Republic of Iraq

Ministry of Environment

FIFTH NATIONAL REPORT TO THE CONVENTION ON BIOLOGICAL DIVERSITY IRAQ

March 2014

FOREWORD BY THE MINISTER OF ENVIRONMENT OF IRAQ

As a commitment to meet its obligations to the Convention on Biological Diversity, Iraq has issued the - First for Iraq - (namely the Fourth) Iraqi National Report on Biodiversity back in 2010. Since then, attention was directed towards a presumably more updated, informative and timely publication of the upcoming Fifth National Report on Biodiversity.

For this, the Ministry of Environment was geared up and determined to abide by the timeline set by the CBD secretariat and has mobilized all resources needed for the assignment. Nevertheless, the task wasn't easy at all and encountered several practical obstacles, and it was a race against time for collecting vast and wide array of updates of information, new scientific data, additions and records.

The composition of the task team was a recipe for success. Its efficient, well organized and professional work was evident ever since it's set up in 2012. During the entire period of its preparation, the progress of the Fifth National Report was monitored by resilient timetable that coped with unforeseen difficulties; utilize scattered data to make sound conclusions, and the whereabouts of missing pieces of information.

A consolidated report such as the Fifth National Report on Biodiversity in Iraq demanded not only excellent planning and fair assuming of roles by the team, but also the effective and efficient participatory contribution of tangible spectrum of the society. To achieve desired goals, rehabilitation of the legislative, institutional and financial environment was also equally needed. During the past decade, the Ministry of Environment vigorously motivated the issuance of numerous decisions, directives, and laws that all served promotion of environmental issues in Iraq. Of course, this directly contributed to that works such as the present report come to light in time and in excellent format.

Many events and scientific meetings and workshops, both local and regional, had to be organized prior to the publication of the present report. Most of these activities were timed and directed by close consultation with the global and regional institutions that have provided help and guidance for the process.

The ministry of Environment extends sincere thanks and gratitude to all those parties, institutes and individuals, who closely monitored this output, or have rendered knowhow, assets or information to make this fine product available to decision makers, academics and all stakeholders.

Engineer Sargon Lazar Slewa,
The Minister of Environment
April 2014

PREFACE BY THE TECHNICAL ADVISOR OF MOEI – CBD NATIONAL FOCAL POINT

When the ministerial order to set up a team for writing up the Fifth National Report on Biodiversity was issued in 2012, planning and regular meetings were immediately held to realize the actual challenge of the mission. Wisely composed, the team coordinated works and roles so that the fifth report comes out as an additive contribution, not just a repetitive volume. These visions, however correct, but needed the search for, and concentrate on, new, concise and precise information.

One can only be proud of the task team which was up to expectation and who throughout the preparation period inspired a one unit and one task conductance which lead to the present volume comes to reality.

In the course of work towards this task, several activities had to be organized and designed to absorb views, assess capacities and assign missions to officials and stakeholders of various ranks. These activities were mostly in the form of National and Regional workshops held in the capital Baghdad, and further a field in the autonomous Kurdistan and South provinces.

The rich content and most up-to-date information on biodiversity which can be possibly collected in the given space of time makes the Fifth National Report represents not only a source of reliable information on the status and needs to promote biodiversity issues in Iraq, but also a guideline, in particular, for decision makers, local governments, stakeholders, and researchers across Iraq.

In general, the report dealt with all information on eco-region bases. It is logically divided into what the CBD advised that parts are to deal with providing answers and stimulate discussions on major issues of biodiversity in Iraq. The first part gives an update on biodiversity status, trends, and threats and implications for human well-being. While the second part dealt with aspects of the National Biodiversity Strategy and Action Plan (NBSAP), its implementation, and the mainstreaming of biodiversity. The later and third part assessed the progress towards the 2020 Aichi Biodiversity Targets and contributions to the relevant 2015 Targets of the Millennium Development Goals. However, these major parts were further subdivided into specialized sections exhibiting variety of pictorial and numerical data.

The Ministry of Environment and the scientific community in Iraq, in general, eagerly await the official release of the Fifth National Report on Biodiversity for its paramount importance as major contribution to the issue of Biodiversity for Iraq and the world.

Project Manager,
Dr. Ali Al-Lami - MoE Technical Advisor,
April 2014

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TABLE OF CONTENT

FOREWORD BY THE MINISTER OF ENVIRONMENT OF IRAQ 3
PREFACE BY THE TECHNICAL ADVISOR OF MOEI – CBD NATIONAL FOCAL POINT 4
ACKNOLEDGMENTS 6
PREAMBLE: THE FOURTH NATIONAL BIODIVERSITY REPORT IN IRAQ 12
INTRODUCTION 15
EXECUTIVE SUMMARY 17
PART I - AN UPDATE ON BIODIVERSITY STATUS, TRENDS, AND THREATS AND IMPLICATIONS FOR HUMAN WELL-BEING 24

1. Importance of Biodiversity in Iraq 25
1.1. Main eco-regions of Iraq 27
1.1.1. Marine ecosystems 29
1.2. Agrobiodiversity 30
1.3. Biodiversity status 30
1.3.1. New information 30
1.4. Indicators and trends about biodiversity in Iraq 45
1.4.1. Indicator 1 45
NUMBER OF GLOBALLY THREATENED SPECIES (IUCN) per TERRESTRIAL HABITAT IDENTIFIED. 45
1.4.2. Indicators for threatened freshwater and marine fishes 47
1.4.3. Indicator 2 48
OCCURRENCE STATUS OF IRAQI FRESHWATER FISH 48
1.4.4. Indicator 3 49
CONSERVATION STATUS OF IRAQI FRESHWATER FISH 49
1.4.5. Indicator 4 50
ABUNDANCE OF SENSITIVE NATIVE SPECIES IN SHATT AL-ARAB DURING THE PERIOD 1982-2008 50
1.4.6. Indicator 5 52
THREAT STATUS OF MARINE FISH OF IRAQ 52
1.4.7. Indicator 6 54
BREEDING BIRDS OF IRAQ 54
1.4.8. Indicator 7 55
THE STATUS OF THE IRAQI ENDEMIC SPECIES 55

2. Major Changes Have Taken Place in the Status and Trends of Biodiversity in Iraq 57
2.1. Desertification 57
2.1.1. Indicator 8 57
TOTAL AMOUNT OF DESERTIFIED LAND AND LANDS UNDER DESERTIFICATION THREAT OF IRAQ 57
2.1.2. Indicator 9 58
DESERTIFICATION TYPES THAT AFFECT IRAQI LAND 58
2.2. Indicators of Changes in Land cover and land use 58
2.2.1. Indicator 10 59
LAND USE OF IRAQ IN 2005 59

2.2.2. Indicator 11 59
DEFORESTATION 59
2.3. Ecological footprint 60
2.3.1. Indicator 12 62
ECOLOGICAL FOOTPRINT OF IRAQ 62

3. The Main Threats to Biodiversity 64
3.1. Land Mines 64
3.1.1. Indicator 13 65
MINE FIELD SURFACE PER GOVERNORATE 65
3.1.2. Indicator 14 66
DEMINING SURFACE IN SOME GOVERNORATES 66
3.2. Hunting and Trading 66
3.3. Alien species 71
3.3.1. Alien species in terrestrial, freshwater and marine environment: 71
3.3.2. Invasive species in Shatt al Arab: 72
3.4. KBA threats assessment 72
3.4.1. Indicator 15 75
THREATS IDENTIFIED IN KBA AREAS 75

4. The Impacts of the Changes in Biodiversity for Ecosystem Services and the Socioeconomic and Cultural Implications of These Impacts 80
4.1. Soil quality 80
4.1.1. Indicator 16 81
FERTILIZER CONSUMPTION (% OF FERTILIZER PRODUCTION) 81
4.1.2. Indicator 17 82
FERTILIZER CONSUMPTION (KILOGRAMS PER HECTARE OF ARABLE LAND) 82
4.1.3. Indicator 18 83
USE OF PESTICIDES AND HERBICIDES IN IRAQ (LITER) 83
4.2. Socio economic activities 84
4.2.1. Cultural Heritage and Socio-economic activities based on natural resources 84
4.2.2. Fisheries 86
4.2.3. Indicator 17 87
ANNUAL FISH CATCH OF FRESHWATER AND MARINE RESOURCES 87
4.2.4. Livestock breeding 87
4.2.5. Indicator 18 88
IRAQ LIVESTOCK ESTIMATE 2006-2009 (MILLION HEADS) 88
4.2.6. Forestry 89

PART II - THE NATIONAL BIODIVERSITY STRATEGY AND ACTION PLAN (NBSAP), ITS IMPLEMENTATION, AND THE MAINSTREAMING OF BIODIVERSITY 90

5. The Biodiversity Targets in Iraq 91

6. Biodiversity indicators to monitor progress in the implementation of the NBSAP 96

7. Successful stories to implement the Convention in Iraq 99

8. National Biodiversity Strategy and Action Plan to incorporate Biodiversity Targets and to Mainstream Biodiversity 100

9. Actions taken to implement the CBD Convention since the 4th National Report and outcomes of these actions 111

9.1. NBSAP and related activities 111
9.1.1. Outcomes of the first steps of the NBSAP 111
9.2. National Environmental Strategy and Action Plan of Iraq (2013-2017) (NESAP) 111
9.2.1. Outcomes of the NESAP 111
9.3. GEF Project: Initial steps for the Establishment of the National Protected Areas Network 112
9.3.1. Outcomes of the initial steps for the establishment of the National Protected Areas Network 112
9.4. Draft list of proposed protected areas (under the umbrella of the PoWPA programme of the Convention) 112
9.4.1. Outcomes of the Protected Areas Draft Document 112
9.5. Legislation on PAs 112
9.6. National park declaration 113
9.7. World Heritage 114
9.7.1. The nomination file “the marshes of southern Iraq: a refuge of biodiversity and evidence of the cities of Mesopotamia civilization" 114
9.8. KBA book publication 116
9.8.1. Outcomes of the KBA inventory and its publication 116
9.9. CITES 116
9.9.1. Outcomes of the initial steps for implementing CITES in Iraq. 116
9.10. CMS 116
9.11. AEWA 117

10. Mainstreaming of Biodiversity into Relevant Sectoral and Cross-sectoral Strategies, Plans and Programmes 118

10.1. National Environmental Strategy and action plan for Iraq (2013-2017) 118
10.2. National development plan (2010-2014) 119
10.3. National Strategy on higher education 119
10.4. Poverty Reduction Strategy 119
10.5. Energy strategy: 120
10.6. The Strategy on Water and Land Resources of Iraq (SWLRI) 121

PART III - PROGRESS TOWARDS THE 2020 AICHI BIODIVERSITY TARGETS AND CONTRIBUTIONS TO THE RELEVANT 2015 TARGETS OF THE MILLENNIUM DEVELOPMENT GOALS 123

11. Progress made by Iraq towards the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets 124

11.1. The action Planning Workshop for the NBSAP 126

12. The contribution of actions to implement the CBD Convention towards the achievement of relevant 2015 Targets of the Millennium Development Goals (MDGs) in Iraq 129

13. Lessons learned in the Implementation of the CBD Convention in Iraq 130

14. Conclusions and Gap assessment 131

REFERENCES 135

ANNEX 1: INFORMATION ABOUT THE PARTY 141

ANNEX 2: PICTURES OF TYPICAL SPECIES OF MAIN ECOREGIONS/ECOSYSTEMS OF IRAQ 142

ANNEX 3: THE PROCESS OF PREPARING THE 5TH NATIONAL REPORT AND ADDITIONAL SOURCES OF INFORMATION 145

ANNEX 4: INVASIVE AND ALIEN SPECIES OF IRAQ 156

ANNEX 5: LIST OF BIODIVERSITY-RELATED PROJECTS, PLANS AND STRATEGIES 165

ANNEX 6: A NEW REFERENCE DOCUMENT FOR THE CHECKLIST OF ALGAE OF IRAQ 169

ANNEX 7: PROGRESS IN ACHIEVING THE AICHI TARGETS 170

PREAMBLE: THE FOURTH NATIONAL BIODIVERSITY REPORT IN IRAQ

In a letter to his Excellency the Minister of Environment on 27th November 2013, the Executive Secretary of CBD praised Iraq's accession to the Convention on Biological Diversity in 2009. He regarded the steps being taken by the national team to fully implement the different measures adopted by successive meetings of the Conference of the Parties, as a testimony of Iraq's commitment to protect its Biodiversity. He considered the multiple efforts made by the Ministry of Environment in Iraq on Biodiversity conservation and its sustainable use as true examples of progress being made towards the overall goals of the Strategic Plan of Biodiversity 2011-2020 and the Aichi Biodiversity Targets in Iraq.

Indeed, one of the major steps taken by the Ministry of Environment as part of Iraq's obligations as a Party to the Convention and towards implementation of its goals regarding Biodiversity protection was the timely submission to the CBD Secretariat of an important document; the - First for Iraq - (namely the Fourth) Iraqi National Report on Biodiversity. This document which was published in 2010 came out as a response to Article 26 of the Convention on Biodiversity which requires regular reporting by country members. Although Iraq was then a new party to the Convention and this was the country's first report to the Secretariat, the CBD's guidelines for the Fourth National Report were used in its preparation. The report examined the status of biodiversity within Iraq and laid the groundwork for development of a national biodiversity strategy and action plan (NBSAP) to protect the diverse and vital species and ecosystems of Iraq.

The information contained in the report was seen by many specialist and decision makers as first most collective and complete compilation ever issued regarding Biodiversity in Iraq. Despite the fact that not all of the content suggested in the guidelines for the Fourth National Report were covered, the IV National Report offered vital information and established significant baseline data. Also the report presented an elaborated initial set of indicators for biodiversity for assessing gaps in information.

Iraq is now (March 2014; time of writing up the V National Report) half way through developing its first National Biodiversity Strategy and Action Plan (NSBAP). To serve this assignment, the 4th National Report proved to be valuable source of information and provided a preliminary evaluation of priorities, so highlighting the pathway ahead to the creation of Iraq's first NBSAP.

The 4th National Report consisted of four main and one conclusive chapter.

Chapter I presented an Overview of the Biodiversity Status in Iraq which described the Biological Diversity, Ecosystems and the Importance of Species Biodiversity in Iraq. It also described the challenges and threats for Biodiversity Protection in Iraq. These included desiccation of the southern marshes in the 1990s and changes in land management of the desert and steppe regions which caused increased rate of dust storm frequency and

desertification. Other threats include climate change, invasive species, over exploitation of resources and nutrients and industrial pollution; development and oil exploration. The account also proposed initial Indicators for Status and Pressures on Biodiversity in Iraq as part of the Pressure-State-Response Model used for tracking changes over time.

In Chapter II, some general objectives and main policy goals for the Iraqi NBSAP were defined and the obstacles that need to be overcome in order to develop the Iraqi NBSAP were identified. However, it was suggested that these objectives and goals need to be shared with other stakeholders and somehow integrated into a global approach. It was clearly indicated that 81% of the globally important, ecological region “Tigris and Euphrates alluvial salt marsh” is contained within the borders of Iraq and priority will surely be given to "marshland protection and restoration". One of these most globally important activities was the creation of the Mesopotamian Marshlands National Park as a joint venture between the MOE and the Italian Ministry of Environment Land and Sea (IMELS), the Iraqi Ministry of Water Resources (MOWR), the Iraqi Ministry of Municipalities and Public Works (MOMPW), and Nature Iraq organization (NI). Another important activity was the designation of Hawizeh Marsh as a Ramsar wetland of international importance by the New Eden Group initiatives. However, considerable obstacles for implementation and challenges for future development have been also identified. These concerned stakeholders involvement, jurisdictional disputes, lack of legislation, difficulties in the legislative process, difficulty in raising awareness, funding availability, capacity building, and security constraints. It was stated that there is urgent need for global involvement and commitment in order to overcome these obstacles. Regarding the process of mainstreaming Biodiversity issues the report drew attention to the attempts to bring the biodiversity discussion into a broader institutional, private and public context. It appeared that there are still many remaining steps to take to begin the basics of mainstreaming.

The absence of biodiversity concerns in broader national policies was discussed in Chapter III. This was identified regarding poverty reduction and economic planning. It was mentioned that Biodiversity issues were addressed in a broader context only by few institutions in Iraq which again raises deep concerns about the necessity of the mainstreaming process.

For a global context of analysis, a preliminary assessment of the overall biodiversity status in Iraq was identified for each focal area of the Convention. These included Agricultural biodiversity; Dry and sub-humid lands biodiversity; Forest biodiversity; Marine and coastal biodiversity. It was clear that out of the 21 targets of the 2010 biodiversity goals, Iraq has progressed in only 5: Target 1.1 (at least 10% of each of the world's ecological regions effectively conserved); Target 1.2 (areas of particular importance to biodiversity protected); Target 6. 2 (management plans in place for major alien species that threaten ecosystems, habitats or species); Target 7.2 (reduce pollution and its impacts on biodiversity); Target 11.2 (Technology is

transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4).

It was evident from the 4th National Report and the analysis it offered that the CBD Convention was still poorly implemented in Iraq and that the first big challenge for Iraq appears to be the collection of information, stakeholder involvement and the implementation of an effective NBSAP.

INTRODUCTION

The Ministry of Environment's work plan for building the National Biodversity Strategy and Action Plan (NBSAP) project is still ongoing, and it is by now well underway and developed. The National Biodiversity Strategy and Action Plan are major parts of the totally new implementation process of the Convention on Biological Diversity for Iraq, and for which it has received funding through the GEF financial mechanism for the enabling activity project "*First NBSAP for Iraq and Development of Fifth National Report to the CBD*". Within this context, the Iraqi Ministry of Environment with the support of UNEP-ROWA and the GEF, has organized four events to gather all the stakeholders that will be involved in adopting and implementing or giving technical advice for the NBSAP. On the other hand and according to the fifth component of the project detailed plan, approved by the GEF, and to the specific guidelines issued by the CBD Secretariat, timeline was set for the country to develop and submit its Fifth National Report on Biodiversity. Proudly presented in this volume, the report is considered a milestone in the long, complex process that will hopefully in the end lead to preserving biodiversity of the country.

The Fifth National Report on Biodiversity is basically prepared by the PMU (Project Management Unit) but the information contained were extracted from original sources of scientific information and the results of numerous papers and publications issued by huge number of national and foreign authors and institutions which all dealt with biodiversity issues in general.

Issues related to biodiversity in Iraq however are so wide and complex, because of the traditional knowledge practices related to biodiversity and its utilization having a particular significance in the Iraqi context. These issues were well known since the very old times, probably more than 3000 years ago. Historical evidence documented how the Sumerian civilization described the use of many medicinal herbs, which then have been inherited by the Babylonians and Assyrians. Today the use and applications of biodiversity resources and knowledge could be even greater and more applied especially with the global assistance provided by agencies such as UNEP and GEF for enabling activities regarding biodiversity enhancements and achievements. For these reasons the Fifth National Report comes at a time during which the action plan up to 2020 is being developed and for which the Fifth Report will serve as a valuable source of information identifying and updating gaps, research needs, and relevant causes of threats.

The present Fifth National Report on Biodiversity is comprised of three major parts, concluding remarks and seven annexes:

Part one of the report presents updated information on biodiversity status, trends, and threats and implications for human well-being. It emphasized the Importance of Biodiversity in Iraq, the major changes that have taken place regarding the status and trends of biodiversity in Iraq. It also refers to the main threats to biodiversity and the

Impacts of the changes in biodiversity for ecosystem services and the socio-economic and cultural implications of these impacts.

In part two the National Biodiversity Strategy and Action Plan (NBSAP), its implementation, and mainstreaming of biodiversity are discussed. This includes the biodiversity targets in Iraq, biodiversity indicators to monitor progress in the implementation of the NBSAP which are highlighted and discussed. Also, the actions taken to implement the CBD Convention since the 4th National Report are explored together with the outcomes of these actions, the mainstreaming of biodiversity into relevant sectors and cross-sectoral strategies, plans and programmes.

Part three describes the progress made towards the 2020 Aichi Biodiversity Targets and the contributions to the relevant 2015 Targets of the Millennium Development Goals. This part includes progress made by Iraq towards the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets, the contribution of actions to implement the CBD Convention towards the achievement of relevant 2015 targets of the Millennium Development Goals (MDGs) in Iraq, and a short view about the lessons learned in the implementation of the CBD Convention in Iraq. This Chapter/section further presents a gap assessment towards the Strategic Plan of the Convention and the achievement of the Aichi Targets with a list of suggestions and requirements for the coming period.

Additional information were included in the seven annexes attached to the report and in particular: information about the Party, pictures of relevant species and ecosystems of Iraq; the process of preparing the 5th National Report and additional sources of information, invasive and alien species of Iraq, list of biodiversity-related projects, plans and strategies, a lists of Algae and Fungi in Iraq, and the Progress in Achieving the Aichi biodiversity Targets.

EXECUTIVE SUMMARY

The conservation of biodiversity in Iraq is becoming an important national issue. Natural resources must be preserved from being depleted; as this in turn will affect the ecological, economical, cultural, and social aspects of people's life. The centerpiece of the natural resource wealth of Iraq is the highly diverse and sometimes unique habitats and species.

Biodiversity provides many important services to the nation. Foremost provision is that of food resources, materials for rural buildings, and also raw materials for industrial activities and pharmaceutical products. Other important services provided by biodiversity for national as well as global benefits are climate change and desertification mitigation and carbon sequestration.

Biodiversity is also an essential component of human well-being in Iraq with a particular reference to the tribal communities where biodiversity plays a role in the ethical, religious and social values.

As a matter of fact, however, the flora and fauna of Iraq are experiencing sharp decline from the levels that existed even a few decades ago because of various reasons, that will be further mentioned and explored in the below paragraphs.

The importance of preserving the Iraqi natural habitats stretches beyond the national boundaries and reaches the global dimension.

As a result of an Iraqi Ministry of Environment initiative with the logistical and financial support of GEF and UNEP, the enabling activity project "First NBSAP for Iraq and Development of Fifth National Report to the CBD" has been initiated as of November 2012. The process of drafting the Strategy is on-going, and has so far succeeded, In particular, in stakeholders' involvement with biodiversity issues. This has been achieved by a number of workshops and meetings that have been organized under Step 3 of the cyclical process of building/updating the NBSAP. The consultation meetings have led to the identification of the Iraqi national priorities and targets concerning biodiversity.

Iraq has set its national targets, within the framework of the Aichi Biodiversity strategic Goals and Targets:

<u>Iraqi Target 1:</u>

By 2020, 25% of urban and rural people have awareness of the status of biodiversity, its benefits for people, the pressures that affect it, and the actions they can take for its conservation and sustainable use (*Aichi Target 1, Goal A*).

<u>Iraqi Target 2</u>

By 2020, 50% of policy makers and planners have awareness of the status of biodiversity, its benefits for people, the pressures that affect it, and the actions they can take for its conservation and sustainable use (*Aichi Target 1, Goal A*).

<u>Iraqi Target 3</u>

By the end of 2015 a national survey of tools used for public awareness of biodiversity is completed (*Aichi Target 1, Goal A*).

Iraqi Target 4

By 2020 the use of tools (films, publications, educational programmes, guidance materials, and training) for raising awareness of biodiversity is improved with locally defined, area based and targeted awareness programs (e.g. governorate level) (*Aichi Target 1, Goal A*).

Iraqi Target 5

By the end of 2020 a GIS database of the extent, condition (i.e. healthy or degraded) and protection status of the natural (not altered by human intervention), semi-natural and human modified habitats of Iraq has been developed *(Aichi Target 5, Goal B).*

Iraqi Target 6

By the end of 2020 the reasons for loss and degradation (i.e. the species that used to be present in that habitat are not there anymore, and the services that the people expected or used are reduced or absent) of each of the natural (not altered by human intervention), semi-natural and human modified habitats of Iraq have been identified to inform conservation actions. (*Aichi Target 5, Goal B).*

Iraqi Target 7

By the end of 2015 the main pressures on forest ecosystems are identified and studied *(Aichi Target 5, Goal B).*

Iraqi Target 8

By the end of 2020 legislation to address the main pressures on forest ecosystems and native forest species is issued, promoting sustainable management, restoration and conservation. *(Aichi Target 5, Goal B).*

Iraqi Target 9

By the end of 2020, about 1,000 square km of desertified shrub land and grassland is restored *(Aichi Target 5, Goal B).*

Iraqi Target 10

By end of 2016 a national monitoring programme is established for identification of the main sources and diffusion paths of chemical and physical pollutants in the natural ecosystems and the effects of pollution on natural ecosystems *(Aichi Target 8, Goal B).*

Iraqi Target 11

By the end of 2018 environmental standards are issued and enforced for prevention and control of priority pollutants in the natural ecosystems (not altered by human intervention). *(Aichi Target 8, Goal B).*

Iraqi Target 12

By the end of 2014 a decree is issued for the establishment of protected areas in Iraq (*Aichi Target 11, Goal C).*

Iraqi Target 13

By the end of 2014 at least three training workshops on PA management have been conducted (*Aichi Target 11, Goal C).*

Iraqi Target 14

By the end of 2015 a study and GIS maps of the most sensitive habitats (i.e. under high level of threats and containing high numbers

of globally threatened species) have been developed. (*Aichi Target 11, Goal C).*

Iraqi Target 15

15. By the end of 2020 ten new Protected Areas have been gazetted and established (*Aichi Target 11, Goal C).*

Iraqi Target 16

By the end of 2016 a national assessment is published of the state of provisioning, regulating and cultural services supplied by natural ecosystems and their importance for rural and urban people and on management options to be developed for the sustainable supply of ecosystem services *(Aichi Target 14, Goal D).*

Iraqi Target 17

By the end of 2018 a national strategy/subnational strategies are established for the sustainable management of ecosystems to supply important ecosystem services for rural and urban people *(Aichi Target 14, Goal D).*

Iraqi Target 18

By the end of 2016 legislation is enacted to control the introduction and diffusion of non-native species into the natural environment (*Aichi Target 9, Goal B)*.

Iraqi Target 19

By the end of 2020 the list of invasive species of Iraq and their impacts and invasion pathways has been published. (*Aichi Target 9, Goal B)*.

Iraqi Target 20

By the end of 2020 the list of threatened species of Iraq has been published and an action plan for the conservation of priority species is produced (*Target 12, Goal C).*

Iraqi Target 21

By 2020 legislation for the conservation of threatened species is issued and enforced (*Target 12, Goal C).*

Iraqi Target 22

By the end of 2020 a survey of indigenous and local communities' traditional knowledge, use and practices relevant for the conservation and sustainable use of biodiversity is published. (*Aichi Target 18, Goal E).*

Iraqi Target 23

By 2016 a Resource Mobilization Plan for implementation of the NBSAP is established and implemented (*Aichi Target 20, Goal E).*

Iraq has no previous NBSAP in place, and no previous experience in its development under global guidelines. However, the National Environmental Strategy and Action Plan of Iraq (2013-2017) (NESAP) has been issued in June 2013 by the Iraqi Ministry of Environment with the support of UNEP and UNDP. The document addresses all environmental issues and concerns in Iraq and provides for actions and objectives within the time frame set.

Many issues raised in the NESAP are cross-cutting and addressing biodiversity concerns and issues that will be covered and developed also in the NBSAP of Iraq.

10 strategic objectives have been set in the strategy; for each of them various indicators and projects have been defined. The strategy has been spread and divulgated at all institutional levels and some of the projects identified are on-going.

The year 2010 was an important year for Iraq; in this year the first Report about the status and the future perspectives on biodiversity of the country was produced. The issuance of this report, initiated the process of reporting and complying with the obligations of the Convention that is on-going and working.

The process of spreading biodiversity messages and background among people and policy makers in Iraq is very difficult and complex, due to a serious lack of environmental awareness at all levels. However, and considering the major lack of: awareness, financial resources, security, coordination and cooperation among institutions, significant progress has been achieved by Iraq in the last 4 years towards major issues of the CBD Convention.

For biodiversity to become a top priority nationally, its relevance to livelihoods, poverty and national development needs to be highlighted. On the national level, Iraq can accomplish this through incorporating biodiversity-relevant issues into all the national strategies that have or might have cross-cutting issues with biodiversity, such as: the National Environmental Strategy and action plan for Iraq (2013-2017), the National development plan (2010-2014), the Higher education strategy, the Poverty Reduction Strategy, the Health Strategy, the Energy Strategy(INES), the Water and Land Resources Strategy (SWRLI), that might contribute in supporting and improving the quality of life and biodiversity as well as ecosystems protection and restoration.

The NESAP cross cuts the Biodiversity strategy in a number of issues; in protecting and improving water quality; control of land degradation and combating desertification; maintain marine and coastal environment; protection and sustainable use of biodiversity; reduction of oil pollution, radioactive contamination and integrated management of hazardous chemicals.

The National development plan (2010-2014) strategy cross-cuts biodiversity issues in the following points: agriculture and water resources; poverty alleviation and the national efforts to achieve the millennium development goals.

The National Strategy on higher education refers to 'sustainable development in Iraq', with a view to develop the capacity of scientific community in this field.

The biodiversity-poverty relationship is complex; it is a multi-domain (ecological, social and economic), multi-scale and multi-actor issue. In its Goal 7 of the millennium development goals (MDGs), a target to “reverse the loss of environmental resources” is included.

The Integrated National Energy Strategy for 2013-2030 (INES) was adopted by the Iraqi Council of Ministers in April 2013. Its vision is to “*develop the Energy Sector in a coherent, sustainable and environment-friendly manner*

to meet domestic needs, foster the growth of a diversified national economy, improve the standards of living of Iraqi citizens, create employment, and position Iraq as a major player in the regional and global energy markets". In the INES there is no specific outline of biodiversity conservation objectives, but the importance of environmental sustainability is clearly acknowledged in the outline of strategic objectives and development of the INES Plan.

The objective of The Strategy on Water and Land Resources of Iraq (SWLRI) project (started in 2010) is to define the strategy and the related investment plan that will guide the sustainable management and development of the water and land resources of Iraq for the next twenty-five years.

As of December 2013, the SWRLI project has entered the strategic planning phase. This phase basically entails two different components: the definition of the strategic guidelines for the sectors involved in the national water resources master plan (the strategic guidelines of some of the key sectors are being discussed and shared with the Iraqi decision makers and stakeholders in a number of high level meetings) and the implementation of different planning scenarios to define the opportunities, prioritization and the related investment plan.

The key sectors, for which the SWLRI national water resources master plan will provide the strategic guidelines, are many among those are the management of environmentally sensitive areas including the unique Mesopotamian marshes, the marshland restoration, water and environmental policies, the desertification issue and the rangelands management.

Though the Iraqi membership in the Convention on Biological Diversity is relatively recent (2009), within the framework of the Strategic Plan 2010-2020 and the Aichi Targets some actions and important achievements have been already achieved or initiated, these included:

- under (Aichi Target 1) awareness raising activities such as media conferences and communications, workshops, bilateral meetings, with various institutional bodies involved in biodiversity issues;
- under (Aichi Target 2) a poverty reduction Strategy has been produced and approved in Iraq which recognized the relationship between poverty and biodiversity as a mean to alleviate problems and economic difficulties especially of rural areas populations;
- under (Aichi Target 11) the establishment and wise management of protected areas by the issuance of national legislation on protected areas; the establishment of the first National Park of Iraq (the Mesopotamia marshland National Park); the starting up of a GEF funded project to establish the National Network of Protected Areas and other protected areas related awareness activities;
- under (Aichi Target 17) the drafting and bringing up to the attention of

high level institutional bodies for information and subsequent approval of the National Biodiversity Strategy and Action Plan of Iraq;

- under (Aichi Target 1; Target 19) various initiatives, research, trainings, projects from various national and international bodies (universities, research institutions, NGOs, joint ventures, private companies, and cooperation mechanisms) are contributing to gain insight into specific themes and issues concerning the environment and biodiversity. The results of these studies and researches, with the aid of the web, various on-line datasets, and the international platforms made available by the CBD and the BIP Partnership, and efforts of the Ministry of Environment, are becoming more widespread and known to the national and international community.

Within the framework of the Millennium Development Goals (MDGs) in Iraq, the Ministry of Planning with support of UNDP has produced a recent (2013) update of the country progress towards the achievement of the MDGs with target year 2015. The main issues that are cross-cutting biodiversity themes are related to Goal 1 *"eradicate extreme hunger and poverty*" and to Goal 7 "*ensure environmental sustainability"*.

Biodiversity can clearly contribute to alleviate or eradicate poverty, especially in rural areas, by supporting with fundamental ecosystem functions and services, the needs of food, plants and genetic material that can be of particular relevance to local rural population and that can consistently contribute to supply the basic livelihoods. The launching of the rural economies based on the sustainable use of natural resources is maybe present in Iraq as some sporadic experiments. Iraqi Target 17 (sustainable management of ecosystems) and 22 (traditional knowledge) are combining two essential elements that can, in the medium-long term partially contribute to the poverty alleviation in rural areas, thereby using the traditional knowledge of local tribes and ethnic groups to sustainably manage natural ecosystems and to receive from them all the necessary livelihoods.

With reference to Goal 7 of the MDGs this is related with water quality and the improvement of water sources and their accessibility to population. This goal cross-cut the already mentioned SWLRI Strategy for Iraq that is on-going and that will provide a comprehensive plan for water resource management nationally. As biodiversity is concerned of course this important issue will also have its direct consequences on the aquatic ecosystems (rivers, marshlands, marine environment) thereby improving possibly the overall quality of waters. On the other hand also the terrestrial ecosystems will be affected by the strategic actions and establishments of the SWRLI Strategy by, for instance providing for the irrigation schemes that would turn natural habitats into agricultural land.

The implementation of the CBD Convention in Iraq is just started. The application of the global guidelines of the Secretariat has shed

light on the various aspects of building a strategy. However, this process served as an important lesson that can be very useful for future biodiversity actions. In particular, the recent consultations that have been carried out by the Ministry of Environment for the preparation of the NBSAP and for the national target setting were seen as very useful practices aiming at involving all stakeholders.

Iraq has been for a long time isolated from any international exchange and communication, various wars and the following difficult periods that are still on-going, are making it very hard and difficult to build a functioning communication network that will involve and reach all concerned stakeholders in a certain issues.

Within this difficult context the consultation meetings that have been organized by the MoEI involving and bringing together different actors of the biodiversity world (from the high level institutional bodies, to the NGOs and the representatives of local communities) have proved to be a great success.

The exchange and face-to face discussion has provided therefore both an opportunity of learning and getting to know new things and also the perfect occasion to spread awareness about biodiversity among crucial stakeholders for policy planning and mainstreaming issues.

As a matter of fact, also the capacity of Iraqi staff is increasing and very good progress have been made in a number of subjects, one of the main being biodiversity. Through the capacity and financial support of UNEP, GEF and the CBD Secretariat, among the others, the Ministry of Environment is currently improving and building the capacity of its staff in many biodiversity-related fields, in order to be able in the short-term time horizon to completely fulfill its many and new obligations under all the MEAs to which the country is signatory.

Part I - An update on biodiversity status, trends, and threats and implications for human well-being

1. Importance of Biodiversity in Iraq

According to the definition of the Convention on Biological diversity, the word 'biodiversity' refers to “the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems”. Diversity is a concept which refers to the range of variation or differences among some set of entities; biological diversity thus refers to variety within the living world, including cultural heritage, traditions and historic values of human societies. The term 'biodiversity' is indeed commonly used to describe the number, variety and variability of living organisms. This very broad usage, embracing many different parameters, is essentially a synonym of 'Life on Earth'.

It has become a widespread practice to define biodiversity in terms of genes, species and ecosystems, corresponding to three fundamental and hierarchically-related levels of biological organization. Discussion of global biodiversity is typically presented in terms of global numbers of species in different taxonomic groups.

The conservation of biodiversity in Iraq is an important national issue to preserve the natural resources from being depleted; this in turn will affect the ecological, economical, cultural, and social aspects of people’s life.

Biodiversity provides many service including food resources (fruits and vegetables crops, cattle, fishes and other freshwater and seafood resources), materials for rural house building as in the marshland areas of southern Iraq, and also raw materials for industrial activities such as timber, medicinal plants for pharmaceutical products, fuel for energy and genetic material for a variety of purposes. Other services provided by biodiversity important at the national as well as at the global level are climate change and desertification mitigation and carbon sequestration.

Tough comprehensive and documented evidence is missing; in Iraq both flora and fauna are experiencing a sharp decline from the levels that existed even a few decades ago. This degradation of Iraq’s biodiversity is due to a number of factors, including reduced flow and availability of surface water that comes to the country through neighbouring nations. While this water reduction may be to some extent due to climate change and drought conditions, it is clear that the main factor in the reduction of water entering Iraq from Turkey, Iran and Syria is due to water projects and dams built in these countries, in addition to national irrigation schemes and water diversion projects.

Other factors that have led to the deterioration of freshwater environments and to the species decline are the lack of domestic and industrial wastewater treatment, or the lack of rules regulating in-stream gravel mining which can have adverse effects on water quality, biodiversity and aquifers, and also the wide, unregulated use of poisons and pesticides in fishing and farming. All these factors have affected the habitat of many species like fishes and other fresh water

animals and plants and have also led to the disturbance and possibly of a decline in the migratory water bird species which used to rely on these areas at some crucial points of their lifecycle. The importance of preserving these habitats stretches therefore beyond the national boundaries and reaches the global dimension.

Biodiversity is also an essential component of human well-being. In particular some cultural groups are intimately tied to their environment; as several tribes or ethnic groups are or were founded on an ecological intimacy with biodiversity. Biodiversity plays a role in the ethical, religious and social values of society. The marshes Arabs of Iraq have their own social and agricultural system dependent on their wetland home. Iraq is also traditionally known for its vast wealth of date palm trees so widely spread, especially in the southern parts of the country accounting for one of the most valued food item and for the magnificent variety of its dates.

In Iraq the traditional knowledge related with biodiversity and its utilization has a particular significance in terms of the medicinal herbs and plants that have been used in our country since the very old times, due to the Sumerian civilization more than 3000 years ago. This is documented in the Sumerian clay tablets that describe the use of many medicinal herbs which then have been inherited by the Babylonians and Assyrians, during which times medicine flourished and the Babylonians doctors were requested by Egyptians to cure the rich people.

Many skilful scientists have left medical books dealing with medicinal plants and herbs; one of them being Ibn Al-Bitar (mid of the 12th century), author of a manuscript in which he described 1400 drugs and herbs and their uses and benefits for human health (Al-Rawi and Chakravarty, 2013).

In particular the manuscript contains old recipes for herbs mixture still used till our present day such as Balangu Seeds *(Lallemantia royleana)* used as kidney disinfectant and for the treatment of back pain, and the bitter Apple (*Citrullus colocynthis)*, whose seeds and fruit are used for the treatment of rheumatism and for regulating sugar level in blood (Al-Bayaty, 2011).

