

PROCEEDINGS

International Workshop: Towards an Implementation Strategy for the Human Integrated Management Approach Governance System: *Theories, Concepts, Methodologies, Case Studies and Action Plans*

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FOREWORD

Desert agriculture was among KISR's responsibilities since its establishment in 1967. With over 45 years of experience in the scientific field within the region, KISR's capabilities diversified into additional disciplines that not only address Kuwait's challenges, but address challenges at both regional and international levels. Starting with desert agriculture soon grew into understanding related scientific fields such as the preservation of the environment, sustainable management of natural resources, developing innovative methods of agriculture and the responsible management of water.

As KISR is mandated to apply scientific research methods that address national challenges, it has become a key directive to promote strategic partnerships and alliances at local and international levels that ensure the open exchange of knowledge and expertise to deliver optimal solutions. This is where KISR saw the opportunity to bring together expertise from around the globe to address one of the world's most crucial challenges—sustainable natural resources management. Sustainable natural resources management dates back to the dawn of the Islamic period 1500 years ago. The HIMA 'protected area' concept was introduced to involve local communities in the management of their natural resources. This allowed for diverse opinions on how best to manage and share natural resources, which in turn developed a consensus of best practices to be applied in sustainable management of shared resources.

Our aim in this workshop is to understand the Human Integrated Management System (HIMA) in greater detail and reach to a consensus in selecting the best practices we can apply for the sustainable management of our shared natural resources that suit our surrounding environmental conditions. We here today are stewards for our shared environmental heritage and represent the Arab voice on the international stage where these issues are being discussed. We are tasked with the responsibility for introducing and coordinating the application of the HIMA concept in our respective countries. KISR is privileged to host this important HIMA workshop, which should set the stage for the development of a HIMA implementation framework and is looking forward to further collaboration in the future to participate in the finalization of a comprehensive HIMA system that will be applied in the WANA region.

Dr. Naji Al-Mutairi
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PREFACE

Protection of biodiversity is necessary for both ethical and practical reasons with a long tradition in Islam. Humans are delegated as khalifa, or trustees of God, charged with looking after the Earth and all of its elements. *The Holy Qu'ran* states: “There is not an animal (that lives) on earth or a being that flies on its wings but (forms part of) communities like you. Nothing have we omitted from the book and they (all) shall be gathered to their Lord on the end” (Surat Al-Anaam, Aya 38). One of the most significant approaches to biodiversity protection includes the establishment of protected areas: a key deliverable under the Convention of Biological Diversity’s Programme. Protected areas are the foundation of national and international conservation strategies, which provide shelter for biological species and natural ecological processes, and enhance ecological restoration of damaged ecosystems.

Protected areas also benefit the society by increasing the genetic potential of wild species that in turn, produce substantial environmental benefits, economic values and enhance ecosystem services. Protected area management is therefore needed to ensure common welfare and ecosystem sustainability, which can be introduced through several approaches such as the Human Integrated Management Approach (HIMA).

The Human Integrated Management Approach (HIMA) is a common and particularly important welfare form of rangeland management. It is a community-based natural resources management and conservation system, which seeks to protect areas of land by encouraging local participation that integrates social and environmental priorities.

In this context, the Kuwait Institute for Scientific Research (KISR) initiated the Biodiversity of Terrestrial Ecosystems Program, which seeks to improve ecosystem services and ensure the protection of biodiversity. The program focuses on understanding abiotic parameters associated with desertification by developing and applying the first national level data gathering exercise for understanding biodiversity, and identifying opportunities for conservation, restoration and protection of Kuwait’s terrestrial biodiversity. It also emphasizes the importance of using the HIMA approach to develop land-use policies, sustainable use of natural resources programs, and management schemes that focus on social sanctions and equitable benefit sharing.

KISR, the West Asia and North Africa Forum (WANA), the United Nations University (UNU) and Newcastle Institute for Environmental Sustainability (NIREs) participated in several meetings and discussions, unanimously concluding the importance of recognizing the rights of people's traditional knowledge, cultural values, and ethics in the development process and its success proposed through a methodological framework for inter-disciplinary multi-dimensional research. This workshop targets designing a framework that shifts from multi-disciplinary to inter-disciplinary research that provides an integrated synthesis for very complex social-ecological systems. The main aim is to develop an Integrated Socio-technical Framework by linking the elements of social and technical assessment approaches to implement the HIMA paradigm. The workshop's main deliverable is to develop a "HIMA Governance System Implementation Framework" that efficiently preserves our integrated ecological systems.

We have an ethical obligation to prevent species loss, and KISR is enthusiastic about hosting this workshop and engaging in future events that culminate in the development and actual implementation of the HIMA system on the local, regional and international level to ensure the sustainable management of our Earth's biodiversity.

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HIMA GOVERNANCE SYSTEM

Principles of the Human Integrated Management Approach (HIMA): Towards Sustainable Development

Session I: HIMA Governance System: The Underlying Principles and Legal Framework
Presentation

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Abstract

The HIMA is a Community-Based Natural Resources Management (CBNRM) System that promotes sustainable livelihood, resources conservation, and environmental protection; for the human well-being is presented (Saleh, W. and M. Hashemi. 2011). The main feature of the new system is that it promotes sustainable development through a set of governing principles. HIMA is traditionally ruled by the local communities through consensus and different groups holding specific responsibilities such as collecting rainwater runoff and monitoring grazing (Saleh, W. and M. Hashemi. 2011). As the need for environmental protection represents a prime importance for the people who depend on the natural resources for their survival, HIMA is considered to be a relevant concept to contemporary natural resources dilemmas. One of the main features of the HIMA system is that it is aimed to achieve social justice; this is one of the main strengths “it provides an incentive for local communities to invest in the maintenance of their natural resources and to protect them from abuse” (Kilani et al., 2007).

