaps Syria too. As a result, Turkey would do well to negotiate an acceptable water regime earlier rather than later; • Future budget surpluses in Iraq will allow considerable investment in water resource management infrastructure and	• To a very large extent conflict and war have had a profound impact on the ability of the state to manage water resources effectively and the laws and institutions that governance the sector reflect 'old' ways of doing business; • Lack of a clear supporter in the international community – either through the Arab League, United Nations or European Union have weakened Iraq's ability to negotiate an acceptable riparian agreement; • Conflict and war have also driven environmental degradation, through direct destruction of infrastructure and lack of finance to maintain existing structures; • The worsening water balance in Iraq reflects both drought and the lack of leverage Iraq has been able to have over water policies and usage in upstream riparian states; • The legal framework for the sector – covering MoWR and MoMPW continues to reflect the legacy of the 1960s-1980s and even though the MoWR has just been through institutional restructuring, a massive increase in sector staffing has blurred much of the potential possible from such re-organization; • The impact of war on citizens has been massive, and state-subsidies and increases in public sector staffing have been used to secure the socio-economic transition to peacetime. In the longer	• Many years of conflict and war have led to the displacement of millions of Iraqis from daily political and economic life, undermining the fabric of society and the contributing towards a brain-drain of significant proportions, driving downwards capacity for governance in this important sector; • The formal process of de-Ba'athification led to the systematic removal from power of an elite class who had ruled Iraq since the late 1970, leading to a competency vacuum within the transitional and current administration. No Ministry or sector has been untouched by this policy; • The new elite classes in Iraq, many supported by the international community, whilst influential in many ways have so far failed to establish the basis for reform and modernization of vital aspects of the water resource management sector; • There is a clash between traditionalist (often with religious backgrounds) and modernizers, at all levels of administration, the impact of which has still to play out; • The creation of one of the World's largest Diasprora communities is likely to be the major driver of change once the political and security transitions are complete, and once oil related revenues provide a pull factor for domestic labour markets;

Table 7 Major Drivers of Change in Strategic Water Resource Management in Iraq

Historical Drivers	Structural Drivers	Institutional Drivers	Agency Drivers
• Cultural and religious traditions of free-access to water; and, • Weaknesses in one or more riparian countries leading to increased resources exploitation by others.	institutions and whilst this will increase water use efficiency and limit environmental problems, it also means that the appetite for large dams will continue as it did in the 1970s; • Given that agriculture employs approximately 25 per cent of the existing wage labour, investment in irrigation and agriculture will benefit the various riparian communities directly, and also domestic agricultural markets; • Future trade relations between Iraq, Turkey and Syria will increasingly be determined by water on one side, and oil on the other; • Rain fed agriculture in the non-watershed parts of Iraq will continue to face high levels of unemployment unless non-agricultural means of production are urgently developed. Balancing income disparities will likely require clear redistributive policies; • Ethnic interests appear not to have been a particular driver of water related conflict; and, Lack of data and information on water flows, water quality, salinization and water logging problems, and water pricing, undermine conservation efforts and policy prioritization.	term, concerns over social welfare provision will need to be replaced by drivers related to conservation and cost recovery. • The absence of a market-based water-pricing policy continues to drive poor water conservation and undermines the ability of the state to recover core operating costs; • Upstream users continue to have preferential rights of access, development and policy; • The absence of a well defined National Water Resource Management Policy framework, linked to a clear sector-governance strategy continues to impede progress in many areas; • The Constitution and Provincial Powers Act have created an extremely uncertain – politically driven - decentralization agenda which threatens to undermine the logical governance arrangement for the sector as a whole; • Lack of adequate financing undermines the maintaining of existing structures and the modernization of the sector as a whole; • In the area of domestic water institutions, conflict and war have put on hold many core institutional reforms – such as the creating of public water utilities; • Lack of end-user analysis and a clear policy on public participation continues to drive poor water conservation, weak	• The high level of agricultural and water-related labour in Iraq, as a per cent of national employment, make this sector the most significant sector for private sector reforms, the impact of which will diversify growth and increase national self-sufficiency; • Gender relations, forged from a progressive, secular and liberal world view in the 1970s and 1980s, alongside reduction in male public sector staffing as a result of war, make women a vital partner in water-related management reforms, conservation and agricultural labour; • The Regional Government of Kurdistan, given its strong linkages across all three riparian states, make it a vital partner in future negotiations with regards strategic water resource management issues; and, The Minister of Water Resources, like his counterparts in Turkey and Syria, are strong champions of reform around which a sustainable riparian agreement could one day be forged.