Figure 1: Two sample pages from Ibn Al. Baytar manuscript

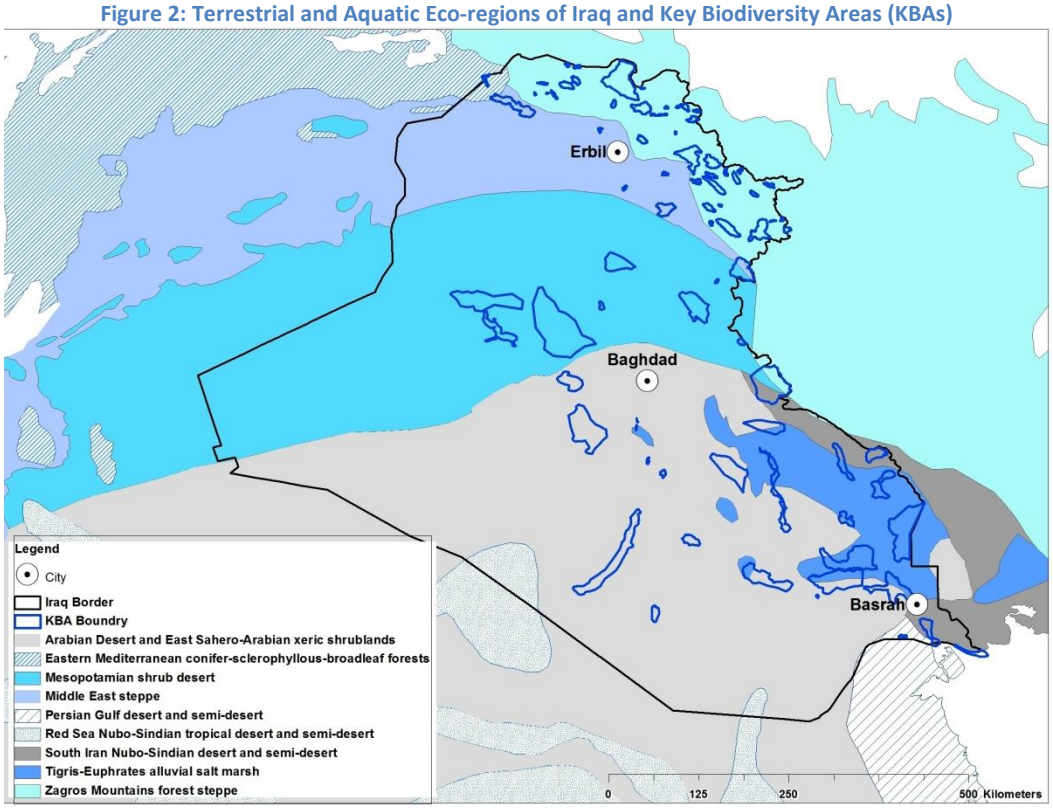
Source: Suleymaniye Library, Ayasofya, MS 3748. Read: Nil Sari

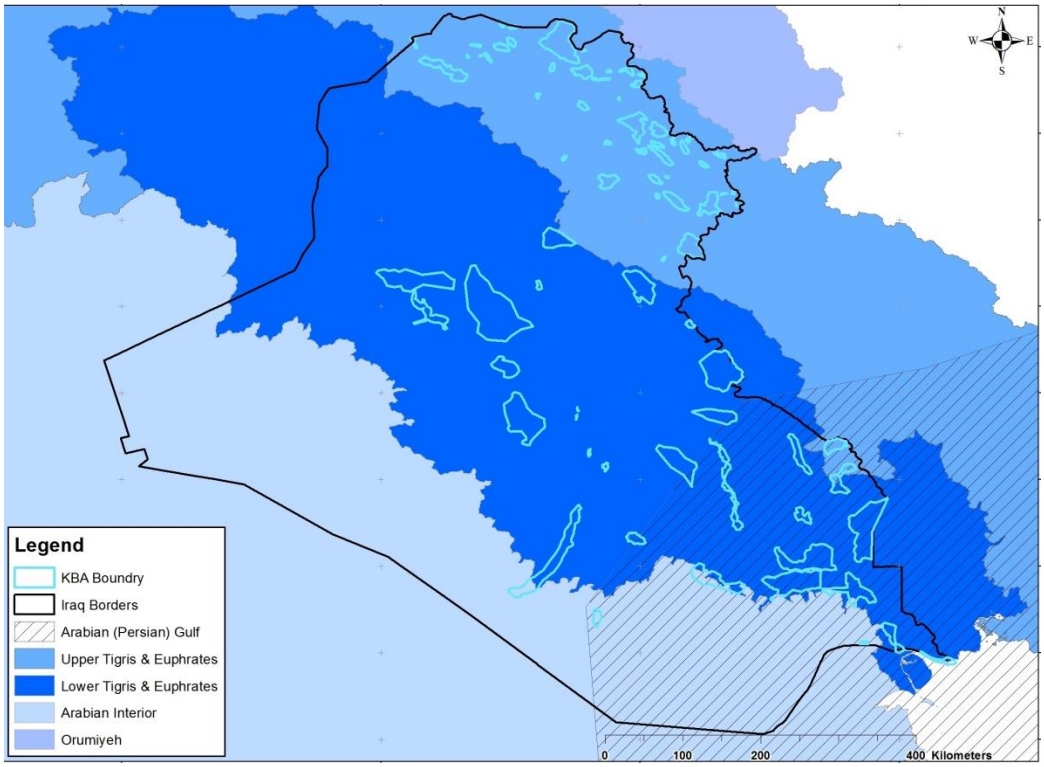
1.1. Main eco-regions of Iraq

Based on the relatively intensive surveys and research, in addition to the existing data on the local and global climate, it became possible to draw the map of the ecoregions of Iraq (Figure 2). According to this map, 11 different ecoregion were defined in Iraq, of which some are the "key ecoregions" that cover the majority of the country. The main ecoregions of Iraq have already been described in the 4th National Report; for this reason only updates, recent findings, species discovery and/or pictures of key species of the various regions will be provided in the following and as Annex. Minor eco-regions of Iraq (because of the area they cover in the country) such as the Arabian Gulf eco-region will be shortly addressed.

The maps below are showing the terrestrial and aquatic ecoregions of Iraq and the delineated Key Biodiversity Areas (KBAs) based on the Inventory of the KBAs of Iraq developed by the Ministry of Environment and Nature Iraq organization.

Figure 2: Terrestrial and Aquatic Eco-regions of Iraq and Key Biodiversity Areas (KBAs)





Source: WWF and Nature Iraq

1.1.1. *Marine ecosystems*

The Arabian Gulf Ecoregion, also known as the ROPME Sea Area, is surrounded by Iran to the north and east, the Arabian Peninsula to the south and west, and Iraq and Kuwait to the northwest where the waters of the Shatt Al Arab and Shatt Al Basrah/Khor Az Zubayr discharge into the Arabian Gulf. These waters represent some of the most important freshwater influences to the Arabian Gulf. Iraq has approximately 105 km of coastline and 716 km^2 of territorial seas (Earth Trends Country Profile, 2003). The waters of the Arabian Gulf are high in salts due to high temperatures, low precipitations, and high evaporation. The Arabian Gulf floor is flat and made up of mostly soft sediments. Water quality in the Arabian Gulf has suffered as water quality in the feeding rivers has declined, particularly suffering from increased sedimentation from the drainage of the Iraqi marshlands in the 1990s. Coral reefs in the region, that were recently discovered, are under threat, and fisheries in the Arabian Gulf underwent a major decline that happened in coincidence with the drainage of the marshlands of southern Iraq.

Several marine, endangered, and threatened turtle species have been reported in Iraqi marine waters, such as: the Loggerhead Sea Turtle (*Caretta caretta*); Green Turtle (*Chelonia mydas*); Hawksbill Turtle sub-species (*Eretmochelys imbricata bissa*); Olive Ridley (*Lepidochelys olivacea*); and Leatherback Sea Turtle sub-species (*Dermochelys coriacea schlegelii*). Two sea snakes are also reported: Beaked sea snake/Hook-nosed sea snake (*Enhydrina schistosa)* and Graceful Small-headed Sea Snake/Slender Sea Snake (*Microcephalophis gracilis*). Several marine fish that utilize the freshwater ecoregion of Iraq have already been mentioned above: Bull Shark (*Carcharhinus leucas*); Hilsa shad (*Tenualosa ilisha*); and Yellow-finned seabream (*Acanthopagrus latus*). But there are also other important marine species that occur in the marine waters in and near Iraq such as the Silver Pomfret (Zobaidy) (*Pampus argenteus).* Marine birds that are using the coastal flats and marine waters of Iraq include: Crab-Plover (*Dromas ardeola*) and Western Reef Heron (*Egretta gularis)*.

Figure 3: Western Reef Heron – A bird related to marine, tidal, and sub-tidal habitats

Source: Mudhafar Salim

1.2. Agrobiodiversity

"Agricultural biodiversity is a broad term that includes all components of biological diversity of relevance to food and agriculture, and all components of biological diversity that constitute the agricultural ecosystems, also named agro-ecosystems: the variety and variability of animals, plants and micro-organisms, at the genetic, species and ecosystem levels, which are necessary to sustain key functions of the agro-ecosystem, its structure and processes (COP decision V/5, appendix)".

Agriculture biodiversity has an important role in human well being since centuries by providing food and the basic for livelihoods. Iraq depends on the national crops for providing food for the population and fodder for animals and to this purpose the conservation and improvement of the wild native crops plays an essential role. Besides the usual crop productions such as wheat, rice and vegetables, Iraq may be considered "the date palm country", apart from the northern part of the country, date palm trees used to grow everywhere. The date palm trees are concentrated in Basrah governorate were considered the largest date palm forest in the world. It was estimated that the number of date palm trees in this governorate exceeded 13 million and that they covered an area over 50 000 hectares (Jaradat 2003). Today and as a consequence of war and other causes these figures appear to be consistently reduced. However, FAO put Iraq sixth in the top 20 date palm producers list in 2011 with 619000 metric ton/year.

Date palm trees are know and cultivated in Iraq since very old times. The importance of date palm plantations to agro-biodiversity lies in the conservation and improvement of the many local races and cultivars that were historically used and selected in Iraq and the conservation of this important and unique genetic materials; also date palms are the essential vegetation element for oasis ecosystems, providing livelihoods for locals, barriers to sand storms and possibly the only desert tree that can be used for plantations in areas threatened with desertification.

1.3. Biodiversity status

The biodiversity status will be assessed by referring to information present at eco-region level; by updating the available information with additional information obtained since the fourth national report; by using data collected from KBA program and specific target studies on some priority species for biodiversity conservation.

1.3.1. *New information*

Comprehensive assessment of all Iraqi biodiversity components is still missing. However some progress has been achieved since the Fourth National Report has been published. To the general information at eco-region level some insight research on specific ecosystems and species has been added up.

Thanks to various projects carried out by various national and international institutions and to a better communication and organizational structure of the Ministry of Environment some reports, researches and scientific articles that covered various issues

on biodiversity have become known and have been spread among relevant stakeholders.

In particular some interesting information has been collected for the following ecosystems:

- Forest habitat of Kurdistan/ North of Iraq
- Steppe habitat of central Iraq
- Desert sandy habitat of central and southern Iraq
- Freshwater environment
- Marshlands of southern Iraq
- Marine environment

The information of these features is presented below as info-boxes.

HABITAT TYPE
FOREST HABITAT OF KURDISTAN/ NORTH OF IRAQ
WILD PEAR TREE: PYRUS PYRASTER

This tree species typical of temperate-fresh climate zones of central Europe, can reach up altitudes of 1400 m in southern regions.
It is important for providing the original genetic material for all cultivated races of pear-tree.
Wild specimens of this tree are quite uncommon if not rare.
The research was a taxonomic study for the species *Pyrus pyraster* that belong to the subfamily *Pomoideae* from the family *Rosaceae* which is growing widely in Iraqi Kurdistan. A wide field survey for the districts of Iraqi Kurdistan was done including Sulaymaniyah, Amadiyah, Erbil, and Rowanduz. The species *Pyrus pyraster L.*was recorded for the first time in Iraq from Iraqi Kurdistan. (Abdul- Razaq, 2013).

Pyrus pyraster flowers

Pyrus pyraster fruits

HABITAT TYPE

FOREST HABITAT OF KURDISTAN/ NORTH OF IRAQ

RAT SNAKE: ZAMENIS HOHENACKERI

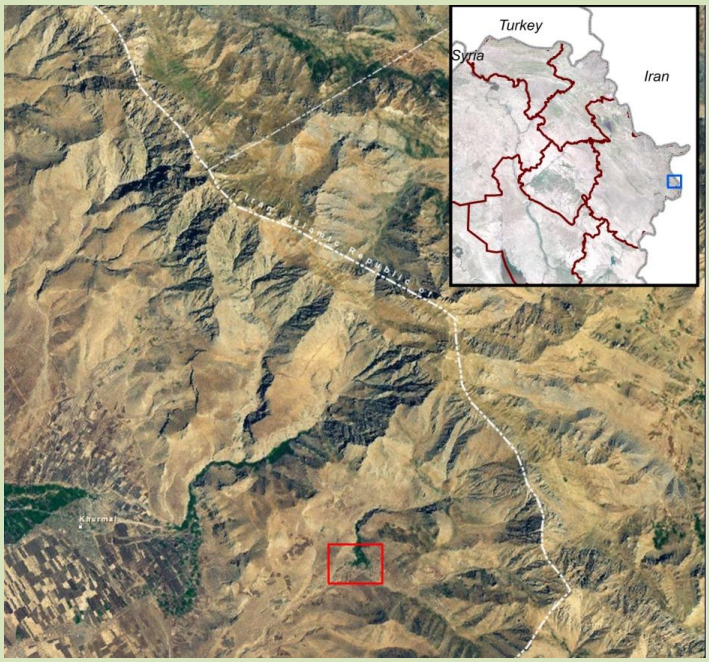
The Rat Snake, *Zamenis hohenackeri* (Strauch, 1873),was found at the foot of Hawraman Mountain and at Erbil in Iraqi Kurdistan, which represents the first country record. The Racer subspecies Platyceps rhodorachis ladacensis was recorded for the first time in Iraq and the Montpellier Snake, Malpolon insignitus was found with a rare colour pattern. (Afrasiab and Mohamad, 2011).

Zamenis hohenackeri RAT SNAKE

HABITAT TYPE
Forest habitat of Kurdistan/ North of Iraq
CHUKAR PARTRIDGE: ALECTORIS CHUKAR

Chukar partridge *Alectoris chukar* (Gray, 1830) is the only species of the 46 species of the genus *Alectoris* to be found in Iraq. There are at least 14 known sub-species, two of them were known to be found in Iraq, *Alectoris chukar Kurdestanica* from Alpine bio-geographical zone of altitude more than 2000 m high, and *Alectoris chukar werae*, from the foothills of altitude not more than 400m. In between these two regions, there is another biogeographical region known as the Irano-turanian zone 400-2000m high. In this region and in particular in the Sulaimaniyah province (Hawraman mountain) at the border with Iran, a new subspecies of Alectoris Chkar was discovered: *Alectoris chukar asoica*. The new subspecies differs from *A.c. Kurdestanica* and *A.c. werae* in voice, migration behavior, chick coloration, egg size and certain aspects of ecology. The taxonomic status of the new subspecies *A. c. asoica* has been discussed according to the most common and widely accepted species concept, biological species concept (BSC) and phylogenetic species concept (PSC). (Lahony and Al-Rawy, 2010).

Alectoris chukar kurdestanica



Location where the new subspecies of Chukar Partridge was discovered, at the border with Iran

HABITAT TYPE

FOREST HABITAT OF KURDISTAN/ NORTH OF IRAQ

KURDISTAN NEWT (NEURERGUS MICROSPILOTUS) AND LAKE URMIA NEWT (NEURERGUS CROCATUS): NEW EVIDENCE OF RANGE DISTRIBUTION

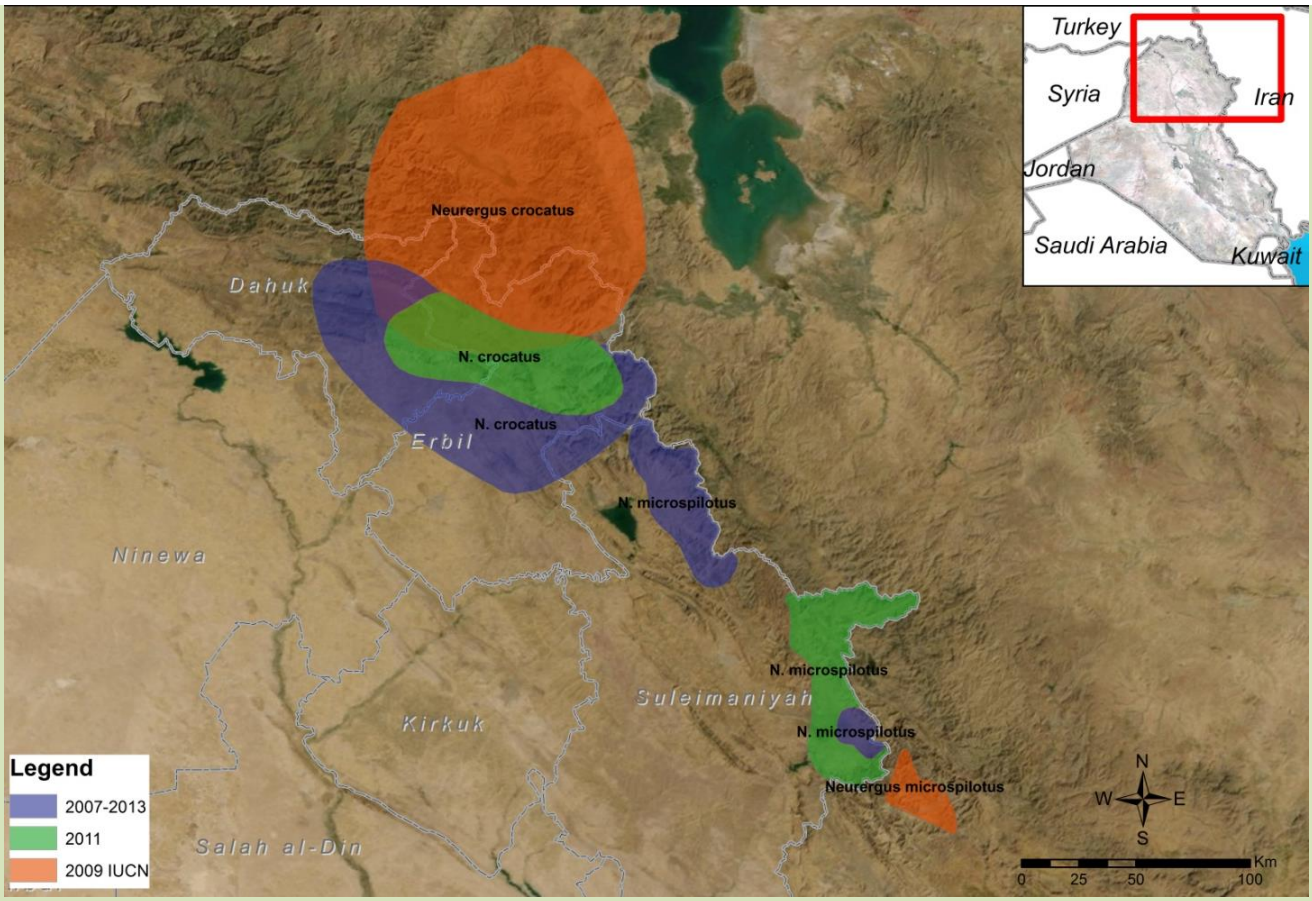
Amphibians are very important species and they contribute to enhance the natural systems and human life in countless ways. They provide vital biomedicines, they provide for an essential step way in the food web, both by predating insects and contributing also to pest control and by providing themselves food for many vertebrate species.

Amphibians' thin skins help them drink and breathe, but also make them particularly susceptible to environmental contaminants, particularly agricultural, industrial, and pharmaceutical chemicals. For this reason, they are frequently used as environmental indicators (for wetland environments), since they are particularly sensitive to habitat fragmentation and modification, to pollution and to other factors causing their decline, as shown in Table.

Newts and salamanders belong to the order *Caudata* of the Amphibian class; as such they are also important bio-indicators linked to wetland and stream environments.

In Iraqi Kurdistan and Iran, in the range of the Zagros Mountains, two very important newt species of the genus *Neurergus* are to be found: the critically endangered Kurdistan newt (*Neurergus microspilotus)* and the vulnerable Lake Urmia newt (*Neurergus crocatus)*.

Surveys in the Kurdistan region of northeastern Iraq from 2007 to 2013 resulted in the discovery of *N. microspilotus* at seven new localities distributed in the Zagros Mountain of Sulaymaniya Province. The new locations provide a major range extension of *N. microspilotus*, also in comparison with the IUCN records of the amphibians' database of 2009. In addition, four new localities of *N. crocatus* were identified between 2007 and 2013. (Al-Sheikhly *et al.*, 2013), which also provide range extension for the IUCN distribution of the species as shown in the following map.



Range extension for the two newt species: Kurdistan newt and Lake Urmia newt

Factors		Effect
Changes in Physical Environment	UV-B radiation	UV-B damages DNA and/or kills cells, causing egg mortality, lesions, and increased susceptibility to disease and low pH.
	Climate change	The changes in the climate (due to global warming) can lead to decreased depth of pond water and increased intensity of UV-B radiation. This ultimately reduces the immune system of amphibians. Hence they will be more prone to diseases.
	Acid precipitation and soil	Toxins create barriers to dispersal and cause high egg and larval mortality.
	Pesticide, Fertilizer and Chemical contamination	Toxins cause direct mortality of eggs and adults, mimic endocrine hormones, reduce the prey
Changes in Biological Environment	Habitat modification, fragmentation	Deforestation and agriculture; wetlands are drained and filled. Roads, introduced species, and low pH dissect habitats, creating barriers to dispersal.
	Introduced species	Introduced predators, prey on/or compete with native amphibians.
	Disease	Disease often causes death in amphibians; what made amphibians susceptible to disease is often unknown.
	Biological interaction	Uphill migration of birds and lizards with rise in cloud cover elevation

Source: http://ces.iisc.ernet.in/biodiversity/amphibians/ecological.htm

HABITAT TYPE

DESERT SANDY HABITAT OF CENTRAL AND SOUTHERN IRAQ

SAND CAT: FELIS MARGARITA

The iraqi natural history museum, together with the university of baghdad and green university of al-qassim, babylon province, has provided a first record of sand cat (*felis margarita)* from iraq. Two males and a female were found on january and november 2012, a living male and female from a desert area situated to the west of al-najaf city. Additionally a stuffed male collected in roughly the same area, in the al-jufaira oasis of the al-najaf desert, was also provided to the researchers. The collection sites are dominated by sandy soils and dunes with some compact inter-dune soil and widely distributed shrubs. No other records from iraq have been registered so far. The species is listed by iucn (2013) as "Near Threatened".

According to interviews with bedouins in the general area from which the sand cats were originally captured, they are rarely seen in the al najaf desert. As sand cats are known to favor sandy desert areas, their presence is expected in the western and southern desert districts west of the euphrates river to the borders with jordan, kuwait, saudi arabia and syria. The al-najaf desert area where the sand cats were collected is prone to environmental pressure such as degradation of desert ecosystems by human settlement and activity, competition for food through introduction of dogs and cats, and through predation and disease transmission. These constitute direct conservation problems for the sand cat and for its declining small mammal prey base. (Mohammed, Lahoney and Al-Rammahi, 2013).

Sand Cat in natural environment

Captured Sand Cat in January-November 2012

Stuffed male Sand Cat

HABITAT TYPE

FRESHWATER ENVIRONMENT

IRAQI ENDEMIC CAVE FISH: TYPHLOGARRA WIDDOWSONI AND CAECOCYPRIS BASIMI

The Sheik Hadid Shrine is a sinkhole near Haditha town, located on the western bank of the Euphrates River in Anbar province. This place holds two endemic species of troglomorphic cyprinids, Typhlogarra widdowsoni and Caecocypris basimi. The Leibniz Institute of Freshwater Ecology and Inland Fisheries in Berlin and the Department of Biology at the University of Baghdad have conducted a short field survey to determine (for the first time in 30 years) the status of these two species in Anbar province. At this locality only Typhlogarra exist, according to recent observations and those of local informants. No specimens from the endemic genus Caecocypris have been seen recently. Furthermore, Typhlogarra are now quite rare. They had previously been very abundant in the sinkhole based on the last survey of 30 years ago. From the inaccessibility of the subterranean environment it is difficult to determine absolute population numbers; and whether or not both species are still present in other places in the underground karsts system. Nonetheless, the situation is clearly far worse than that reported earlier. On the basis of available information, both species must now be categorized as Critically Endangered on the IUCN Red List. (Al-Sheikhly and Freyhof, 2013).

The Iraqi Blind Barb Typhlogarra widdowsoni. (Jörg Freyhof 2012).

HABITAT TYPE

MARSHLANDS OF SOUTHERN IRAQ

NEW RECORDS OF AQUATIC FLORA OF IRAQ

Two genera *Spirodela* and *Landoltia* were recorded for the first time for flora of Iraq. Each genus is represented by one species, these species are *Spirodela polyrhiza* and *Landoltia punctata*. In addition one more species of the genus *Lemna* (*L. minuta*) was added to the flora of Iraq for the first time too. Brief descriptions with main distinguishing characters for the three new recorded species, habitat and geographical distribution were studied. Six stations, two in each marsh of Al-Hawizah, Al- Chebaish and Al-Hammar were chosen for monthly sampling. Floral and fruit characters for *Lemnaceae* species from Iraqi material were tabulated and illustrated for the first time. A key to all species of *Lemnaceae* in Iraq was provided too. (Al-Mayah and Al-Saadi, 2013).

Spirodela polyrhiza

Landoltia punctata

HABITAT TYPE

MARSHLANDS OF SOUTHERN IRAQ

FERRUGINOUS DUCK *AYTHYA NYROCA*

Ferruginous Duck *Aythya nyroca* is globally-threatened (NT) bird species with decreasing population trend according to the IUCN red list and evidence of rapid declines in Asia would qualify the species for up listing to Vulnerable due to various kinds of threats. The geographic distribution of this threatened species is widespread over scattered patches in West Asia from western China to northern India, through east and central of Europe.

In Iraq ferruginous Duck is an uncommon passage migrant and winter visitor mainly to southern Iraq. It discovered breeding in considerable numbers in some locations in the Mesopotamian marshlands. The old locals and hunter reported that they are seeing this bird only in winter in few numbers as well as before and after the cool days, and they mentioned that this bird have been bred recently over about less than the past two decades, so it is new breeding duck.

The breeding habitat of the Ferruginous Duck varies from rather-shallow marsh (more than 0.5 m) up to rather-deep waters (up to 1.5m), but generally, requires dense reedbeds attached to open water 'theatres' to form good landscape for breeding.

The Ferruginous Duck faces serious threats in Iraq that can summarized by serious lack of water that caused by the upstream damming works in Turkey and Syria as well as the continuous fluctuation of water-table in the marshlands and the lack of water management over these vast areas. Hunting is serious threat that faces this duck, and this effects the population on the national level dramatically. (M.A. Salim, 2013)

Ferruginous Duck

Ferruginous Duck nest

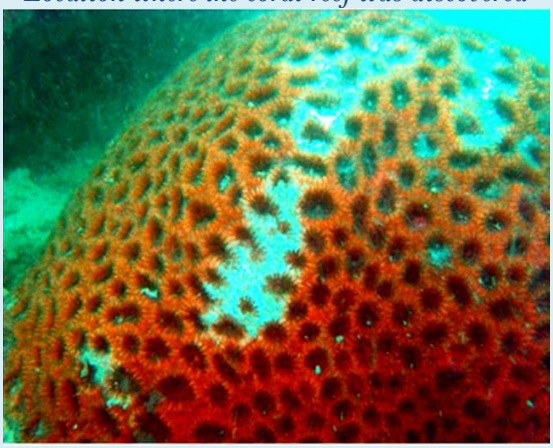
HABITAT TYPE

MARINE ENVIRONMENT

REEF DISCOVERY IN IRAQI TERRITORIAL WATERS

In September 2012 and in May 2013 during joint expeditions performed by scientific scuba divers from the Marine Science Centre of the University of Basrah (Iraq) and Technical University of Freiberg (Germany), a coral reef in Iraqi coastal waters was discovered for the first time ever. The primary survey identified a (7x4 km) wide zone of relatively healthy reefs at water depths between 7 and 20 m. The site is characterized by a tidal variation of about 3 m, rather strong tidal currents (3-4.5 m/s), high turbidity, and high nutrient load from rivers input.This discovery will change what was known until now about the existence of the coral reefs only in the coastal regions of Bahrain, Iran, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates. The discovery of a living coral that lays hidden beneath the murky waters of Iraq's coastal waters is considered an important ecological and scientific event not only for Iraq but to the Arabian Gulf region and the international scientific community working on the fundamental understanding of coral, marine ecosystems and global climate today. The discovery of the corals in the Iraqi territorial waters will impact on a range of research fields as diverse as biology, zoology, ecology, oceanography, geology, palaeontology, geo-biology, biogeochemistry, hydrogeology, and evolutionary sciences. It is expected that Ministry of Environment develop appropriate laws to protect this area, especially as it is located in an area of vital economic importance to Iraq, where the largest and most important ports of crude oil and gas shipping and other commercial ports already exist. These habitats urgently need protection, conservation and funding to develop integrated and long term research.

Location where the coral reef was discovered



Stony Coral (Platygyra Pini), Showing Anchor Damages

Octocoral Menella sp. with different Ophiotheia venusta brittle stars

HABITAT TYPE

MARINE ENVIRONMENT

MARINE CALANOID COPEPOD (PSEUDODIAPTOMUS ARDJUNA) FROM SHATT AL-ARAB RIVER, IRAQ

The marine Calanoid Copepod (*Pseudodiaptomus ardjuna)* was recorded for the first time from some freshwater habitats in some regions of the Shatt A-Arab River during March – July 2009. These regions include Al-Kurnish area, Al-Sindebad Island during April-August 2009 and at Al-Qurna city on March 2009 only. (Mohamed, 2011).

Pseudodiaptomus ardjuna lateral view, female (top) male (bottom), (Mohamed, 2011)

HABITAT TYPE

MARINE ENVIRONMENT

EVIDENCE OF THE PRESENCE OF VARIOUS EPINEPHELUS SPECIES IN IRAQI COASTAL WATERS

Epinephelus genus is considered as a main group in the marine Iraqi fisheries. Fishes collected from Al- FAO city South of Al-Basrah, and from Basrah city fish market. Many Grouper species have been registered in Iraq; the largest registered number ever was thirteen species. Fifteen species were described in this study; four were described for the first time in Iraq, as reported in the Table. The presence and classification of other species has been confirmed. It was found that the presence of four species was suspicious. While other species were recognized by the fishermen to be found in the Iraqi fishing ground. Field classification key for some of the groupers in the Iraqi Marine waters were designed taking into account coloration pattern, morphological characteristics for quick identification of the species. (Almukhtar et al., 2012).

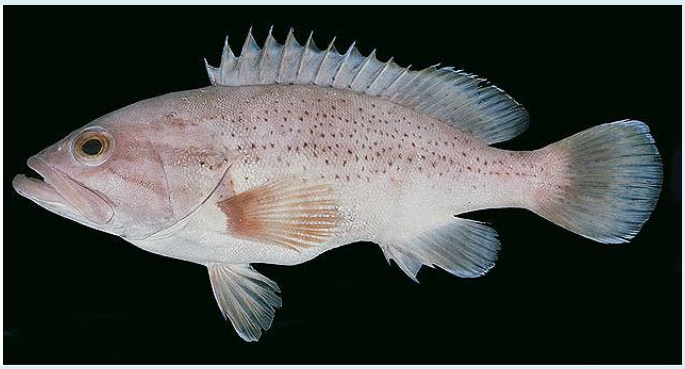
Species registered in Iraq for the first time
Epinephelus coioides
Epinephelus polylepis
Epinephelus epistictus
Epinephelus malabaricus
Species whose presence is confirmed in Iraq
Epinephelus areolatus
Epinephelus bleekeri;
Epinephelus diacanthu
Epinephelus stoliczkae
Suspicious species
Epinephelus longispinis
Epinephelus merra
Epinephelus fuscoguttatus
Epinephelus sexfasciatus
Species whose presence is recognized by locals
Epinephelus coruleopunctatus
Epinephelus fasciatus
Epinephelus latifasciatus

HABITAT TYPE

MARINE ENVIRONMENT

DOTTED GROUPER (EPINEPHELUS EPISTICUS) RECORDED FROM THE MARINE WATERS OF IRAQ

The first record of the Dotted Grouper from the marine waters of Iraq has been recorded in this study. *Epinephelus epistictus* (Temminck & Schlegel, 1842) is known from the Arabian Sea coasts of Oman and the Iranian coasts of Oman. In the Arabian Gulf area, it has been reported from the waters around Bahrain, Saudi Arabia at Dammam city. We report three records from the Arabian Gulf representing its northern most distribution, where no previous record of this species have been found in the northern part of the Arabian Gulf. (Al-Mukhtar et al, 2011).



Epinephelus epistictus

1.4. Indicators and trends about biodiversity in Iraq

In order to assess the biodiversity status in Iraq and the possible trends of important habitats and species, indicators can be built. In this way the policy makers could have a useful tool to establish protection and management measures, depending on the increasing or decreasing trend of species and habitats.

1.4.1. *Indicator 1*

NUMBER OF GLOBALLY THREATENED SPECIES (IUCN) per TERRESTRIAL HABITAT IDENTIFIED.

This indicator will show the number of globally threatened species (according to information available in the IUCN RedList database) which are found in each of the terrestrial habitats of Iraq. The terrestrial habitats are identified according to a land cover Map produced by the FAO in 2000. To the FAO (mainly agricultural categories) the IUCN habitat coding has been matched (available at: www.iucnredlist.org/technical-documents/classification-schemes) according to the following Table.

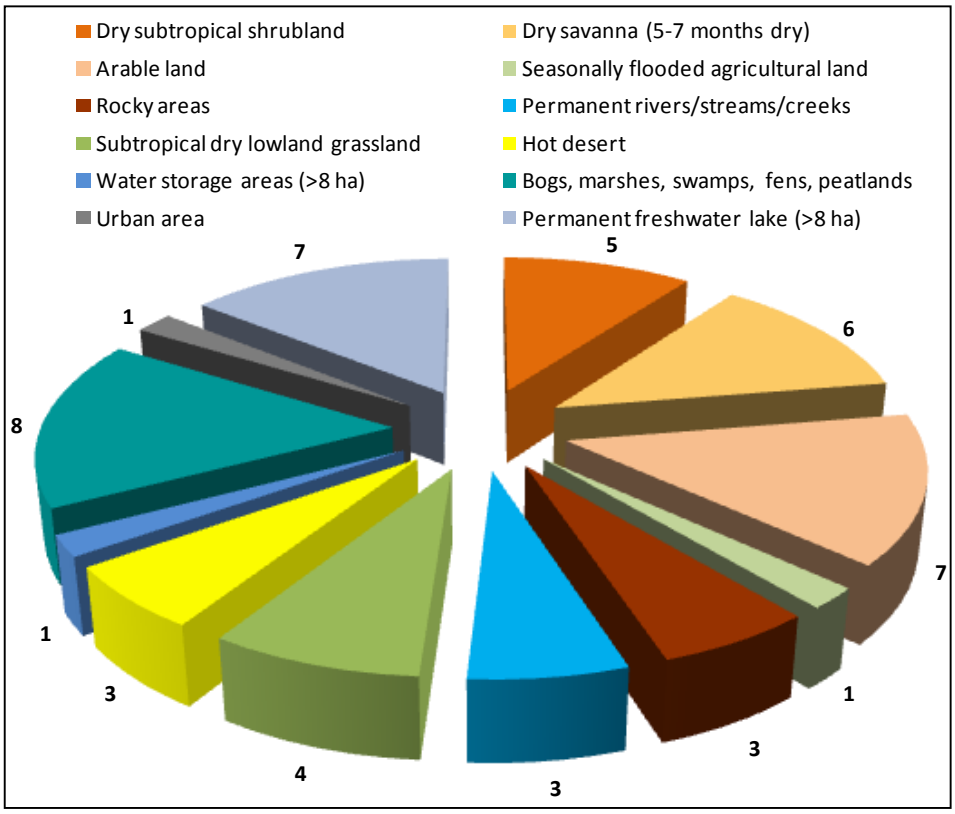
Table 1: matching between FAO land cover and IUCN habitat types

FAO Land Cover	IUCN_habitat
Natural vegetation of open shrubs and herbaceous	Dry subtropical shrubland
Natural vegetation of open trees and herbaceous	Dry savanna (5-7 months dry)
Cereals	Arable land
Rainfed herbaceous crops	Seasonally flooded agricultural land
Bare rock	Rocky areas
River	Permanent rivers/streams/creeks
Palms	Plantations
Natural vegetation sparse herbaceous	Subtropical dry lowland grassland
Bare soil stony	Hot desert
Bare soil	Hot desert
Artificial water body	Water storage areas (>8 ha)
Bare soil	Hot desert
Bare rock	Rocky areas
Rainfed herbaceous crops	Seasonally flooded agricultural land
Palms	Plantations
Cereals	Arable land
Bare rock	Rocky areas
Aquatic herbaceous	Bogs, marshes, swamps, fens, peatlands

FAO Land Cover	IUCN_habitat
Aquatic herbaceous	Bogs, marshes, swamps, fens, peatlands
Aquatic herbaceous	Bogs, marshes, swamps, fens, peatlands
Port	Urban area
Urban	Urban area
Urban	Urban area
Airport	Urban area
Tree crops	Plantations
Herbaceous rice	Seasonally flooded agricultural land
Urban	Urban area
Palms	Plantations
Natural water body	Permanent freshwater lake (>8 ha)
Industrial city	Urban area
Palms	Plantations
Cereals	Arable land
Irrigated herbaceous crop	Irrigated land
Cereals	Arable land
Natural vegetation of sparse shrubs and herbaceous	Dry subtropical shrubland
Cereals	Arable land
Shifting sand	Hot desert
Bare soil stony	Hot desert
Bare soil	Hot desert
Bare soil	Hot desert
Natural water body	Permanent freshwater lake
Herbaceous rice	Seasonally flooded agricultural land
Sand dunes	Hot desert

Accordingly, to each of the IUCN habitat types has been associated the number of species (birds, mammals, reptiles) known and recorded in that habitat for Iraq (global databases information and local survey data – KBA surveys). With this method, 14 major habitat types have been roughly defined for Iraq and all the globally threatened species registered for Iraq have been assigned to each habitat.

Figure 4: number of globally threatened species of Iraq (IUCN) per habitat type



As shown in the Graph above the marshland habitat is the one which has the higher number of globally threatened species; this can indicate a major diversity of this habitat type, but also the fact that this area has received recently great focused research and investigation; this could justify the better knowledge about the species present in this ecosystem.

It has also to be remarked that the habitat classification was deducted from an original FAO land cover and therefore it is focused mainly on agricultural functional categories; forest categories are absent from FAO classification and for these habitats no assessment about presence of globally threatened species could be done.

1.4.2. *Indicators for threatened freshwater and marine fishes*

1.4.2.1.Freshwater fish

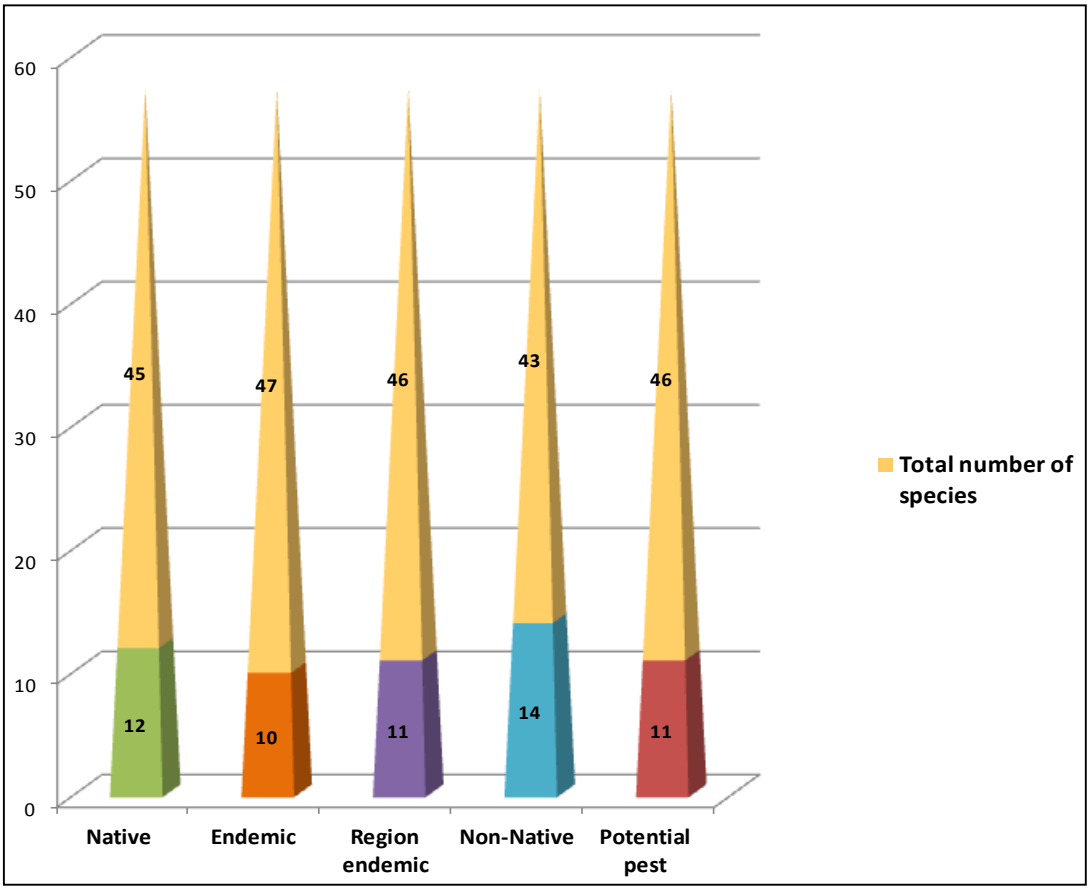
The endangered and threatened freshwater fish fauna of Iraq is experiencing problems resulting primarily from habitat modification by man. Many species have such restricted distributions that the entire *taxon* can face destruction by minor perturbations. Freshwater fishes of Iraq are facing the same general kinds of ecological problems that are causing extinctions throughout the world.

Main information about freshwater fish of Iraq has been collected through the books and website of Brian Coad (http://www.briancoad.com/Iraq/Checklists_I

raq.htm); basing on his checklists and on basic information about the threat status and distribution, available from the Fishbase website (http://www.fishbase.org/search.php); the below indicators have been built.