Modern day challenges have to be taken into consideration when setting up a HIMA governance system such as growing population demands for more land for housing and for addressing the needs of small community farmers. These changes in society could lead to a situation where grazing becomes uncontrolled and could lead to destruction to rangeland and eventually could lead to desertification (Saleh, W. and M. Hashemi. 2011). These challenges were met by established environmental planning and management strategies to balance the

settlements' growth and natural resources uses according to Islamic Environmental Laws and community self-government.

HIMA governance framework has been derived on the basis of cultural heritage, environmental ethics and human development model of the community which is predominantly Islamic. Des Jardins (Jardin, 2001) defines environmental ethics as “a systematic account of the moral relations between human beings and their natural world”. The community ethics are comparable to the modern version as here defined. Humans are considered to be trustees with the responsibility over environmental protection, and they are accountable. The central issue is that the ecosystem should be in a harmonious and equilibrium state with respect to its biodiversity. There should be no harm to nature and no excessive use. Forests and the wild should be protected from deliberate misuses, fire, or damages. Water as the central element should be protected from pollution, overuse and misuse. Finally, the role of law is to promote these principles and is to be rendered respect.

Key words: Natural Resources, Management, Sustainable Development, Environmental Protection, Environmental Law.

Introduction: Why HIMA is relevant?

HIMA; which literary means “Protected Area” in Arabic; can be defined as a Community-Based Natural Resources Management (CBNRM) System that promotes sustainable livelihood, resources conservation, and environmental protection, for human well-being. HIMA CBNRM system was practiced for over 15,000 years in the Arabian Peninsula; was modified by the Prophet of Islam (peace be upon him) by introducing social justice into the governance structure. HIMA system is one of the most widespread systems of traditional conservation in the West Asia and North Africa (WANA) region and beyond where the presence of Muslims is being felt such as in India, Indonesia, Philippines and so forth (Saleh, W. and M. Hashemi. 2011).

Environmental protection, as a modern day concept, has emerged in response to the environmental pollution and degradation linked to industrialization and globalization. The need for environmental protection represents a prime importance for the people who depend on the natural resources for their survival. Therefore, HIMA is considered to be a relevant concept to contemporary natural resources dilemmas. HIMA is traditionally ruled by the local communities through consensus and different groups holding specific responsibilities

such as collecting rainwater runoff and monitoring grazing. This is one of the main strengths of HIMA- “it provides an incentive for local communities to invest in the maintenance of their natural resources and to protect them from abuse” (Kilani et al., 2007)

Local inhabitants of the rural and nomadic lands have successfully established environmental planning and management strategies to balance the settlements’ growth and natural resources uses according to Islamic Environmental Laws and the tribal’s self-government. In the HIMA, the environmental management is fundamental to both the cultural and spiritual survival of the tribal society. Land use and urban form were controlled through consensus rather than prescribed legislative or institutional control. However, it adheres to a political control and influence that is important to bring ecological sensibility in the management of natural resources.

To shed light on the traditional political system in the tribal society (tribal system represents a community in modern day language), administration was led by a *Sheikh* assisted by an advisory commission representing the key groups living in the HIMA, where he has the full power to implement agreed upon environmental rules, and to set punishment sentences for persons found in violation. The commission also consisted of management groups, one such group responsible for water supplies and its fair distribution, another in charge of the landscape resources. A third would be responsible to monitor any misconduct. The management group would also propose any improvements to the HIMA as a whole or on some specific elements, and would suggest measures against any expected hazards. The group was also responsible for the planning of harvest distribution and storage, and the economic affairs of the HIMA market place. For any suggested and agreed upon work improvement in the HIMA, a budget would be agreed upon by the commission, where the Sheikh would authorize the expenditure.

Modern day challenges have to be taken into consideration when setting up a HIMA governance system such as growing population demands for more land for housing and for addressing the needs of small community farmers. These changes in society could lead to a situation where grazing becomes uncontrolled and could lead to destruction to range-land and eventually could lead to desertification.

In most of the Arabian countries where HIMA as a system was abandoned by establishing ministries of agriculture, environment and water, no immediate alternative conservation system was present. Instead, these government authorities had adopted modern conservation concepts such as establishing national parks, and / or protected areas. This period between the banning of the HIMA system and the start of modern (Western) style

conservation management systems is characterized by severe destruction of the plant cover through overgrazing that had led to desertification. Meanwhile, overhunting of wild animals also led to extinction of many wildlife animals and birds. In countries such as Jordan and Syria, the French and British occupations had recognized the tribal authorities and were regulated through special acts whereby their territories were mapped. While the independent governments of these countries considered nomadic life as backward way of life, and nomads were pressed to settle in urban centers abolishing the tribal land administration and effectively bringing to an end the HIMA system. This, along with alteration of the natural water system attributed to widespread land degradation and its resources. It is because of the afore mentioned state of environmental play, and to address the climate change adaptation, it is believed by the authors that since HIMA has helped the nomadic communities sustain a living in the harsh environment of Arabia since 1500 years, there is a need to re-examine the HIMA as environmental natural resources management system taking into account modern day environmental challenges.