Table 7 Major Drivers of Change in Strategic Water Resource Management in Iraq

Historical Drivers	Structural Drivers	Institutional Drivers	Agency Drivers
		non-state water governance institutions and also leads to a supply and not demand driven resourcing framework; and, Weak monitoring arrangements drive the lack of relevant sector specific data, undermining knowledge of the main water quality, conservation and investment challenges faced by the sector as a whole.	

PART VII
RECOMMENDATIONS

7. RECOMMENDATIONS

104. **The analysis presented above – drivers of change from historical, structural, institutional and agency spheres – creates a rich understanding of the major challenges facing Iraq, and the upstream riparian community, in strengthening strategic water resource management across the Tigris – Euphrates watershed**. This short set of recommendations is provided to highlight higher-order priorities only, based on these findings, in the interests of all users of the T-E watershed, in Iraq and beyond. This is presented as a 12-Point action plan.

1. Expedite the Development of an Evidence-Based Tigris-Euphrates Riparian 'Partnership' Agreement, including Iraq, Turkey, Syria and Iran: This may involve urgently reconvening the Trilateral Commission Talks and tasking it to develop a coherent Road Map for reforms across the entire riparian community, up to and including the establishment of a permanent riparian commission tasked with monitoring and oversight. This would go beyond the current trilateral membership and would need to include Iran. This will focus on policy and institutional strengthening to support both water quantity and quality management concerns for households, agriculture, and industrial uses.

2. Establish a National Water Authority in Iraq to support policy and regulatory coordination among line ministries and within the Region of Kurdistan. This would need to include mechanisms to ensure policy-level coordination among various water actors within the GoI, including line ministries within the KRG and riparian states.

3. Establish a Sector-Wide Policy Framework and Strategic Water Resource Master Plan for Iraq, reflective of the main integrated Approach: In the absence of a national water resource management policy framework, encompassing MoWR, MoMPW, MoA and Ministry of the Environment at a minimum, strategic prioritization will be driven by institutional, incremental not fundamental sector-wide reform priorities.

4. Establish Public Water Utilities and a National Pricing Policy and Agency to support cost recovery and enhance water conservation: All surrounding states have public water utilities, and cost recovery and water pricing policies – both of which are lacking in Iraq. The drafting of a specific WATSAN sector law, to include all the structural changes, would allow such a functional restructuring of MoMPW, and this would not only provide a solid foundation for conservation, but also demonstrate the commitment of the GoI to upstream riparian partners. In addition, is important to draft and prioritize rigorous investment policies to align with water conservation policies.

5. Undertake Collaborative Planning and Knowledge Development in the Tigris-Euphrates Region, with the support of the United Nations and other bodies as required: The need for greater riparian-wide information has never been clearer. In the absence of such information decisions in relation to water flow, water balance, user regimes and conservation and end user management and pricing cannot be developed.

6. Invest Heavily in Institutional Strengthening in Iraq and on Setting Standards and Water Conservation Policies: There is an urgent need for functional restructuring of both MoWR and MoMPW, around a new policy framework and costed medium term investment program. This would also facilitate decentralised management

responsibilities for water and environmental conservation, and may lead to right-sizing of staffing establishments and redeployment. MoWR is heavily overstaffed, which limits capital investment finances although it appears that staffing adjustments to MoMPW need to be reviewed through a functional review exercise.