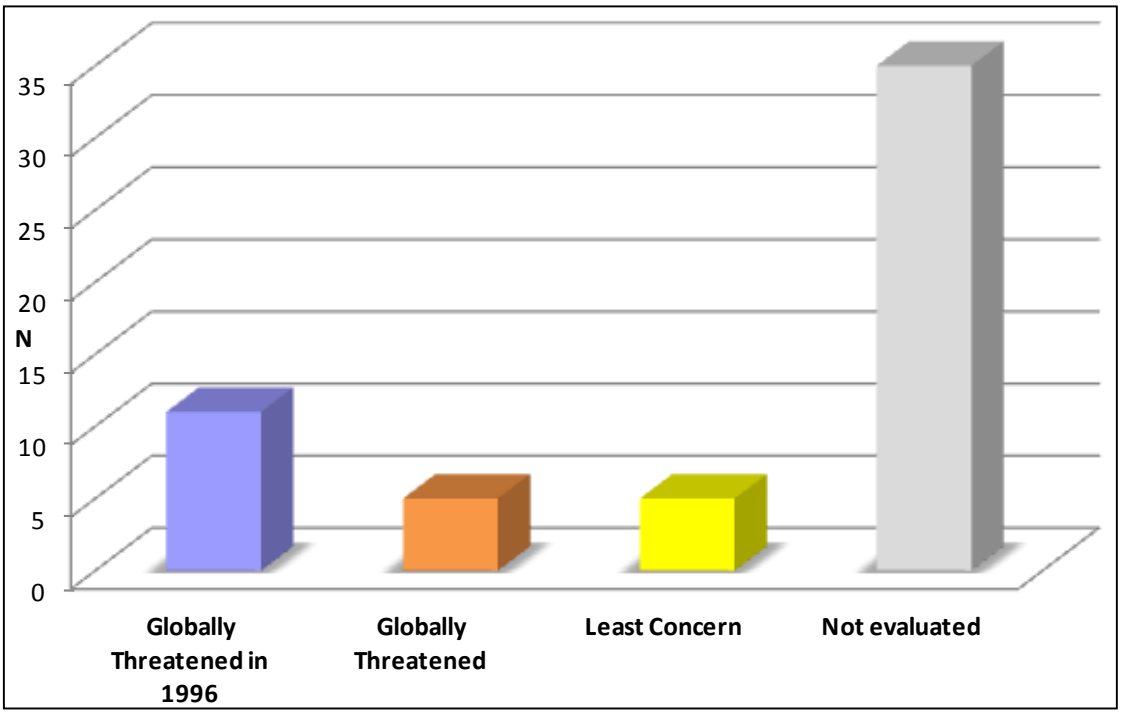
1.4.3. *Indicator 2*

OCCURRENCE STATUS OF IRAQI FRESHWATER FISH



1.4.4.*Indicator 3*

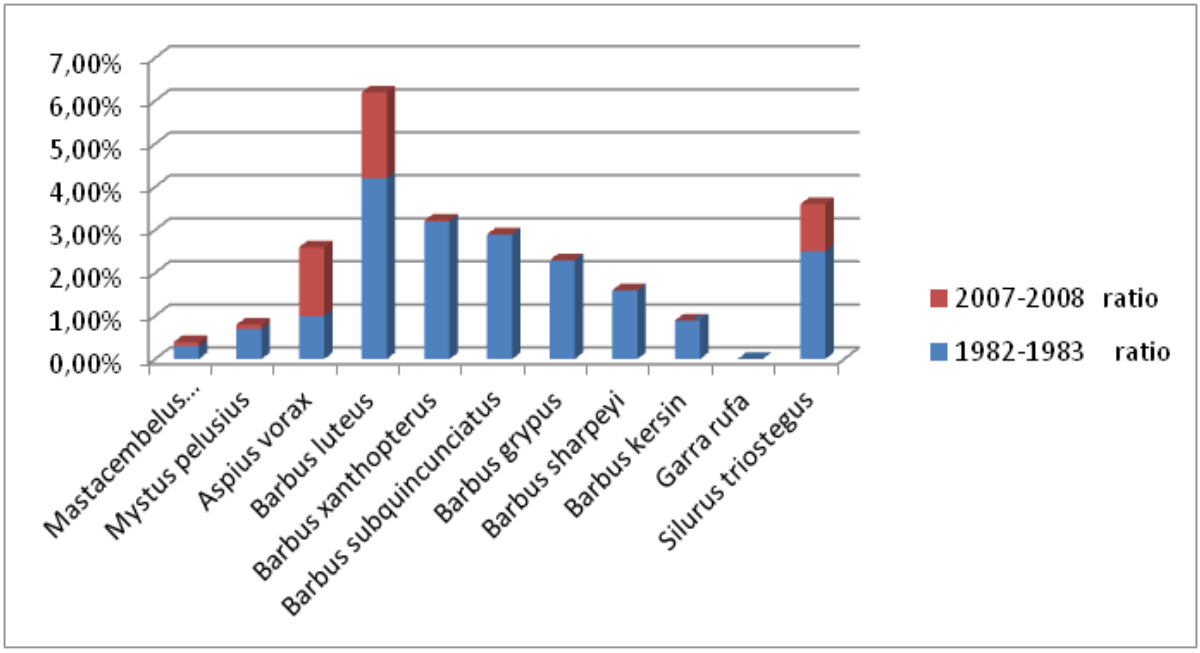
CONSERVATION STATUS OF IRAQI FRESHWATER FISH



The conservation status of Iraqi freshwater fish has been assessed by combining recent information from IUCN Redlist, as reported in the Fishbase website, the information provided by Coad in his website and the information coming from the scientific paper "Threatened Freshwater Fishes of Iraq, with Remarks on their Conservation Status" (Laith Jawad 2013).

1.4.5. *Indicator 4*

ABUNDANCE OF SENSITIVE NATIVE SPECIES IN SHATT AL-ARAB DURING THE PERIOD 1982-2008



Source: Dr. Kadhim Hassan Younis, and Ahmaed J. Jabar, 2013

A specific assessment has been done on marine/brackish species typical of the Shatt Al-Arab River. Native species of this area registered in the period 1982-2008 are reported in Table 2 below.

Table 2: presence of native species in the eighties and two thousands in the Shatt Al- Arab river

Species	Presence eighties	Presence Two thousands
Mastacembelus mastacembelus	X	X
Mystus pelusius	X	X
Aspius vorax	X	X
Barbus luteus	X	X
Barbus xanthopterus	X	X
Barbus subquincunciatus	X	-
Barbus grypus	X	-
Barbus sharpeyi	X	-
Barbus kersin	X	-
Garra rufa	--	-
Silurus triostegus	X	X

The species listed in Table 2 are considered as endemic and sensitive species to Shatt Al-Arab River. The decrease in their abundance or their disappearance goes along with any environmental disturbance, and tends to re-emerge after the end of the instability.

Factors influencing the decline of the Shatt Al-Arab sensitive species are:

Biological disturbance

The biological disturbance is caused by the introduction of alien species. There were two alien species recorded in Shatt Al-Arab in the eighties (*Heteropneusteus fossilis*; *G. holobrookie*), while the number of alien species increased to 9 since then.

Alien species compete with the endemic species for food and places of reproduction and transmit diseases to the endemic species. It has been assessed that the alien species dominate the fish community in the Shatt al-Arab.

Environmental disturbance

Increased salinity pushed the native species to the North of Shatt Al-Arab, for example one individual of the species *B. sharpeyi* was caught in a 13 months study.

It is also expected that the pollution, particularly the raw sewage discharge to Shatt Al-Arab, plays a role in the reduction of the fish diversity.

The Graph above shows that some important species have disappeared like *G. rufa* which originally occurred along the river systems of Iraq. *Barbus luteus* is another important indicator, the population in 2007-2008 almost halved as compared to the figures of 1982-1983, and this could be attributed to the invasion of *Silurus triostegus* competing for food.

Hussain et. al (2008), showed that the abundance of the alien species (*Carassius gibelio*) significantly affects the feeding possibility and that also provides for a major competition with endemic species such as the *B. sharpeyi. Barbus luteus B. xanthopterus* and *Barbus kersin,* that were also recorded by Hussein and Al-Knnaani (1989) as being impacted by common carp *C. carpio*.

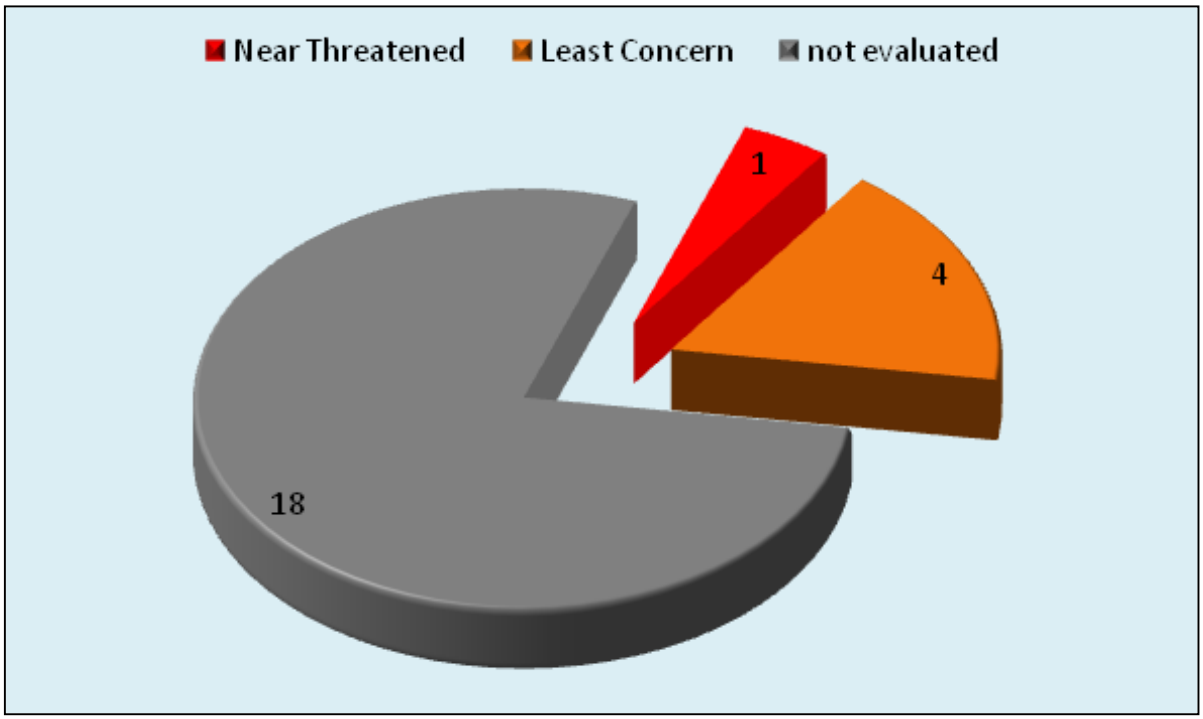
Barbus xanthopterus that is one of the favourite fish for the Iraqi people has almost disappeared from Shatt Al-Arab in the sampling of 2007-2008 and this is attributed to the overfishing and environmental deterioration.

1.4.5.1.Marine fish

Main information about marine fish of Iraq has been collected through the website of Brian Coad; basing on his checklists and on basic information about the threat status and distribution of species, available from the Fishbase website; the below indicator has been built.

1.4.6.*Indicator 5*

THREAT STATUS OF MARINE FISH OF IRAQ



It is possible to notice that, for marine fish as well as for freshwater fish, the major category is "not evaluated" showing the lack of information in this regard and also indicating that for fish species local focused research is needed that must be fed into international databases/organizations in order to be evaluated globally.

Silver pomfret (locally know as Zubaidi) (*Pampus argenteus)*, is one of the most commercially important fish in the Arabian Gulf region, Iraq in particular. It formed about 22% of the total marine fish catchment (Ali et al., 2000). The stock of this species is critically endangered and experiences a severe decline, as researchers from the Marine Science Centre of Basra University remark, due to over fishing, poor management of the stock and the impact of environmental pollution and changing water quality, in particular salinity.

Figure 5: Fishing Location coordinates of *Pampus argenteus*, summer 2013.

Source: Dept. of Aquaculture & Marine fisheries, MSC

As Figure 5 indicates the spawning site that has been identified by the MSC (Marine Science Center) researchers is impacted by commercial activities including oil and gas, commercial port development and ship traffic.

Another important marine species of fish facing the danger of severe decline is the Hilsa shad (*Tenualosa ilisha) (Sobor).* This species is facing over fishing in open sea, Shatt Al-Arab estuary and Shatt Al-Arab River. Over fishing mostly happens in the river because of the ease of access where the fish gather for spawning. Also the river pollution, increase of salinity and fresh water shortage impacted the population. For the above two species it is recommended to have a stock enhancement program through the development of marine fish hatcheries with proper fisheries management similar to other Arabian Gulf states like Iran and Kuwait.

Cartilaginous fish are also threatened in Iraqi waters due to bottom trawling, and most importantly the occurrence of the fins trade has recently worsened the conservation status of these important species. There are no invasive fish species recorded in the Iraqi marine waters; however there is a change in the species diversity like the emergence and abundance of a number of species of (*Epinephelus sp.)* locally called Hammour in the Iraqi marine waters. This is expected to be due to environmental changes namely the increased salinity in the Arabian Gulf area that would make the Shatt Al-Arab river as a major spawning area since many of these species need lower salinity for spawning.

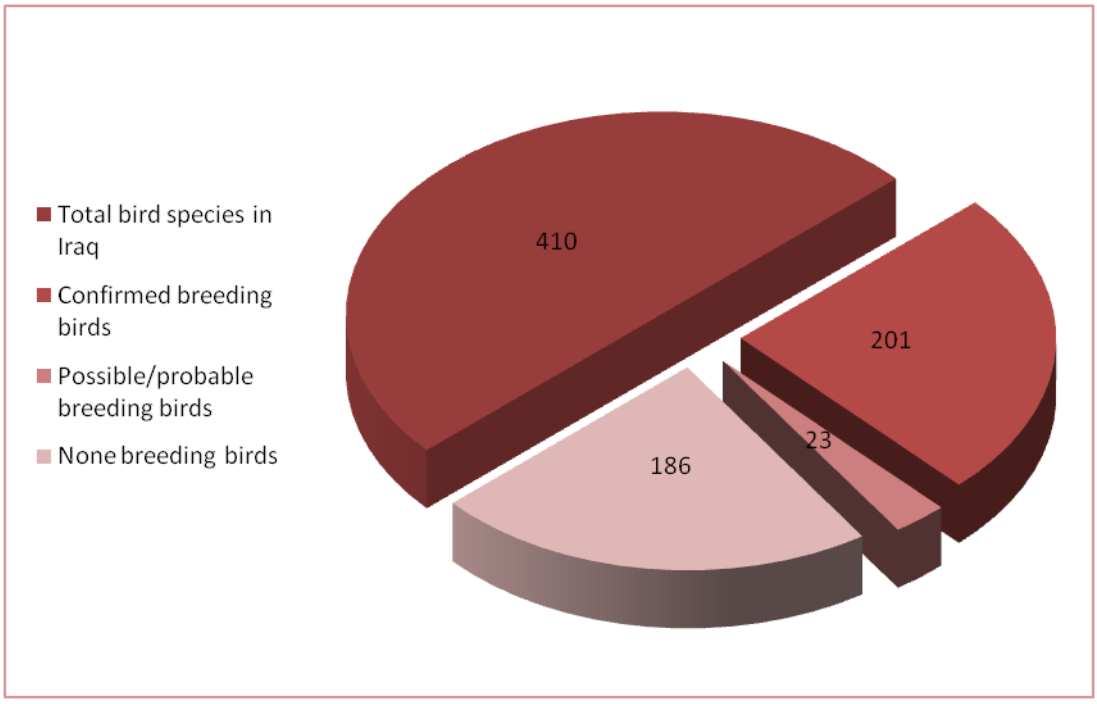
1.4.7. *Indicator 6*

BREEDING BIRDS OF IRAQ

Up to 2014, the total bird species recorded in Iraq are 410 species. More than 200 bird species breed regularly during the breeding season in Iraq, however, there are a list of 23 bird species that were found during the breeding season in suitable habitat for breeding, but no nests or other breeding evidence were found. The percentage of the breeding birds to the non-breeding birds in Iraq is up to 50%. This high number, in comparison with the remaining bird species is considered a good percentage. The distribution of these breeding birds covers all the different types of habitats that belong to different ecoregions.

The numbers of non-breeding birds, that are either passage migrants of wintering birds, are 186 bird species. The more research takes place regarding the breeding birds in Iraq, the more breeding evidences can be collected to confirm the breeding of those bird species that are present during the breeding season.

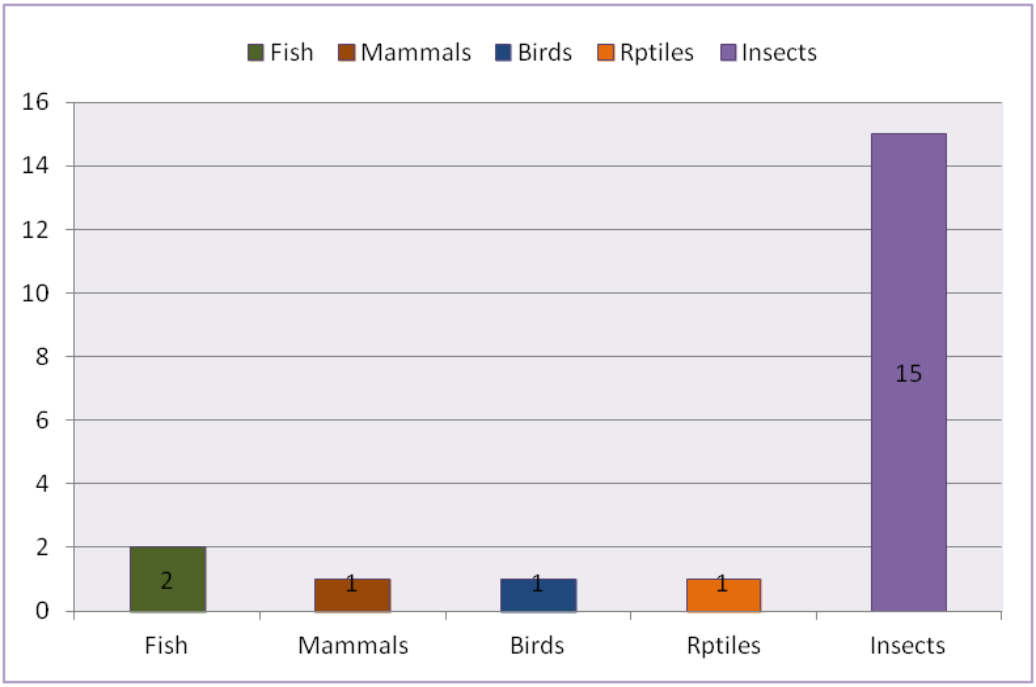
The graph below shows the different categories of the bird species in Iraq in terms of breeding evidence.



1.4.8. *Indicator 7*

THE STATUS OF THE IRAQI ENDEMIC SPECIES

Harbouring different Ecoregions and habitat types, Iraq has a list of endemic Flora and Fauna species found in very tiny distribution range. Nevertheless, large amount of effort is required to explore more about the distribution of the Flora and Fauna life in Iraq in order to have better understanding about the endemic plants and animals of Iraq.



The list below indicates to the status of the endemic animal species in Iraq based on the info presented by "Living National Treasures". However, the presented data might not reflect the actual status of the endemic species in Iraq. This illustrates the necessity for further research to come up with a more accurate checklist for the endemic animals for Iraq.

This list briefs the following facts:

- "Iraq has two cave fish representing genera found nowhere else: the Iraq Blind Barb *Typhlogarra widdowsoni,* and another blind cyprinid *Caecocypris basimi*.
- Bunn's Short-tailed Bandicoot Rat or Red Pest Rat *Nesokia bunnii* is known only from the Iraqi Marshlands.
- The Basra Reed Warbler bird species *(Acrocephalus griseldis)*.
- A leaf-toed gecko *Asaccus saffinae* was described from north of Iraq in Kurdistan region in 2009.
- Insects known exclusively from Iraq include a grasshopper *Uvarovistia iraka*, a chalcidoid wasp *Anagyrus abdulrassouli*, a darkling beetle *Hedyphanes mesopotamicus*, a

longhorned beetle *Dorcadion mosulense*, a scarab beetle *Tanyproctoides freyi*, a click beetle *Agriotes duhokensis*, and the plant bugs *Dimorphocoris seidenstueckeri* and *Yotvata pulcherrima*. Other endemic invertebrates include the freshwater snails *Gyraulus huwaizahensis* and *Bithynia hareerensis*, a salt marsh snail *Assiminea mesopotamica*, a freshwater sponge *Corvospongilla mesopotamica*, an amphipod crustacean *Parhyale basrensis*, a centipede *Lithobius cuklauvus*, and a scorpion *Orthochirus iraqus*.

Among about 190 vascular plant species unique to Iraq are *Iris heylandiana*, *Tulipa kurdica*, *Bellevalia parva*, *Onosma qandilicum*, *Vitex iraquensis*, *Thymus neurophyllus*, a bugle *Ajuga zakhoensis*, a heliotrope *Heliotropium lasianthum*, *Alyssum penjwinense*, a catnip *Nepeta autraniana*, *Stachys nephrophylla*, *Ornithogalum kurdicum*, *Eremurus rechingeri*, *Peucedanum rechingeri*, a dog's tooth grass *Cynodon iraquensis*, *Celsia leatherdalei*, and a milk-vetch *Astragalus gillettii*. *Choriantha popoviana* is an endemic genus.

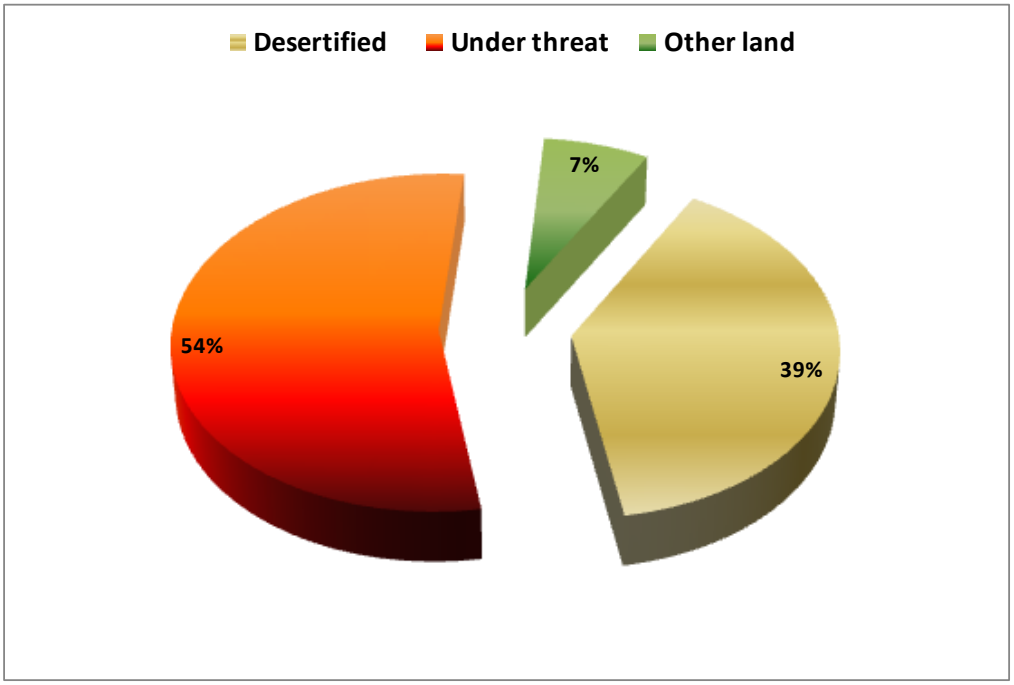
2. Major Changes Have Taken Place in the Status and Trends of Biodiversity in Iraq

2.1. Desertification

As much as 31% of Iraq's surface is desert. Years of inappropriate farming practices and mismanagement of water resources have exacerbated the effects of an already dry climate and contributed to increasing rates of desertification. Declining fertility, high soil salinity, erosion and the extension of sand dunes are pervasive problems. The Government of Iraq reports that 28% of the country's land is arable, of which an average of 100000 donums (100 sqKm) is lost each year to degraded land. Meanwhile 39% of the country's surface is estimated to have been affected by desertification, with an additional 54% under threat. As a result of declining soil moisture and lack of vegetative cover, recent years have witnessed an increase in the frequency of vast dust and sand storms, often originating in the western parts of Iraq.

2.1.1. *Indicator 8*

TOTAL AMOUNT OF DESERTIFIED LAND AND LANDS UNDER DESERTIFICATION THREAT OF IRAQ



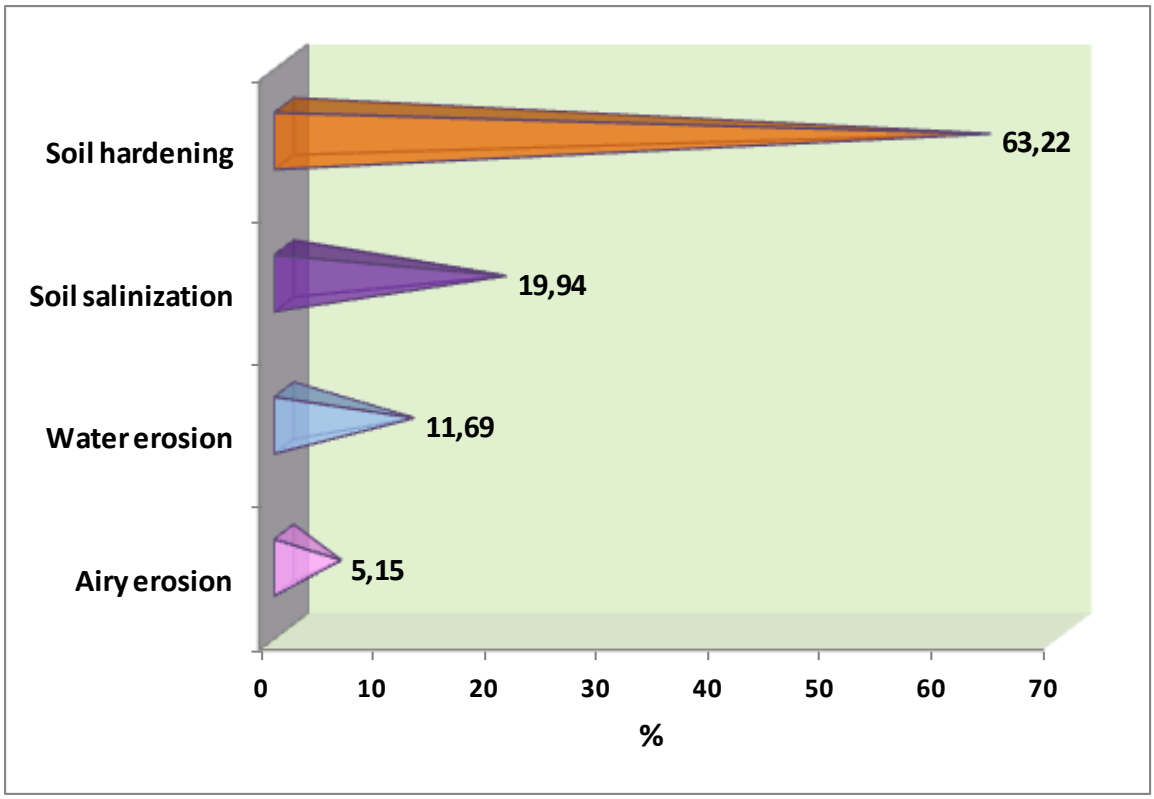
Source: Ministry of Planning based on data by Ministry of Environment

The phenomenon of desertification is considered a priority environmental issue which will hinder the future development plans for Iraq, where the total desertified area is estimated 401290 square kilometers of the total area of Iraq of 434320 square kilometers (according to the figures of a World Bank Report published in 2012; http://www.tradingeconomics.com/iraq/land-area-sq-km-wb-data.html). This figure, if confirmed, would indicate that 93% of Iraqi

land is either desertified either under desertification threat.

2.1.2. *Indicator 9*

DESERTIFICATION TYPES THAT AFFECT IRAQI LAND



Source of data: Deserts Researches Center/ Anbar University (Environmental Statistics Report for Iraq for 2011)

There are various types of desertification that affect Iraq, these are: erosion caused by air or water, the increasing salinization of soils, and the drying and hardening of soil, that turns the land into unfertile desert where no vegetation will naturally occur. The graph above shows that soil hardening is the major factor contributing to desertification; and this indicates that wrong agricultural practices, unsuitable irrigation schemes and drainage operations might have played a major role into the emergence of this phenomenon. According to the information collected by the Desert Research Center of Anbar University, the total amount of land affected by desertification events would be 401290 sqKm, as compared to a total land surface of Iraq of 434320 sqKm, where desertified lands represent the 92.3 % of total Iraqi land.

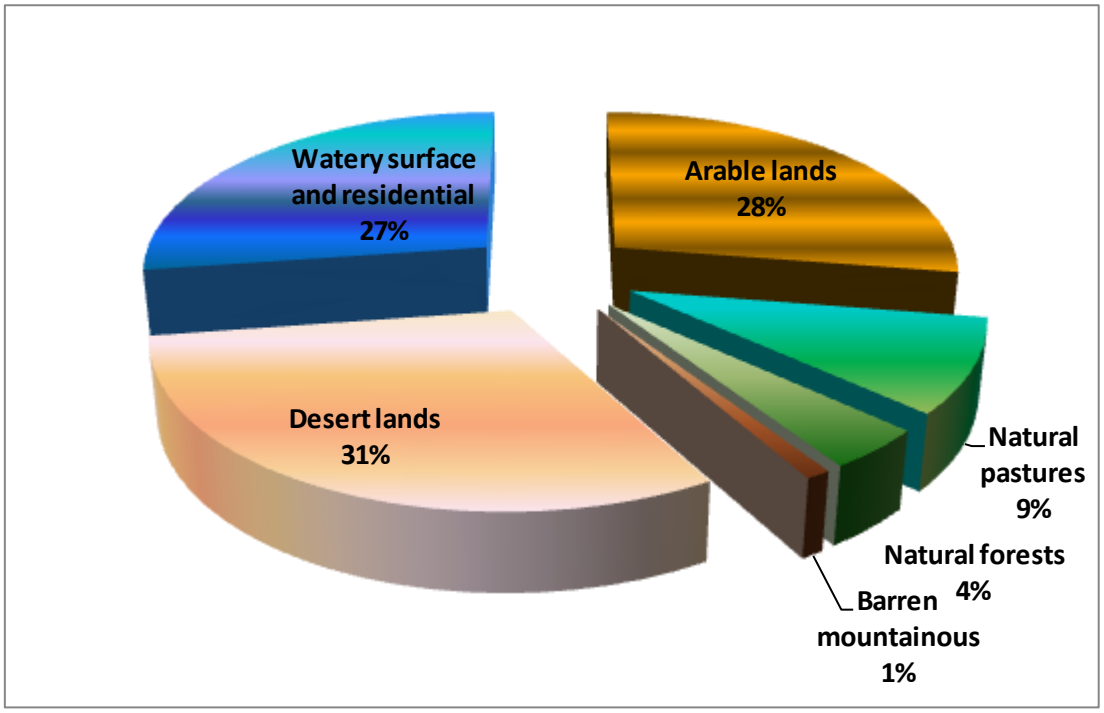
2.2. Indicators of Changes in Land cover and land use

Land use change assessments are essential in order to estimate global impacts in countries that, like Iraq, are subject to desertification and drought problems. The land use of Iraq has been assessed by the statistics departments of the Ministry of Environment for the year 2005; unfortunately no other

data are available in order to make a comparison with subsequent years.

2.2.1. *Indicator 10*

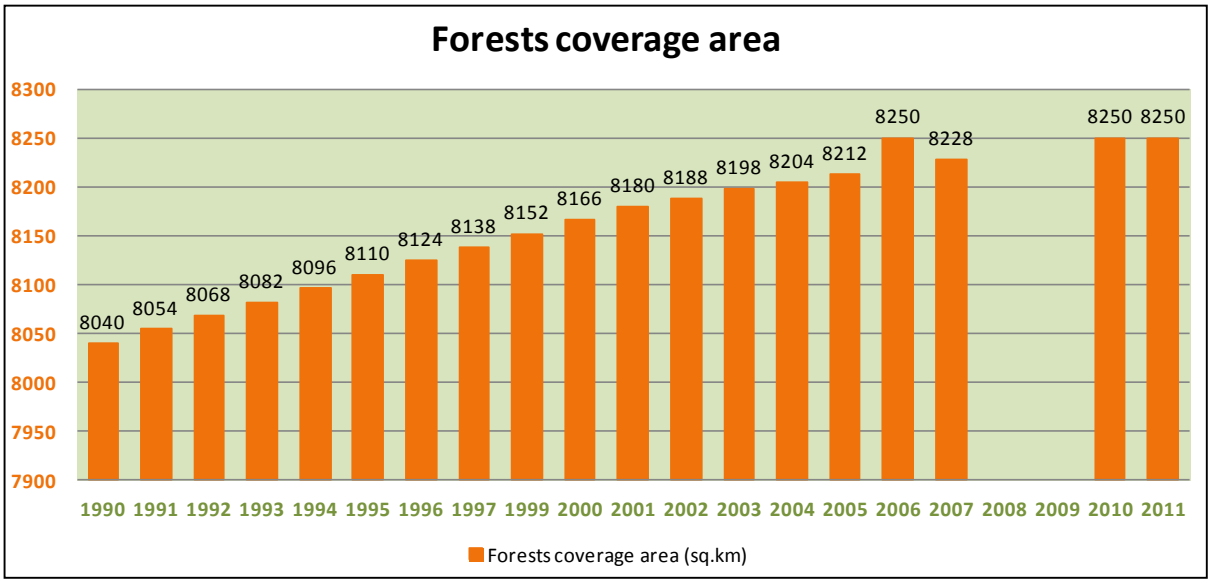
LAND USE OF IRAQ IN 2005



Source: Ministry of Environment, Technical Planning and follow-up department

2.2.2. *Indicator 11*

DEFORESTATION



Source: http://www.tradingeconomics.com/iraq/forest-area-sq-km-wb-data.html

The above graph shows the Forest area (sqKm) in Iraq which was last reported at 8250 sqKm in 2010, according to a World Bank report published in 2012. Forest area (according to the World Bank definition) is land under natural or planted stands of trees of at least 5 meters *in situ*, whether productive or not, and excludes tree stands in agricultural production systems (for example, in fruit plantations and agro forestry systems) and trees in urban parks and gardens.

Before the 90s the forest coverage area was larger than the coverage within the 90s, but there is no available data to show from this historical period. However, since 1954, indiscriminate cutting has been prohibited, and charcoal production from wood has ceased, so the forests were in average in a good conservation status, but since the 80s and 90s excessive cutting for fuel or by fires, overgrazing, salinization and soil erosion caused by river basin flooding, has affected otherwise fertile agricultural lands, and some of the forests in different governorates were destroyed completely by the military forces or by other entities during the wars. All these reasons led to the removal of 50% or more of the natural forests, for instance forests of oak and Aleppo pine in the north, cover less than 2% of Iraq's entire area and have been depleted. In 2000, only about 1.8% of the total land area of the country was forested, but still the desertification has long been a problem in the hot, dry climate which characterizes Iraq overall. In 2003, there were no protected lands in the country. Few actions have been taken for reforestation. However, the Graph above shows that there has been an improvement in the forest coverage area since the nineties, though the total coverage still remains low.

2.3. Ecological footprint

The need to adopt a comprehensive approach in monitoring biodiversity clearly emerged during COP 10 of the CBD (Nagoya, Japan). As a result the five Strategic Goals and the Aichi Biodiversity Targets have been approved and are the baseline for CBD Parties to set national targets and to plan biodiversity frameworks.

According to the Global Footprint network (http://www.footprintnetwork.org/en/index.php/GFN/) organization, the Ecological Footprint is one of the indicators considered by BIP and it essentially measures how much nature we have and how much we use. In this way human-induced pressures on biodiversity can be tracked thus providing a useful contribution to the advancement of conservation science.

In today's world, where humanity is already exceeding planetary limits, ecological assets are becoming more critical. Each country has its own ecological risk profile. Many are running ecological deficits, with Footprints larger than their own biological capacity. Others depend heavily on resources from elsewhere, which are under increasing pressure.

In some areas of the world, the implications of ecological deficits can be devastating, leading to resource loss, ecosystem collapse, debt, poverty, famine and war.

The Ecological Footprint is a resource accounting tool that helps countries understand their ecological balance sheet and

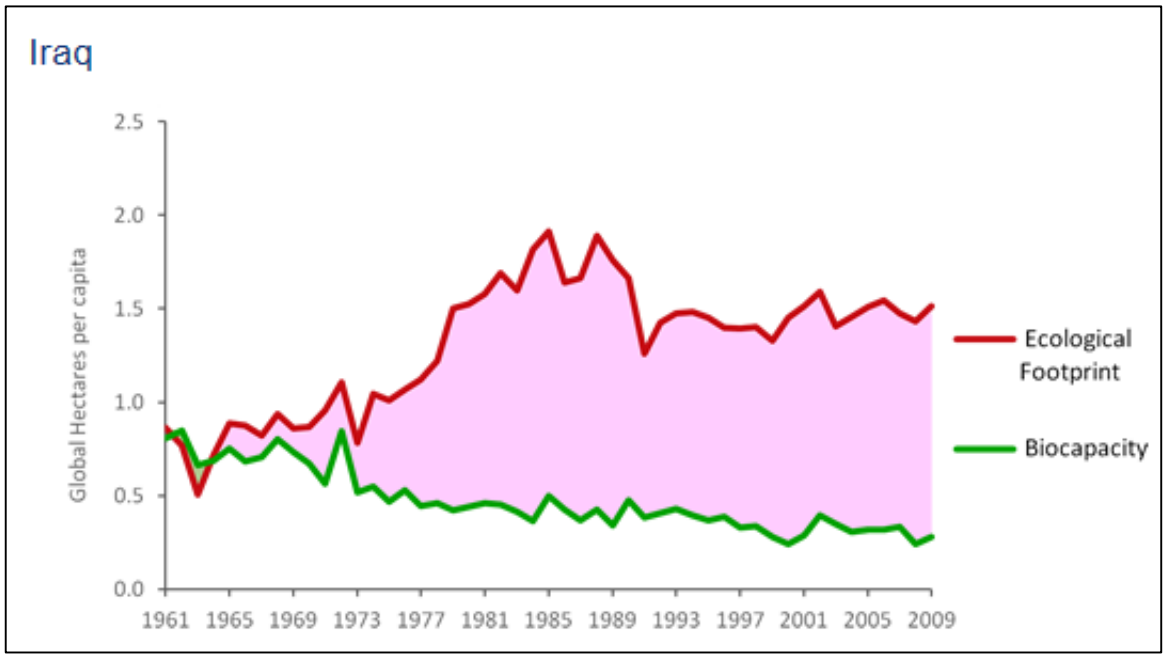
gives them the data necessary to manage their resources and secure their future.

National governments using the Footprint are able to:

1. Assess the value of their country's ecological assets
2. Monitor and manage their assets
3. Identify the risks associated with ecological deficits
4. Set policy that is informed by ecological reality and makes safeguarding resources a top priority
5. Measure progress toward their goals

It is almost certainly the case that countries and regions with surplus ecological reserves—not the ones relying on continued ecological deficit spending—will emerge as the robust and sustainable economies and societies of the future.

2.3.1.*Indicator 12* *ECOLOGICAL FOOTPRINT OF IRAQ*



Source: http://www.footprintnetwork.org/en/index.php/GFN/page/trends/iraq/

To understand the above graph it is essential to clarify the definition of Ecological Footprint and Biocapacity.

Ecological Footprint: A measure of how much area of biologically productive land and water an individual, population or activity requires to produce all the resources it consumes and to absorb the waste it generates, using prevailing technology and resource management practices. The Ecological Footprint is usually measured in global hectares. Because trade is global, an individual or country's Footprint includes land or sea from all over the world. Ecological Footprint is often referred to in short form as Footprint. "Ecological Footprint" and "Footprint" are proper nouns and thus should always be capitalized.

Biocapacity: The capacity of ecosystems to produce useful biological materials and to absorb waste materials generated by humans, using current management schemes and extraction technologies. "Useful biological materials" are defined as those demanded by the human economy. Hence what is considered "useful" can change from year to year (e.g. use of corn (maize) stover for cellulosic ethanol production would result in corn stover becoming a useful material, and thus increase the biocapacity of maize cropland). The biocapacity of an area is calculated by multiplying the actual physical area by the yield factor and the appropriate equivalence factor. Biocapacity is usually expressed in global hectares.

The ideal situation would be when a country can reach to have the green line always on

top of the red line. In Iraq's case, as shown in the graph above, this has happened for a very limited period of time during the sixties, when the resource needs and consumption were limited as compared with resources available, possibly as a consequence of different consumption models and to lower population. This trend has experienced a sharp increase during the eighties reaching its maximum values between beginnings of the eighties until towards the end of the eighties. This period coincides with the Iran-Iraq war and this can explain the very high ecological footprint of this period. Resource consumption and needs were increased because of the war; on the other hand the biocapacity was stopped also as a consequence of war and of the abandonment of agricultural land by farmers leaving to war.