The revival of these traditional knowledge systems to natural resource management has started in more recent times such as the 1990s HIMA project in Tanzania (Minja and East, 1996) which was aimed to revive the community-based management of the natural resources. The Food and Agriculture Organization (FAO) (FAO, 2009) calls for the incorporation of HIMA in the forestry management and noted the quasi-religious force of HIMA prescriptions.

The HIMA Governance Framework

The HIMA governing principles that foster sustainable development through social justice, economic growth, conservation of resources, and environmental protection, under new governance system, must meet the requirements as follows:

- ▶ It must be constituted by the legitimate governing authority;
- ▶ It must be established for purposes pertaining to the public welfare;
- ▶ It must avoid causing undue hardship to the local people by, for example, depriving them of indispensable resources;
- ▶ The actual benefits it brings to society must be greater than its societal costs.

HIMA governance framework has been derived on the basis of cultural heritage, environmental ethics and human development model of the community which is

predominantly Islamic. Des Jardins (Jardin, 2001) defines environmental ethics as “a systematic account of the moral relations between human beings and their natural world”. The community ethics are comparable to the modern version as here defined. Humans are considered to be trustees with the responsibility over environmental protection, and they are accountable. The central issue is that the ecosystem should be harmonious and equilibrium state with respect to its biodiversity. There should be no harm to nature and no excessive use. Forests and the wild should be protected from deliberate misuses, fire, or damages. Water as the central element should be protected from pollution, overuse, and misuse. Finally, the role of law that promotes these principles should be rendered respect.

Bound by these environmental ethics, a human development model that consists of five compulsory or essential principles need to be adopted as follows:

- ▶ invigoration of the human self;
- ▶ enrichment of human faith and values;
- ▶ enrichment of intellect;
- ▶ enrichment of posterity;
- ▶ development and expansion of wealth and human well-being.

The aim is to serve public interest by achieving two criteria; namely, repulsion of harm and removal of difficulty and hardship. This should lead to the HIMA Development Vision (HDV) that is based on socioeconomic justice and environmental integrity such as the following:

- ▶ optimal utilization of the resources based on appreciation, i.e., no excessive use;
- ▶ equitable use and distribution based on justice;
- ▶ environmental integrity based on condemning disvalues and (aggression, harm, abuse).

The specific principles dealing with the three elements of HIMA approach are the following:

- ▶ Social cohesion and sustainable livelihood for HIMA communities;
- ▶ Criteria on property rights and resource use which are based on carrying capacity and regeneration of resources;
- ▶ Environmental protection and conservation and adaptive management.

Governing Principles of HIMA

The principles of HIMA governance are categorized into four broad categories which are not mutually exclusive (W. Saleh, 2012) as follows:

- ▶ The ethical principles which include the HIMA development vision and describe the aims and objectives and the ethical dimensions.
- ▶ Environmental sustainability principles are based on reverence to natural resources and no harm.
- ▶ Institutional principles recognize the role of the state in providing basic needs; role of the voluntary sector to contribute to socioeconomic and nonmaterial development of the community, and the devolution of HIMA management within the local community.
- ▶ Good governance principles provide a framework for the adequate management of the natural resources in HIMA zones.

Table 1. Principles of Human Integrated Management Approach (HIMA) Governance (Source: Hashemi, 2012)

Principles	Definition
<p>Part I: The Ethical Principles</p> <p>HIMA Development Vision:</p> <p>General Policy making:</p> <p>Integration and Social Cohesion:</p>	<p>This outlines the aim and objectives of the establishment of HIMA zones: the aim is human well-being which can be attained if justice, equity and public interest are established.</p> <p>Justice, equity and public interest Justice can only be achieved if there is social solidarity or cohesion.</p> <p>A multidimensional principle based on the notion of community as an integrative unit such as:</p> <ul style="list-style-type: none"> - Collective duty and responsibility: The notion of nation provides individual rights for the community members but it also provides sense of collective duty and responsibility. - HIMA zones should create no hardship for other communities around the zone. - ‘Fraternizing’ Principle: The Fraternalizing ‘Human Bonding’ Principle creates a coalition alliance to implement HIMA governance system. - Diversity Principle: Human diversity is looked at as a positive driver that