7. Strengthen Water Quality Monitoring, Management and Ecosystem Conservation Priorities: Efforts to ensure the quality of water delivered to households, agriculture and industry must increasingly meet international water quality standards and so a clear set of policy standards needs to be agreed and institutionalised. At the same time, GoI should invest heavily in pilot ecosystem conservation projects, within a strong local community framework, as the basis for a sustainable approach.

8. Improve Strategic Water Resource Management of the Competition Polices: In addition to central level coordination and management efforts, it will be vital to foster cooperation between governorates and across sectors (agriculture, irrigation, industry, construction, water delivery and the environment) towards a national vision based on resource sustainability and conflict prevention criteria. This recommendation can be achieved once a National Water Authority is implemented, as outlined in recommendation 2 above.

9. Develop a Whole-of-Government, Regional and Provincial Coordination Framework: There is a need to strengthen operational management and information coordination between line ministries, governorates and Kurdistan authorities. Adopted measures would ensure operational and information coordination with local communities and water user associations at the sub-national and district levels.

10. Improve Decentralization where Justified and Strengthen Public Participation in Water Resource Management: There are compelling arguments for decentralizing many aspects of water-related service delivery, with a view to strengthening end-user demand management and supplies. The focus of efforts would be to minimize the human and environmental impact of reservoir development, hydro-electric generation initiatives, oil production, agriculture and other large-scale projects on the quantity and quality of overall water supplies.

11. Expedite the issuance of a unified water law, which covers all activities using water resources such as agriculture, hydropower, municipal, industry etc through out Iraq.

12. Encourage research at all levels within the specialized ministries as well as in the universities to improve the water use efficiency, management, use of saline water, adaptation of salt tolerant plants, etc

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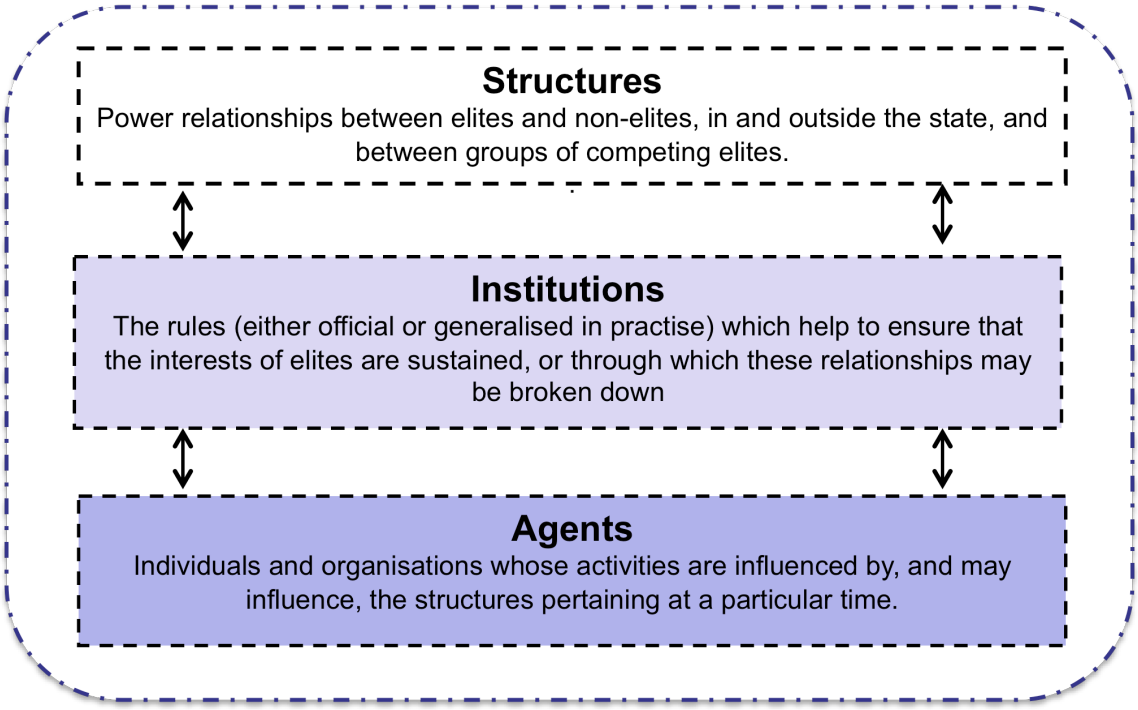
Annex1 Drivers of Change Methodology