In more recent years the ecological footprint has registered a slight decrease, as well as the biocapacity; therefore in general terms no real progress or improvement can be mentioned for Iraq up to the year 2009. This figure (though maybe some data have to be updated) gives the dimension of the unsustainability of the development model adopted by the country and should capture the attention of all involved policy makers in order to insert these kind of concerns into their policy agenda.

3. The Main Threats to Biodiversity

Most threats to biodiversity have already been mentioned in the 4th National Report and refer mainly to pollution, agricultural and urban expansion illegal hunting and fishing and oil extraction activities.

As marine ecosystems are concerned relevant threats are coming from the transportation activity, especially oil transport. Iraq has four major commercial ports and namely: Um Qasr port, Khor Al –Zubair, Ma'akal and Abu Floos. Um Qasr port has the biggest role for the ship storage and represents the first port of commercial importance due to its particular suitable features for navigation and for the presence of big and well structured docks. Other threats to the marine environment are represented by the presence of wrecks and war residuals as well as mines in the territorial waters of Iraq and beyond and also by poor water quality waters coming from Tigris and Euphrates rivers. Another important threat that has not been mentioned previously refers to the possible introduction into the marine waters of Iraq of non-native and potentially invasive algae and animal species that can be introduced with the ballast water of oil tankers and ships.

3.1. Land Mines

In many countries of the developing world mines are not merely instrumental in denying vital land to farmers, shepherds and to avoid the coming back of refugees, but have covered large areas of the earth's surface with toxic pollutants. According to the UN since the natural environment constitutes the basis of all social life and economic development, the direct damage caused by landmines and unexploded ordnance (UXO) may destroy the basis for socio-economic development in badly affected countries. Even the suspicion of mines prevents people using their natural resources by denying access to that component of the environment. A United Nations Environment Programme (UNEP) report to the UN General Assembly concluded that mines adversely affect ecological processes by disturbing the soil, destroying vegetation, and killing flora and fauna. Landmines (as well as UXO) also introduce poisonous substances into the environment as their casing corrode and decay. Mines commonly used substances can leach into the surrounding soil and water as the metal or timber casings disintegrate. These substances, and the compounds derived from them as they decompose, are soluble in water, long-lived, carcinogenic, and quite toxic to mammals, aquatic micro-organisms, and fish, even in small amounts.

The impacts of sporadic landmine detonations on soil and vegetation are also deleterious. Not only do mines destroy flora, they also shatter the soil structure thereby lowering soil productivity. A UNEP report on the environmental effects of the Iraq-Kuwait conflict concluded that mines caused: irreversible damage to ecosystems, including prolonged direct damage to soil through shattering and displacement, destruction of soil structure, and increased vulnerability of soil to water and wind erosion (UNEP, 1991).

Iraq continues to be one of the most contaminated countries in the world with landmines and unexploded ordinance,

restricting access to essential services and causing death to the animals and humans alike. It is estimated that more than 1,730 square kilometres of land in Iraq is contaminated with landmines and unexploded ordinance, affecting 1.6 million of Iraqis in around 4,000 communities across the country.

3.1.1. *Indicator 13*

MINE FIELD SURFACE PER GOVERNORATE

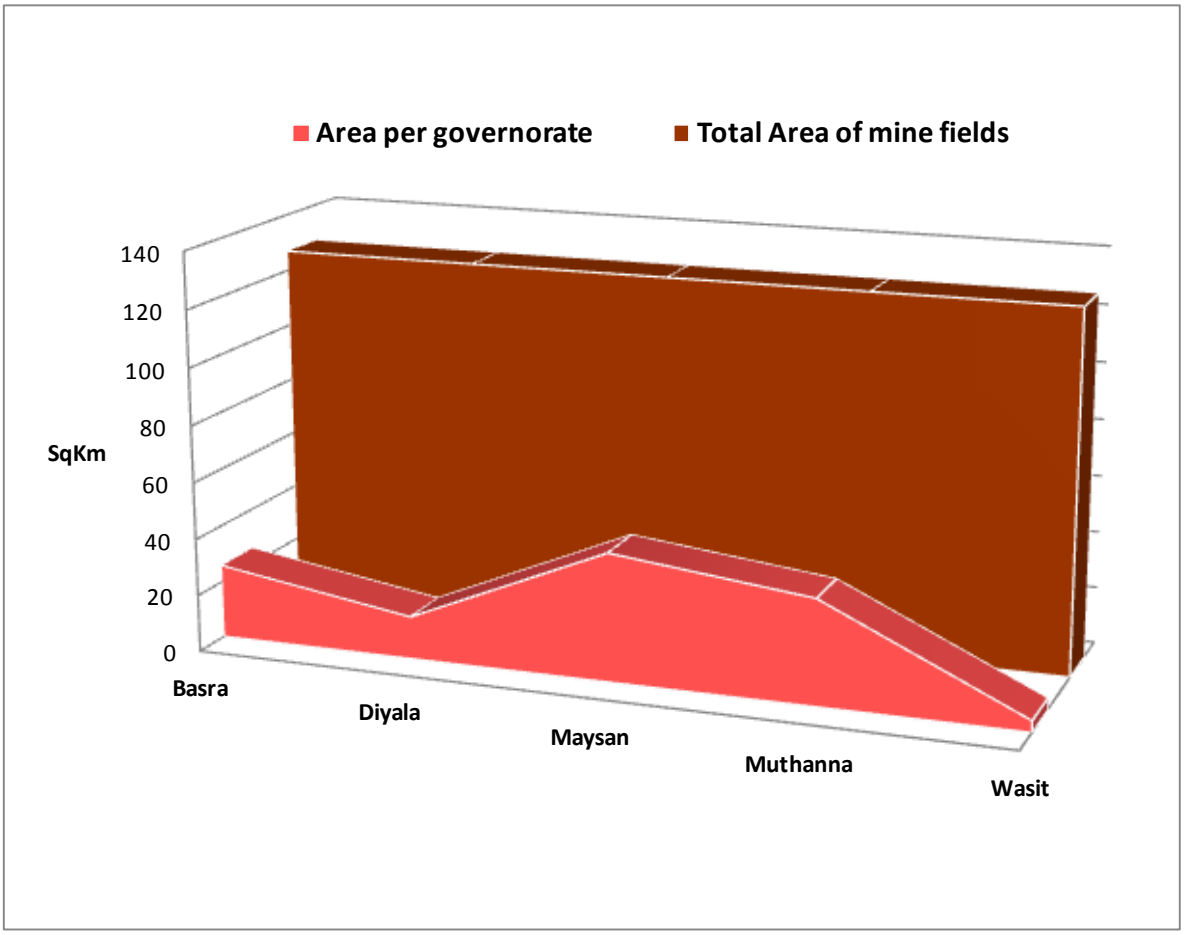


Table 3: Hazardous areas classified as minefield

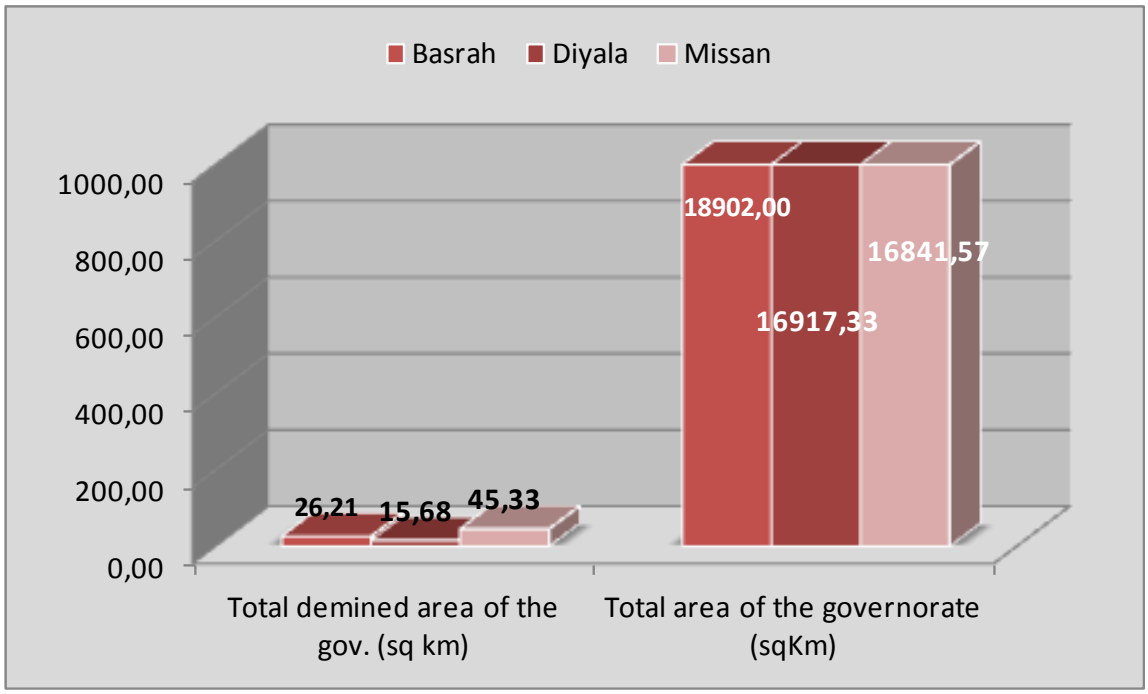
Governorate	Number dangerous areas (minefields)	Total area (square Kilometres)
Basra	36	26, 211
Diyala	18	15,684
Maysan	217	45,33
Muthanna	2	37,479
Wasit	5	4
Total	**278**	**128,709**

MOE/ Directorate of mine action / Planning and information 2013

The demining process has been carried out and is still on going to clean land mines contaminated areas within a specified plan until the mines are removed entirely from the country. This work is carried on in collaboration with the Ministry of Defence, oil companies, and other organizations; the below graph shows the demining process in some governorates of Iraq.

3.1.2. *Indicator 14*

DEMINING SURFACE IN SOME GOVERNORATES



Source: MOE/ Directorate of mine action, 2013

3.2. Hunting and Trading

Hunting has been the main source of income for most people in the rural and even the urban areas in Iraq, which has caused wide spread eradication of many wild species including several globally endangered species that once existed in the region, driving them

into extinction or into continuous decline. Hunting and capturing techniques that are practiced in the country include guns, poisons, nets, iron traps and other hunting equipments. Also falconry is very popular using birds of prey throughout Iraq especially for hunting the Vulnerable Houbara Bustard *(Chlamydotis undulata).*

There are three main reasons for hunting and trading the animals in Iraq and these can be identified in the following:

- animal use for health treatment and traditional medicine;
- - import/export of exotic animals for zoo, which is in fact acting as another market where trade in wild species takes place.
- Animal use for deriving an income or for food

Figure 6: 6 months old female lion cub are imported from Thailand (Erbil Animal Zoo), 2010

Photo by Hana A. Raza

Examples of animals declining because of hunting and trading:

- **Wild Goats (*Capra aegagrus*),** assessed as Vulnerable species by IUCN; is present in large numbers in the wild in Kurdistan/ North of Iraq, tough the species is now coming under threat and declining in number because of extensive hunting.
- Hunting and trade in **waterfowl species** such as **the Mallards** and the Vulnerable **Marbled Ducks**, widespread in the Mesopotamian marshlands of Iraq, that are sold in the markets for local use and consumption.
- Hunting of **Houbara Bustard**, assessed as Vulnerable by IUCN, and found in the desert regions of

southern and western Iraq. The species is heavily hunted by locals. In addition foreign hunters and falconers from Arabian Gulf countries usually come in large convoys protected by their own security to hunt in these areas. The birds are then exported to UAE, Qatar and Kuwait with no regulation or registration about the killed numbers.

- Common **otters and Smooth-coated Otter** are hunted in river and wetlands areas of Kurdistan/ North of Iraq and in southern Iraq marshes. Common otters are also caught in the central part of Iraq, in Samara and Salah Al-Din along Tigris river banks, as well as in Zagaton and Alduz near Kirkuk, and further north at Altun Kopri on the Little Zab River near Erbil governorate. These species are mostly exported to Turkey or kept and killed by locals because considered noxious animals contributing to the decrease of fish stocks.
- **Persian (Goitered) Gazelles** are hunted in the eastern territories and the southern arid and grassy lands near Hemreen area, Qaratapa, and Mandali of Diyala Governorate, Badra and Jassan of Wasit Governorate, Kumait, Al-Teeb, Al-Sheeb, the sparse areas of Ali Al Garbi of Missan Governorate. These species, in addition of being consumed by the locals, are exported to Kuwait, Saudi Arabia, and the UAE.
- **Persian Squirrels** are hunted in the wide range of mountains of Kurdistan/ North of Iraq, and precisely in areas such as Gali Ali Beg, Soran, Barzan in Erbil Governorate and in the eastern mountain regions near Kalar, in Sulaymaniyah Governorate. A few have been trapped near Mar Matti and Sinjar mountains in Mosul. These species are sold within Iraq and are also reported as exported to Kuwait and Saudi Arabia, a few to Syria, and some have been reported passing through the Jordanian border in the past.
- **Indian Crested Porcupines** are widely hunted and trapped in the centre and the west of Iraq, beside the river banks of the Tigris, especially in Al-Allam and Al-Mahzan areas of Salah Al-Din and the Nimrod area near Mosul. These species are also exported to Kuwait, UAE, and Saudi Arabia in addition to being sold in Iraqi markets for local use.
- **Saker Falcons** are hunted in the western and eastern grassy, arid steppes of Iraq during the beginning of winter, in such areas as the western steppes of Al-Jazera sector of Anbar Governorate, Rabea'a and Sinjar of Mosul, the open steppes of Himreen in Diyala Governorate, Kalar in Sulaimaniyah Governorate, Al-Azezia and Al-Garbi, Al-Teeb in the Missan Governorate, and in the Fao area of Basrah. They are reportedly exported to Kuwait, Qatar and UAE from the southern provinces of Iraq

and to Saudi Arabia from the northern and western provinces of Iraq.

- **Peregrine Falcons** are foremost found near the big water bodies such as Rania of Dukan in Sulaimaniyah Governorate, Tharthar of both Anbar and Salah Al-Din Governorates and the southern marshes, primarily the Hawizeh Marshes (Iraq's only Ramsar site) in Missan and the Fao Peninsula of Basrah during the winter and fall migration period. They are captured and sent to the same countries mentioned above.
- **Barbary Falcons** are hunted in the eastern mountains of Sulaimaniyah and Erbil Governorates, in Maqloob, Sinjar mountains, and the Makhool hill range of Mosul, Hawija of Kirkuk Governorate and Hemreen range of Diyala Governorate. They are exported to the same countries mentioned above.
- **White-eared Bulbul** is frequently hunted and trapped from Shahraban, Baladrouz and Mandaly of Diyala Governorate, in citrus and date palm stands and orchards in the centre and south of Iraq. They are caught alive and transported to Syria and Jordan.
- The reptile **Horned Sand Viper**, which is a rare species in Iraq distributed in the sandy dunes of the western and south western Iraqi deserts, are hunted in the Al-Qae'm and Rutba areas of Anbar Governorate and the deserts of Muthanna Governorate. They are exported to Kuwait as well as to Turkey in the north.

Figure 7: Eurasian Badgers at the Sulaimaniyah zoo

Photo: Mudhafar Salim

Figure 8: Brown Bear and a Gray Wolves caught in the districts near Erbil- Sulaimaniyah Zoo. Kurdistan/ North of Iraq, January-2010

Photo: Hana A. Raza

Figure 9: Two Jungle cats brought from the hunters home in Sulaiymaniyah

Photo: Korsh Ararat

Figure 10: Mounted Goitered Gazelle after it was killed in a district of Kirkuk, January 2010

Photo: Hana A. Raza

3.3. Alien species

Alien species or non-native, non-indigenous, foreign, and exotic includes any part, gametes or propagule of a species, subspecies, or lower *taxon* that might survive and subsequently reproduce outside of its natural range. **All invasive alien species are native somewhere.**

Native species can become problematic in their native environment, but this usually occurs only when that environment has been disturbed (e.g. for agricultural purposes)**.**

Invasive species can negatively impact human health, the economy (i.e. tourism, agriculture), and native ecosystems. These impacts may disrupt the ecosystem processes, introduce diseases to humans or flora and fauna, and reduce biodiversity.

The International Union for Conservation of Nature, (IUCN) considers animals, plants or other organisms introduced by man where they become established and disperse and generating a negative impact on the local ecosystem and species, as invasive species.

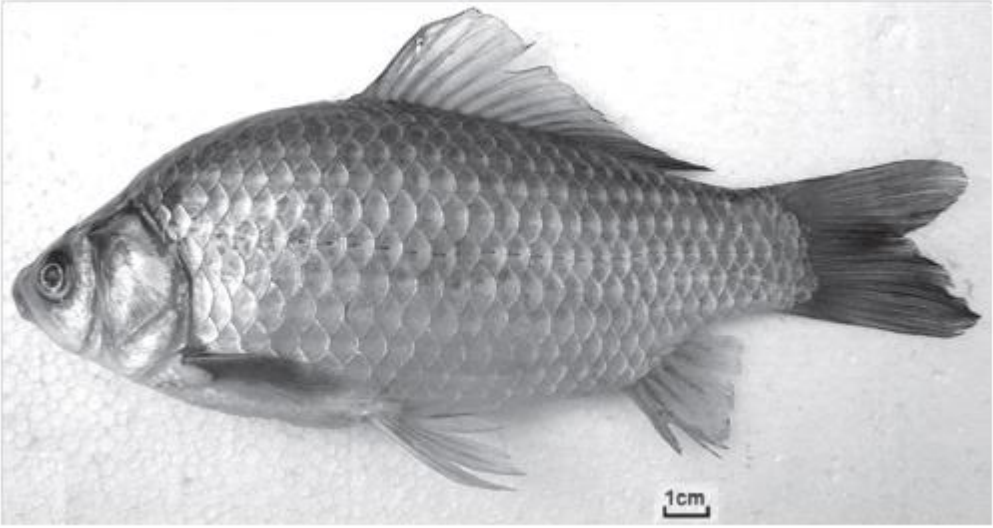
The Global Invasive Species Program (GISP) uses a broader definition of invasive alien species. Invasive alien species are "non-native organisms that cause, or have the potential to cause, harm to the environment, economies, or human health".

Useful species have been carried by humans to new locations throughout our history and most of these introductions have caused little or no damage to the environment. However, in a small percentage of cases, introduced species take advantage of favourable conditions in new locations and wreak ecological and economic havoc in their new environments.

3.3.1. *Alien species in terrestrial, freshwater and marine environment:*

Investigations conducted in the southern Iraq freshwater in Basrah governorate reported the first record of the Gibel Carp *Carassius gibelio,* in Lower Mesopotamia in freshwater systems, ponds and lakes (Jiang et al., 1983; Abramenko et al., 1998; Tarakanet al., 2012). The presence of *C. gibelio* in Iraq is considered as a serious threat to native and particularly to endangered freshwater fish species and should be taken as a serious issue just like the presence of all the wide array of potential pest species which are commonly reported from the waters of the southern marshes and river systems.

Figure 11: Carassius gibelio, Gibel Carp



3.3.2. *Invasive species in Shatt al Arab:*

According to the studies of the Marine Science Center/ Basrah University, there are many species of Crustaceans that invaded the Shatt Al-Arab River in the last 40 years, one of the important species was believed to be the crab *Esriocheir sinensis* which is lately turned out to be a different species and identified as *Esriocheir nepuensis*. This species was noticed to occur in the river in the early 1980s (S. D. Salman, personal observations) and is now found in the marshes as well as in the river.

The other invasive species is the shrimp *Macrobrachium nipponeusis,* apparently this species has invaded the river through Iran aquaculture experiments. It has established as a population in the Shatt Al-Arab river.

Also the Striped barnacle, (*Balanus Amphitrite)* has been noticed to occur in Shatt Al-Arab in late 1960 to 1966 by the researcher Murad B. M. Mohammad. Since then it has penetrated upstream where it has been noticed to occur in Al-Nassiriah in the 1990s particularly in Suq Al-Shuyukh. This species can cause economic damage because it colonize and obstructs water treatment plants and pipes.

The current IUCN listing of invasive alien species for Iraq contains a total of 92 Alien species, 12 of which are considered Invasive, while 80 species remain with no specified biostatus and for 6 of them the provenance is still uncertain; the whole list is provided as Annex.

3.4. KBA threats assessment

Within the framework of Nature Iraq work on the Key Biodiversity Areas of Iraq, for all the surveyed areas during the years in which the programme was carried out (2005-2010), a threat assessment was performed in order to identify the main pressures that were threatening the natural areas surveyed.

The maps below are showing the threat levels, classified according to the 11

categories created by the International Union for the Conservation of Nature (IUCN) (see table below); however in most of the cases only the first 9 types of threats were ranked and identified, as described in the following Table.

Threat number	Symbol	Threat type	Description	Notes from the KBA survey
1		Agricultural expansion & intensification	Threats from farming and ranching as a result of agricultural expansion and intensification, including silviculture, mariculture and aquaculture.	Wood and pulp plantations include deforestation and livestock farming; ranching includes forest grazing. Agricultural pest control and agricultural pollution-specific problems apply to '5. Overexploitation, persecution & control' and '9.Pollution' respectively.
2		Residential & commercial development	Threats from human settlements or other non-agricultural land uses with a substantial footprint, resulting in habitat destruction and degradation, also causing mortality through collision.	Domestic or industrial gathering includes firewood collection, and logging includes clear cutting, selective logging and charcoal production.
3		Energy production & mining	Threats from production of non-biological resources; resulting in habitat destruction and degradation, also causing mortality through collision.	Renewable energy includes windfarms.
4		Transportation & service corridors	Threats from long narrow transport corridors and the vehicles that use them, resulting in habitat destruction and degradation, disturbance and collision.	
5		Over-exploitation, persecution & control	Threats from consumptive use of wild biological resources including both deliberate and unintentional harvesting effects; also persecution or control of specific species.	• Hunting includes egg-collecting • gathering includes firewood collection • logging includes clear cutting, selective logging and charcoal production.
6		Human intrusions & disturbance	Threats from human activities that alter destroy and disturb habitats and species associated with non-consumptive uses of biological resources.	

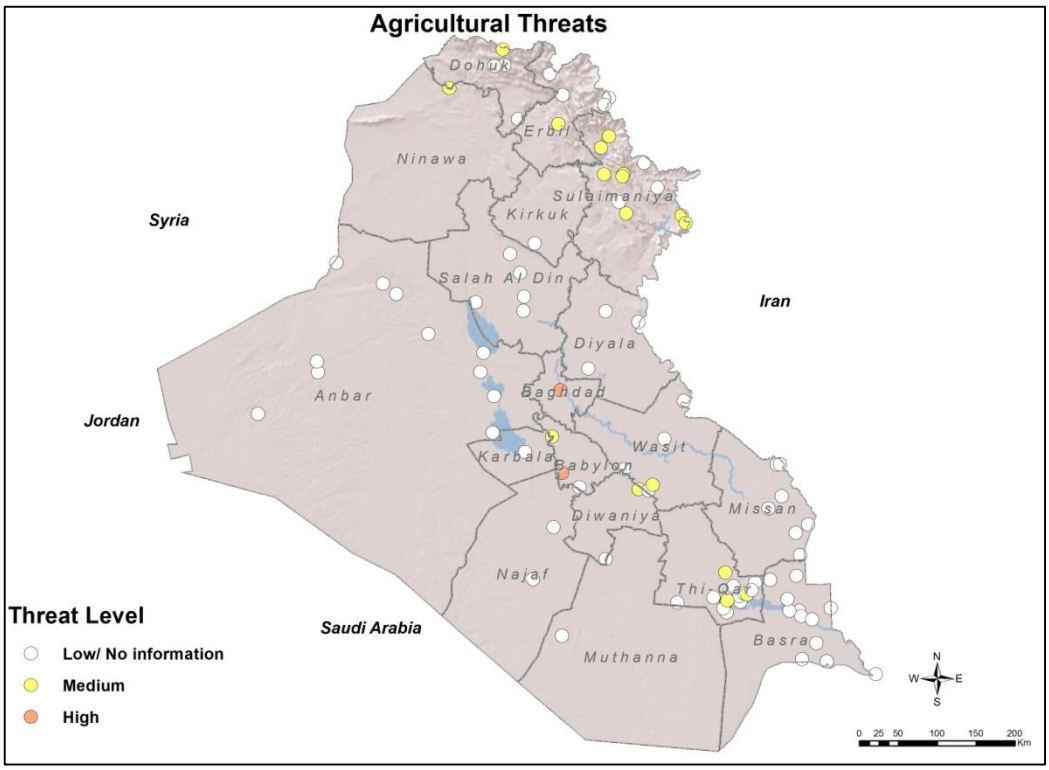
Threat number	Symbol	Threat type	Description	Notes from the KBA survey
7		Natural system modifications	Threats from actions that convert or degrade habitat in service of managing natural or semi-natural systems, often to improve human welfare.	'Other ecosystem modifications' includes: • intensification of forest management, • abandonment of managed lands, • reduction of land management, • under grazing. 'Dams & water management/use' includes: • construction and impact of dykes/dams/barrages, • filling in of wetlands, • groundwater abstraction, • drainage, • dredging and canalisation.
8		Invasive & other problematic species & genes	Threats from non-native and native plants, animals, pathogens and other microbes, or genetic materials that have or are predicted to have harmful effects on biodiversity (through mortality of species or alteration of habitats) following their introduction, spread and/or increase in abundance.	The KBA team was not able to assess these threats due to lack of information.
9		Pollution	Threats from introduction of exotic and/or excess materials from point and non-point sources causing mortality of species and/or alteration of habitats.	• Domestic and urban waste water includes sewage and run-off; industrial and military effluents include oils spills and seepage from mining; • agricultural and forestry effluents and practices includes nutrient loads, soil erosion, sedimentation, high fertiliser input, excessive use of chemicals and salinization; • Air-borne pollutants include acid rain.
10		Geological events	Threats from catastrophic geological events that have the potential to cause severe damage to habitats and species.	The KBA team was not able to assess these threats due to lack of information but in most cases the main geological threats facing Iraq are earthquakes.
11		Climate change & severe weather	Threats from long-term climatic changes which may be linked to global warming	The KBA team did not have adequate information to assess these threats but global warming, desertification

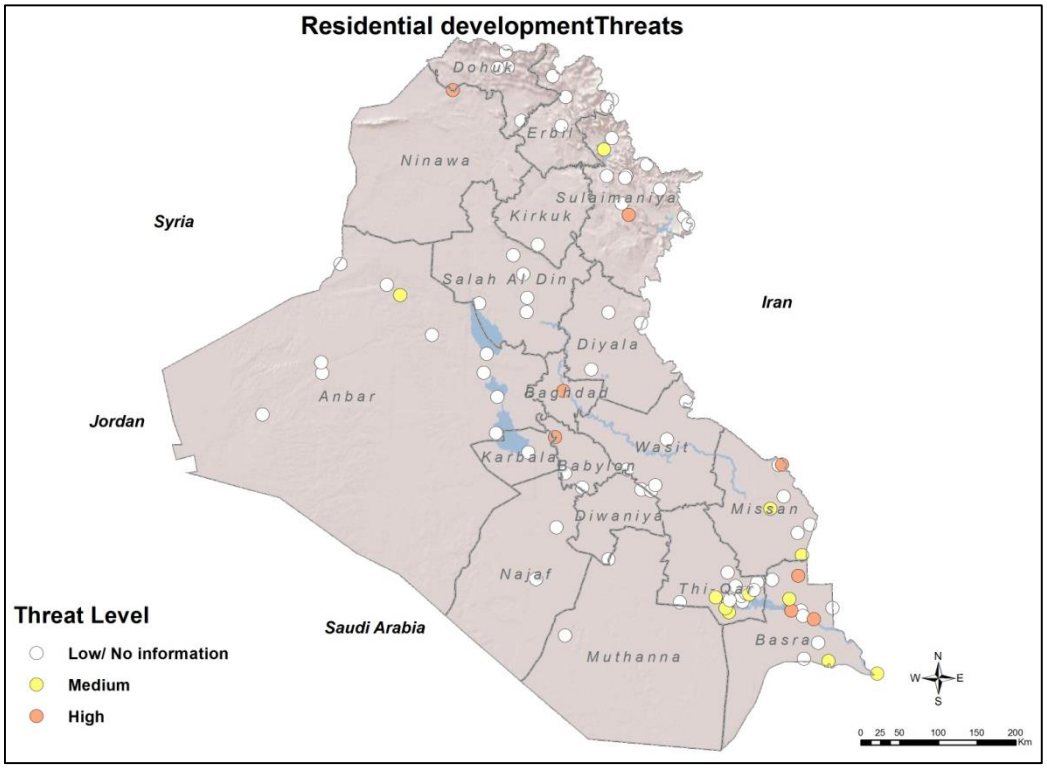
Threat number	Symbol	Threat type	Description	Notes from the KBA survey
			and other severe climatic/weather events.	and increased dust storm events are potentially significant threats in Iraq.

The following maps are an attempt to summarize the information collected for a number of selected KBA locations across northern, central and southern Iraq. Only threat types 1 to 7 and 9 were assessed by the KBA Team and are therefore represented.

3.4.1. *Indicator 15*

THREATS IDENTIFIED IN KBA AREAS




Residential developmentThreats
Dohuk
Erbil
Ninawa
Suleimaniya
Kirkuk
Syria
Salah Al Din
Iran
Diyala
Anbar
Baghdad
Jordan
Wasit
Karbala
Babylon
Diwaniya
Missan
Najaf
Thi Qar
Threat Level
Saudi Arabia
Basra
Low/ No information
Muthanna
Medium
High
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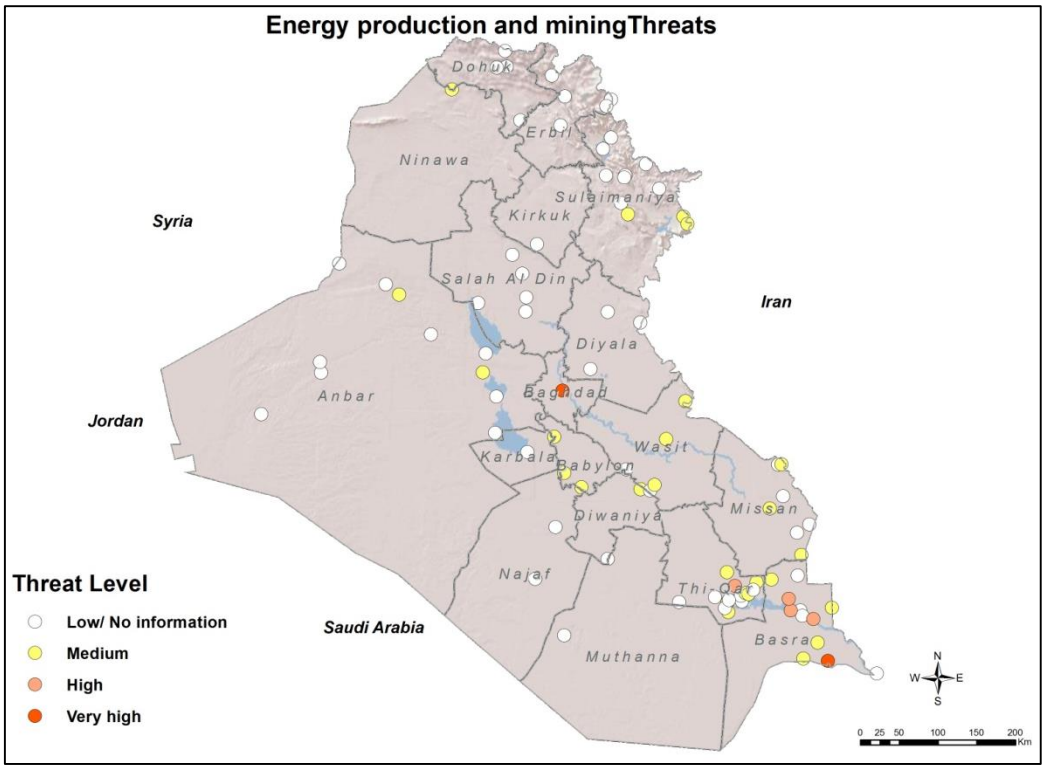
Energy production and miningThreats
Dohuk
Erbil
Ninawa
Suleimaniya
Kirkuk
Syria
Salah Al Din
Iran
Diyala
Anbar
Baghdad
Jordan
Wasit
Karbala
Babylon
Diwaniya
Missan
Najaf
Thi Qar
Threat Level
Low/ No information
Saudi Arabia
Basra
Medium
Muthanna
High
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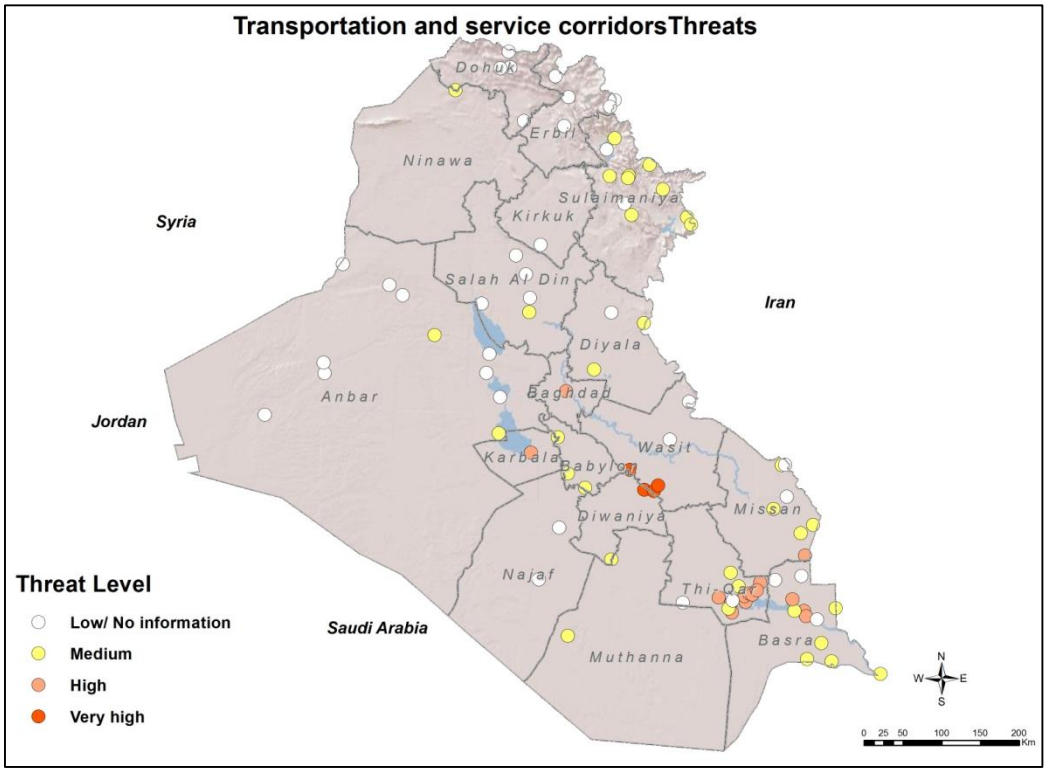
0 25 50 100 150 200
Km


Transportation and service corridorsThreats
Dohuk
Erbil
Ninawa
Sulaimaniya
Kirkuk
Syria
Salah Al Din
Iran
Diyala
Anbar
Baghdad
Jordan
Wasit
Karbala
Babylon
Diwaniya
Missan
Najaf
Thi-Qar
Saudi Arabia
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Muthanna
Threat Level
Low/ No information
Medium
High
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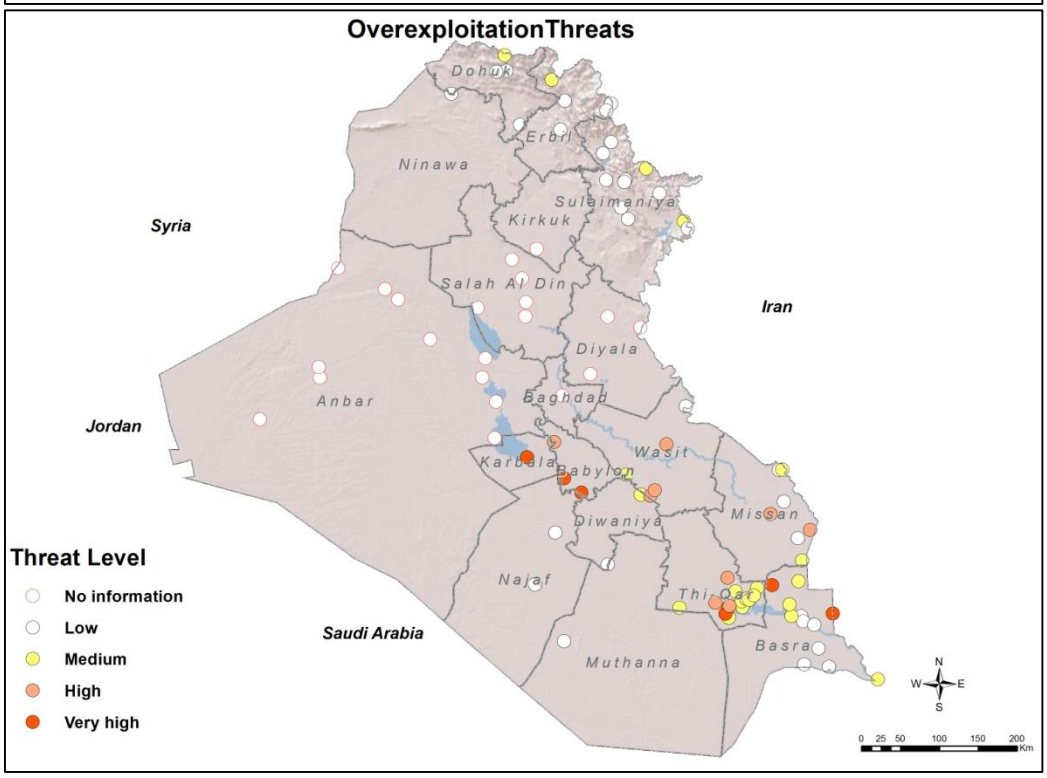
Km


OverexploitationThreats
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Erbil
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Sulaimaniya
Kirkuk
Syria
Salah Al Din
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Diyala
Anbar
Baghdad
Jordan
Wasit
Karbala
Babylon
Diwaniya
Missan
Najaf
Thi-Qar
Saudi Arabia
Basra
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Threat Level
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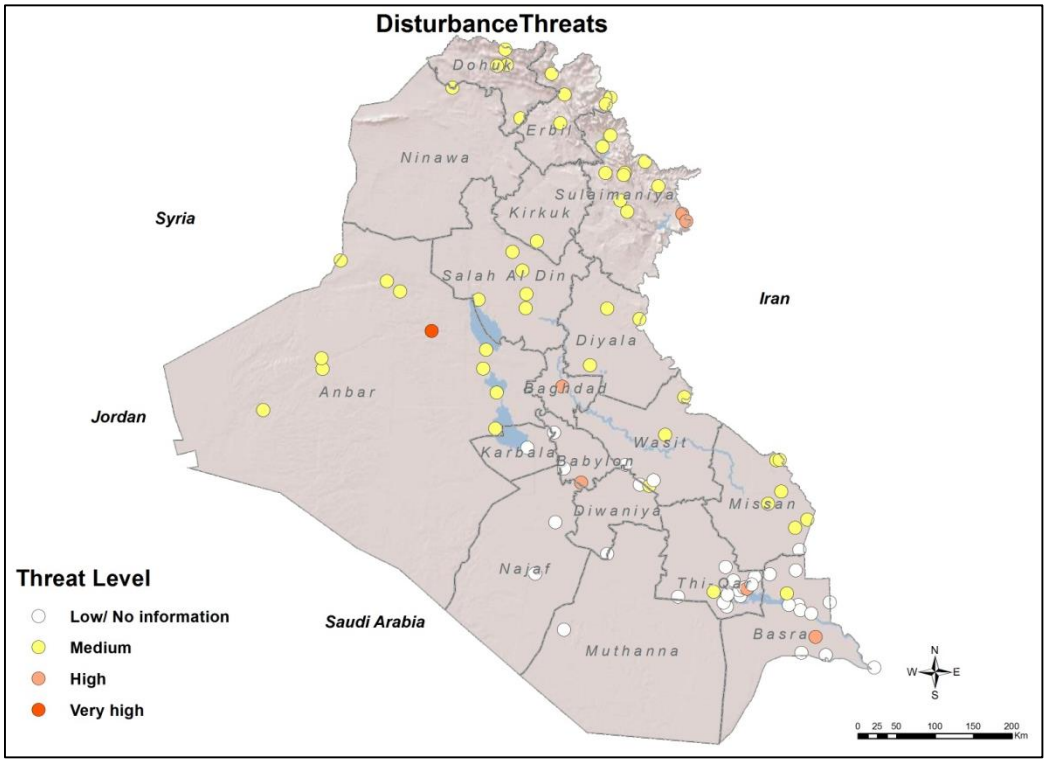
Km