<p>Holism Principles</p> <p>No Excessive use Principle:</p> <p style="text-align: center;">Principle</p> <p>Respect for International Treaties and Conventions:</p> <p>Part II Environmental Sustainability Principles:</p> <p style="padding-left: 40px;">Reverence for Natural Resources</p> <p style="padding-left: 40px;">Environmental Equilibrium</p> <p style="padding-left: 40px;">No Harm Principle</p> <p style="padding-left: 40px;">No Pollution</p> <p>Part III Institutional Principles Devolution to Local Community:</p> <p style="padding-left: 40px;">Collective action Principle</p> <p>Financial Sustainability Principle</p>	<p>promotes sharing of resources rather than competing and depriving others. Diversity means sharing of knowledge, values, ethics and culture;</p> <ul style="list-style-type: none"> - Integration and social cohesion require having a broader holistic and aesthetic worldview about the nature. Therefore, the splendors of nature and its equilibrium should be acknowledged. <p>Describe human rights within the greater environment.</p> <p>Right to use for sustainable livelihoods based on these principles:</p> <ul style="list-style-type: none"> - Humans are beneficiaries of the earth creation. - Original allowance rule can be restricted if required. <p style="text-align: center;">Definition</p> <p>This can provide a linkage to principles from other CBNRMS paradigms which are either mutual or complementary.</p> <p>God is the sustainer- Any damage to the Environment is considered going against God's will.</p> <p>The earth and its resources are balanced and in a measured way".</p> <p>Psychological, opportunities, environmental etc.</p> <p>(spoil, corruption or damage) to the environment.</p> <p>By recognizing informal institutions and local traditional knowledge systems.</p> <p>Basis for the role of the State and voluntary sector:</p> <ul style="list-style-type: none"> - Fulfilment of the needs principle- everyone in the community should have enough of basic goods and
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	<p>services. These are collective (social-obligatory) duties that have to be fulfilled by the state. “Allocate and re-distributive role of voluntary sector” to be enhanced in achieving social obligatory duties.</p>
<p>Conflict Resolutions</p>	<p>Is based on:</p> <ul style="list-style-type: none"> - Upkeep of social welfare of the vulnerable members of the HIMA community such as establishing Child Welfare Fund, Wealth Fund (income Tax), reduction of tax burden on the poor and so forth. - Economic efficiency: e.g. extra taxes on goods and services to recover costs and enhance community accountability. - Payoffs for efficiency targets and penalties for noncompliance.
<p>Part IV- Good Governance Principles:</p>	<p>Based on</p> <ul style="list-style-type: none"> - Acknowledging and understanding rights of each other in terms of nationality (i.e., ethnic, cultural), loyalty and kinship, gender, peaceful existence, and mutual consultation process.
<p>Responsive</p>	<p>Conflict Resolution should lead to peace which can have several meaning as follows:</p>
<p>Accountable</p>	<ul style="list-style-type: none"> - Reform: I only desire reform to the best of my ability.
<p>Consensus Oriented</p>	<ul style="list-style-type: none"> - Betterment of conditions: The best thing to do is what is for the people Reconciliation and good.
<p>Participatory-based</p>	
<p>Proclaiming the Clear Message</p>	<p>Humans Trustees and are responsible</p>
<p>Follow Rule of Law</p>	<p>Principle of humans are Stewards-participation in decision making;</p>
<p>Legitimacy and Capacity Development</p>	<p>Principle of Consensus of experts</p> <p>Principle of consultation and community participation</p>
	<p>Transparency and clarity in information</p>

<p>Exercise of Knowledge and Intellect</p>	<p>dissemination and policymaking.</p> <p>Principle of maintenance of the order is to avoid chaos and injustice. Sanctions can be enforced, as well as incentives to achieve environmental sustainability principles.</p> <p>Effectiveness and efficiency of the governance system is a measure of its legitimacy; capacity development and empowerment ethical and moral obligations provide a basis for the legitimacy of the governance system.</p> <p>Knowledge is more than acquiring information; knowledge can be considered as a societal force embracing theory (belief system), enlightenment (Spiritual), thought (philosophical and scientific), and society (educational) (Rosenthal, 2007). Therefore, knowledge system is vital to any governance system.</p>
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Human Behavioral Modification

To enhance people’s motivation and adherence toward HIMA governance principles and to ensure successful implementation of the HIMA, there is a need for human behaviour modification (HBM). Based on modified version of the Health Believe Model, developed in 1950s whereby personal beliefs and perception influence human behavior, it is important to start with proclaiming the clear message principle to build knowledge acquisition with sociopolitical and ethical dimensions. There are four perceptions which serve as the main components of the model, such as perceived importance of the natural resources management leading to sustainable development, perceived people susceptibility to depletion of resources, perceived individual and societal benefit and perceived barriers to behavioral change.

Perceived importance of sustainable natural resources management addresses the individual’s belief about the seriousness or significance of the issue. The perception of such seriousness is usually built on information and knowledge, but it could likewise be based on beliefs and values. For example, water scarcity would mean exploring new water resources under supply-demand driven management system. However, if financial resources are scarce, water scarcity would mean drought, famine, and loss of life.

Perceived susceptibility meanwhile, is a powerful perception in promoting people to adopt positive behavior against wasteful of natural resources- conservation, reduce waste, prevent pollution and respect for the environment. The greater the perceived risk, the greater the likely hood of engaging in behaviors, habits, and practices to reduce wasteful of natural resources. This is what prompts people to ration in water consumption in countries suffering from droughts like many in WANA region.

Perceived benefits encourage people to adopt a responsible behavior once they realize the positiveness of their actions or behavior. Recycling of grey water in any manufacturing facility means saving money and reduction in the production cost, and should lead to more profit. Overfishing in many regions has depleted fish stocks which have led governments to forbid fishing using certain size of nets to prevent completely fishing by explosives. Overfishing has often led to reduce people's economic benefits and job losses. Therefore, perceived benefit can play an important role in the adoption of a new natural resources management system.

Perceived barriers, and since change does not come easily to most people, this is an individual's own evaluation of obstacles in the way of him or her adopting new behavior. In order for a new behavior to be adopted, a person needs to believe in the benefits of the new behavior outweighing the consequences of the old behavior (Center for Diseases Control and Prevention, 2004). This enables barriers to be overcome and the new behavior to be adopted.

The four major constructs of perception are influenced by other variables, such as cultural values and ethics, education level, religious beliefs, past experience, skills, and motivation. These are individual characteristics that influence person's perceptions.

In summary, a person's behavior is determined by personal beliefs or perceptions (seriousness, susceptibility, benefits, and barriers). Each of these perceptions individually or collectively can explain a person's behavior. Therefore, to secure the individual's responsibility toward the HIMA approach, an action plan should address each of these perceptions that the authors believe they coincide with HIMA's Governing principles.