Political economy maintains that the economy cannot be understood simply as an outcome of economic principles, but also as a result of vested political interests, balances of power and social relationships – in this case not just within Iraq but also within the wider regional and international community. Similarly, understanding political systems requires an understanding of economics and the manner in which economic power is translated into social and political power. Yet, political economy analysis goes beyond obvious areas such as state capture by powerful economic actors and considers higher and lower order dynamics. For instance, the political decisions of ordinary citizens are not just a factor of political beliefs but also of perceived economic interest and of social values and beliefs. In this case, the values of water in Iraq are not only to be understood in cultural terms, but also in religious terms. The Holy Quran states that "*from water every living creature was created*" and that right of thirst where all people have the right to quench thirst or to water animals and rights of irrigation where water can be used to water land and plants. Furthermore, foreign relations, (in this case Iraq's), are also dictated by national economic interest and ideology, linkages between politics, economics and culture and society, as well as the history of conflict and war.

It is more than just its inclusion of politics that distinguishes Political Economy Analysis from basic Economics. Political Economy typically puts less emphasis on purely economic *reactions* to shifting demand and prices and examines the manner in which markets *produce* political change or act as the field of battle for political actors (individuals or groups). A common example is the allocation of profits from natural resource extraction, in this case, trans-boundary water resources. In such an instance, a political economy approach would be useful in understanding the negotiations among the endowed countries (Iraq, Turkey and Syria) and those attempting to extract and use water resources, among countries positioning for greater control and, internally, among various national, regional or other groupings. In such interactions and negotiations, the sources of power, the forms of power and the institutions and mechanisms of negotiation are critical in producing the economic outcome, which will almost certainly be dictated more by political (or structural) power than by pure economic development efficiency. In political economy analysis we also see shifts in power, or change in agency, within these situations as some individuals or groups (companies, government structures, etc.) gain power and others lose it. Yet, in the context of Iraq and the wider sub-region, it is essential for a sustainable approach to resource allocation to emerge based on an acceptable trade-off of all parties.

The original Drivers of Change (DoC) framework (depicted in figure below) demonstrates the relationship between political-economy power and agency. It highlights the manner in which agents' (or actors') options are limited and guided by structures and the power they possess. Institutions such as legal frameworks, international water resource management agreements (or customs, manifest or operationalise) empower and *tend* to favour the interests of influential groups, or powerful countries. Institutions are, therefore, the tangible forms of power and the manner in which power is maintained or challenged. In this regard, the fracturing of political authority in Iraq since 2003 has undermined the power of negotiation in Iraq vis-a-vis its strategic relationship with Turkey and Syria, and even Iran. Moreover, the relations between Turkey and Syria have also changed over this period, undermining a comprehensive approach to sustainable water resource management.