DisturbanceThreats
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Erbil
Ninawa
Sulaimaniya
Kirkuk
Syria
Salah Al Din
Iran
Diyala
Anbar
Baghdad
Jordan
Wasit
Karbala
Babylon
Diwaniya
Missan
Najaf
Thi-Qar
Saudi Arabia
Basra
Muthanna
Threat Level
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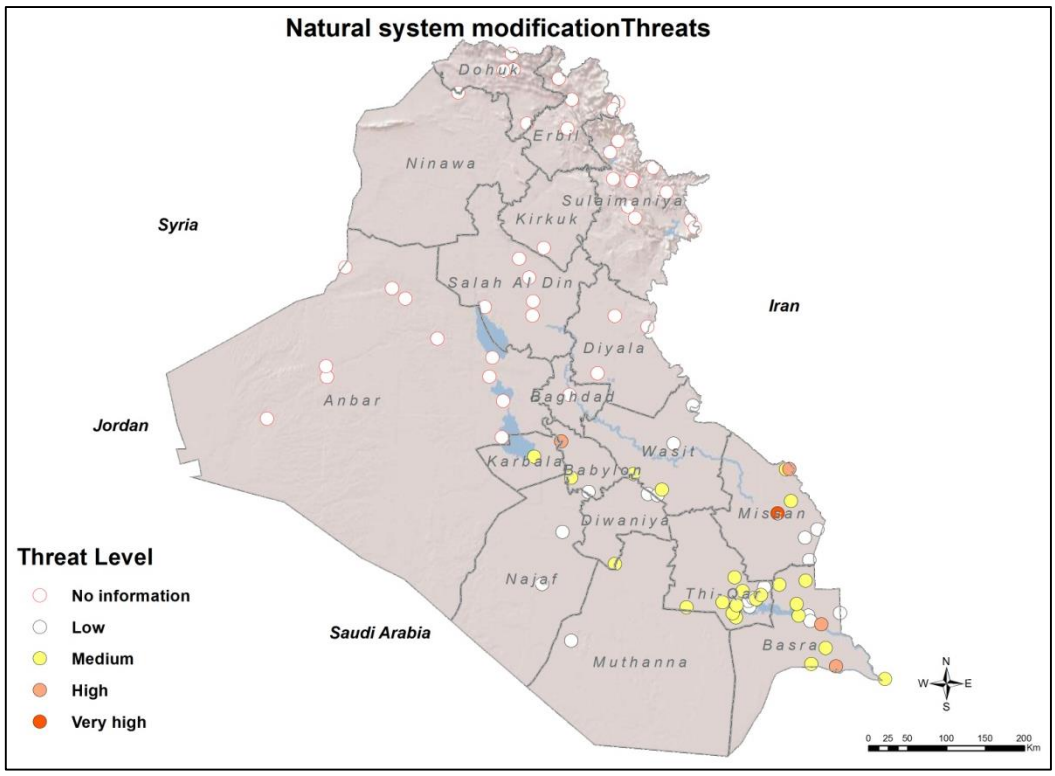
Natural system modificationThreats
Dohuk
Erbil
Ninawa
Sulaimaniya
Kirkuk
Syria
Salah Al Din
Iran
Diyala
Anbar
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Jordan
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Missan
Najaf
Thi-Qar
Saudi Arabia
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Threat Level
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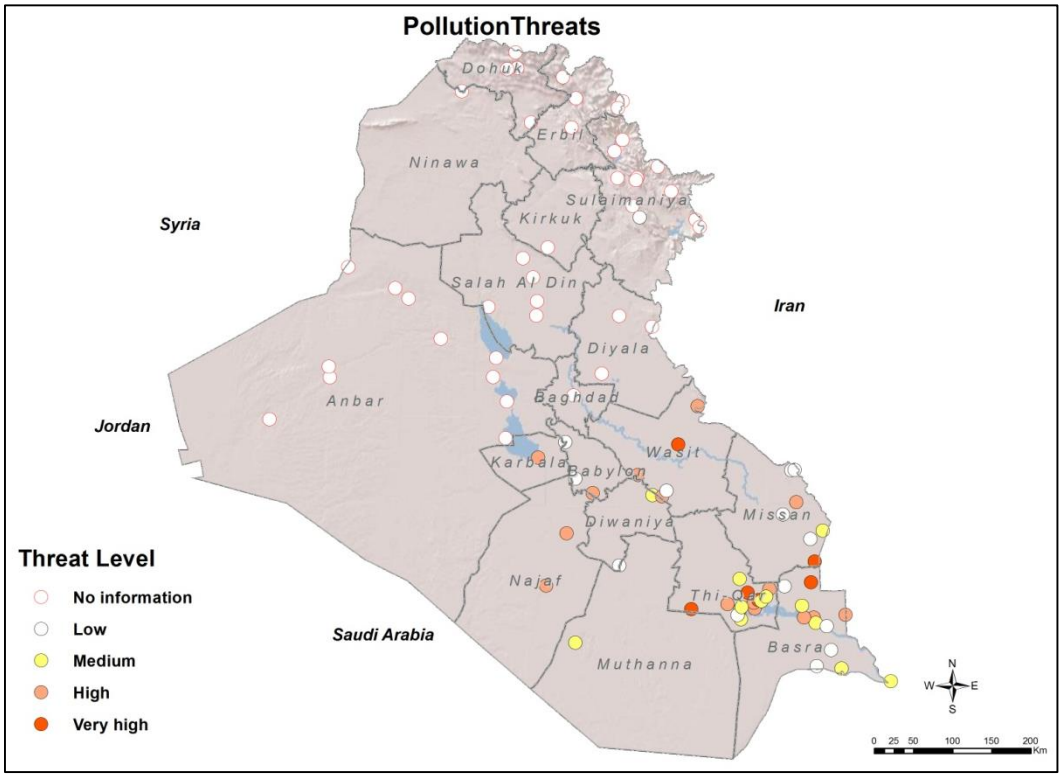
PollutionThreats
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4. The Impacts of the Changes in Biodiversity for Ecosystem Services and the Socioeconomic and Cultural Implications of These Impacts

4.1. Soil quality

Soil quality is important for a number of reasons among which granting that the plants and invertebrates entering the food chain of higher animals do not convey dangerous pollutants bio-accumulating in their tissues and leading to harmful effect or even to death. Soil quality is also important because through the effect of rain the elements present in the soil are delivered either to rivers and surface water bodies through soil washing and run-off or to groundwater, thereby possibly contaminating important water resources and reservoirs for both human and wildlife uses.

One important indirect indicator to assess to which extent the soil might be contaminated by, for instance, agricultural products and chemicals is to evaluate the production and consumption of fertilizers, pesticides and herbicides that a country uses.

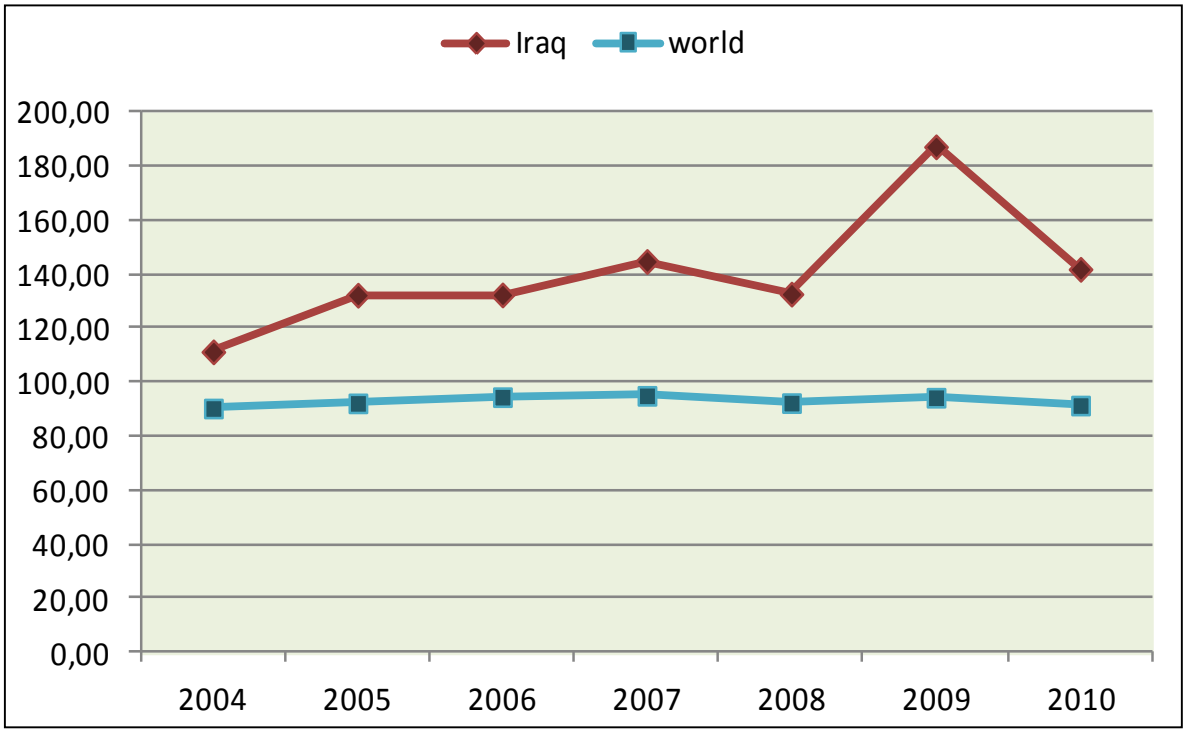
The indicator below shows fertilizers consumption which measures the quantity of plant nutrients used per unit of arable land. Fertilizer products cover nitrogenous, potash, and phosphate fertilizers (including ground rock phosphate). Traditional nutrients--animal and plant manures--are not included.

Through this indicator, it can be supposed that great amounts of fertilizers are used in Iraq exceeding the legislative limitations, most of these pollutants are persistent and end up in soil and water, the excessive use of these compounds can contribute to damaging soil quality and water quality; which can cause water pollution when erosion carries the chemicals off of lands along with eroded soils after each rainfall. The nitrogen fertilizer finds its way into rivers, lakes and causes eutrophication[1] and "dead zones" that kill aquatic life.

Additionally, use of artificial fertilizers in place of animal manure eventually can deplete soils of organic matter, making them lose their ability to retain water and making them more subject to erosion.

[1] Eutrophication is a process whereby nitrogen feeds an algal bloom, but when the short-lived algae die, decomposing bacteria then consume most of the available oxygen, suffocating aquatic life.

4.1.1. *Indicator 16* — *FERTILIZER CONSUMPTION (% OF FERTILIZER PRODUCTION)*



http://data.worldbank.org/indicator/AG.CON.FERT.PT.ZS/countries/1W-IQ?display=graph

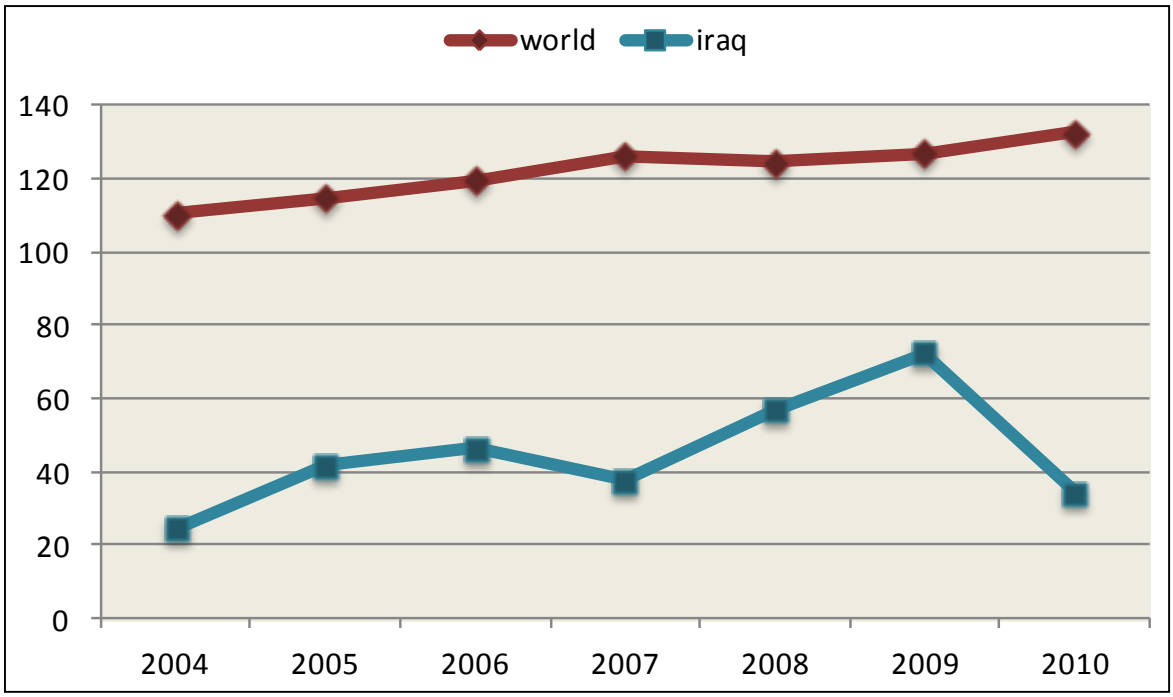
It is possible to notice that in Iraq the fertilizers consumption (expressed as percentage of fertilizers production) always exceeds the line representing the average consumption (as percentage of production) of fertilizers of the world; the important remark about this Graph is that, while in average the other countries of the world are using less than they are producing Iraq needs to buy these chemicals from other countries. This figure *per se* does not tell us whether or not fertilizers are efficiently used in the country.

Some more useful information can be deducted from the below Graph, where the kilograms of fertilizers *per* Hectare are shown. In this case the numbers of Iraq are on average well below the "world" figure; this could be a positive signal for the prevention of soil and water contamination from dangerous chemicals; however it has also to be considered that into the category "arable land"[2] are comprised also lands that are temporarily not cultivated or orchards and cultivations for which the use of fertilizers is maybe reduced or absent; this would therefore increase the pressure of fertilizers on the remaining cultivated land, meaning that the use of these products might still be excessive and not responsible.

[2] Arable land includes land defined by the FAO as land under temporary crops (double-cropped areas are counted once), temporary meadows for mowing or for pasture, land under market or kitchen gardens, and land temporarily fallow.

4.1.2. *Indicator 17*

FERTILIZER CONSUMPTION (KILOGRAMS PER HECTARE OF ARABLE LAND)

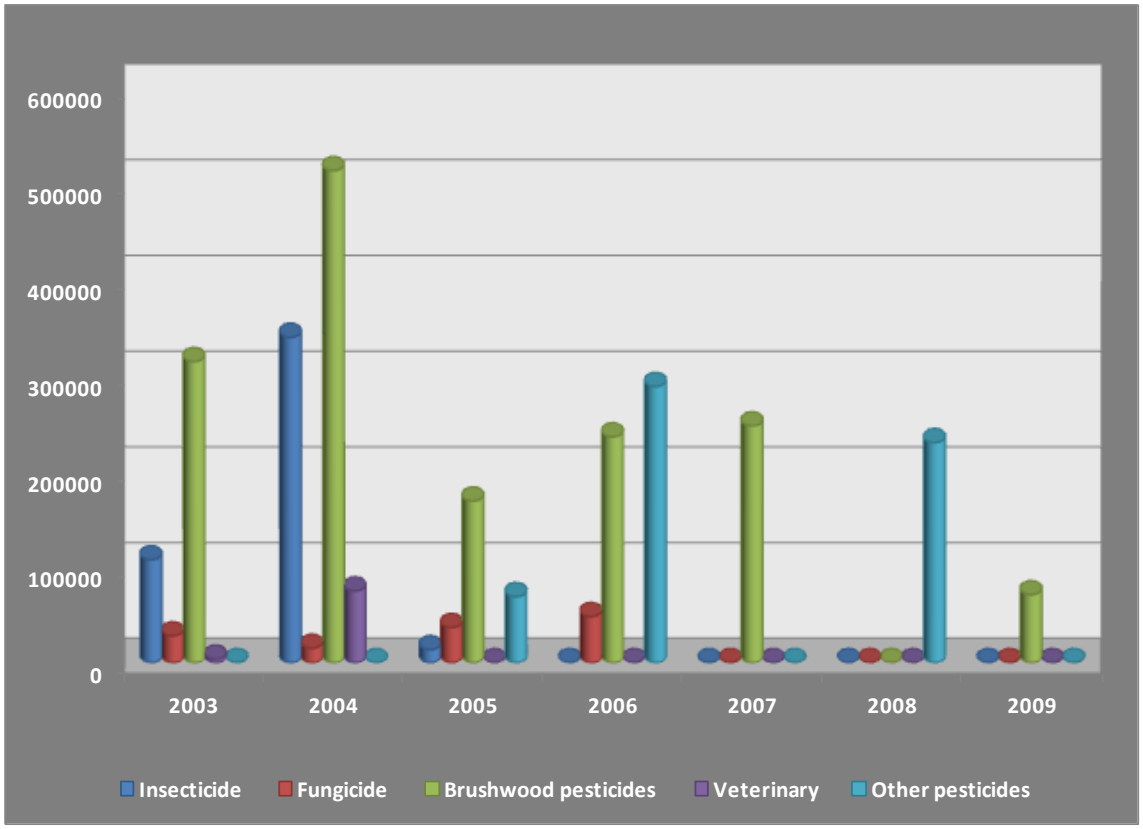


http://data.worldbank.org/indicator/AG.CON.FERT.ZS/countries/1W-IQ?display=graph

Pesticides are like fertilizers, can cause water pollution when erosion carries the chemicals off of the farms along with eroded soils. The majority of pesticides are not specifically targeting the pest only and during their application, they also affect non-target plants and animals. Repeated application leads to loss of biodiversity. Many pesticides are not easily degradable; they persist in soil, leach to groundwater and surface water and contaminate the environment. Pesticides also pose a risk, not only to non-target animal and plant species, but to humans as well; depending on their chemical properties they can enter the organism, bioaccumulate in food chains and consequently influence also human health. Overall, intensive pesticide application results in several negative effects in the environment that cannot be ignored.

The below indicator is showing that high amounts of pesticides have been and are used in Iraq, especially brushwood pesticides, which have been recorded in the very high amount of 92963909 litre in 2010, data not shown in the Graph.

4.1.3. *Indicator 18* — *USE OF PESTICIDES AND HERBICIDES IN IRAQ (LITER)*



Source: Ministry of Agriculture/ state company for agricultural equipments (Environmental Statistics Report for Iraq for 2011)

Table 4: Use of Pesticides and Herbicides in Iraq (litre)

Years	Insecticide	Fungicide	Brushwood pesticides	Veterinary	Other pesticides
2003	107500	27998	314594	3579	unknown
2004	339998	15000	513999	75000	unknown
2005	13553	36677	168914	unknown	69000
2006	187818.5	48126	236001	unknown	288522
2007	789356.7	20137.5	247504	unknown	1
2008	24188.8	13125.7	240649.3	unknown	230026
2009	628451.8	17740.5	70990	unknown	unknown
2010	359093	2387577	92963909	95620	unknown

Source: Ministry of Agriculture/ state company for agricultural equipments (Environmental Statistics Report for Iraq for 2011)

4.2. Socio economic activities

The socio-economic activities can have consistent impacts on natural resources; on the other hand they are also based and dependant on natural ecosystems and on the services these provide to society. Ideally, the best future scenario for a society that aims at living in harmony with nature would be the 'sustainable development'; meaning that the resources, services and benefits that ecosystems provide to society are used in a responsible way, as to grant their long term persistence and that their use is made in such a way as not to deplete them completely and not to damage them in an irreversible way.

Resource depletion and overexploitation, soil and water pollution are the main factors affecting the natural environment and under the umbrella of these factors can be placed all the wide array of threats that are putting the natural systems under pressure. All of these threats are generated as a consequence of economic activities, of the needs of society and (unfortunately too often) to make profit for the benefits of few people. The extreme resource depletion to the primary purpose of profit, neglecting the real needs of the majority of society and the overall human well-being is extremely dangerous and can lead to the final collapse of the national economies and to unpredictable natural disasters.

In order to avoid this danger and to set out a sustainable development path, Iraq should take a number of steps, one of them being the enhancement and promotion of its rural economies based on the ancient and traditional use of natural resources.

4.2.1. *Cultural Heritage and Socio-economic activities based on natural resources*

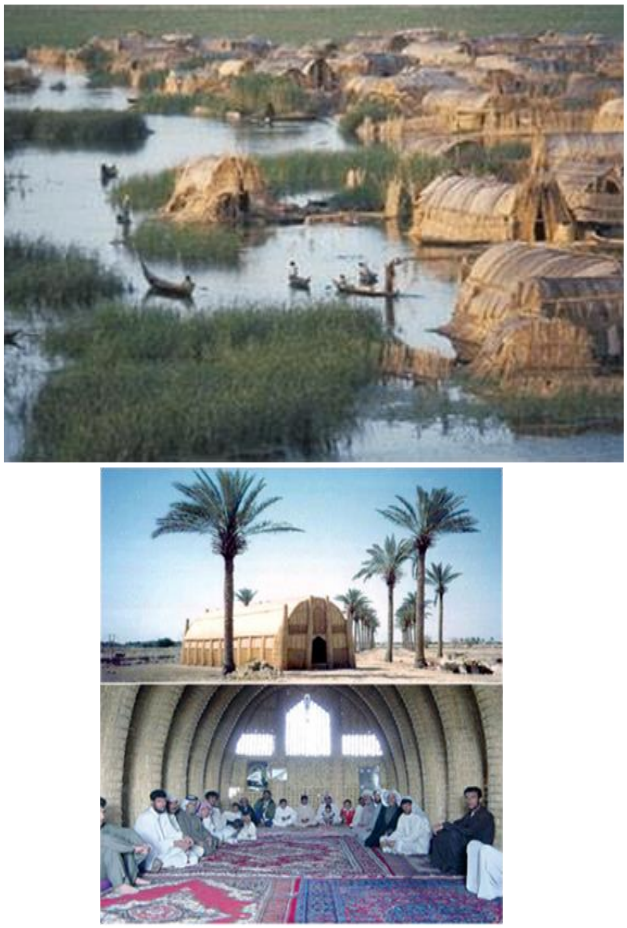
4.2.1.1. Traditional activities and the use of natural resources related to tribal distribution

Many People of Iraq especially in the rural and marshland area depend in their daily life on the natural resources provided by their surrounding environment. There are many economic benefits of the marsh plants and natural resources and the most commonly used are the papyrus (*Cyperus sp.*) and reed (*Phragmites australis*) which grow extensively in large areas and are used to feed buffalo, while the lignified older plants are harvested for many purposes including mats industry, houses building, and paper industry (Thalin, 1979).

Marsh Arabs (the Ma'dan) who inhabit the area live in huts (known as Sarifa's) built from reeds with elaborate latticework entrances and attractive designs that go back to ancient times. It looks like hundreds of islands clustered together into small townships reed houses are the most peculiar features of the marshes. Such houses are built on small artificial islands made out of layers of papyrus and mud. The utilization of reeds and mud houses of all forms has reached an excellent level by traditional standard as reeds are natural (need no treatment) and almost manually transformed without any external tool. This technique confirms the variety and richness of inventions by local builders who made the best possible use of simple and locally available building materials. (Salim, 1970), (Samarai and Azawi, 1997).

The Mudief (guesthouse) is also a special traditional way of making reed houses and it follows a technique thousands years old. The typical mudief is built from a cane skeleton which consists of long and thick bundles for making continuous columns and beams and thin bundles for purling. The skeleton is covered with cane mats. The lower part of the mudief is left open with cane grills to allow the air to pass through during the summer and is closed during the winter with reeds (Samarai, 2008).

Figure 12: typical village in the marshlands and the traditional construction the Mudhief



Date palm cultivation is socio-economically and traditionally important for local populations where the culture thrives (Jain, Al-Khayri and Johnson, 2011). Every part of the palm date tree is put into good use. In ancient times, the leaves were used to build the roof of the hut for desert dwellers, and to weave baskets for date collection and hats to protect from the burning desert sun. To make carpets for use inside the hut was yet another use of leaves. In modern time, the wood from the trunks, and the leaves provide timber and fabric material for houses and fences. The leaves can be made into ropes, cords, baskets, crates and furniture and fruit stalk may be used as fuel (Jambi, 1999).

Figure 13: collecting dates and dates final products

About thirty five animal species that have been domesticated for use in agriculture and food production are the primary biological capital for livestock development and are vital to food security and sustainable rural development. Many indigenous breeds, some of which are threatened with extinction, have characteristics such as resilience to climatic stress and resistance to diseases and parasites, which make them well adapted to local conditions, and which are of great potential importance to future livestock production.

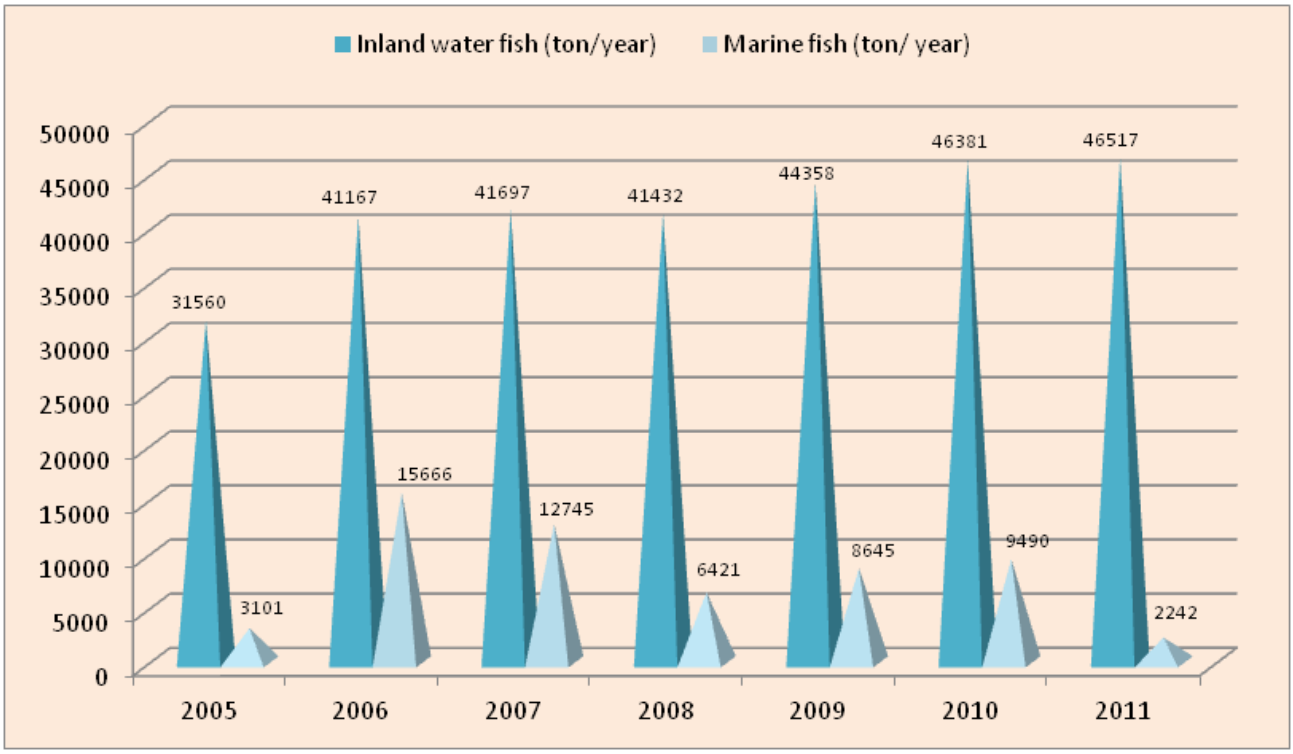
4.2.2.*Fisheries*

Fish are the most species rich group of vertebrates exploited by humans. Since the time of Sumerians and Babylonians, they have provided food and employment through commercial and traditional fisheries as well as recreation and enjoyment in sport fisheries. There is a marine fishing society in Basrah Governorate, which is active in Iraqi territorial waters and the Arabian Gulf, and about 70% of the local fishermen work in this society. There are also some private fishermen companies working in this marine area. (Mahdi 1962, Al-Nasiri and Shamsul-Houda 1975, Banister 1980, Al-Daham 1982, Coad 1991, 1996a, 2010).

The indicator below shows human's dependence on freshwater and marine fishes as a main food source, especially the freshwater fishes; through this indicator it can be noticed the increase of freshwater fish catch through the years. This can be attributed to many reasons, such as the increasing population or an increasing fish demand from local and international markets. Considering these high figures, it can be expected that the use of fish resources is unsustainable and this might probably lead to overfishing and a future decrease in fish catch with deleterious consequences for the local economy and for the fishery resources of the area, that are already subject to a number of other pressures.

4.2.3.*Indicator 17*

ANNUAL FISH CATCH OF FRESHWATER AND MARINE RESOURCES



Source: The Iraqi Ministry of Planning / Central Bureau of Statistics 2012

4.2.4.*Livestock breeding*

Livestock resources are contributing to the country's economy and human well-being by directly providing for food and by indirectly contributing to increase gross national income (GNI). The increase of gross national income however is not always giving the right measure of human well-being, being this latter based also on intangible values and goods and services provided by natural resources that are often neglected from these calculations. Nevertheless, in a country such as Iraq, where poverty alleviation and satisfaction of primary needs of a big part of society remains a priority, the livestock and poultry breeding plays an important role in enhancing food availability. It has also to be remarked that the animals as shown in Table 5 below are usually bred in an extensive way and they are often owned by nomadic shepherds or by the Marsh Arab tribes (the Buffalo) and are therefore causing less impacts on the environment in terms of the disposal of the typical intensive breeding waste. However it is still worth mentioning that the grazing from herds of nomads groups or other shepherds is one of the major impacts that have been identified in steppe and desert ecosystems (Thalen, D.C.P., 1979; Nature Iraq, 2010).

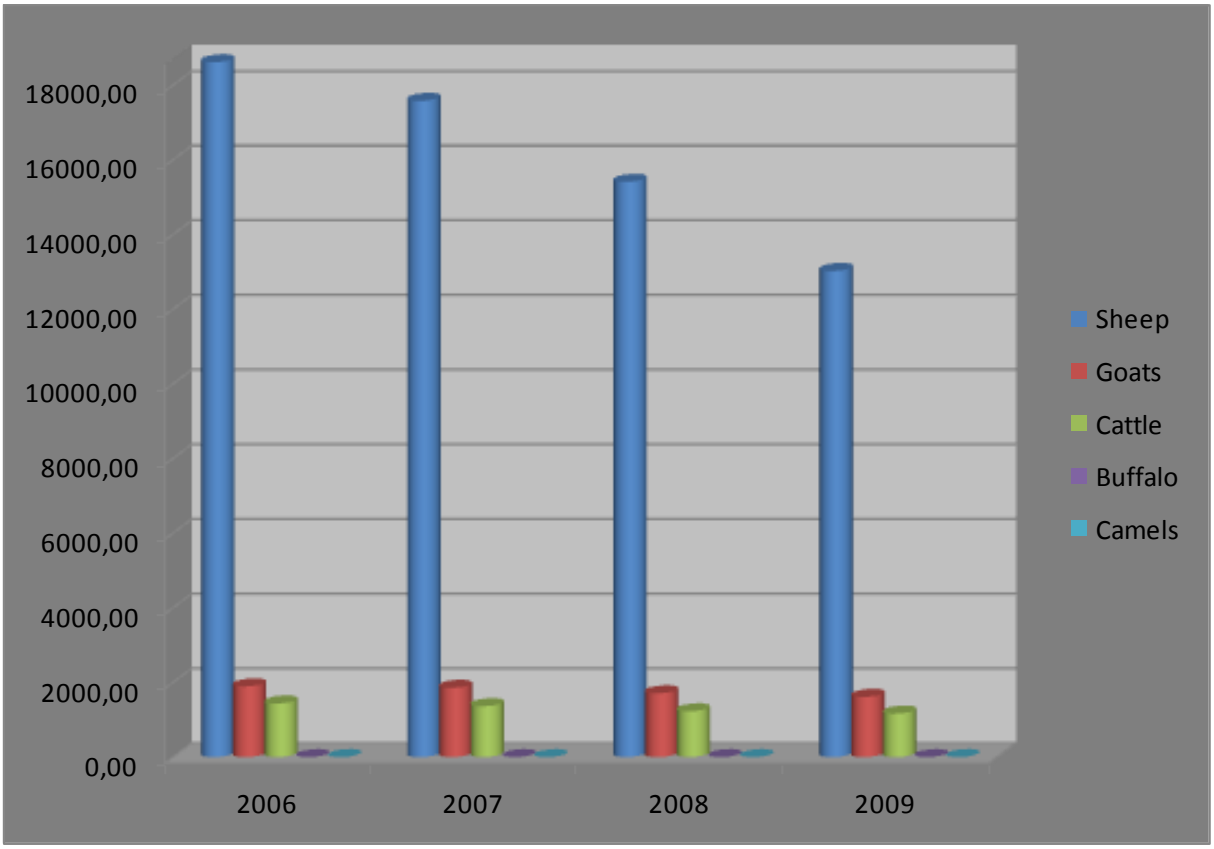
Table 5: Iraq livestock estimates (2006–2009; million head; includes KRG)

Livestock	2006 Iraqi Ministry of Agriculture	2007 USDA Baghdad	2008 USDA Baghdad	2009 USDA-Baghdad	% Change
Sheep	18.615	17.580	15.412	13.025	-30
Goats	1.897	1.860	1.710	1.614	-15
Cattle	1.437	1.365	1.228	1.166	-25
Buffalo	0.146	0.146	0.146	0.146	-0-
Camels	0.009	0.009	0.009	0.009	-0-

Source: the latest GAIN Report from USDA Foreign Agricultural Service.

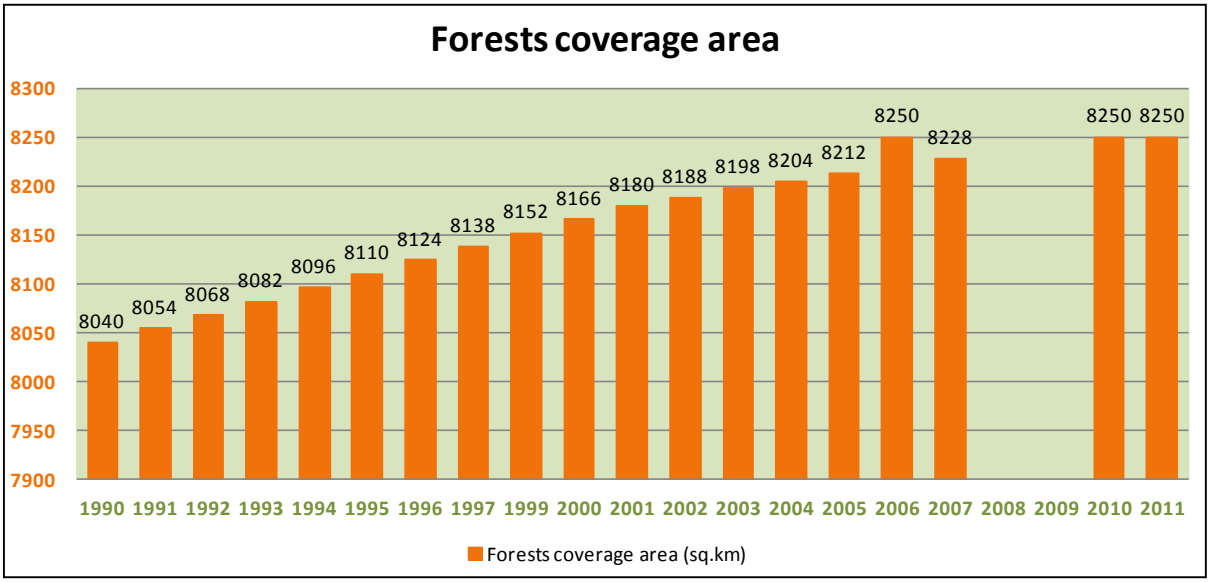
4.2.5.*Indicator 18*

IRAQ LIVESTOCK ESTIMATE 2006-2009
(MILLION HEADS)



4.2.6. *Forestry*

As already mentioned in Indicator 2.2.2, the forest coverage (in sqKm) in Iraq was last reported as 8250 in 2010, according to a World Bank report published in 2012. This coverage represents a slight increase as compared to the years two thousands and especially as compared to the nineties figures.

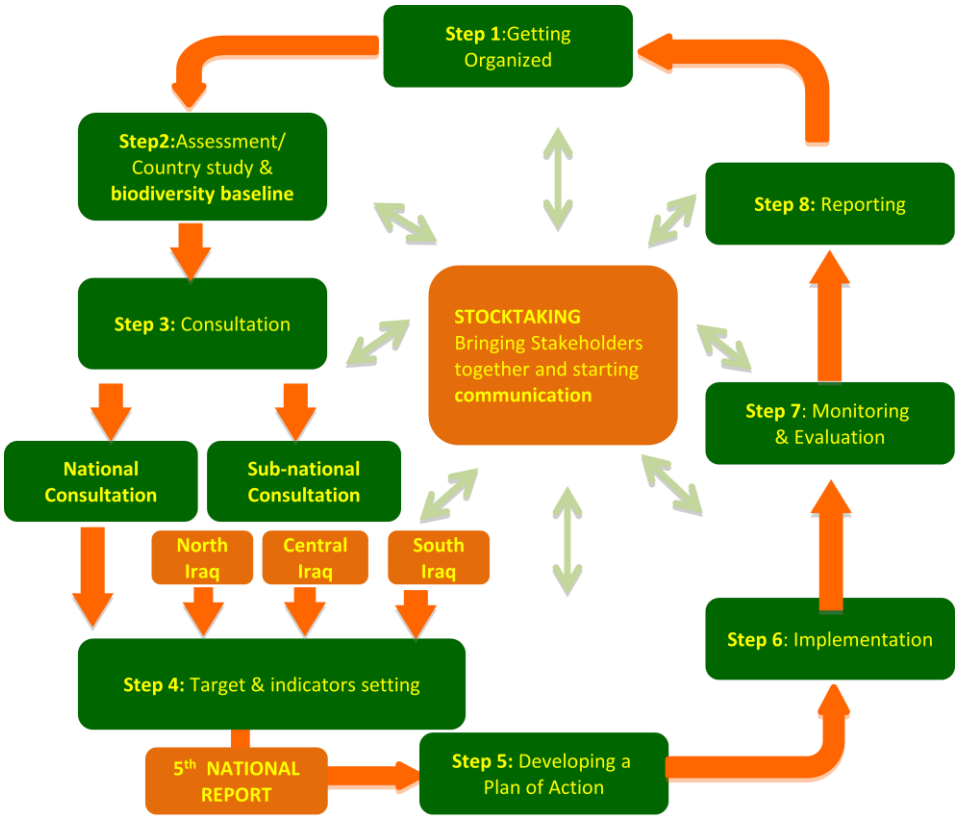


Source: http://www.tradingeconomics.com/iraq/forest-area-sq-km-wb-data.html

Concerning the forestry industry in Iraq and to what extent this industry might play a role in the trends of forest coverage of the country, it can be said that Iraq produces very little timber from its natural forests so most of the requirements, especially in constructional timber and high-grade furniture wood, have to be imported.

In 1938, the value of timber imports amounted to IQD. 440,000 ($2,150,000); it is evident that Iraq, due to the nature of its territory and to the low coverage in natural forests (as compared to the majority of the country land) will be always dependent on timber imports. The natural forests that are left in Iraq need active and effective management and protection and their exploitation for forestry purposes should be avoided. Reforestation interventions are in most of the cases very expensive, require high volumes of water and are often made with non-native species that can spread into the natural environment and damage the local resources.

Part II - The National Biodiversity Strategy and Action Plan (NBSAP), its implementation, and the mainstreaming of biodiversity



5. The Biodiversity Targets in Iraq

Iraq is in the process of developing its first National Biodiversity Strategy and Action Plan. At the moment of writing, according to Figure 1, the focus of work is on the development of the 5th National Report; in between Step 4 and Step 5 of the overall process. As an output of a broad consultative process with relevant stakeholders Iraq has set its national targets, within the framework of the Aichi Biodiversity Targets. These are reported as follows with the corresponding Strategic Goal and Aichi Target of reference.