Conclusions: Bridging the Gap between Traditions and Modern Day Practices

It can be conclude that HIMA is a coherent set of principles for an equitable and sustainable use and management of natural resources. Using the aforementioned principles as an entry point, a viable CBNRM governance system is recommended. The HIMA governance principles are comparable to modern day concepts which show that HIMA

concept can be interfaced with cotemporary principles. For example, the HIMA governance principles are comparable to the following:

- The nine contemporary CBNR governance principles presented by (Dudley, 2008) representing IUCN’s guidelines on protected area and,
- The twelve organizational principles based on a survey of latest research done Grunber (Gruber, 2010).

The comparison is shown in Table 2.

It is worth noting that many countries in the WANA region have been experiencing lack of implementation of these principles due to many factors including resistance to change, unfair distribution practices, lack of good governance as well as weak operational and financial management of the natural resources. HIMA’s governance principles provide a good basis for sustainable natural resources management in the WANA region and beyond. This policy proposal needs to be tested empirically to show how the theory can be put into practice.

Table 2. Comparison of Contemporary CBNR Governance Principles with HIMA

Governance System (Source Hashemi, 2012)

IUCN ‘s protected area Principles (Dudley, 2008)	Contemporary CBNR Principles (Gruber, 2010)	Some of the relevant HIMA Governance principles
1. Legitimacy and voice	1. Public trust and legitimacy	1. Legitimacy and capacity development
	2. Public participation and mobilization	2. consultation and community participation
2. Subsidiarity	3. Devolution and empowerment	3. Devolution by recognition of the informal local institutions
	4. Adaptive leadership and co-management	4. Recognising adaptive management: Principle of ‘Necessity’ Rules
	5. Participatory decision making	5. Consensus oriented
3. Fairness	6. Resources and equity	6. Principles of policymaking (Justice and equity and public interest
4. Do no harm		7. No harm Principles
		8. No damage, corruption, pollution
5. Direction- clear vision		9. HIMA Development Vision
6. Performance	7. Social capital and collaborative partnerships	10. Principles of Integration and social cohesion
7. Accountability	8. Monitoring, feedback, and accountability	11. Principle of Humans are Stewarts
8. Transparency	9. Communication and information dissemination	12. Proclaiming the clear Message Principle

9. Human rights

10. Research and information development

11. Enabling environment: optimal preconditions or early conditions

12. Conflict resolution and cooperation

13. Holism principles

14. No excessive use

15. Principles of Exercise of Intellect (Knowledge accusation with socio-political and ethical dimensions)

16. Collective action Principle

17. Financial Sustainability Principle

18. Principles of reform, betterment of conditions and reconciliations and cooperation

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Socioeconomic Framework of the HIMA

Presentation in Session I: HIMA Governance System: The Underlying Principles and Legal Framework

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Introduction

The Human Integrated Management Approach (HIMA) is defined as: Community Based Natural Resource Management (CBNRM) System that promotes sustainable livelihood, resource conservation and environmental protection for the human well-being. This all-encompassing system is needed as global demand for water, food and energy is rising. With a hike in population growth and increased urbanization there is the need to provide a higher standard of living for an ever growing number of people. Such changes in society may lead to a situation in which harvesting from the land becomes uncontrolled, ending inevitably in desertification. The HIMA system focuses on sustainability. By devolving authority to the local community, they are encouraged to invest in the maintenance of their natural resources; individuals are permitted to make a profit from the land but only within a strict framework of regulations aimed at sustaining that land. There will be no overuse or underuse of the natural environment in a successful HIMA zone.

Thus, the main economic benefit is financial sustainability, especially for those who live directly off the land. The strengthening and sustaining of local institutions is also a HIMA aim along with rural development. The need for these HIMA induced benefits is clear when considering the current situation in Africa. Arable land on the continent has been crowded with foreign investors, who invest very little in the agricultural process or developing the surrounding infrastructure. As this has inflicted some serious damage on the local resource base, experts have called for the development of a more solid framework upon which to build production and export capability. The finances and knowledge to bolster local capacity building must come from the outside, since those on the outside seek to benefit from

the HIMA zone. This is a more modern element of the HIMA system; the local community is no longer working just to feed themselves but to establish an export capability as well.

When social benefits revolve around social cohesion, the community is brought together in a cooperative decision making process. Furthermore, each individual has equal rights to the land; there will be no monopolizing of resources. Social justice and equity are the key social benefits of the HIMA system.

As Islamic economist Chapar said...

'While economic growth is essential it is not sufficient for attaining real human wellbeing,' rather we depend on 'justice and fair play at all levels

To be just and provide social and economic benefits the HIMA must meet the following requirements, put in place by the Prophet of Islam:

- It must be established for purposes pertaining to the public welfare.
- It must avoid causing undue hardship to the local people.
- The benefits to society must be greater than the costs.

The HIMA must be Established for Purposes Pertaining to the Public Welfare

Prior to the advent of Islam, the HIMA was commonly used as a tool of repression. The wealthy often declared their land off limits to the detriment of the poor. The Prophet (PBUH) introduced the reformative notion of social justice, now vital to the HIMA initiative.

To be valid, the HIMA must benefit all levels of society, not only a certain class or family. Islam holds that it is the birthright of every human being to access his share of mother earth's sustenance. HIMA's socio-economic benefits spring from this notion that there should be no monopolizing of natural resources by a certain class or sect. Equal opportunities for all are the key to this tried and tested system.