Drivers of Change Framework



It is important to understand how, exactly, political economy relates to the current assignment; to identify a set of practical strategic entry points for improved water resource management. The above framework highlights that agents (for example policy makers or water resource users) are constrained by institutions, though they also have a tendency to challenge them peacefully (through politics) in the first instance or violently (through conflict) in the absence of a peaceful solution. It is generally noted that agents pursue rational outcomes, though 'rationality', from the political economy perspective can be based on political ideology, economic self-interest or cultural obligation.[24] Generally, political, economic and cultural/social interests will all contribute to the final determination of rational self-interest, within groups, Iraq, and the wider regional community. The most obvious application of this in Iraq is the negative effect of war on the ability of Iraqi national leadership to negotiate a rational regional share of water resources and the massive loss of infrastructure and degraded environment as a result of lack of state investment due to war and conflict. This fact has important implications for policy and institutional strategic options, as technical or economic solutions may fail to meet regional political, cultural or religious expectations or obligations.

Trajectories of Water Resource Accumulation

The focus on drivers of change highlights another feature of the political economy approach; its focus on what might be termed 'trajectories of accumulation'. Over time, certain countries or groups might be more successful than others at accumulating power or capital; here in relation to the supply and demand for water resources flowing across national boundaries. Here it is not only important to understand what is driving accumulation, both in terms of power to

[24] Individuals or groups, it is widely noted, will act in opposition to their economic interest if their political beliefs, culture, religion or identity, for instance, makes an unprofitable decision seem the most rational in net terms.

control and through the means employed, it is also important to understand which opportunities for rational accumulation are available to GoI, in the current national and regional context, with a view to achieving acceptable trade offs. The evolution of Kurdistan as a regional power within a federal Iraq also has implications over the longer term.

One of the arguments emphasised in this report is that current and future water resource management policy has to be cognizant of, and work within existing, decades-old trajectories of accumulation while attempting also to shape them in a forward process. The Iran-Iraq war, the international engagement since 2003 and subsequent internal conflict in Iraq have fundamentally changed power arrangements whilst also leading to the massive degradation of water resource management structures and institutions (formal, informal and customary). From a national strategy perspective, the key questions are as follows: (i) How can trajectories of water resource accumulation, and the vested political interests they represent, be shaped and, in many cases, limited without negative economic, environmental or social consequences and without increasing risk of water related conflict? (ii) What combination of water resource management and national economic policy strategy could be adopted to secure a sustainable regional agreement towards meeting the water supply and demand needs of all actors, whilst mitigating the risks of conflict and undermining the interests of one over the other?

History of Water Resource Management

According to a political economy perspective, it is also necessary to understand the history of water resource management within the T-E watershed and the ways in which vested interests have been shaped by changes in the balance of regional power relations. It is insufficient to describe contemporary power relations; policy makers also need to understand how and *why* they came about. Only then can we understand: (i) which interest groups are fundamentally opposed to change in water resource management; (ii) which strategies and factors (in Iraq the sequential reduction on water supply as a result of drought and upstream irrigation development) have encouraged interest groups to push for change; and (iii) which strategies lead to the most rational and sustainable form of change? Political economy theory dictates that war, conflict and crisis represent the most obvious opportunities for change, accumulation and for changing interests, rationality and motivation. Each crisis increases the cost of maintaining the status quo and helps to create or exploit divisions within interest groups, across boundaries or coalitions.

Capital, Coercion and Legitimacy

Nation states aim to mobilise sufficient capital and resources – including natural resources such as water - to sustain vital state functions and to deliver growth and employment enabling services. They aim to maintain a legal monopoly on coercion (violent, economic and otherwise) and to be viewed as legitimate by their citizens and by the international community. As a consequence, understanding the role of capital, coercion and legitimacy are vital to understanding the entire state-building process itself, with each elected government aiming to mobilize legitimacy through protecting the rights of its citizens, and through boosting growth and employment. The state can best mobilise legitimacy by providing basic services, by effectively regulating markets, by building its capacity and pursuing good governance (and the rule of law) by promoting equitable development. Given the primacy of agricultural employment in Iraq, the expanding water demand from a low base, the need to enhance food security as well as future water requirements for industrial and oil development, state legitimacy will be

substantially determined by success in negotiating a viable water future for the country and its citizens.

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