Iraqi Target 1 *By 2020, 25% of urban and rural people have awareness of the status of biodiversity, its benefits for people, the pressures that affect it, and the actions they can take for its conservation and sustainable use*	**Aichi Target 1** *By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.*	***Strategic Goal A*** *Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society*
Iraqi Target 2 *By 2020, 50% of policy makers and planners have awareness of the status of biodiversity, its benefits for people, the pressures that affect it, and the actions they can take for its conservation and sustainable use*		
Iraqi Target 3 *By the end of 2015, a national survey of tools used for public awareness of biodiversity is completed.*		
Iraqi Target 4 *By 2020 the use of tools (films, publications, educational programmes, guidance materials, and training) for raising awareness of biodiversity is improved with locally defined, area based and targeted awareness programs (e.g. governorate level)*		

Iraqi Target 5 *By the end of 2020, a GIS database of the extent, condition (i.e. healthy or degraded) and protection status of the natural (not altered by human intervention), semi-natural and human modified habitats of Iraq has been developed.*	**Aichi Target 5** *By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.*	**Strategic Goal B** *Reduce the direct pressures on biodiversity and promote sustainable use*
Iraqi Target 6 *By the end of 2020, the reasons for loss and degradation (i.e. the species that used to be present in that habitat are not there anymore, and the services that the people expected or used are reduced or absent) of each of the natural (not altered by human intervention), semi-natural and human modified habitats of Iraq have been identified to inform conservation actions.*		
Iraqi Target 7 *By the end of 2015 the main pressures on forest ecosystems are identified and studied*		
Iraqi Target 8 *By the end of 2020, legislation to address the main pressures on forest ecosystems and native forest species is issued, promoting sustainable management, restoration and conservation.*		
Iraqi Target 9 *By the end of 2020, about 1,000 square km of desertified shrubland grassland is restored*		
Iraqi Target 10 *By end of 2016 a national monitoring programme is established for identification of the main sources and diffusion paths of chemical and physical pollutants in the natural ecosystems and the effects of pollution on natural ecosystems*	**Aichi Target 8** *By 2020, pollution, including from*	

Iraqi Target 11 *By the end of 2018 environmental standards are issued and enforced for prevention and control of priority pollutants in the natural (not altered by human intervention), semi-natural and human modified habitats of Iraq.*	*excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.*	
Iraqi Target 12 *By the end of 2014 a decree is issued for the establishment of protected areas in Iraq.*	**Aichi Target 11** *By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.*	***Strategic Goal C*** *Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity*
Iraqi Target 13 *By the end of 2014 at least three training workshops on PA management have been conducted*		
Iraqi Target 14 *By the end of 2015 a study and GIS maps of the most sensitive habitats (i.e. under high level of threats and containing high numbers of globally threatened species) have been developed.*		
Iraqi Target 15 *By the end of 2020 ten new Protected Areas have been gazetted and established*		
Iraqi Target 16 *By the end of 2016 a national assessment is published of the state of provisioning, regulating and cultural services supplied by natural ecosystems and their importance for rural and urban people and on management options to be developed for the sustainable supply of ecosystem services*	**Aichi Target 14** *By 2020, ecosystems that provide essential services, including services related to water, and contribute to*	***Strategic Goal D*** *Enhance the benefits to all from biodiversity and ecosystem services.*

Iraqi Target 17 *By the end of 2018 a national strategy/subnational strategies are established for the sustainable management of ecosystems to supply important ecosystem services for rural and urban people*	*health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.*	
Iraqi Target 18 *By the end of 2016 legislation is enacted to control the introduction and diffusion of non-native species into the natural environment*	**Aichi Target 9** *By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.*	**Strategic Goal B** *Reduce the direct pressures on biodiversity and promote sustainable use*
Iraqi Target 19 *By the end of 2020, the list of invasive species of Iraq and their impacts and invasion pathways has been published.*		
Iraqi Target 20 *By the end of 2020 the list of threatened species of Iraq has been published and an action plan for the conservation of priority species is produced*	**Aichi Target 12** *By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.*	***Strategic Goal C*** *Improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity*
Iraqi Target 21 *By 2020 legislation for the conservation of threatened species is issued and enforced*		

Iraqi Target 22 *By the end of 2020, a survey of indigenous and local communities' traditional knowledge, use and practices relevant for the conservation and sustainable use of biodiversity is published.*	**Aichi Target 18** *By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels*	***Strategic Goal E*** *Enhance implementation through participatory planning, knowledge management and capacity building*
Iraqi Target 23 *By 2016 a Resource Mobilization Plan for implementation of the NBSAP is established and implemented*	**Aichi Target 20** *By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011- 2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.*	

6. Biodiversity indicators to monitor progress in the implementation of the NBSAP

In order to monitor progress in the implementation of the Strategy and towards the achievement of the Strategic goals of the Convention, Iraq has set a number of indicators under some of the national targets.

Not all of the Iraqi targets were transformed and split up into indicators: some of them were already phrased in such a way to represent actions to be fully implemented at a given time; some others are considered too complex and too data deficient to be implemented in the short time and will be therefore postponed to the Action Planning phase for further research and data collection.

According to the above the following indicators have been drafted, trying to set as a maximum three indicators for each target and with an indication about the timeframe of their development. For those targets that are phrased as actions, an indication about the timeframe of completion is also provided.

IRAQI TARGET	INDICATOR	ACTION	TIMEFRAME
Target 1 Awareness of common people increased	1. Membership of environmental organizations		Short term
	2. Number of scholarships or higher education programs devoted to biodiversity and ecosystem services		Short term
	3. Number of TV, Radio commercials etc. on biodiversity		Short term
Target 2 Policy makers' awareness increased.	1. Number of actions or strategies put in place by policy makers for BD protection		Short term
	2. % of policy makers that have taken action about biodiversity		Short term
Target 3 Survey on awareness raising tools completed.		☑	Short term
Target 4 Use of communication tools improved	1. Number of awareness raising tools implemented at governorate level		Short term
	2. Coverage (%) of administrative units (sub-district level) where awareness raising initiatives have been organized		Short term
	3. Number of target groups		Short term

IRAQI TARGET	INDICATOR	ACTION	TIMEFRAME
	addressed for awareness raising initiatives		
Target 5 GIS database on habitats		☑	Medium term (action planning)
Target 6 Reasons for habitat loss identified	1. Number of habitats for which the reasons of loss have been identified		Medium term (action planning)
	2. Area of natural habitats lost		Medium term (action planning)
	3. Area of degraded habitats.		Medium term (action planning)
Target 7 Pressure on ecosystems		☑	Medium term (action planning)
Target 8 Legislation on forest protection		☑	Medium term (action planning)
Target 9 Restoring desertified land	1. Area (Km2) of desertified land all over Iraq		Short term
	2. Number and types of restoration measures adopted		Medium term (action planning)
	3. Coverage (Km2) of restored areas		Medium term (action planning)
Target 10 Monitoring pollution		☑	Short term
Target 11 Issuing environmental standards		☑	Short term
Target 12 Issuing decree for protected areas		☑	Short term
Target 13 Training workshops on PA carried out		☑	Short term
Target 14 GIS on sensitive habitats		☑	Medium term (action planning)
Target 15 PA establishment	1. Number of existing protected areas		Short term
	2. Number of proposed protected areas		Short term
Target 16 Assessment of ecosystem services		☑	Long term (action planning)
Target 17 National strategy on sustainable management of ecosystems		☑	Medium term (action planning)
Target 18 Legislation is issued against introduction of non-native species into natural environment		☑	Short term

IRAQI TARGET	INDICATOR	ACTION	TIMEFRAME
Target 19 List of invasive species of Iraq		☑	Medium term (action planning)
Target 20 List of threatened species of Iraq is published		☑	Medium term (action planning)
Target 21 Legislation for protection of threatened species issued		☑	Medium term (action planning)
Target 22 Survey on traditional knowledge		☑	Medium term (action planning)
Target 23 Resource mobilization plan established and implemented		☑	Short term

7. Successful stories to implement the Convention in Iraq

As already mentioned, Iraq is relatively new Party to the Convention and therefore it is in the on-going process of complying with the many obligations that are set under the CBD framework. This process is complex, also considering that Iraq has passed through war and that it is still sadly facing nowadays terrorism, civilian and social destabilization that are summing up the environmental emergencies with the most urgent ones like health and security.

In this context it is certainly noteworthy the progress and the efforts made to focus the attention of both the institutional and the common people level, on the importance of biodiversity and environmental protection, striving to pass over the message that 'our health, well-being and life depend on a healthy environment'.

The first successful story for Iraq concerning the implementation of the Convention relates to the cross-sectoral institutional involvement that has been achieved under the coordination of the Iraqi Ministry of Environment for the development of national strategies and action plans concerning the environment and biodiversity.

1. The development of the National Environmental Strategy and Action Plan for Iraq (NESAP).
2. The development of the National Biodiversity Strategy and Action Plan (NBSAP)
3. The collection of data for the 5NR to the CBD

Both the strategies (of which only the NESAP is completed) have adopted a participatory approach, between the MOE, acting as the national umbrella supervising all environmental related activities and actions, and the involved institutional stakeholders (all ministries, various Committees of the Parliament Council).

The data collection for the 5NR report is another successful story for Iraq's implementation of the Convention; further details on this issue are reported as Annex; a Ministry of Environment dedicated Team has repeatedly visited and surveyed main scientific and technical information sources nationally; trying to fill the gaps of information that have already been recognized as a main issue in the Fourth National Report. The most recent findings of the KBA Programme have been reported as concerns the field work and field surveys; recent scientific articles and discoveries have been searched from national libraries, from the web and from personal communication/sources with local experts and scientists. This methodical research has allowed not only enriching and increasing the data archives about the environment in Iraq; but has also contributed to spread the message of biodiversity importance thereby raising the awareness among the contacted stakeholders.

The second successful story for the Iraqi implementation of the Convention deals with the local level and active stakeholder involvement in the protection of biodiversity.

The services that the ecosystems provide consist of a wide range of benefits of which the local people are the direct and main beneficiary. At the same time, the most effective effort that can

protect and conserve the local natural resources, including biodiversity, comes from the local people themselves. The idea of educating and building the capacity of the locals everywhere and especially around the KBAs ensures the best approach for the protection measures that can be taken.

In Iraq the establishment of a network of protected areas is on-going; studies and researches are currently taking place, as well as the necessary stakeholder involvement and consultations, in order to declare and manage sustainably a number of noteworthy natural areas of the country. In considering the protected areas issue and with special reference to cross cutting issue of protected areas and traditional knowledge, in Iraq there are currently two sites that are alredy protected to a certain extent, on base of customary law in one case and of a local conservation group in another case. These two excellent examples of local intitiatives to protect biodiversity are: Barzan Tribal protected area (Kurdistan Nature Watch) and Dalmaj marsh (Friends of Dalmaj).

Both local conservation groups were founded by themselves pushed by the belief of their belonging and ownership of their areas and by the necessity of protecting the beauty of the landscape and the natural components of their important places for themselves and for next generations.

Friends of Dalmaj (FoD) Local Conservation Group (LCG)

This conservation group was founded locally by the Iraqi Organization for Conservation of nature (IOCN) at early 2010, and the members of the group have proved genuine commitment towards the on the field protection, tough on a small scale. Some experts (including international) have visited Dalmaj area and met some members of FoD.

Kurdistan Nature Watch

This local conservation group is located in Barzan mountain, Kurdistan Region of Iraq. The local tribal group living in part of this mountain committed themselves to the protection of this woodland and shrubs landscape, mainly by not allowing hunting or clear-cutting activities. In this way the natural features of the area have been preserved from substantial changes.

Tough the above stories might be perceived as little achievements as compared to the huge quantity of issues that are addressed by the Convention and that still need to be taken into account by Iraq, knowing the Iraqi context and current situation they are indeed big steps of progress towards the implementation of the Convention.

8. National Biodiversity Strategy and Action Plan to incorporate Biodiversity Targets and to Mainstream Biodiversity

Iraq has no previous NBSAP in place. The focus here will be in the description of relevant actions and implementation of measures of similar strategies, in particular reference will be made to the “National Environmental Strategy and Action Plan for Iraq” (NESAP) (2013-2017). Through this strategy, Iraq is achieving target no. 2 about the “integration of biodiversity values” of the CBD Strategic Plan 2010-2020.

	On-going projects/actions of the NESAP	Iraqi target (NBSAP)	Strategic Plan of the Convention 2010-2020	Threats addressed
1.	Overall assessment of climate change for priority sectors		Target 15 Ecosystem Resilience	Climate Change
2.	Development of a national strategy to adapt to climate change		Target 15 Ecosystem Resilience	Climate Change
3.	Implementation of adaptation activities in the most fragile sectors, regions and ecosystems in partnership with civil society		Target 15 Ecosystem Resilience	Climate Change
4.	Establishment of the national center for climate change		Target 15 Ecosystem Resilience	Climate Change
5.	Enactment of laws, legislations and determinants of gas emissions		Target 15 Ecosystem Resilience Target 8 Pollution reduction	Climate Change/ Pollution
6.	The private sector partnerships in controlling the emissions		Target 15 Ecosystem Resilience Target 8 Pollution reduction	Climate Change/ Pollution
7.	Installing of air control quality stations in northern governorates and develop an environmental plan for the most polluted areas in cities and governorates' centers.	Target 10 Target 11	Target 15 Ecosystem Resilience Target 8 pollution reduced	Climate Change/ Pollution
8.	Cleaner fuel and its necessary specifications and legislations	Target 10 Target 11	Target 8 pollution reduced Target 3 Incentives	Climate Change/ Pollution
9.	Monitoring and assessment of desert, draught and assessing rain amount for 2015.		Target 15 Ecosystem resilience	Drought
10.	Environmental awareness of the harm caused by random incineration		Target 1 Biodiversity Awareness Target 8 Pollution	Pollution
11.	Building a database on craft industries in Iraq	Target 22	Target 18 Traditional knowledge	Loss of knowledge
12.	Identifying the national air pollutants standards	Target 10 Target 11	Target 8 Pollution reduced	Pollution
13.	Linking air quality monitoring units (establish a monitoring network)	Target 10	Target 8 Pollution reduced	Pollution
14.	Conducting studies and research on air quality monitoring		Target 8 pollution reduced	Pollution
15.	Assessing the environmental damages caused by the brick factories polluting air in Nahrawan area		Target 8 pollution reduced	Pollution
16.	Establishing air quality control system in Baghdad and the governorates	Target 10 Target 11	Target 8 pollution reduced	Pollution
17.	Developing a program for monitoring and control of different water resources and sources of pollution	Target 10 Target 11	Target 8 pollution reduced	Pollution
18.	Remote sensing project (investment) to monitor the water quality of the	Target 10 Target 11	Target 8 pollution reduced	Pollution

	On-going projects/actions of the NESAP	Iraqi target (NBSAP)	Strategic Plan of the Convention 2010-2020	Threats addressed
	Euphrates, Habbaniyah Lake and discharges flown into them (Anbar Environment Directorate)			
19.	Operational project to implement quality systems (ISO) in Baghdad Directorate	Target 10 Target 11	Target 8 pollution reduced	Pollution
20.	Development of environmental monitoring and early warning systems			Pollution
21.	Improvement of quality of water resources in northern governorates through developing monitoring and install remote sensing systems		Target 8 pollution reduced	Pollution
22.	Development of national environmental database and atlases		Target 19 Biodiversity Knowledge	Lack of knowledge
23.	Using remote sensing techniques and GIS for the Marshlands M&E	Target 5 Target 14	Target 5 habitat loss Target 19 Biodiversity Knowledge	Habitat Loss/ Natural system modifications/ Lack of knowledge
24.	Taking advantage of recycling water and materials in the Marshlands communities		Target 4 use of natural resources Target 15 Ecosystem Resilience	Pollution
25.	Including the Marshlands in the international and regional agreements		Target 19 Biodiversity Knowledge	
26.	Establishing a program to monitor and locate sewage disposal in rivers (to be included within the sewage systems development plan)	Target 10 Target 11	Target 8 pollution reduced	Pollution
27.	Issuance of instructions on the use of treated wastewater for the purposes of irrigation	Target 10 Target 11	Target 4 use of natural resources Target 8 pollution reduced	Pollution
28.	Encouragement of programs of cleaner production and recycling in plants and facilities to stop discharging wastes	Target 10 Target 11	Target 4 Sustainable productions and consumptions Target 8 pollution reduced	Pollution
29.	Monitoring and control of water quality in the downstream estuary	Target 10 Target 11	Target 8 pollution reduced	Pollution
30.	Removing the remnants of war (mines, warships, shipwrecks) from environment of the Marshlands and wetlands (MDF)	Target 5 Target 14 Target 10 Target 11	Target 5 habitat loss Target 8 pollution reduced	Pollution
31.	Management and use of soil and land and mapping of degraded soils (MDF)		Target 4 sustainable productions and consumptions	Agricultural expansion and intensification Wood/shrubs cutting/ Transportation and service corridors

	On-going projects/actions of the NESAP	Iraqi target (NBSAP)	Strategic Plan of the Convention 2010-2020	Threats addressed
32.	Raising awareness about urban expansion to agricultural lands and orchards.	Target 1 Target 2 Target 6 Target 7	Target 1 Biodiversity Awareness Target 5 Habitat loss Target 7 Area under sustainable management	Uncontrolled urban expansion
33.	Monitoring of desertification and land degradation using remote sensing	Target 5 Target 14	Target 5 habitat loss Target 19 Biodiversity Knowledge	Agricultural expansion and intensification Wood/shrubs cutting/ Transportation and service corridors
34.	Mapping of desertification and vegetation at the national level (198)	Target 5 Target 9	Target 5 habitat loss Target 19 Biodiversity Knowledge	Agricultural expansion and intensification Wood/shrubs cutting/ Transportation and service corridors
35.	Environmental awareness in the fight against desertification (MDF)	Target 1 Target 2 Target 9	Target 1 Biodiversity Awareness	Lack of awareness
36.	Raising awareness to decision maker level on implementing green belts in Baghdad and governorates	Target 2	Target 1 Biodiversity Awareness	Lack of awareness
37.	Reduction of soil contamination from chemicals and oil products (MDF)	Target 10 Target 11	Target 8 pollution reduced	Pollution/ Energy Production and Mining
38.	Rehabilitation of lands contaminated with mines	Target 10 Target 11	Target 15 Ecosystem Resilience Target 8 pollution reduced	Pollution/ Energy Production and Mining
39.	National plan to study marine pollution sources (including land-based sources, etc.)	Target 10 Target 11	Target 8 pollution reduced Target 10 pressure on coral reefs and other vulnerable ecosystems	Pollution
40.	Development of a response plan for oil spill from crude oil exporting facilities in Basra, Khor Al Amaya Oil Terminal, Umm Qasr, and Khor Al Zubair (being prepared by JICA under the Japanese loan)	Target 10 Target 11	Target 8 pollution reduced	Pollution/ Energy Production and Mining
41.	Strategic action for regional cooperation to reduce pollution and protect marine environment	Target 10 Target 11	Target 8 pollution reduced	Pollution
42.	Preservation of biodiversity in the marine environment	Target 15 Target 17	Target 11 protected areas Target 10 pressure on coral reefs and other vulnerable ecosystems	Pollution/ Over exploitation/ Invasive Alien Species/ Natural

	On-going projects/actions of the NESAP	Iraqi target (NBSAP)	Strategic Plan of the Convention 2010-2020	Threats addressed
				System modifications
43.	Integrated management of Iraqi coast	Target 15 Target 17	Target 11 protected areas Target 10 pressure on coral reefs and other vulnerable ecosystems	Pollution/ Over exploitation/ Invasive Alien Species/ Natural System modifications
44.	Developing the coastal environment	Target 15 Target 17	Target 10 pressure on coral reefs and other vulnerable ecosystems Target 4 sustainable productions and consumptions	Pollution/ Over exploitation/ Invasive Alien Species/ Natural System modifications
45.	Modernizing the marine and coastal environment laws and legislation	Target 15	Target 17 NBSAP adopted as a policy instrument	Pollution/ Over exploitation/ Invasive Alien Species/ Natural System modifications
46.	Establishment of national protected areas network	Target 9 Target 12 Target 15 Target 20 Target 17	Target 11 protected areas Target 5 habitat loss Target 12 threatened species Target 18 traditional knowledge	Protection of endangered and local species, to improve habitats status and reduce the pressures
47.	Biodiversity protection in the marshlands	Target 12 Target 20	Target 11 protected areas Target 12 threatened species Target 4 sustainable productions and consumptions.	Protect endangered and local species, improve habitats status and reduce the pressures
48.	Maintaining areas of natural heritage	Target 22	Target 18 traditional knowledge	Maintaining natural heritage is part of traditional knowledge.
49.	The national strategy for biodiversity		Target 2 Integration of Biodiversity values Target 17 NBSAP adopted as a policy instrument	Lack of policy and legislation addressing biodiversity concerns
50.	Mapping of important areas of biodiversity and birds	Target 5 Target 14	Target 19 Biodiversity Knowledge	Lack of knowledge
51.	Inventory of biodiversity and lists of endemic and endangered species	Target 20	Target 12 threatened species Target 19 Biodiversity Knowledge	Lack of knowledge
52.	Strategy of invasive species control	Target 18 Target 19	Target 9 invasive species Target 3 incentives	Avoid the effect of invasive species on

	On-going projects/actions of the NESAP	Iraqi target (NBSAP)	Strategic Plan of the Convention 2010-2020	Threats addressed
			reformed	local biodiversity
53.	Establishment of stations for breeding of endangered Iraqi deer	Target 20	Target 12 threatened species	Loss of threatened species
54.	Animal genetic resources		Target 13 genetic diversity maintained	Loss of genetic diversity
55.	Genetic fingerprinting		Target 13 genetic diversity maintained	
56.	The national framework for biosafety in accordance with Cartagena Protocol			
57.	Implementation of the National Program for Biological safety in accordance with Cartagena Protocol			
58.	Integration of biodiversity in the curricula of research, education and training	Target 4	Target 1 Biodiversity Awareness	Lack of knowledge/ awareness on biodiversity
59.	Activation of eco-tourism		Target 4 sustainable productions and consumptions	Over-exploitation of natural resources for touristic purposes
60.	Developing the institutional framework for biodiversity management		Target 2 Biodiversity values integrated	Lack of policy level awareness
61.	Monitoring and activation of compliance with laws	Target 8 Target 11 Target 18 Target 21	Target 2 Biodiversity values integrated Target 17 NBSAP adopted as a policy instrument	Lack of policy implementation
62.	Capacity building for the biodiversity related staff.	Target 13	Target 19 Knowledge improved, shared and applied	Lack of knowledge/ Awareness on biodiversity
63.	Outreach and inventory of cultural environmental heritage	Target 22	Target 18 traditional knowledge	
64.	Awards for actors in Biodiversity	Target 1 Target 2 Target 4	Target 1 Biodiversity Awareness	Lack of knowledge/ Awareness on biodiversity
65.	Awareness campaigns of using environmentally friend bags (paper and non-paper) instead of plastic bags.	Target 1 Target 2 Target 4	Target 1 Biodiversity Awareness Target 8 Pollution reduction	Lack of knowledge/ Awareness on biodiversity / Indiscriminate waste dumping
66.	Raising awareness of school students of all levels on waste differentiation	Target 1 Target 2 Target 4	Target 1 Biodiversity Awareness	Lack of knowledge/ Awareness on biodiversity
67.	Building of a database for all contaminating activities in the northern	Target 10 Target 11	Target 8 pollution reduction	Lack of knowledge/

	On-going projects/actions of the NESAP	Iraqi target (NBSAP)	Strategic Plan of the Convention 2010-2020	Threats addressed
	governorates			Awareness on biodiversity
68.	Impact of agricultural pesticides on the Marshlands environment (206)	Target 10 Target 11	Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution
69.	Environmental Awareness Project on materials hazardous chemicals	Target 1 Target 2	Target 1 Biodiversity Awareness	Awareness
70.	Project environmental awareness of farmers about the safe use of pesticide	Target 1 Target 2	Target 1 Biodiversity Awareness	Awareness
71.	Enacting environmental legislation for use of the environmental inspection guide in cooperation with the Legal Department (MDF)	Target 10 Target 11	Target 8 pollution reduced Target 2 Biodiversity values integrated Target 17 NBSAP adopted as a policy instrument	Lack of policy implementation
72.	Environmental assessment of mercury pollution in Iraq (203)	Target 10 Target 11	Target 8 pollution reduced	Pollution
73.	Modernizing legal framework for the environment	Target 8 Target 10 Target 11 Target 12 Target 18 Target 21	Target 2 Biodiversity values integrated Target 17 NBSAP adopted as a policy instrument	Lack of policy implementation
74.	Enactment of environmental legislation to use the Environmental Inspection Guide in collaboration with the Legal Department	Target 8 Target 10 Target 11 Target 12 Target 18 Target 21	Target 2 Biodiversity values integrated Target 17 NBSAP adopted as a policy instrument	Lack of policy implementation
75.	Collaboration with academic bodies to conduct applied researches		Target 19 Biodiversity Knowledge	Lack of knowledge/ Awareness on biodiversity
76.	MoE institutional development		Target 19 Biodiversity Knowledge	Lack of knowledge/ Awareness on biodiversity
77.	Institutional support for civil society institutions and non-governmental organization.		Target 19 Biodiversity Knowledge	
78.	Support and completion of Iraq's accession to regional and international conventions and agreements		Target 19 Biodiversity Knowledge	
79.	Environment workers efficiency improvement		Target 19 Biodiversity Knowledge	
80.	Environmental awareness and education among parliamentarians, decision makers, religious leaders and opinion leaders	Target 1 Target 2	Target 1 Biodiversity Awareness	Awareness

	On-going projects/actions of the NESAP	Iraqi target (NBSAP)	Strategic Plan of the Convention 2010-2020	Threats addressed
81.	Environmental awareness and education among communities, women and youth	Target 1 Target 2	Target 1 Biodiversity Awareness	Awareness
82.	Environmental awareness in the most vulnerable areas	Target 1 Target 2	Target 1 Biodiversity Awareness	Awareness
83.	Environmental incentives, competitions and awards	Target 1 Target 2	Target 1 Biodiversity Awareness Target 3 Incentives	Awareness
84.	Developing air quality management system	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution
85.	Water quality evaluating system	Target 10 Target 11	Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution
86.	Environmental and ground water monitoring system	Target 10 Target 11	Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution

	On-going projects/actions of the NESAP (which are addressing specific issues of pollutions or human health)	Iraqi target (NBSAP)	Strategic Plan of the Convention 2010-2020	Threats addressed
1.	Monitoring, inspection and testing of landfills	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution
2.	Environmental assessment of military manufacturing facilities	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution
3.	Inventory of hazardous waste (types and quantities) in Iraq	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution
4.	Control and treatment of hazardous waste	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution
5.	Environmental assessment of contamination with mercury in Iraq	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution
6.	Study on establishing landfills for hazardous waste	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution/ Loss of knowledge/ Awareness on biodiversity
7.	Raising awareness to health offices on sorting medical wastes from normal wastes.	Target 1 Target 2	Target 1 Biodiversity Awareness	Pollution/ Awareness on Biodiversity
8.	Raising awareness on waste management of all its types for young and students of all levels.	Target 1 Target 2	Target 1 Biodiversity Awareness	Pollution/ Awareness on biodiversity
9.	Locating and establishing hazardous waste landfills using remote sensing technology	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution
10.	Issuing rules, regulations and determinants for the transfer, circulation, storage, processing and dumping of hazardous	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution

	On-going projects/actions of the NESAP (which are addressing specific issues of pollutions or human health)	Iraqi target (NBSAP)	Strategic Plan of the Convention 2010-2020	Threats addressed
	waste			
11.	Raising awareness on the risks of dealing with hazardous wastes and safe disposal and means of reducing it	Target 1 Target 2	Target 1 Biodiversity Awareness	Awareness
12.	Modelling of oil pollution movement within coastal and aquatic environments and soil	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution/ Energy Production and Mining
13.	Introduction of remote sensing technology to control oil pollution	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution/ Energy Production and Mining
14.	Acceding to the international and regional oil agreements	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution/ Energy Production and Mining
15.	Minimize oil pollution incidents	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution/ Energy Production and Mining
16.	Raising awareness to the workers in oil sector on environmental and health risks of oil pollution	Target 1 Target 2	Target 1 Biodiversity Awareness	Awareness
17.	Development of a response plan for oil spill from crude oil exporting facilities, prepared by JICA and the stakeholders of South Oil Company and the other concerned ministries (the first phase of the plan above has been prepared and the second phase is being prepared. The organogram, tasks and the bylaw will be developed along with all the requirements of the operation centre to combat oil pollution in the southern area).	Target 10 Target 11	Target 8 pollution reduced	Pollution/ Energy Production and Mining
18.	Early warning of oil pollution in water bodies	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution/ Energy Production and Mining
19.	Regional linking of the systems of environmental monitoring and early warning system (oil)	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
20.	Oil pollutant data bank	Target 10 Target 11	Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
21.	Development of safety and contingency plans to control oil disasters	Target 10 Target 11	Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
22.	Preparing information on the radioactive materials circulated within the public and private sectors	Target 10 Target 11	Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
23.	Training staff on radioactive sources M&E	Target 1	Target 1 Biodiversity	

	On-going projects/actions of the NESAP (which are addressing specific issues of pollutions or human health)	Iraqi target (NBSAP)	Strategic Plan of the Convention 2010-2020	Threats addressed
	systems	Target 2	Awareness Target 19 Biodiversity Knowledge	
24.	School awareness on radiation risks and handling ways	Target 1 Target 2	Target 1 Biodiversity Awareness	Awareness
25.	Conducting comprehensive radiological surveys of radioactively contaminated sites	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
26.	Assessment of radiation effect of oil industry (radioactive survey to measure radon in all oil companies)	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
27.	Closing destroyed nuclear facilities and sites	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution/ Energy Production and Mining
28.	Radiological evaluation of military industrial facilities	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution/ Energy Production and Mining
29.	Building of a material base for treatment and storage of radioactive solid waste	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
30.	Drafting a law on granting licenses for radioactive materials transfer, circulation and storage licensing	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution/ Energy Production and Mining
31.	Conducting specialized radiological scans for goods at border crossings	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution/ Energy Production and Mining
32.	Capacity building in the field of licensing, inspection and obtain certificates of inspectors under the ISO 17020	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	
33.	Regulatory control to manage, store and dispose of the waste of natural origin resulting from industrial activities and oil	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
34.	The regulatory control of the Facilities dismantling of past Iraq's nuclear program and former management of radioactive waste resulting therefrom.	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
35.	ISO system	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
36.	Developing a map for radiation of Iraq	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced	Pollution/ Energy Production

	On-going projects/actions of the NESAP (which are addressing specific issues of pollutions or human health)	Iraqi target (NBSAP)	Strategic Plan of the Convention 2010-2020	Threats addressed
			Target 19 Biodiversity Knowledge	and Mining
37.	The preparation of legislation, instructions, and rules covering regulatory control to ensure the safety of nuclear and radiation.	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
38.	Early Warning and linking the national system regionally	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution/ Energy Production and Mining
39.	Assessment of HR needs in the environment sector		Target 19 Biodiversity Knowledge	
40.	Drafting of an environment HR development plan		Target 19 Biodiversity Knowledge	
41.	Assessment of lead contaminating in Iraq	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution
42.	Rapid assessment of mercury pollution in contaminated sites	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution
43.	Developing of a national record of hazardous wastes	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution
44.	Monitoring program for storage methods of chemicals and pesticides	Target 10 Target 11	Target 3 Incentives Target 8 pollution reduced Target 19 Biodiversity Knowledge	Pollution

9. Actions taken to implement the CBD Convention since the 4th National Report and outcomes of these actions

2010 was an important year for Iraq; in this year the first Report about the status and the future perspectives on biodiversity of the country was produced. The issuance of this report, tough not perfect, had also the invaluable function of initiating for Iraq the process of reporting and complying with the obligations of the Convention on-going and working, as this report demonstrates.

The process of spreading and divulgating biodiversity messages and background among people and policy makers in Iraq is very difficult and complex, due to a serious lack of environmental awareness at all levels. For this reason the process of implementing the CBD Convention and the related actions taken to that purpose are still struggling in an adverse environment. However, and considering the major lack of awareness, financial resources, security, coordination and cooperation among institutions, significant progress has been achieved by Iraq in the last 4 years towards major issues of the CBD Convention.

9.1. NBSAP and related activities

As a result of an Iraqi Ministry of Environment initiative with the logistical and financial support of GEF and UNEP, the enabling activity project "First NBSAP for Iraq and Development of Fifth National Report to the CBD" has been initiated as of November 2012.

The process of drafting the Strategy is on-going, but relevant achievements have been reached as parts of the overall process. In particular main stakeholders involved with biodiversity issues have been identified and a number of workshops and meetings have been organized.

9.1.1. *Outcomes of the first steps of the NBSAP*

The consultation meetings have led to the identification of the Iraqi national priorities and targets concerning biodiversity, to be inserted and developed in the Strategy and subsequent action planning.

9.2. National Environmental Strategy and Action Plan of Iraq (2013-2017) (NESAP)

This Strategy has been issued in June 2013 by the Iraqi Ministry of Environment with the support of UNEP and UNDP. The document addressed all environmental issues and concerns in Iraq and provides for actions and objectives within the time frame set.

Many issues of the NESAP are cross-cutting and addressing biodiversity concerns and issues that will be covered and developed also in the NBSAP of Iraq.

10 strategic objectives have been set in the strategy; for each of them various indicators and projects have been defined. The strategy has been spread and divulgated at all institutional level and some of the projects identified are on-going.

9.2.1. *Outcomes of the NESAP*

Implementation of some projects beneficial to biodiversity and that are contributing to achieve the objectives of the CBD Convention.

9.3. GEF Project: Initial steps for the Establishment of the National Protected Areas Network

In July 2013 Iraq has received the approval from GEF for the initiation of the activities to establish its National Protected Areas Network.

The project aims at designing the first national system of protected areas in Iraq, at institutional strengthening, protected areas system implementation and awareness increasing at all levels.

At the time of writing, the preparation of all necessary project documents is on-going.

9.3.1. *Outcomes of the initial steps for the establishment of the National Protected Areas Network*

This project will allow to establish the network of PAs nationally and to contribute to the accomplishment of the PoWPA programme.

9.4. Draft list of proposed protected areas (under the umbrella of the PoWPA programme of the Convention)

The Iraqi Ministry of environment (MOE), in order to fulfill with the requirements of the Programme of Work on Protected Areas of the CBD Convention, has drafted a document in which, taking into account relevant information provided in the Key Biodiversity Areas work of Nature Iraq, a first list of 17 protected areas has been proposed, as of December 2013.

The document is in the process of review and approval by the Ministries' Council of Iraq.

9.4.1. *Outcomes of the Protected Areas Draft Document*

Approval of the first 17 protected areas of Iraq by the Ministries' Council.

9.5. Legislation on PAs

Legislation named the "System of protected areas" has been approved in Iraq and entered into force according to the Council of Ministers' decree No. 139 in 2014. The system was prepared by the National Committee for the study on protected sites (which was formed under the leadership of the Ministry of Environment with a membership of the relevant authorities). The law is intended to set the requirements and criteria for the establishment and management of protected areas, considered as one of the most important ways to preserve biodiversity and protect the environment; thereby preserving all its components, including important natural and cultural heritage. The law encompasses 13 articles, which are summarized below:

Article 1: It defines the most important terms used globally in relation with protected areas, and among the others: biodiversity, geological diversity, national park, eco-tourism, threatened species, habitats, sustainable development in addition to a number of other terms.

Article 2: It deals with the formation of a national committee for protected natural sites, which will be chaired by the Ministry of Environment and with the membership of the relevant authorities and institutions that will perform administrative controls.

Article 3: It reviews and list the most important duties and functions of the Committee mentioned

in Article 2, such as the evaluation of the proposed sites for declaration as a protected areas, the coordination with international experts and organizations; the indication on how to manage the sites and the classification of those sites, develop the necessary plans for the management and preparation of environmental awareness programs. In addition this article lists a number of other tasks for the Committee.

Articles 4, 5, 6, 7: these articles include the baseline conditions and criteria to propose a site as protected area.

Article 8: It explains the baseline of the protected areas management through the development of plans and the necessary administrative controls.

Article 9: It sets the prohibitions and forbidden actions that cannot be carried out within the protected area because they negatively affect biodiversity and habitats.

Article 10: It provides for exemptions under which the Ministry of Environment can allow to perform certain (normally forbidden) activities within the protected areas.

Article 11: It provides for sanctions and punitive provisions as established under the law to protect and improve the environment nr. 27 of 2009.

Article 12: It sets coordination activities between the Ministry of Environment and Ministry of Agriculture to issue relevant instructions (ministerial decrees), when needed.

Article 13: It endorses the implementation of the above articles from the date of publication in the National Official Gazette.

9.6. National park declaration

The Central marshes of southern Iraq have been declared as a protected area in accordance with Council of Ministers' Decision No. 289 in 2013. The Iraqi government will have the duty of implementing the management plan which is designed to create a close correlation between the goals of the protection of natural and cultural heritage and the necessary measures to promote the development of social and economic aspects and improve quality of life for the local population.

The national park is located in southern Iraq between the provinces of Maysan in the north and Thi Qar in the west, and bounded on the east side by Basrah province (West Qurna. The central marshes are fed naturally by the Tigris River through Pitera, Al-Areeth and Al-Majar Al-Kabeer branches, and Al-Gharraf River branching from the Tigris River from the city of Kut, and across the Shatt al- Abu Lihya feeding channels on the western site of Abu Zirig marsh.

The Central Marshes is the first site that was announced as a protected area since the first re-flooding of the southern marshes in 2003. The National Park category is defined (according to IUCN classification) as Category II ***National Park: It is a protected area is managed mainly for ecosystem protection and recreation***.

The purpose of this declaration is to protect the ecological integrity of one or more ecosystems for the present and future generations, removal and prevention of exploitation of resources and maintenance of environmental geomorphologic and aesthetical values. Thus the maintenance of the natural or semi-natural state of the area,

which takes into account the needs of the local population and ensures their livelihoods, is the focal issue of the National Park establishment. The main environmental goal of the National park is the protection and promotion of biodiversity, restoration of ecosystems of the marshes and, on a larger scale, to encourage the establishment of environmental corridors between the marshes and find a management system suitable for the whole Mesopotamia marshes complex, in addition to the revival and protection of all identified archaeological sites.

The National Park will retain a coherent and close relationship between the cultural and natural environment, reflecting a living and working landscape for the Iraqi Marshlands in general.

9.7. World Heritage

The project for nominating World Heritage sites in Iraq started in 2009, it was funded by the Italian government and implemented by the Ministry of Environment and several other ministries, together with the United Nations Environment Programme (UNEP) and *United Nations Educational, Scientific and Cultural Organization* (UNESCO). UNEP and UNESCO have been working on building capacity of Iraqi staff about the sustainability of the Iraqi marshes and on maintaining biodiversity.

A national committee for the project was formed, headed by the Ministry of Environment, represented by Dr. Ali Abdul-Zhra Al-Lami /the ministry advisor with the membership of a number of relevant authorities (Secretariat of the Council of Ministers, Ministry of Planning, Ministry of Water Resources, the provincial council of Basrah, Maysan and Thi Qar, and the Ministry of Tourism and Antiquities).

Also a national skilled team was formed to write the nomination file for World Heritage, trained on the concepts of the World Heritage Convention and how to write and prepare a nomination file. The project ended with the preparation of the nomination file of Iraqi marshes as a mixed site on the list of World Heritage that carries natural and cultural values.

The nomination file was signed by both Excellencies the Minister of Environment and the Minister of Tourism and Antiquities on the 23rd of January 2014.

The file was submitted to the World Heritage Committee in Paris / UNESCO Centre to be revised and then presented to the consultative agencies to evaluate the nomination file and clarify the importance of the chosen site, as it would represent the first mixed site in the Arab world within the world heritage sites.

9.7.1. *The nomination file "the marshes of southern Iraq: a refuge of biodiversity and evidence of the cities of Mesopotamia civilization "*

The preparation of the nomination file of Iraqi southern marshes as a national sequential and mixed property for natural and cultural heritage, consists of 7 sequenced sites and includes 4 components of the natural heritage, and 3 components of cultural heritage, these sites extend in the provinces of Muthanna, Maysan, Thi Qar and Basrah, with a total area of 211.544 hectares.