Such attributes formed their roots in Al Wathiqah, arguably the first Islamic state constitution. According to a plethora of Islamic scholars, the document was drafted between the three main communities of Al Madina in 622. Poverty, corruption, injustice, and bondage were seen as severe obstacles to the creation of an internally harmonious state; thus, the constitution designates their elimination the utmost importance. So too does the HIMA system, *Fallah* or human well-being is the main aim. This cannot be realized until justice, equity, and public interest have been served; and thus, alleviating poverty is seen as a major stepping stone on the way to true human well-being and a successful HIMA.

Social scientists and economists have defined two types of poverty, the absolute and relative as follows:

- The Absolute: refers to those who do not have the financial means to procure the necessities of food, shelter, clothing and healthcare.
- The Relative: refers to those who can access the necessities but who have relatively less than the average person in their society.

The HIMA system places emphasis on helping those in ‘absolute poverty’, those without the basic means to live. Many Islamic economists have already called for a fundamental restructuring of consumer preferences to help those in absolute poverty. The community should ensure that basic essentials are plentiful and equitably distributed; luxuries for the few should only come after all community members are duly provided for. Thus, any individual is ‘allowed’ to attain great wealth, but only after he has accorded some of his gain to help those in poverty. The HIMA system does not bar any individual from wealth if he has earned it within the framework of obligations set by the governing body. Such a system encourages collective duties and responsibilities, as well as social integration.

Social scientists and economists have offered different causes for poverty-economic, political and cultural. Brief explanations of each, coupled with the HIMA system’s prescriptions are here presented.

<p>The Economic cause of poverty stresses that the condition is caused by a lack of jobs and the low wages paid by many jobs. The overall failure to produce enough goods and services is also a major issue here.</p>	<p>The HIMA system seeks to deal with this cause by: encouraging economic activity at all levels of society i.e, all members have access to the natural resources they need. Furthermore the HIMA system seeks to provide social insurance, especially for the needy sections of the community. The system entails that necessities (food, shelter, clothing and healthcare) must be provided for those who cannot independently procure them; therefore, no person shall accept an unfair wage or unfair working hours for fear of no food or no shelter.</p> <p>The modern HIMA places emphasis on the diversification of local livelihoods. The community coordinates their activities within the new governance framework, to ensure that the right goods and services are provided to/by the right people.</p>
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<p>The Political cause of poverty stresses the unequal distribution of wealth in society. Theorists such as Gans argued that the rich <i>need</i> the poor. He claimed that without poverty, of society’s work would not get done, the price on services such as house cleaning would rise and many welfare workers, government beaurocrats and policemen would be unemployed. ‘In many direct and indirect ways the existence of poor people contributes to the comfort of the middle and upper class.</p>	<p>The HIMA system seeks to deal with this cause by making sure no individual is without the insurance of basic necessities. No person shall be taken advantage of due to a lack of income. The HIMA system respects individual rights but bars any particular group from accumulating all of society’s wealth.</p>
<p>The Cultural cause of poverty emphasizes the distict ‘culture of poverty’- created due to the social, economic and political exclusion faced by the poor. This theory has been put forward by anthropologist Oscar Lewis.</p>	<p>The HIMA system seeks to deal with this cause by nvolving the entire local community in the decision making process. This ensures social cohesion.</p>

The HIMA system does not however, seek to breed dependence on handouts. Each individual is encouraged to work hard with the means available to them; effort is rewarded and indifference left unrewarded. The HIMA system seeks to promote equality of opportunity, not equality in every sense of the word. According to Islamic thinking, artificial economic equality is impossible to realize. It is believed that society should not place obstacles in the way of any individual who strives according to his talent and capacity; thus, it is of utmost importance that no particular race, class or social group be given privileges over natural resources. People may not have equal means, but they should be afforded equal access to the benefits of the land.

The case in Algeria. The great Khabily region of Algeria is home to a town that was run by a Citizen juries’ Assembly. The system worked according to Hima governance principles with the main goal being the establishment of social equity in the town. The assembly or *thajmaat* as it was known in the local language, was representative of the entire local community and worked to establish resource sharing agreements within the town and neighbouring areas.

This system allowed the local community to participate directly in the budget formulation process for various projects. Ultimately the system resulted in the following.

- Increased investment transparency
- Improved public accountability
- Improved budget targeting

These are all aims of the HIMA initiative transparency in the governance (or proclaiming a message), collective responsibility and the ability to more effectively assess needs and means will only come with a community based governance model.

Thus, the HIMA system strikes a perfect balance between the individual and society. The individual is free to make a profit so long as he follows the rule of law in place to avoid chaos and injustice. The formulation of this law is consensus oriented and thus, geared toward equality and justice.

The community comes together to control their own economic affairs, making sure that risk as well as return is shared. Economic activity is not strictly controlled to the point of stifling creativity nor is there an atmosphere of unbridled economic growth where the poor will inevitably be taken advantage of. Instead, the system encourages locals to acknowledge the rights of each other and dutifully attempt peaceful coexistence. This has been espoused by Islam.

‘We created you from nations, tribes’ men and women to acknowledge the rights of each other’ (excerpt from the Holy Quran).

The HIMA Should Avoid Causing Undue Hardship. Islamic legal theory (*Usl-al-fiqh*) is aimed to serve public interest by achieving two criteria as follows:

- Repulsion of harm (*daf’e zarar*)
- Repulsion of difficulty (*raf’e haraj*)

The HIMA should not deprive the local community of indispensable resources; it should not impose difficulty on the local community or any neighboring communities. A balance must be found between unbridled economic and physical growth (for example more land for housing) and sustaining natural resources. Overuse will lead to desertification which holds no promises for the future. Sustainable usage assures the repulsion of future harm.

This is why it is so crucial that the HIMA be locally managed; needs and means can be better assessed, and planning can be duly coordinated. However, there is less chance of this, if the conservation system is imposed by a geographically distant authority. Such modern conservation concepts as establishing national parks have led to a severe destruction of plant cover by means of overgrazing. By devolving power to the local community we the direct stakeholders, who have most to gain and lose, are ensured to be taking on the major role. This encourages local communities to invest in the maintenance of their surroundings. Devolving power to the local community will also go a long way in the concerned as follows:

- improving state-society relations, and
- Strengthening governance systems within the local community.

The HIMA Fund. This fund was set up to provide grants to conserve Important Bird areas in the Middle East. The Funds objectives shed light on the socioeconomic benefits of the HIMA system.

- To link environmental conservation and livelihood development for local communities.
- To promote the financial sustainability of local communities through ecotourism and rural development.
- To build and strengthen the working capacity of local HIMA management teams and the local community.
- To increase Awareness, outreach and non formal education schemes for local communities.

The benefits of the HIMA must be greater than the costs. The HIMA system can attract a large amount of outside investment, especially when implemented by a centralized authority. With this injection of capital, local businesses can increase their services and/or can diversify. Thus, alternative livelihood routes are opened up for local workers, examples include bee keeping, natural environment-based tourism, etc. In some documented cases, the government or the implementing body has provided training for these new livelihood routes. Such activity is promoted by the ‘good governance principles ‘of HIMA which encourages the exercise of/ search for knowledge and intellect.

One of the main attributes of the HIMA system is its focus on local capacity building. Local governance institutions are strengthened, and their role in society is cemented. It is important to create institutions and management mechanisms that will outlast the current generation, as sustainability is an important aim. Viable local institutions will make the project more appealing to outside investors; they need to put their money behind a tried and trusted institution. The efficiency and effectiveness of this local governance system will be the measure of its legitimacy, and as long as it is working for the good of the environment and societal well-being, it will continue to have relevance. Sustainability of the decision making body will translate to economic sustainability. The benefits of a structured decision making process which involves the entire local community will transcend the current generation.

This system also holds great popular appeal, if it is desirable to the local community who carry the cost of implementing it, this is not an outside imposition.

By far, the most important economic benefit of HIMA is its sustainability. The HIMA is most beneficial to those who earn a living from the land; they can reap the benefits of mother earth but are not allowed to endanger their future livelihoods by over grazing or over harvesting.

The system adheres to Islamic ethics and environmental laws as follows:

- God as sustainer; Any damage to the environment considered as going against God's will.
- Humans are trustees with responsibility.
- Humans are stewards and accountable.
- Holism of nature: All creatures (animal and plantspecies) are nations like humans (possesses intrinsic values and rights in the ecosystem.
- Ecosystem equilibrium: - Creation is a balance and measured way".
- No harm to the environment must be allowed.
- No excessive use of natural resources.
- HIMA zones are for sustainable natural resource use and environmental protection.
- Wild and planted trees and vegetation need to be conserved and should be protected from deliberate fire or cuts (pro-afforestation).
- Respect for rule of law: the principle of Maintenance of Order *_hefz-e-al-nizam'* (Hashemi, 2012; Hashemi and O'Connell, 2009).

Equal access to natural resources and an equal say in the decision making process ensure that all levels of society 'invest in the maintenance of their natural resources and protect them from abuse' (Kilani 1995). The Islamic development vision holds that resources should be used equitably and distributed fairly, based on concept of justice (*Adl*). The managers of the HIMA are entrusted with finding a balance between the growth of their settlement and sustaining their natural resources There should be no excessive use or *Fassad* (harm or damage). This encourages environmental sustainability which, for a natural resource-dependent community (i.e., farmers or nature-based tourism businesses), promotes financial sustainability. Thus, the HIMA system places great emphasis on sustaining resources for the future; however it also dictates that land must not be wasted. The local community must seek an optimal use of resources. Islamic thinking holds that no land can be unused for over 3 years. This would be a waste of the benefits of that land. Even if this land is privately

owned, whosoever makes use of this land (after the 3 yr period) will gain certain rights over this piece of land. The HIMA system ensures no wastage of resources, neither by their underuse or overuse. This promotes financial sustainability for the future

Conclusion

The social and economic benefits of the HIMA system fit into the Maqasid model, Islam’s version of the human development model. There are 5 essential elements (Table 3).

Table 3. Five Essential Elements to the Maqasid

1) Invigoration of the human self	By devolving the power to the local community the HIMA system breeds self confidence. By rewarding those who make effort (as opposed to creating a system of ‘handouts’) the HIMA system breeds self respect and the ability to <i>earn</i> wealth and well being. The community-based governance aspect provides the individual with personal freedoms and rights but also facilitates a sense of collective responsibility and social cohesion.
2) Enrichment of the human faith	The HIMA teaches respect for one’s natural surroundings. Islam holds that God is the sustainer, any damage to the environment is considered as going against his will. There should be no ‘fassad’ (spoil, corruption or damage) to the Environment. One should learn to balance the use of the land against its destruction for ‘creation is a balanced and measured way’
3) Enrichment of the intellect	The HIMA encourages progress in all forms of knowledge; educational (pursuing new livelihood routes along with the skills needed) and spiritual (learning respect for God’s creation)
4) Enrichment of posterity	HIMA places emphasis on sustainability. The system transforms environmental sustainability into economic sustainability. Focus is also placed upon local capacity

	building, all of which benefits future generations.
5) Development and expansion of wealth	The HIMA system stimulates economic activity at all levels of society. It also seeks to alleviate poverty while still rewarding those who make great personal effort.