<u>The components of natural heritage include:</u>

-Al-Hawizeh marsh with an area of 48131 hectares (Maysan province)

-Central Marshes with an area of 62435 hectares (Maysan and Thi Qar)

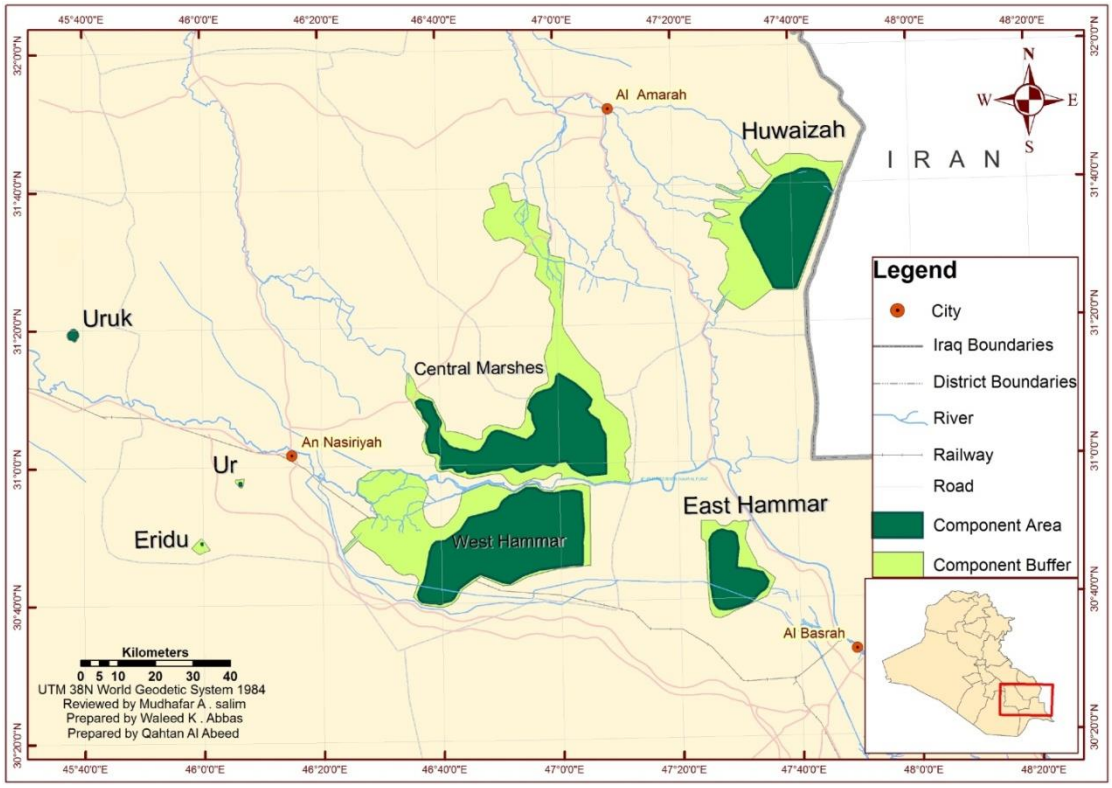
-The eastern marsh of Al-Hammar with an area of 20342 hectares (province of Basrah)
-The western marsh of Al-Hammar with an area of 79991 hectare (the province of Thi Qar)

<u>The Components of cultural heritage include</u>

-Uruk site with an area of 541 hectares (Muthanna province)
-Ur with an area of 71 hectares (Thi Qar)

-Eridu with an area of 33 hectare (Thi Qar)

Figure 14: components of the World Heritage nomination file



<u>The Exceptional World Value</u>

The natural component considered in the nomination procedure are the Key Biodiversity Areas (KBA), Important Bird Areas (IBA), and Important Plants Areas (IPA) criteria found in the overall area, in addition to the fact that the Hawizeh marsh has already been included in the Ramsar sites as a wetland of international importance, and the Central marshes have been declared as a national park.

The different biotic and abiotic properties of Iraqi southern marshes are considered the main reason in the development and evolution of a number of endemic taxonomic orders, in addition the area of the marshes of southern Iraq and their habitats have global importance to aquatic birds' communities, representing an important breeding area globally. This migration area is located within the migration routes of west Siberia -Caspian-Nile, one of the three main migration pathways of Western Palaearctic for ducks, and of the West Asia-East Africa migration route, considered one of the main world migration paths for Waders and Shorebirds.

The cultural components considered refer to the ancient history related with the growth and decay of ancient urban centres of southern Mesopotamia, Sumerian communities, and even from the Babylonian period. The archaeological unique heritage represents the baseline reference in the development of cultures and urbanized human societies, by having provided the foundations of urban planning and hydraulic works as well as the first writing system, leaving a civilization imprinting that will last forever.

9.8. KBA book publication

The KBA programme was initiated in 2005 by Iraqi MOE in coordination with Nature Iraq with support from the Canada-Iraq Marshlands Initiative (CIMI) and BirdLife International. CIMI and BirdLife supported much of the initial training of the project teams and the first exploratory bird surveys in southern Iraq to test field methods. Major funding since 2006 came from the Italian Ministry of Environment, Land and Sea.

As a result of these activities, at the time of writing, a comprehensive inventory to document the Key Biodiversity Areas (KBAs) work of Iraq is under review for final publication.

The main goal of the KBA programme was to identify areas of outstanding importance for their biodiversity and to provide a foundation for developing a protected area network in Iraq.

9.8.1. *Outcomes of the KBA inventory and its publication*

When the KBA Inventory will be published and publically available to biodiversity stakeholders, scientists and policy makers, it will be a sound tool to inform conservation and management actions for most of the habitats of Iraq.

9.9. CITES

Iraq became the party 180 to CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora). And according to the law No. 29 in 2012, CITES became an obligation on Iraq. The convention will be under the duties of the Ministry of Environment with the help of other ministries and institutions. The Convention will enter into force for Iraq on 6 May 2014.

Iraq is home to a variety of fauna and flora, of which over 100 are included in the CITES Appendices, including Arabian oryx, red deer, fallow deer, common jackal, grey wolf, red fox, Eurasian lynx, leopard, brown bear, Asian wild ass, red-breasted goose, Eurasian spoonbill, various birds of prey, whale shark, knifetooth sawfish and several Euphorbia species (a flowering plant).

9.9.1. *Outcomes of the initial steps for implementing CITES in Iraq.*

- Two bodies (scientific and administrative) have been formed.

- Authorized people have been identified to sign the permits and CITES certificates, and the general secretary of CITES have been informed with the names.

- Identifying and organizing the work mechanism is on-going.

9.10. CMS

A decree No. 114 in 2014 has been issued from the minister's council with an agreement on Iraq's

accession to CMS (the Convention on the Conservation of Migratory Species of Wild Animals). and implementation of Iraq's commitments towards the convention will be under the duties of the Ministry of Environment with the help of other ministries and institutions.

9.11. AEWA

A decree No. 144 in 2014 has been issued from the minister's council with an agreement on Iraq's accession to AEWA (Agreement on the Conservation of African-Eurasian Migratory Waterbirds). And Implementation of Iraq's commitments towards the convention will be under the duties of the Ministry of Environment with the help of other ministries and institutions.

10. Mainstreaming of Biodiversity into Relevant Sectoral and Cross-sectoral Strategies, Plans and Programmes

Biodiversity management is complex and requires the active and effective participation of stakeholders not only at different levels of government, but also in the large number of sectors potentially impacting the environment. Coordination and mainstreaming of Biodiversity in the national strategies is essential.

For biodiversity to become a top priority nationally, its relevance to livelihoods, poverty and national development needs to be highlighted. On the national level, Iraq can accomplish this through incorporating biodiversity-relevant issues into all the national strategies that have or might have cross-cutting issues with biodiversity, such as: the National Environmental Strategy and action plan for Iraq (2013-2017), the National development plan (2010-2014), the Higher education strategy, the Poverty Reduction Strategy, the Health Strategy, the Energy Strategy(INES), the Water and Land Resources Strategy (SWRLI), that might contribute in supporting and improving the quality of life and biodiversity as well as ecosystems protection and restoration. Other plans and strategies that are cross-cutting biodiversity issues are provided as Annex.

10.1. National Environmental Strategy and action plan for Iraq (2013-2017)

In the following paragraph are reported a number of points that are cross-cutting biodiversity subjects and issues contained in this Strategy:

- A target on protecting and improving water quality which promote sustainable water resources management and improve scarcity and quality of marshlands water and this habitat recovery.
- A target on control of land degradation and to combat desertification. This target is aiming at solving issues about the land use such as its management and the identification of the degraded areas, the desertification spots, soil pollution and degraded vegetation.
- A target to maintain marine and coastal environment, which promotes the water quality in the marine environment, the sustainable management of marine fisheries, biodiversity protection, the establishment of marine and coastal protected areas and rehabilitation of degraded coastal habitats.
- A target on protection and sustainable use of biodiversity, which promotes: long term maintenance of ecosystems and biodiversity, comprehensive field survey using standard qualitative and quantitative methods for monitoring and detecting future changes, environmental management techniques to restore natural biodiversity, identification of endangered ecosystems, establishment of protected areas, establishment of gene bank of local species, identification of local species, ecotourism, promotion of biodiversity into different education *curricula*, updating legislation and regulations and raising environmental awareness and public participation.

- Targets on reduction of oil pollution, radioactive contamination and integrated management of hazardous chemicals, which promote enhancing institutional and legislative structures by developing deterrent legal procedures, strengthen the regulatory system and public participation in order to reduce the effects of oil exploration and radiation contamination on ecosystems and biodiversity, identifying the chemicals spread into environment.

10.2. National development plan (2010-2014)

This strategy cross-cuts biodiversity issues concerning the following points:

- A chapter on agriculture and water resources promoting sustainable use, the protection of agricultural land management and providing for the required water quantity and quality. Water resources management and land reclamation together with rural development are foreseen through the term of the plan, to raise all levels of rural societies. This chapter also promotes the maintenance of biological diversity and the increase in number of the natural protected areas as well as the maintenance of the ones that are currently existing and the establishment of gene banks.
- A chapter on social status brings forward the achievement of the objectives of poverty alleviation and the national efforts to achieve the millennium development goals. A chapter on sustainable development promotes the improvement of the environmental situation of Iraq, by addressing: water quality, soil quality, desertification, and the improvement of environmental awareness.

10.3. National Strategy on higher education

In this Strategy reference is made to sustainable development in Iraq, with a view to develop the capacity of scientific community in this field.

10.4. Poverty Reduction Strategy

The biodiversity-poverty relationship is complex; it is a multi-domain (ecological, social and economic), multi-scale and multi-actor issue.

The millennium development goals (MDGs) fulfill the same overarching function for poverty reduction efforts. Goal 7 of the MDGs, includes a target to “reverse the loss of environmental resources”, also this goal highlights the importance of maintaining ecosystems and their restoration for providing services for the locals for improving their livelihood.

A national Strategy on poverty reduction was prepared and approved in Iraq, this highlights that the rural people are facing a poorness more than the urban people because their ability to get benefits from the ecosystem services is decreasing due to continuation of drought, decreasing of water and lack of water policy; together with other critical challenges, and the unsustainable use of the ecosystem resources., All of these factors have led to ecosystem degradation, that, together with the scarce interest and actions taken in restoration

interventions, the lack of financial support from the government or from other sources, and the population increase has resulted in a collective emigration from some of marshland areas and rural villages in search of better opportunities.

10.5. Energy strategy:

The Integrated National Energy Strategy for 2013-2030 (INES) was adopted by the Iraqi Council of Ministers in April 2013. The INES describes the current challenges facing Iraq's energy sector and the opportunities presented by Iraq's energy resources, addressing all the major components of Iraq's Energy Sector: upstream and downstream oil, natural gas, power, and linked industries. The vision is to "*develop the Energy Sector in a coherent, sustainable and environment-friendly manner to meet domestic needs, foster the growth of a diversified national economy, improve the standards of living of Iraqi citizens, create employment, and position Iraq as a major player in the regional and global energy markets*".

The INES Plan is will be developed in three phases, each of which reflects a distinct set of priorities: the short term "Oil Rush" phase, the medium-term "Gas Value Added Phase" and the long-term "Diversified export" phase. The INES Plan is built on 5 Strategic Objectives:

1. Energy Security
2. Government Value Creation
3. Economic Diversification
4. Employment Growth
5. Environmental Sustainability

The Strategy in based on three main scenarios for oil production in the self operated fields:

1. a Low Production Scenario, targeting a 6 million bbl/d production plateau by 2025
2. a Medium Production Scenario, targeting a 9 million bbl/d production plateau by 2020
3. a High Production Scenario, targeting a 13 million bbl/d production plateau by 2017 and a rapid decline beyond 2023)

The current primary strategic objective is to ensure development of the 12 major fields of Iraq. The minimum target production level should be 4.5 million bbl/d in 2014.

The secondary strategic objective is to develop within three years a basis for setting long term production targets. For this purpose, a Petroleum Reserve Management System shall be developed by the Ministry of Oil, in order to organize and analyze the information gathered from current oilfields activities and from the related reports submitted by TSC Operators.

Thereafter, the primary upstream objective will be to manage oil and gas production and develop reserves in accordance with its long term production targets.

As for downstream oil subsectors, the INES includes three main activities: commercializing crude oil as an export product, refining crude oil into oil products suitable for domestic use and export, and distributing refined oil products to domestic customers.

As for the Gas subsector, the primary objective is to develop infrastructure needed to handle and distribute gas production. It is foreseen that by 2015, virtually all of Iraq's gas production should be captured and processed and available for transport to domestic end users, for power

generation and for the development of gas based linked industries, and any potential surplus can be exported.

As for the Power Subsector, the INES foresees that that imports of gas should end by 2016 and crude, heavy crude and liquid fuel oil will be phased out as power fuels. It is planned that natural gas, that currently fuels one quarter of power production, will fuel four fifths by 2030.

Six linked industries are included in the INES, namely petrochemicals, fertilizers, steel, aluminium, cement and bricks, as each of these industries consumes large quantities of energy in the form of power or heating fuel, and the petrochemical and fertilizers industries require large quantities of natural gas components as feedstock for their products. The development of these subsectors will allow Iraq to substantially reduce import of products of these industries for the domestic market and eventually establish a material export flow.

In setting the strategic objectives, the environmental and socio-economic situation of the country is taken into consideration in a specific Socio-economic and Environmental Baseline analysis. The Environmental Sustainability strategic objective is aimed at solving the main environmental issues related to the energy sectors – greenhouse gas emissions, emission of air pollutants, use of freshwater resources, and discharge of liquid effluents, solid waste generation, and land use.

In the INES there is no specific outline of biodiversity conservation objectives, but the importance of environmental sustainability is clearly acknowledged in the outline strategic objectives and development of the INES Plan.

10.6. The Strategy on Water and Land Resources of Iraq (SWLRI)

The objective of the SWRLI project is to define the strategy and the related investment plan that will guide the sustainable management and development of the water and land resources of Iraq for the next twenty-five years. The SWRLI project started in 2010 and is being developed by SGI Studio Galli Ingegneria S.p.A in association with Med Ingegneria (Italy) and El Concorde (USA).

The activities to be performed include data collection, archiving, and analysis, as well as performing all the planning activities required for the development of the Strategy. The planning horizon of the SWLRI comprises the time span from 2010 to 2035, with greater detail for the first five years. The planning process shall be designed to be periodically updated every five years.

The primary outputs of SWLRI studies shall include, but not be limited to, the following:

- Framework for water and land resources strategy for Iraq and preparation of the master plan based on integrated water resources management approach.
- Comprehensive strategy based on international laws and accepted conventions for negotiation with riparian countries in order to ensure efficient and equitable use and benefits of common resources.
- Integrated approach for prioritization of development of infrastructure and capital investment projects from different

sectors that ensure the sustainable development.

As of December 2013, the SWRLI project has entered the strategic planning phase. This phase basically entails two different components: the definition of the strategic guidelines for the sectors involved in the national water resources master plan (the strategic guidelines of some of the key sectors are being discussed and shared with the Iraqi decision makers and stakeholders in a number of high level meetings) and the implementation of different planning scenarios to define the opportunities prioritization and the related investment plan.

The key sectors, for which the SWLRI national water resources master plan will provide the strategic guidelines, are the following:

- Water quantity
- Water quality - reduction and management of water and soil salinity
- Groundwater, including the conjunctive use of groundwater and surface water
- Municipalities & industries - enhancement of the reliability and scope of water delivery system
- Current and future agriculture developments and productivity
- Irrigation and drainage - current and future water allocation for each irrigation project
- Drainage system, including the main outfall drain (mod)
- Energy and hydropower
- Environmentally sensitive areas including the unique Mesopotamian marshes
- Marshland restoration - financial implications
- Managing fisheries
- Navigation and water transport
- Floods - management of water-related hazards - flood mitigation and response
- Droughts - management of water-related hazards - drought mitigation and response
- Water control infrastructure - enhance the national storage capacity & infrastructure to meet year-round needs (dams, reservoirs)
- Management of water resources
- Improvement of sanitation and municipal services
- International waters
- Water & environmental policies
- Institutional arrangements
- Environment
- Reduction and management of water and soil salinity
- Managing desertification
- Managing pastures

Part III - Progress towards the 2020 Aichi Biodiversity Targets and contributions to the relevant 2015 Targets of the Millennium Development Goals

11. Progress made by Iraq towards the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets

In 2009, Iraq signed the Convention on Biological Diversity (CBD) and since then many important steps have been moved towards the building of global environmental awareness at the national level and for biodiversity conservation and management. The Convention covers a number of thematic areas which are related with biodiversity and its conservation in the relevant institutional and socio-economic context. However, due to the recent membership of Iraq into the Convention, its processes to fully and comprehensively implement and take action on all the thematic areas encompassed by the CBD are still on-going. Iraq fourth National Report was issued in 2010; in the same year Iraq actively participated in the 10th Conference of the Parties to the Convention in Nagoya, Japan. The launching of the Strategic Plan of the Convention 2011-2020 and the related Aichi Biodiversity Targets have been taken up by Iraq since then and the country has currently drafted its **23 NATIONAL BIODIVERSITY TARGETS** (as previously described) and is presently drafting its First National Biodiversity Strategy.

The Aichi Targets are very ambitious, especially if they are considered in the Iraqi context. In this section some Aichi Targets will be reviewed, on which some national progress has been achieved (even through sporadic events or isolated actions). They are listed as follows.

Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

In Iraq due to the preparation of the National Environmental Strategy (NESAP) and of the National Biodiversity Strategy (NBSAP), a number of initiatives and events to spread the message of biodiversity have been organized and carried out; globally awareness has been raised through these consultative meetings and informative events.

Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

In Iraq the NESAP incorporates the biodiversity values; through the development of the first NBSAP (on-going) important steps are taken towards the integration of biodiversity values into other strategies (the NBSAP foresees the coordination and mainstreaming with other relevant strategies). Also the NBSAP will be adopted as a policy instrument and will have its own financial mechanism; thereby including biodiversity into national accounting.
A poverty reduction Strategy has been produced and approved in Iraq, partially addressing, as already mentioned, the relationship between poverty and biodiversity as a mean to alleviate problems and economic difficulties especially of rural areas populations.

Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

In the governorate of Qadissyia in the Dalmaj marsh area there is a successful example of sustainable fishery production. The species produced is the local species 'Bunni' (Barbus Sharpeyi) that is bred by a private and then released in the marshlands thereby providing an economically important source for local fishermen.

Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.

As an attempt to fill the knowledge gaps about the alien and invasive species of Iraq and in order to complete the present report, a research group has been informally set under the Ministry of environment. This group has allowed the collection of the baseline information about alien invasive species in Iraq (present from international and national sources) and has set in place the background for establishing and reviewing the National List of alien and invasive species of Iraq.

Target 11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.

A number of steps for the establishment and wise management of protected areas have been accomplished by Iraq, referring in particular to, among the others, the issuance of national legislation on protected areas; the establishment of the first National Park of Iraq (the Mesopotamia marshland National Park); the starting up of a GEF funded project to establish the National Network of Protected Areas and other protected areas related awareness activities.

Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Two important examples of Iraqi genetic diversity and the maintenance of socio-economically and culturally valuable species are represented by the Water buffalos present in the marshland areas and the many date palm races that are cultivated along the Shatt Al Arab River, in Basra governorate. These species could be further promoted and preserved, along with other less visible but still locally important animal and plant species.

Target 17: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

The Strategy is in progress and following up with the participatory approach that has been adopted

up to now; it will be brought to the attention of high level institutional bodies for their subsequent approval and adoption/implementation.

Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant level.

In Iraq, due to a very high ethnographic diversity there are many different cultures, religious groups, tribes, local communities, ethnic groups that have their own traditions, dressing, food, music and practices. A comprehensive review of these traditions and their relation with biodiversity is a complex and lengthy process; however two examples of sustainable uses of biodiversity and customary uses of biological resources are given by the already mentioned local/tribal conservation groups of Dalmaj and Barzan, as described in detail in Chapter 7, above.

Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

Various initiatives, research, trainings, projects from various national and international bodies (universities, research institutions, NGOs, joint ventures, private companies, and cooperation mechanisms) are contributing to gain insight into specific themes and issues concerning the environment and biodiversity. The results of these studies and researches, thanks to various tools such as the web, various on-line datasets, and the international platforms made available by the CBD and the BIP Partnership, and thanks to the efforts of the Ministry of Environment, are becoming more and more widespread and known to the national and international community.

Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011-2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.

A resource mobilization strategy and plan will be drafted as a part of the NBSAP process; the Action Planning phase further requires that the financial resources are mobilized not only by the Ministry of Environment but in a cross-sectoral way from all involved stakeholders and searching out funds from additional sources such as external donors, IGOs and NGOs.

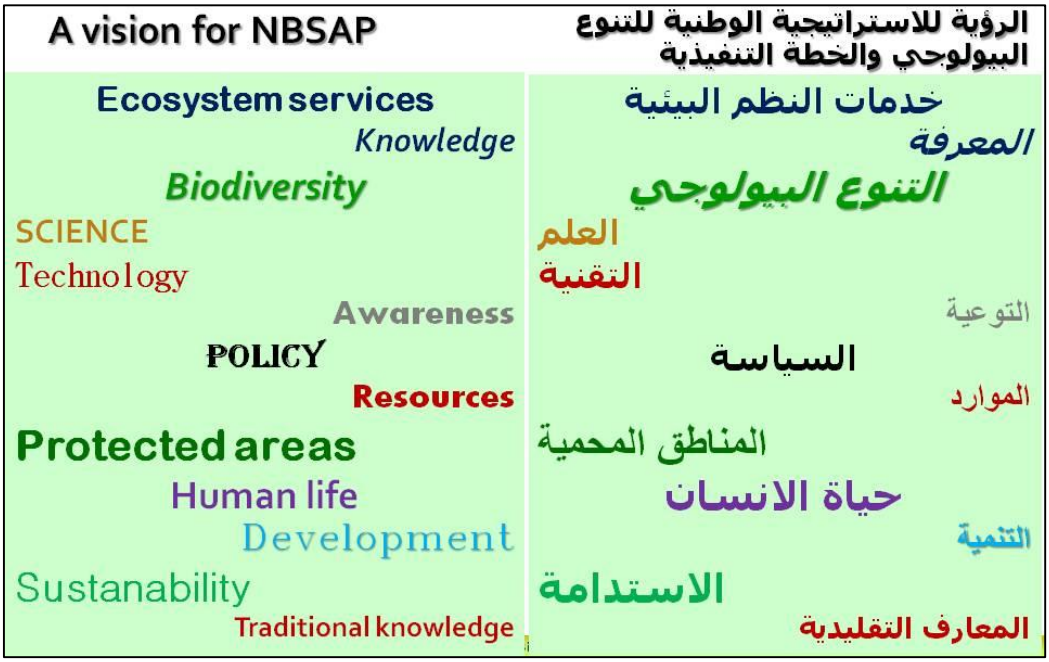
11.1. The action Planning Workshop for the NBSAP

Within the framework of the on-going NBSAP Project, from the 9th until the 11th of March 2014 the "Third National Workshop for the National Biodiversity Strategy and Action Plan of Iraq" was held in Baghdad. This Workshop was carried out following the same approach of the previous ones that have allowed defining the National Priorities and National Targets. Through this consultative meeting with key stakeholders from relevant

national authorities and institutions, the baseline for defining the Action Plan has been set: Iraq has entered **Step 5** of the cyclical process for building/updating the NBSAP. Proceeding from the identified national priorities and Targets, through a participatory approach, the participants have been asked to define specific actions that would allow achieving the national Targets set. For each action they have also been asked to define: the timeline, the source of finance, the responsible body/champion, the implementation mechanism and the possible matching with other strategies.

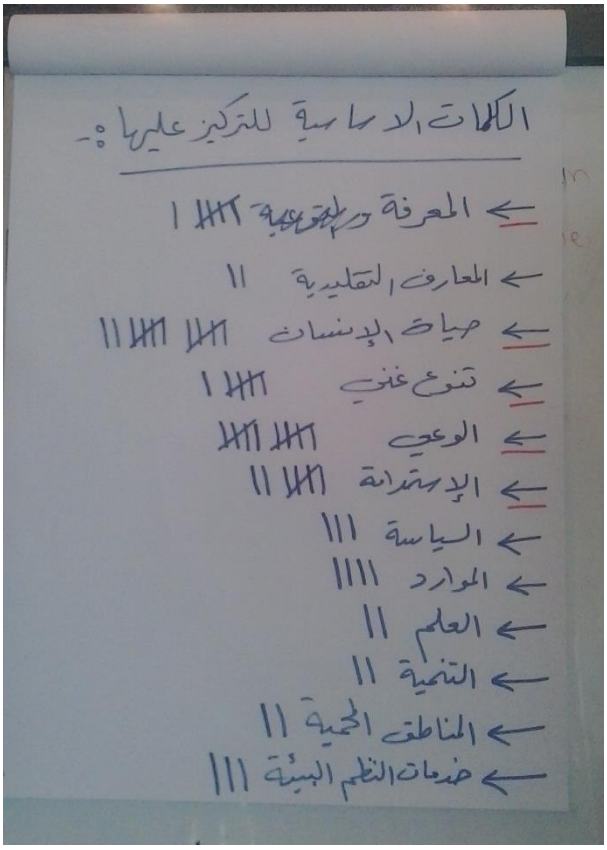
At the end of the Workshop a plenary exercise has been carried out to summarize biodiversity priorities for Iraq and to build the Iraqi Vision and key message/mission for the 2020 scenario.

Figure 15: the process of defining the Iraqi Vision for the NBSAP



The results of the consultation about the priority elements that shall be synthesized in the Iraqi Vision for the NBSAP are shown in Figure 16 below.

Figure 16: the key priority concepts chosen for the Iraqi NBSAP Vision



They show that the key elements identified for building the Vision for Iraq are, according to their priority:

1. Human life (and human well-being)
2. Awareness about the environment and biodiversity at all levels
3. Sustainability of productions and consumptions
4. Knowledge and Biodiversity

These concepts will be further elaborated in order to create a comprehensive Vision and a Mission for Iraq that will incorporate all national concerns and needs.

12. The contribution of actions to implement the CBD Convention towards the achievement of relevant 2015 Targets of the Millennium Development Goals (MDGs) in Iraq

Within the framework of the MDGs Iraq (the Ministry of Planning with support of UNDP) has produced a recent (2013) update of the country progress towards the achievement of the MDGs with target year 2015. There are main issues that are cross-cutting biodiversity themes and are related to Goal 1 “eradicate extreme hunger and poverty” and to Goal 7 “ensure environmental sustainability”.

Biodiversity can clearly contribute to alleviate or eradicate poverty, especially in rural areas, by supporting with fundamental ecosystem functions and services the needs of food, plants and genetic material that can be of particular relevance to local rural population and that can consistently contribute to supply the basic livelihoods. The launching of the rural economies based on the sustainable use of natural resources is maybe present in Iraq as some sporadic experiments; Iraqi Target 17 (sustainable management of ecosystems) and 22 (traditional knowledge) are combining two essential elements that can in the medium-long term partially contribute to the poverty alleviation in rural areas, thereby using the traditional knowledge of local tribes and ethnic groups to sustainably manage natural ecosystems and to receive from them all the necessary livelihoods.

With reference to Goal 7 of the MDGs this is related with water quality and the improvement of water sources and their accessibility to population. This goal cross-cut the already mentioned SWLRI Strategy for Iraq that is on-going and that will provide a comprehensive plan for water resource management nationally. As biodiversity is concerned of course this important issue will also have its direct consequences on the aquatic ecosystems (rivers, marshlands, marine environment) thereby possibly improving the overall quality of waters. On the other hand also the terrestrial ecosystems will be affected by the strategic actions and establishments of the SWRLI Strategy by, for instance, setting in place irrigation schemes that would turn natural habitat into agricultural land.

13. Lessons learned in the Implementation of the CBD Convention in Iraq

It can be said that the implementation of the CBD Convention in Iraq is just started. Nevertheless an important lesson learned that can be very useful for future biodiversity actions comes from the recent consultations that have been carried out by the Ministry of Environment for the preparation of the NBSAP and for the national target setting.

Iraq has been for a long time isolated from any international exchange and communication, various wars and the following difficult periods that are still on-going, are making it very hard and difficult to build a functioning communication network that will involve and reach all concerned stakeholders in a certain issue.

Within this difficult context the consultation meetings that have been organized by the MOE involving and bringing together different actors of the biodiversity world (from the high level institutional bodies, to the NGOs and the representatives of local communities) have proved to be a great success.

The exchange and face-to face discussion has provided therefore both an opportunity of learning and getting to know new things and also the perfect occasion to spread awareness about biodiversity among crucial stakeholders for policy planning and mainstreaming issues.

As a matter of fact, also the capacity of Iraqi staff is increasing and very good progress have been made in a number of subjects, one of the main being biodiversity. Through the capacity and financial support of UNEP, GEF and the CBD Secretariat, among the others, the Ministry of Environment is currently improving and building the capacity of its staff in many biodiversity-related fields, in order to be able in the short-term time horizon to completely fulfil its many and new obligations under all the MEAs to which the country is signatory.

14. Conclusions and Gap assessment

The guidance and the obligations set by the Convention on Biological Diversity are providing every Party with tools and means to constantly improve their national biodiversity situation.

Various programmes of work and frameworks that are cross-cutting relevant biodiversity themes, provide a reference picture for setting a wide variety of measures nationally that will not only improve the national situation on the environmental point of view, but will also contribute to the global achievement of the biodiversity Strategic Goals (2010-2020).

In a context such as the Iraqi one not all the issues can be properly addressed at the present time; however huge efforts and commendable activities have been undertaken, considering the particularly dangerous situation of the country.

Still large areas for biodiversity conservation and human well-being remain uncovered though they would need to be addressed as soon as possible. These gaps in biodiversity conservation and human well-being will be identified by referring to the Strategic goals of the Convention and to the Aichi Targets thematic areas, as summarized in the following Table.

STRATEGIC GOALS AND AICHI TARGETS	GAPS TO BE FILLED
Strategic Goal A	
Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably	- **review the school *curricula* and incorporate biodiversity issues** **- reach out the local communities, the poor and vulnerable as major targets to acquire biodiversity knowledge**
Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	- **proper and complete cross-sectoral mainstreaming of biodiversity values** **- integration of biodiversity values into all relevant national strategies**
Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.	- **review of the negative and positive incentives nationally** **- establish a negotiation round table or a inter-ministerial national committee to remove the negative incentives from national sectoral policies.**
Target 4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	- **review of the projects and production methods (in cooperation with Ministry of Agriculture and with the agriculture departments at the governorates)** **- establishment of a permanent committee Ministry of Agriculture/Ministry of Environment for setting the guidelines for sustainable productions**
Strategic Goal B	

STRATEGIC GOALS AND AICHI TARGETS	GAPS TO BE FILLED
Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	- **produce an updated land cover and habitat map of Iraq** **- assess the rate of habitat loss by comparison with historical sources**
Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	**-establish a permanent inter-ministerial committee to coordinate national policies about the harvesting of aquatic resources** **- implement locally management plans for the sustainable fisheries also taking into account existing positive experiences.**
Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	- **establish the 'sustainability' thresholds for the agricultural, aquacultural and forestry productions**
Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity	- **identify and classify major pollution sources and types nationally** **- set a framework of environmental standards in order to set internationally used and most modern pollution thresholds** **- implement a national monitoring plan on major pollutants** **- set an action plan to halt the contamination of the environment from major pollutants**
Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	**- the final list of alien and invasive speices is approved and reviewed** **- risk assessment and early warning systemprogram is established** **- legislation to address the introduction and diffusion paths of these species is issued and implemented**
Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	- **the pressures on the Iraqi coastal waters and coral reef are specifically identified in order to inform conservation actions**
Strategic Goal C	
Target 11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.	- **the network of protected areas is formally established** **- pilot projects are carried out to start up conservation programmes for the protected areas** **- management authorities and management plans are set in place for the PAs**

STRATEGIC GOALS AND AICHI TARGETS	GAPS TO BE FILLED
Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	- **the list of threatened species of Iraq is issued together with relevant research evidence of the reasons of their threat status** **- target actions (action plans) are set in place to address or remove all or some of the reasons that are driving the decrease of the species**
Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	**- establish a inter-ministerial committee with the Ministry of Agriculture to address this issue** **- identify all the socially and culturally valuable species at the national level** **-set in place specific plans (e.g. also by establishing incentives) to promote and conserve the sustainable production of plants and animals**
Strategic Goal D	
Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	**- Conduct a national assessment about the state of provisioning, regulating and cultural services supplied by natural ecosystems and their importance for rural and urban people and on management options to be developed for the sustainable supply of ecosystem services**
Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	- **identify the ecosystems that are in need of restoration (degraded)** - **set up action plans for ecosystem restoration**
Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	- **ratify the Nagoya protocol** **-implement the Nagoya protocol**
Strategic Goal E	
Target 17: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan	- **complete the first NBSAP for Iraq** **- adopt this framework as policy instrument at the national level**
Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local	- **Conduct a survey of indigenous and local communities' traditional knowledge, use and practices relevant for the conservation and sustainable use of biodiversity** **- integrate local communities' and indigenous peoples' concerns and needs into local policies and plans, by adopting participatory approaches to local-level decision making**

STRATEGIC GOALS AND AICHI TARGETS	GAPS TO BE FILLED
communities, at all relevant levels.	
Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	- **the knowledge, science and technologies related to biodiversity are shared**
Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011- 2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.	- **A resource mobilization strategy and plan will be drafted as a part of the NBSAP process; the Action Planning phase further requires that the financial resources are mobilized not only by the Ministry of Environment but in a cross-sectoral way from all involved stakeholders and searching out funds from additional sources such as external donors, IGOs and NGOs.**

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Annexes

ANNEX 1: INFORMATION ABOUT THE PARTY

REPORTING PARTY	
Contracting Party	IRAQ
NATIONAL FOCAL POINT	
Full Name of the Institution	The Ministry of Environment
Name and Title of Contact Officer	Dr. Ali Al-Lami, Minister Advisor
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Mailing Address	Same
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E-Mail	Same
Submission	
Signature of Officer responsible for submission	
Date of Submission	27 Mar. 2014

ANNEX 2: PICTURES OF TYPICAL SPECIES OF MAIN ECOREGIONS/ECOSYSTEMS OF IRAQ[3]

Common landscape in the Zagros Mountains Forest Steppe ecoregion

Juvenile Egyptian Vulture (Vulnerable) – In the Zagros Mountains Forest Steppe ecoregion

The Oak wood represents common vegetation cover large areas in the mountainous habitats

Common landscape in the Arabian Desert and East Sahero-Arabian Xeric Shrublands ecoregion

Desert Monitor – A typical desert animal

Spiny-tailed Lizard – A typical desert animal

3 All the pictures in this Annex are by Mudhafar Salim

Common landscape in the northern parts of the Middle East Steppe ecoregion

Houbara Bustard (Vulnerable) - A desert bird species

Turtle Dove (Steppe Habitat)

A wild Dorcas Gazelle (Vulnerable) (Steppe habitat)

Common landscape in the Mesopotamian Shrub Desert ecoregion

Common landscape in the marshes of the Tigris-Euphrates Alluvial Salt Marsh ecoregion

Basra Reed Warbler (Endangered) in the Central Marshes

A local carries "bunni" fish in the southern marshes

Marbled Duck (Vulnerable) – Common wintering and breeding bird species in southern Iraq

Euphrates Soft-shell Turtle (Vulnerable) in the marshes of the Tigris-Euphrates region

ANNEX 3: THE PROCESS OF PREPARING THE 5TH NATIONAL REPORT AND ADDITIONAL SOURCES OF INFORMATION

DATA COLLECTION PROCESS FOR THE 5TH NATIONAL REPORT

The biodiversity and ecosystems of Iraq are characterized by a large variability; despite they face various kinds of threats. The threats and pressures on biodiversity and their severity differ between ecosystems and ecoregion and depending on the species considered. Due to the frequent impossibility of performing field surveys and to the discontinuity of current surveys and field works at the national level, it is always difficult and unpredictable to assess the status and trends of species and habitats.

Assessing and improving the status of ecosystems and biodiversity in Iraq, was and still is one of the goals that the Ministry of Environment is striving to achieve, and many steps were taken, one of them being certainly the ratification of the Convention on Biological Diversity (CBD).

As a first commitment towards the Convention, Iraq prepared its First National Report just one year after it had joined the Convention (July 2010) (the fourth one for the CBD). After that, and in order to comply with the other obligations set under the Convention, the process for preparing the First National Biodiversity Strategy and Action Plan[4], and for developing the Fifth National Report to the CBD was set in place, through a project funded by Global Environmental Facility (GEF).

The development of the Fifth National Report has been carried out in parallel with the activities and preparation the NBSAP. The first step of the Project was done through the stocktaking and assessment phase, where stakeholders were invited to share their information, researches and expertise about Iraqi biodiversity and a specific questionnaire (tailored on the Aichi Targets) was used to roughly assess the baseline about biodiversity and identify the national needs. However and as it was to be expected, the information collected during the workshop was still not enough to achieve the target of availing useful and updated information about biodiversity for the Fifth National Report and the subsequent steps of the Project.

For this reason it was decided by the National Project Manager (Deputy Minister of MoEI[5] Dr. Ali Al-Lami) to use another way of collecting necessary data, by sending official letters and E-mails to most of the governmental and non-governmental institutions that are relevant to biodiversity and environmental issues, asking for more data. The table below shows the targeted institutions.

[4] National Biodiversity Strategy and Action Plan (NBSAP)

[5] MoEI: Ministry of Environment of Iraq

Formal Letters sent to the Ministries and relevant institutions to collect information

Targeted Institution		Letter ref.	Date
Ministry of Environment	Environment Directorate of Baghdad: - Division of Planning and Follow-up - Division of Geographic Information Systems - Division of monitoring biodiversity - Division of agricultural pesticides - Division of monitoring agricultural land and desertification - Division of Water Quality Control - Division of Air Quality and Noise Monitoring - Control Division service activities - Division of monitoring chemicals and industrial activities - Division of the environmental impact assessment and land use - Ozone Unit	628	24/6/2013
	Central Environmental Laboratory	627	24/6/2013
	Technical Department - Department assessment and monitoring of soil	3540	23/6/2014
		622	24/6/2013
	Technical Department - Department of Environmental Impact Assessment and land use	3540	23/6/2013
		621	24/6/2013
	Technical department - Department of monitoring and evaluation of industrial activities	617	24/6/2013
	Technical department - department of marshes and wet lands monitoring	620	24/6/2013
	Technical department - Department of biodiversity	624	24/6/2013
	Technical Department - Department of Information Technology - GIS Division - Division of Environmental Information	626	24/6/2013
	Technical Department - Department of Water Quality monitoring	608	23/6/2013
	Technical department - section of control and monitoring of industrial activities	617	24/6/2013
	Technical department - section control service activities	618	24/6/2013
	Technical department - section control chemicals and assess contaminated sites	619	24/6/2013
	Technical Department - Department of air quality monitoring and noise	632	24/6/2013
	Mine Affairs Department	604	23/6/2013

Targeted Institution		Letter ref.	Date
		1033	20/10/2013
	Department of Planning and Follow-up - Department of Planning & Statistics	625	24/6/2013
	Center for the prevention of radiation	629	24/6/2013
	International Relations Department of Environmental	609	23/6/2013
	Center for Climate Change	623	24/6/2014
Ministry of Agriculture	General Authority for Fish Resources Development	3532	23/6/2013
	- Department of Planning and Follow-up - General Company for Horticulture and Forestry - General Authority for examination and certification of a seed - General Authority for Date palms	3540	23/6/2013
	Department of Livestock	6142	30/10/2013
	Office of Planning and Follow-up - Department of Environment	6226	4/11/2013
Ministry of Planning	- Central Bureau of Statistics - Department of Environment statistics	4326	7/8/2013
Baghdad University	Research Center and the Museum of Natural History	3608	25/6/2013
	- Central Library - Faculty of science - Institute of Genetic Engineering - Faculty of Agriculture - Faculty of Environmental Engineering - College of Science for Women - College of Education for Women - College Educational Ibn al-Haytham - College of Veterinary Medicine	5888	28/10/2013
Al-Mustansrya University	- Central Library - College of Science - Faculty of Environmental Engineering		
University of Technology	- Central Library - College of Science - Environmental Studies Center		
Al-Nahrain University	- Central Library - College of Science - Biotechnology research center		
- Maysan University **- Basra University** **- ThiQar University**	- Central Library		

Targeted Institution		Letter ref.	Date
- Kufa University **- Al-Qadisiyah University** **- Anbar University** **- Kut University** **- Diyala University** **- Al-Muthanna University** **- Al-Mosul University** **- Salah Al Din University**			
Al-Qasim Green University	Faculty of Environmental Science	1101	30/10/2013
Basrah University	Marine Science Center	3542	23/6/2013
Ministry of Oil	Division of Environment	3536	23/6/2013
Ministry of Science and Technology	Department of Materials Research - oil and petrochemical Research		
	Department of Space and Communications - Center for Remote Sensing	5826	23/10/2013
	Department of Environment and Water	608	23/6/2013
Ministry of Industry and Minerals	- Department of Development and Industrial Organization - Department of Environment - General Directorate for Industrial Development	3606	25/6/2013
Ministry of Water Recourses	- National Center for Water Resources Management - Centre of reviving the Iraqi Marshlands	3534	23/6/2013
	- Centre of reviving the Iraqi Marshlands - National Center for Water Resources Management	5454	1/10/2013
Ministry of Health	Department of Public Health	608	23/6/2013

Tough, as shown in the above Table, the list of targeted institutions was comprehensive, not always the response was timely and efficient as it was sought. It appeared that some of institutions didn't give this issue so much importance, while others were very committed and provided information at the best of their possibilities and resources; to these institutions and people goes our outmost appreciation and thanks.

After analysing the received data, the project manager realized that the data obtained from the institutions was not enough and should be more specific and detailed. Therefore, he decided to send delegates from the project team and other employees from the Ministry of Environment to make office surveys in all the governorates of Iraq to collect information by: visiting biodiversity departments in the universities, and visiting environment directorates (of the Ministry of Environment) in the governorates. At this point there was a real improvement and a variation in the success of the data collection process. In general it was a useful experience to communicate with the stakeholders to get the information, as well as getting to know how some studies on biodiversity were implemented.

The MoEI delegations started the collection process from the north of Iraq visiting Erbil, Sulaimania and Dohuk Governorates. In Erbil, they visited the University of Salah Al-Din, the College of Science, College of Agriculture, College of Higher education and scientific researches, and the Natural History Museum. They met Dr. Abdullah Hma, Dr. Farhad Hussain Azez, Dr. Sirbad Ibrahim Mohammed and Dr. Zohair Ibrahim Fetohi (plants, algae and fishes specialists). The local experts explained the status of biodiversity in the Kurdistan region highlighting in particular the new records of plants that have been reported in this region; they also mentioned the presence of species such as the Cheetah, the Persian Leopard and the Brown Bear in the mountains of the region, which are threatened or possibly extinct. In addition, they mentioned the difficulties of surveying these zones, due to the mine fields that have been placed on many natural areas in the past, and this makes it difficult to obtain a clear picture of the wildlife status in this area. Scientific research and papers were collected; some pictures below are documenting the office survey of the MoEI Team.

The MoEI Team moved then towards Sulaimania governorate to meet Dr. Terfaa Kamal, Dr. Rezan Omer and Dr. Sherko Ali Mohammed and many other academics of the University of Sulaimania. They are specialist in biodiversity issues. They were happy to give their researches and thesis to help in feeding the fifth national report.

The next travel was towards Dohuk governorate, visiting the University of Dohuk - College of Science and College of Agriculture, in addition to the Directorates of Dohuk Environment. The Head of the Agricultural College provided much information for the Team: thesis, photos, documents and books about Kurdistan trees and shrubs.

Another MoEI Team visited Kirkuk and Salah Al-Din governorates, and visited the Central Library, College of Science and College of Agriculture. The Team also visited Anbar governorate, and the Natural History Museum in Mosul governorate.

Other MoEI teams moved towards the south of Iraq. The teams visited Thi-Qar Al-Diwaniya, Missan and Basrah governorates where the delegates visited the University of Missan to meet the head assistant of the College of science Dr. Ali Naeem who was pleased to meet the delegation and to help in making their mission successful. The Team also visited Environmental directorates in Missan, Diwanyia and Basrah and met the researchers at the Marine Science Center and the academics of the College of Science at Basrah University.

Other teams have been sent to Babylon, Al Najaf and Karbala governorates, where they visited the University of Babylon (College of Science and College of Agriculture), Al- Qassim Green University - the Environmental Research Center, Karbala University (College of Agriculture, College of Science - Department of Biology), Al-Kufa University (College of Agriculture, College of Science - Department of Environment and Department of Biology) and the office of environmental protection and improvement in the middle Euphrates area. A number of discussions were held with the professors and researchers regarding the availability of biodiversity studies and information at the provinces level or at the country level.

Field visits to all Iraqi Governorates to gather information by the employees of the Ministry of Environment

Names and Work place	Destination	Target institution	Period
Reem Abdulhadi & Ali Haloob/ Ministry Advisor Office	Baghdad	- University of Baghdad (College of Science and College of Science for Women). - University of Al-Nahrain - College of Science - Biotechnology Department.	7-10/10/2013
		- The National Center of Herbs.	
		- The Natural History Museum.	21/10/2013 24/10/2013
		Ministry of Science and Technology	27/10/2013
Ammar Abdulnabi Magid/ Ministry Advisor Office	Babylon	- Babylon University: College of Science College of Agriculture - Al-Qasim Green University - Environmental Research Center - Directorate for protection and improvement of the environment in the Middle Euphrates	28 – 30/10/2013
- Ammar Abdulnabi Magid/ Ministry Advisor Office - Ibrahim Khalid Nasir/ Ministry Advisor Office	Erbil Sulaymaniah Dohuk	- Erbil University: College of science College of agriculture Natural history museum - Al-Sulaymaniah University College of Science College of Agriculture - Dohuk University College of Science College of Agriculture - Environmental directorate in Dohuk	7 – 19/11/2013

Names and Work place	Destination	Target institution	Period
- Ali Ne'ama Salman/ Center for the sustainable management of natural systems -Osama Abdulrazaq/ Center for the sustainable management of natural systems	Anbar Salah Al-Din Kirkuk Mousel	- Anbar center for desert studies - Salah Al-Din, and Kirkuk Universities - Mosul University/ College of Science and Natural history museum	14/11 – 1/12/2013
- Ali Sami Khashan/ Center for the sustainable management of natural systems - Mustafa Salim Rashed/ Center for the sustainable management of natural systems	Thi Qar	Thi Qar University	14 – 19/11/2013
- Adil Omran Salman/ Center for the sustainable management of natural systems - Mohamed Fadhil/ Center for the sustainable management of natural systems	Karbala'a Najaf	Karbala'a Najaf	17 – 28/11/2013
- Mustafa Salim Rashed/ Center for the sustainable management of natural systems - Dhirgham Mohamed Mahdi/ Center for the sustainable management of natural systems	Basrah Missan	Basrah and Missan Universities	28/11 – 8/12/2013
- Ammar Abdulnabi Magid/ Ministry Advisor Office - Ali Abdulsalam/ Ministry Advisor Office	Wasit Diwaniyah Muthanna	Wasit, Diwaniyah, and Al- Muthanna Universities	29/11 – 9/12/2013

As a result of the above mentioned activities the project manager and the project teams have collected many useful data; however they considered that the process was still not complete and they perceived that they could obtain more by contacting also international institutions and organizations that have global databases on biodiversity on which data about Iraq might have been fed and collected by various bodies and from various sources. The main organizations that have been contacted are the United Nation Environment Programme - World Conservation Monitoring Center (UNEP-WCMC), the Biodiversity Indicators Partnership (BIP)[6] and the Alliance for Zero Extinction (AZE)[7]. An official letter was sent to BIP

[6] The CBD-mandated Biodiversity Indicators Partnership is the global initiative to promote and coordinate development and delivery of biodiversity indicators in support of the CBD, Multilateral Environmental Agreements (MEAs), IPBES, national and regional governments and a range of other sectors. And the partnership brings together over forty organizations working internationally on indicator development to provide the most comprehensive information on biodiversity trends.

[7] The Alliance for Zero Extinction (AZE), a joint initiative of biodiversity conservation organizations from around the world aims to prevent extinctions by identifying and safeguarding key sites, each one of which is the last is the last remaining refuge of one or more endangered or Critically Endangered species.

requesting specific information about various biodiversity issues; according to the request the partners of BIP contacted the Iraqi teams, and in this way very useful information was available to the Team.

The international organizations and institutions that have responded to the Iraqi request of assistance.

No	Organization
1	World Conservation Monitoring Centre (WCMC)
2	American Bird Conservancy
3	Global Biodiversity Information Facility (GBIF) Secretariat
4	Mediterranean- MENA Program Global Footprint Network
5	University of Auckland
6	Amphibian Survival Alliance
7	Organization for Economic cooperation and Development (OECD)

Websites used as a reference of information during the 5NR preparation

No	Organization
1	IUCN red list, http://www.iucnredlist.org/
2	Fish data base, http://www.fishbase.org/
3	Invasive species database, http://www.issg.org/
4	Wild finder database, http://worldwildlife.org/science/wildfinder/
5	Bird life data base, http://www.birdlife.org/
6	Footprint database, www.footprintnetwork.org
7	Reptile database, www.reptile-database.org

At the end of this story, we send our warm greetings and acknowledgements to the generous academics, researchers, employees and every person contributed to realize this work.

Dr. Mufak Sulaiman - Dean of Agriculture Faculty - Dohuk University

Dr. Ezat Yousif Al-Nakshabandy - head of Biology Department - Sulaymania University

Kirkuk University

Kirkuk University

Mosul Natural History Museum

Mosul Natural History Museum

Dr. Mohammed Jawad Salih Al-Haydarey - Department of Environment - Kufa University

Dr. Jafar Musa Saleh Al-Garawy - Karbala University - College of Agriculture

Dr. Alaa Eadan Hasan - Al-Kufa University - College of Agriculture.

Dr. Kasim Kadhim Al-Asedi - Head of Environmental Department - Al-Kufa University

Head of the Biology Science Department, and professors of the Faculty of Science - University of Karbala

Ahmed Mahmoud Abdel Latif, Dean of the Faculty of Science - University of Karbala

Dean Associate of the Faculty of Agriculture - Karbala University

Dean assistant and professors of the College of Agriculture - University of Kufa

Professors of College of Education for Women - Kufa University

Professors of College of Education for Women - Kufa University

Professor Hamid Owaid /central Library manager/ Faculty of Agriculture at the University of Anbar and Dhia'a Mahmoud Mandalawi / Anbar Environmental Directorate

Dr. Ahmed Abd Ibrahim / Dean of the Faculty of Science / University of Kirkuk, accompanied by a number of college professors

Dr. Osama Mohammed Saied Al- Nuaimi/ director of the Museum of Natural History /University of Mosul

Dr. Abdullah Saleh Fayyad al-Dulaimi/ manager of the desert Science center / University of Anbar

ANNEX 4: INVASIVE AND ALIEN SPECIES OF IRAQ

Organism type	Species	Country/ Detailed Location	Common name-English	Habit	Occurrence	Provenance	Invasive	Establishment Method	Pathways of introduction	Source
Alga	*Polysiphonia brodiei*	Iraq	Brodie's Siphon Weed	Marine	Reported	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Aquatic plant	*Eichhornia crassipes*	Iraq	Water hyacinth	Freshwater	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Aquatic plant	*Hydrilla verticillata*	Al-Masehb Marsh; Abu-Zirig Marsh; Little Zab River	Hydrilla	Freshwater	Established	Alien	Invasive	Unknown	Unknown	Al-Kenzawi, 2011; Al-Mandeel, 2013
Bacterium	*Vibrio cholerae*	Iraq	causal-Cholera	Aquatic (Marine/Freshwater)	Reported	Alien	Invasive	Unknown	Unknown	World Health Organisation (WHO), 2003
Bacterium	*Yersinia pestis*	Iraq	causal- Bubonic plague	Terrestrial	Reported	Uncertain	Not specified	Unknown	Unknown	Songer, G. n.d.
Bird	*Acridotheres tristis*	Iraq	Common myna	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	Holzapfel et al 2006
Bird	*Psittacula krameri*	Iraq	Rose-ringed parakeet	Terrestrial	Established	Alien	Not specified	Escape from cages	Unknown	BirdLife International, 2012; Mudhafar Salim, pers.comm. Feb, 2014
Bird	*Spilopelia senegalensis*	Iraq	Laughing Dove	Terrestrial	Established	Alien	Invasive	Natural expansion	Unknown	Mudhafar Salim, pers.comm. Feb, 2014
Bird	*Oena capensis*	Iraq	Namaqua Dove	Terrestrial	Established	Alien	Not specified	Natural expansion	Unknown	Mudhafar Salim, pers.comm. Feb, 2014
Bird	*Elanus caeruleus*	Iraq	Black-shouldered Kite	Terrestrial	Established	Alien	Not specified	Natural expansion	Unknown	Mudhafar Salim, pers.comm. Feb, 2014
Crustacean	*Macrobrachium nipponense*	Abu-Zirig Marsh; Al-Hammar	Oriental River prawn	Freshwater	Established	Alien	Not specified	Accidental	Unknown	Salman et al 2006

Organism type	Species	Country/ Detailed Location	Common name-English	Habit	Occurrence	Provenance	Invasive	Establishment Method	Pathways of introduction	Source
		Marsh; Chibayish Marsh; Al-Huwaizah Marsh								
Crustacean	*Pseudodiaptomus c.f. ardjuna*	Shatt Al-Arab River	Calonid copepod	Marine	Established	Alien	Not specified	Accidental	Ballast water/ ship's hulls	Mohamed 2011
Fish	*Acanthalburnus microlepis*	Iraq	Blackbrow bleak	Freshwater	Established	Alien	Not specified	Unknown	Unknown	Froese & Pauly, 2013
Fish	*Carassius auratus auratus*	Al-Hawizeh Marsh; Chybayish Marsh; Hammar Marsh	Goldfish	Freshwater	Established	Alien	Invasive	Intentional	Aquaculture	FAO Fisheries and Aquaculture 2013; Mohamed et al 2008, Mohamed et al 2012; Al-Lamy et al 2012
Fish	*Clarias gariepinus*	Iraq	North African catfish	Freshwater	Established	Alien	Not specified	Intentional	Aquaculture	Froese & Pauly, 2013
Fish	*Ctenopharyngodon idella*	Hanmar Marsh	Grass carp	Freshwater	Established	Alien	Not specified	Intentional	Aquaculture/ Weed control/ Biological Control (phyto-plankton)	FAO Fisheries and Aquaculture 2013; Mohamed et al 2008, Mohamed et al 2012
Fish	*Cyprinus carpio*	Al-Hawizeh Marsh; Chybayish Marsh; Hammar Marsh	Common carp	Brackish/Freshwater	Established	Alien	Invasive	Intentional	Aquaculture	FAO Fisheries and Aquaculture 2013; Mohamed et al 2008, Mohamed et al 2012
Fish	*Gambusia affinis*	Southern Iraq	Mosquitofish	Freshwater	Established	Alien	Not specified	Intentional	Biological Control (mosquitoes)	FAO Fisheries and Aquaculture 2013; Al-Daham et al 1977;

Organism type	Species	Country/ Detailed Location	Common name-English	Habit	Occurrence	Provenance	Invasive	Establishment Method	Pathways of introduction	Source
Fish	*Gambusia holbrooki*	Chybayish Marsh; Hanmar Marsh	Eastern mosquitofish	Freshwater	Established	Alien	Not specified	Intentional	Biological Control (mosquitoes)	FAO Fisheries and Aquaculture 2013; Mohamed et al 2008, Mohamed et al 2012
Fish	*Hemiculter leucisculus*	Iraq	Sharpbelly	Brackish/Freshwater	Reported	Alien	Not specified	Unknown	Unknown	FAO Fisheries and Aquaculture 2013
Fish	*Heteropneustes fossilis*	Al-Hawizeh Marsh; Chybayish Marsh; Hammar Marsh	Stinging catfish	Brackish/Freshwater	Established	Alien	Not specified	Intentional	Biological control (snails)	FAO Fisheries and Aquaculture 2013; Mohamed et al 2008, Mohamed et al 2012
Fish	*Hypophthalmichthys molitrix*	Iraq	Silver carp	Freshwater	Reported	Alien	Invasive	Intentional	Aquaculture/ Research	FAO Fisheries and Aquaculture 2013
Fish	*Hypophthalmichthys nobilis*	Iraq	Bighead carp	Freshwater	Reported	Alien	Invasive	Intentional	Aquaculture	FAO Fisheries and Aquaculture 2013; Froese & Pauly, 2013
Fish	*Liza subviridis*	Iraq	Greenback mullet	Brackish/Freshwater/Marine	Reported	Uncertain	Not specified	Unknown	Fisheries	FAO Fisheries and Aquaculture 2013
Fish	*Oncorhynchus mykiss*	Iraq	Rainbow trout	Brackish/Freshwater/Marine	Reported	Alien	Not specified	Intentional	Aquaculture	FAO Fisheries and Aquaculture 2013
Fish	*Oreochromis niloticus*	Iraq	Nile tilapia	Brackish/Freshwater	Reported	Alien	Not specified	Intentional	Aquaculture/ Weed control	FAO Fisheries and Aquaculture 2013
Fish	*Poecilia sphenops*	Hanmar Marsh	Short-finned Molly	Brackish/Freshwater	Reported	Alien	Not specified	Unknown	Unknown	Mohamed et al 2012
Fish	*Sarotherodon galilaeus*	Iraq	Mango tilapia	Brackish/Freshwater	Reported	Alien	Not specified	Unknown	Aquaculture/ Research	FAO Fisheries and Aquaculture 2013
Fish	*Tilapia zillii*	Iraq	Redbelly tilapia	Brackish/Freshwater	Reported	Alien	Not specified	Unknown	Aquaculture/ Weed control	FAO Fisheries and Aquaculture 2013; Al-Lamy et al 2012

Organism type	Species	Country/ Detailed Location	Common name- English	Habit	Occurrence	Provenance	Invasive	Establishment Method	Pathways of introduction	Source
Insect	*Culex quinquefasciatus*	Iraq	Southern house mosquito	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	Harbach, 1988 in CABI Invasive Species Compendium
Insect	*Leptocybe invasa*	Dohuk, Kurdistan/ North of Iraq	Eucalyptus Gall wasp	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Hasan 2012
Insect	*Lymantria dispar*	Iraq	Gypsy moth	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	European Plant Protection Organisation (EPPO), 2013
Insect	*Papilio demoleus*	Iraq	Chequered swallowtail	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Larsen 1977
Insect	*Paratrechina longicornis*	Iraq	Crazy ant	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Harris & Abbott, n.d.
Insect	*Rhynchophorus ferrugineus*	Iraq	Red Palm weevil	Terrestrial	Reported	Alien	Invasive	Unknown	Unknown	European Plant Protection Organisation (EPPO), 2013
Insect	*Tapinoma melanocephalum*	Iraq	Ghost ant	Terrestrial	Reported	Alien	Invasive	Unknown	Unknown	Donisthorpe, 1918 in Wetterer, 2009
Insect	*Trogoderma granarium*	Iraq	Khapra beetle	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	European Plant Protection Organisation (EPPO), 2013
Insect	*Varroa destructor*	Iraq	Varroa mite	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	World Organisation for Animal Health (OIE), 2013
Land plant/grass	*Cynodon dactylon*	Iraq	Bermuda grass	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/grass	*Dactyloctenium aegyptium*	Iraq	Crowfoot grass	Terrestrial	Established	Uncertain	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013

Organism type	Species	Country/ Detailed Location	Common name- English	Habit	Occurrence	Provenance	Invasive	Establishment Method	Pathways of introduction	Source
Land plant/grass	*Imperata cylindrica*	Iraq	Cogon grass	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	Flora of Iraq
Land plant/grass	*Lolium temulentum*	Iraq	Darnel	Terrestrial	Established	Uncertain	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/grass	*Panicum repens*	Iraq	Torpedo grass	Terrestrial	Established	Uncertain	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/grass	*Paspalum distichum*	Iraq	Knotgrass	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/herb	*Capsella bursa-pastoris*	Iraq	Shepheard's purse	Terrestrial	Established	Uncertain	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/herb	*Cuscuta campestris*	Iraq	Field dodder	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/herb	*Emex spinosa*	Iraq	Spiny emex	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/herb	*Senna alexandrina (=Cassia senna)*	Iraq	Alexandrian senna	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/herb	*Taraxacum officinale complex*	Iraq	Dandelion	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/palm	*Washingtonia robusta*	Iraq	Washington fan palm	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/palm	*Washingtonia filifera*	Iraq	California fan palm	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/sedge	*Cyperus rotundus*	Iraq	Purple nutsedge	Terrestrial	Established	Alien	Invasive	Unknown	Unknown	Bendixen & Nandihalli 1987
Land plant/shrub	*Senna artemisioides (=Cassia artemisioides)*	Iraq	Feathery cassia	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/shrub	*Senna corymbosa (=Cassia*	Iraq	Argentine senna	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January

Organism type	Species	Country/ Detailed Location	Common name- English	Habit	Occurrence	Provenance	Invasive	Establishment Method	Pathways of introduction	Source
	corymbosa)									2014
Land plant/shrub	*Senna didymobotrya (=Cassia didymobotrya)*	Iraq	African senna	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/shrub	*Senna occidentalis*	Iraq	Coffee senna	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/shrub	*Senna occidentalis (=Cassia occidentalis)*	Iraq	Senna coffee	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/shrub	*Senna sophera (=Cassia sophera)*	Iraq		Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/shrub	*Tetrapanax papyrifer*	Iraq	Rice-paper plant	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/shrub-tree	*Prosopis spp.*	Iraq	Mesquite	Terrestrial	Established	Alien	Invasive	Unknown	Unknown	Pasiecznik 2001
Land plant/tree	*Acacia karroo*	Iraq	karoothorn	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Acacia saligna (=Acacia cyanophylla)*	Iraq	Orange wattle	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	Midgely & Turnbull, 2003
Land plant/tree	*Albizia julibrissin*	Iraq	Silk tree	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Albizia lebbeck*	Iraq	Indian siris	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Bauhinia purpurea*	Iraq	Butterfly tree	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014

Organism type	Species	Country/ Detailed Location	Common name- English	Habit	Occurrence	Provenance	Invasive	Establishment Method	Pathways of introduction	Source
Land plant/tree	*Bauhinia variegata*	Iraq	Butterfly tree	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/tree	*Cassia fistula*	Iraq	Golden shower	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/tree	*Casuarina equisetifolia*	Iraq	Australian pine	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Dalbergia sissoo*	Iraq	Indian rosewood	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	World AgroForestry Centre, 2013
Land plant/tree	*Eucalyptus camaldulensis*	Iraq	Red gum	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Eucalyptus spp. (37 known species)*	Iraq	Gum	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Flora of Iraq
Land plant/tree	*Gleditsia triacanthos*	Iraq	Honey locust	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Leucaena leucocephala*	Iraq	Leucaena	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Melia azedarach*	Iraq	Chinaberry	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Parkinsonia aculeata*	Iraq	Parkinsonia	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Pinus halepensis*	Iraq	Aleppo pine	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Pithecellobium dulce*	Iraq	Manila tamarind	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Robinia pseudoacacia*	Iraq	Black locust	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Senegalia laeta (=Acacia laeta)*	Iraq		Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014

Organism type	Species	Country/ Detailed Location	Common name- English	Habit	Occurrence	Provenance	Invasive	Establishment Method	Pathways of introduction	Source
Land plant/tree	*Vachellia cornigera (= Acacia cornigera)*	Iraq	Bullhorn Acacia	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/tree	*Vachellia farnesiana (=Acacia farnesiana)*	Iraq	Needle bush	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/tree	*Vachellia nilotica (Acacia nilotica)*	Iraq	Gum Arabic tree	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/tree	*Ziziphus mauritiana*	Iraq	Jujube	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/vine	*Conyza canadensis*	Iraq	Canadian fleabane	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Land plant/vine	*Lonicera japonica*	Iraq	Japanese honeysuckle	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/vine	*Lonicera maackii*	Iraq	Amur honeysuckle	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/vine	*Lonicera morrowii*	Iraq	Morrow's honeysuckle	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/vine	*Lonicera periclymenum*	Iraq	European honeysuckle	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Land plant/vine	*Lonicera sempervirens*	Iraq	trumpet honeysuckle	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Mammal	*Bos taurus*	Iraq	Cattle	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Mammal	*Capra hircus*	Iraq	Goat	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013

Organism type	Species	Country/ Detailed Location	Common name- English	Habit	Occurrence	Provenance	Invasive	Establishment Method	Pathways of introduction	Source
Mammal	*Equus asinus*	Iraq	Donkey	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Mammal	*Oryctolagus cuniculus*	Iraq	Rabbit	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Mammal	*Ovis aries*	Iraq	Sheep	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	CABI Invasive Species Compendium, 2013
Mammal	*Suncus murinus*	Iraq	Asian house shrew	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Varnham, Karen, pers.comm, 2002
Mammal	*Rattus norvegicus*	Iraq	Norway rat	Terrestrial	Established	Alien	Not specified	Unknown	Unknown	Ali- Haloob pers.comm January 2014
Mollusc	*Dreissena polymorpha*	Al-Musayab power plant	Zebra mussel	Terrestrial	Reported	Alien	Not specified	Natural dispersal	Water course	
Crustacean	*Eriocheir hepuensis*	Iraq	Hepu mitten crab	Brackish	Established	Alien	Not specified	Accidental	Larval forms in Ballast water/ Adult on ship's hulls	Naser et al 2012
Crustacean	*Eriocheir sinensis*	Shatt Al-Basrah Canal; Shatt Al-Arab River	Chinese mitten crab	Brackish	Established	Alien	Invasive	Accidental	Larval forms in Ballast water/ Adult on ship's hulls	Clark et al 2006; Hashim 2012
Mollusc	*Potamopyrgus antipodarum*	Iraq	New Zealand mud snail	Freshwater	Established	Alien	Invasive	Unknown	Unknown	Naser & Son, 2009
Reptile	*Ramphotyphlops braminus*	Iraq	Brahminy blind snake	Terrestrial	Reported	Alien	Not specified	Unknown	Unknown	Kraus 2009

Source: Invasive Species Specialist Group (ISSG) (Shyama Pagad), Ali Haloob (2013); unpublished information, Mudhafar Salim (2014)

ANNEX 5: LIST OF BIODIVERSITY-RELATED PROJECTS, PLANS AND STRATEGIES

Year	Donor name	Aid description	Project title	Purpose name (sector)	Long description	Environment	Biodiversity	Climate Mitigation	Climate Adaptation
2010	Japan	Project-type interventions	TC AGGREGATED ACTIVITIES	Water resources policy/admin. mgmt		2	1	0	0
2010	Japan	Project-type interventions	TC AGGREGATED ACTIVITIES	Sanitation - large systems		0	1	1	0
2010	Japan	Project-type interventions	TC AGGREGATED ACTIVITIES	Environmental policy and admin. mgmt		2	2	0	0
2010	Japan	Project-type interventions	TC AGGREGATED ACTIVITIES	Environmental policy and admin. mgmt		2	1	0	0
2010	Japan	Project-type interventions	TC AGGREGATED ACTIVITIES	Bio-diversity		2	2	1	0
2010	Australia	Project-type interventions	AusAID-JICA agricultural training for Iraqis	Agricultural education/training	AusAID-JICA agricultural training for Iraqis	1	1	1	0
2010	Australia	Core support to NGOs, other private bodies, PPPs and research institutes	Small scale Ag projects in Iraq	Agricultural development	Small scale Ag projects in Iraq	1	1	1	0
2010	Australia	Core support to NGOs, other private bodies, PPPs and research institutes	Scholarships Iraq AIAS	Agricultural development	Scholarships Iraq AIAS	1	1	1	0
2011	Germany	Project-type interventions	Learning region - a community development centre for the region of Berwari Bala, Iraq	Rural development	Learning region - a community development centre for the region of Berwari Bala, Iraq	1	1	0	1
2011	Italy	Project-type interventions	FARMING DEVELOPMENT OF SOUTH IRAQ RURAL AREAS THROUGH A RATIONAL MANAGEMENT OF	Agricultural development	Support the increase of agricultural production together with a more conscious and rational management of water resources in rural areas of	1	1	0	0

Year	Donor name	Aid description	Project title	Purpose name (sector)	Long description	Environment	Biodiversity	Climate Mitigation	Climate Adaptation
			WATER RESOURCES		south Iraq				
2011	Sweden	Scholarships/training in donor country	229IRAQ Food Safety	Trade policy and admin. management		1	1	0	0
2011	United Arab Emirates	Project-type interventions	Stachys species	Bio-diversity		0	2	0	0
2011	Japan	Project-type interventions	TC AGGREGATED ACTIVITIES	Water resources policy/admin. mgmt		2	1	0	0
2011	Japan	Project-type interventions	TC AGGREGATED ACTIVITIES	Sanitation - large systems		2	1	1	0
2011	Japan	Project-type interventions	TC AGGREGATED ACTIVITIES	Environmental policy and admin. mgmt		2	2	0	0
2011	Korea	Imputed student costs	Master's Programs for International Students	Higher education	Produce international experts in the field of development economics and public policy. Contribute to developing capacity of developing countries.	1	1	1	1
2011	Australia	Project-type interventions	Soil Salinity Project	Agricultural research	Soil Salinity Project	1	1	1	1
2011	Australia	Project-type interventions	Small scale Ag projects in Iraq	Agricultural development	Small scale Ag projects in Iraq	1	1	1	1
2011	Australia	Project-type interventions	ACIAR crop project in Northern Iraq	Agricultural research	ACIAR crop project in Northern Iraq	1	1	1	1
2011	Australia	Project-type interventions	AusAID-JICA agricultural training for Iraqis	Agricultural education/training	AusAID-JICA agricultural training for Iraqis	1	1	1	1
2011	Australia	Core support to NGOs, other private bodies, PPPs and research institutes	Scholarships Iraq AIAS	Agricultural development	Scholarships Iraq AIAS	1	1	1	1
2011	Australia	Other technical assistance	Iraq Agriculture Strategy Design	Agricultural development	Iraq Agriculture Strategy Design	1	1	1	1
2011	GEF	Project-type interventions	First NBSAP for Iraq and Development	Environmental policy and admin. mgmt	GEF Focal Area Description Biodiversity. Enabling	2	2	0	0

Year	Donor name	Aid description	Project title	Purpose name (sector)	Long description	Environment	Biodiversity	Climate Mitigation	Climate Adaptation
			of Fifth National Report to the CBD		Activity. Amount of planned co-financing: USD 0.45 million.				
2012	Italy	Project-type interventions	New Eden Project - Technical Assistance for the implementation in Iraq of the UNFCCC and the UN CBD	Biosphere protection	Pilot project for the post war reconstruction of Iraq aimed at promoting sustainable development of marshlands and mitigate greenhouse gasses effects impacts	2	2	2	2
2012	Italy	Project-type interventions	World Heritage as a tool for enhancing Natural and Cultural Management of the Iraqi Marshlands UNESCO-UNEP Joint Project	Biosphere protection	The project provides guidance and support to the Iraqi stakeholders on how to develop a long-term preservation and management plan, build capcity and raise awareness among the local population	2	2	2	2
2012	Japan	Project-type interventions	TC AGGREGATED ACTIVITIES	River basins' development	TC AGGREGATED ACTIVITIES	2	1	0	0
2012	Japan	Project-type interventions	TC AGGREGATED ACTIVITIES	Sanitation - large systems	TC AGGREGATED ACTIVITIES	2	1	1	0
2012	Australia	Project-type interventions	Soil Salinity Project	Agricultural land resources	Australia-Iraq Soil Salinity Management project in Central and Southern Iraq, delivered by the Australian Centre for International Agricultural Research (ACIAR) in partnership with the International Centre for Agricultural Research in Dry Areas (ICARDA.	1	1	1	1
2012	Australia	Other technical assistance	AusAID-JICA agricultural training for Iraqis	Agricultural education/training	Co-funding arrangement between Australia and Japan on an agricultural training program based in the International Centre for	1	1	1	1

Year	Donor name	Aid description	Project title	Purpose name (sector)	Long description	Environment	Biodiversity	Climate Mitigation	Climate Adaptation
					Agricultural Research in Dry Areas (ICARDA) that aims to strengthen capacity in agricultural research in Iraq.				
2012	Australia	Scholarships/training in donor country	Scholarships Iraq AIAS	Agricultural development	This initiative provides funding to support the Australia Iraq Agricultural Scholarships (AIAS) program. AIAS provides Iraqi public servants with postgraduate scholarships in Australian Institutions to support the Iraqi agricultural sector and includes up to 24 months pre-course intensive English language training.	1	1	1	1

Source: Organization for Economic cooperation and Development (OECD), Anna Drutschinin 2013.

ANNEX 6: A NEW REFERENCE DOCUMENT FOR THE CHECKLIST OF ALGAE OF IRAQ

A total of 2647 algal *taxa* were reported in an undergoing check list of algae in Iraq[8]. The check list includes almost all trustful published knowledge on algae of Iraq that including: *Chlorophyceae* (788), *Cyanophyceae* (508), *Chrysophyceae* (1233), *Euglenophyceae* (54), *Charohyceae* (13), *Cryptophyceae* (5), *Pyrrophyceae* (32) and *Rodophyceae* (13). The checklist adds other 334 algal *taxa* to the previously known algae in Iraq. The checklist will be used as trustful data base for future investigations on algae and for filling up the gap that exists on the knowledge in this area about Limnology and Phycology of the whole Middle East.

The data were collected from previous studies that were published in scientific journals and were checked for species lists. The *taxa* list represents algae which are found in different Iraqi aquatic systems.

The groups of the algae are arranged in the following sequence:

1- Cyanophyta 508 taxa (19.20%)
2- Chlorophyta 788 taxa (29.78%)
3- Charophyta 13 taxa (0.49%)
4- Euglenophyta 54 taxa (2.04%)
5- Chrysophyta 1233 taxa (46. 60%)
6- Pyrrophyta 32 taxa (1.21%)
7- Rhodophyta 13 taxa (0.49%)
8- Cryptophyta 5 taxa (0.19%)

[8] Bahram.K. Maulood, Fikrat M. Hassan, Ali A. Al- Lami, Janan J. Toma and Abbas, M. Ismail "Checklist of Algal Flora of Iraq", Ministry of Environment, Iraq 2013.

ANNEX 7: PROGRESS IN ACHIEVING THE AICHI TARGETS

Improving 🙂 No change 😐 Decline ☹

STRATEGIC GOALS AND AICHI TARGETS	PROGRESS STATUS IN IRAQ	EVALUATION
Strategic Goal A		
Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably	*In Iraq due to the preparation of the National Environmental Strategy (NESAP) and of the National Biodiversity Strategy (NBSAP), a number of initiatives and events to spread the message of biodiversity have been organized and carried out; globally awareness has been raised through these consultative meetings and informative events.*	🙂
Target 2: By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.	*In Iraq the NESAP incorporates the biodiversity values; through the development of the first NBSAP (on-going) important steps are taken towards the integration of biodiversity values into other strategies (the NBSAP foresees the coordination and mainstreaming with other relevant strategies). Also the NBSAP will be adopted as a policy instrument and will have its own financial mechanism; thereby including biodiversity into national accounting.* *A poverty reduction Strategy has been produced and approved in Iraq, partially addressing, as already mentioned, the relationship between poverty and biodiversity as a mean to alleviate problems and economic difficulties especially of rural areas populations.*	😐
Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions.	*In order to achieve some progress in this Target firstly a comprehensive review of all the existing incentives and subsidies harmful to biodiversity needs to be carried out. Subsequently funds have to be raised to the purpose of setting in place the positive incentives. Considering the current situation of the country and the priorities that have been set nationally by the various stakeholders, the achievement of this Target is delayed.*	😐
Target 4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve	*In order for the country to put in place sustainable consumption and productions practices and projects, coordination with*	😐

STRATEGIC GOALS AND AICHI TARGETS	PROGRESS STATUS IN IRAQ	EVALUATION
or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	*other strategies and institutional bodies is essential. To this purpose there is a specific department for sustainable use and consumption at the MOEI, however the active participation and the cooperation especially of the Ministry of Agriculture is essential. Some progress in this Target can be achieved as a result of the mainstreaming activities and after the adoption of the NBSAP as a policy instrument by all institutional bodies.*	
Strategic Goal B		
Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.	*This Target has been selected as one of the national priorities for Iraq, and 5 Iraqi Targets have been drafted under the umbrella of Aichi Target 5; this demonstrates the importance and priority that has been identified by the stakeholders as concerns habitat loss. Some activities that would allow to meet the Iraqi Targets set have been initiated such as the capacity building for GIS experts (to build a GIS database on the extent and condition of habitats) as well as the research of information about recent land use/habitat maps of Iraq.*	🙂
Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.	*In the governorate of Qadissiya in the Dalmaj marsh area there is a successful example of sustainable fishery production. The species produced is the local species 'Bunni' (Barbus Sharpeyi) that is bred by a private and then released in the marshlands thereby providing an economically important source for local fishermen.*	🙂
Target 7: By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	*The only known example of sustainable management of fish stocks is the already mentioned Dalmaj marsh fish hatchery for the Bunni (Barbus Sharpeyi).*	🙂
Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity	*Pollution has been identified by Iraqi stakeholders as a major issue to be addressed and as a national priority. Various monitoring activities are taking place, carried out by different institutions in*	☹

STRATEGIC GOALS AND AICHI TARGETS	PROGRESS STATUS IN IRAQ	EVALUATION
	the framework of various projects, and especially as concerns water quality; however the control and reduction of pollution sources is still lacking.	
Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment.	*As an attempt to fill the knowledge gaps about the alien and invasive species of Iraq and in order to complete the present report, a research group has been informally set under the Ministry of environment. This group has allowed the collection of the baseline information about alien invasive species in Iraq (present from international and national sources) and has set in place the background for establishing and reviewing the National List of alien and invasive species of Iraq.*	🙂
Target 10: By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	*In September 2012 and in May 2013 a coral reef in Iraqi coastal waters was discovered for the first time ever as a result of joint expeditions by the Marine Science Centre of the University of Basrah (Iraq) and Technical University of Freiberg (Germany). The discovery is very recent and no actions have been taken up to now to minimize the many anthropogenic pressures present in the area.*	☹
Strategic Goal C		
Target 11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascapes.	*A number of steps for the establishment and wise management of protected areas have been accomplished by Iraq, referring in particular to, among the others, the issuance of national legislation on protected areas; the establishment of the first National Park of Iraq (the Mesopotamia marshland National Park); the starting up of a GEF funded project to establish the National Network of Protected Areas and other protected areas related awareness activities.*	🙂
Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.	*Two Iraqi Targets have been established under this Aichi Target; the issue of species conservation is recognized by Iraq as a national priority; however it is too early to assess the progress with reference to Iraqi Targets and no local initiatives or successful examples are known in the conservation of any threatened species.*	☹

STRATEGIC GOALS AND AICHI TARGETS	PROGRESS STATUS IN IRAQ	EVALUATION
Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	*Two important examples of Iraqi genetic diversity and the maintenance of socio-economically and culturally valuable species are represented by the Water buffalos present in the marshland areas and the many date palm races that are cultivated along the Shatt Al Arab River, in Basra governorate. These species could be further promoted and preserved, along with other less visible but still locally important animal and plant species.*	😐
Strategic Goal D		
Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	*An Iraqi Target has been framed under the Aichi Target 14; the importance of this issue to Iraq is recognized by the stakeholders. It is too early to evaluate the progress towards meeting this Target; no new successful cases or stories can be reported.*	☹
Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.	*This Target has not been selected as a national priority by the stakeholders; no progress has been achieved so far in the restoration of degraded ecosystems.*	☹
Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	*Up to date Iraq has not ratified the Nagoya Protocol, though it is planned in the near future.*	😐
Strategic Goal E		
Target 17: By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan	*The Strategy is in progress and following up with the participatory approach that has been adopted up to now; it will be brought to the attention of high level institutional bodies for their subsequent approval and adoption/implementation.*	🙂
Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources,	*In Iraq, due to a very high ethnographic diversity there are many different cultures, religious groups, tribes, local communities, ethnic groups that have their own traditions, dressing, food, music and practices. A comprehensive review of these*	🙂

STRATEGIC GOALS AND AICHI TARGETS	PROGRESS STATUS IN IRAQ	EVALUATION
are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.	*traditions and their relation with biodiversity is a complex and lengthy process; however two examples of sustainable uses of biodiversity and customary uses of biological resources are given by the local/tribal conservation groups of Dalmaj marsh (Qadissiya governorate) and Barzan tribal protected area (Kurdistan region).*	
Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.	*Various initiatives, research, trainings, projects from various national and international bodies (universities, research institutions, NGOs, joint ventures, private companies, and cooperation mechanisms) are contributing to gain insight into specific themes and issues concerning the environment and biodiversity. The results of these studies and researches, thanks to various tools such as the web, various on-line datasets, and the international platforms made available by the CBD and the BIP Partnership, and thanks to the efforts of the Ministry of Environment, are becoming more and more widespread and known to the national and international community.*	🙂
Target 20: By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan 2011- 2020 from all sources and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.	*A resource mobilization strategy and plan will be drafted as a part of the NBSAP process; the Action Planning phase further requires that the financial resources are mobilized not only by the Ministry of Environment but in a cross-sectoral way from all involved stakeholders and searching out funds from additional sources such as external donors, IGOs and NGOs.*	😐