Case Study: Tanzania. The Hifadhi ya Mazingira (Protect the Environment) Natural Resources Conservation and Management Program in Tanzania (HIMA) promote sustainable agricultural production, natural resource management, and forestry production among farmers by involving the local population and using relevant indigenous knowledge. HIMA commenced in Iringa District 1990, was extended to Njombe and Makete Districts in 1992, and finally Mufindi and Ludewa Districts in 1998. The HIMA was terminated in 2002, as when the initiative progressed; there was a shift in scope from a conservation approach to an emphasis on crop and livestock productivity and sustainable forest management.

Orbicon A/S from Denmark and Goss Gilroy Inc. from Canada conducted an impact evaluation of HIMA in 2006 to 2007. A succinct outline of the key findings in their report with focus on the issue of sustainability and their overall ‘lessons learned’ is here discussed.

Their evaluation found a marked improvement in the economic well-being of the residents within the HIMA villages. Key indicators included greater livestock ownership (and diversity), an increase in the consumption of crops per every household, larger land holdings, and overall heightened food security. Crucially, access to water had improved in many of the HIMA villages. These successes were attributed partly to the impact of HIMA-related livelihoods on income and the impact of crop production on income.

However, 30% of households reported no change in their economic well-being; some reasons put forward by the report included poor quality agricultural inputs, poor soil, and price increases.

The report went on to state the difficulties of sustainability in some livelihood areas; fish farming for example, was deemed vulnerable to natural factors and market considerations and so was not as successful as initially hoped. Livelihoods such as bee keeping have not been sustainable due to a variety of reasons including a lack of the proper equipment. Another big issue was the lack of proper marketing strategies. A further barrier to sustainability was the failure of the initiative to take the economic status of participants into account; farmers who found their fishponds dried up did not have the resources to replenish

them. There was no pre-HIMA study of the economic margins the local community was working on. Finally a crucial failing, which can be avoided in the attempt to initiate HIMA, was the curtailing of extension services in the later years of the initiative in Tanzania.

The successes of sustainability can be seen in the timber production activities of HIMA villages. Crucially, there existed a vibrant market for timber products in the region, buyers were said to actively seek out producers. There was also strong technical support from HIMA operators in terms of refining nursery practices, etc. A culture of conservation was introduced, whereby the local community was encouraged to forge a link between forestry management and developmental benefits.

The evidence found in the report indicated that HIMA achieved mixed results in improving livelihood income in the Iringa region. While there are examples of successes at the village and individual levels, in the establishment of improved and new livelihood activities, there were also cases of failure. What follows is a list of the key findings of the report group as to what lessons have been learned.

The successes of the HIMA system in the Iringa region of Tanzania highlight the need to identify potential or actual areas of growth; the HIMA was most successful in crop production and forestry, and i.e., when it recognized to build upon areas with potential.

The report has noted that to be successful, HIMA interventions require a private sector approach. A market-driven strategy could have ensured potential entrepreneurs information on existing markets for their products. Such an approach would also have ensured the cross flow of information between experienced entrepreneurs and potential entrepreneurs.

If there had been a decision to introduce a new form of livelihood, it must be followed up with additional support over a longer time frame. An adequate level of resources and a guiding design must also be present if the initiative is to reach success. It is also critical, before the project takes place, to understand the degree of risk that can realistically be absorbed by individuals in the local community. This is especially so when working in an environment prone to adverse weather conditions such as droughts or floods or other events beyond one's control. The report proposed an in-depth analysis of the economic margins of individuals in the local community before the introduction of 'pioneering' ventures such as fish farming or bee keeping which carry high risk of failure. It is the responsibility of the HIMA implementers to assure adequate technical services and advice so as to assure already vulnerable groups to not become even more vulnerable.

The report also addressed the need to strengthen existing structures rather than create parallel structures. Separating HIMA structures and processes from existing government structures was found to be not conducive to the sustainable creation of government capacity.

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An Ethical Legal Framework for Human Integrated Management Approach (HIMA) (Natural Resources) Governance System to Attain Social Cohesion and Environmental Sustainability

Presentation in Session I: HIMA Governance System: The Underlying Principles and Legal Framework

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Section I: Preamble: Set of Objectives

This includes an introduction, vision goals and objectives of HIMA governance system for sustainable livelihood and based on the governing principles as described earlier.

The vision of HIMA legal framework is to act on the following:

- ▶ aimed at the common good (of human societies and of living beings),
- ▶ be monitored through a legitimate governing process,
- ▶ linked to biodiversity conservation with sustainable use and an emphasis on emphasize the role of local communities, at the river basin level in governance with equitable sharing of benefits at the local and basin-wide level, and
- ▶ on realization greater actual benefits than detriments.

Scope of HIMA legal framework is to see to the following:

- ▶ Limiting the scope so HIMA does not harm human communities, and individuals or the environment.
- ▶ Geographic scope of HIMA is WANA Region which may also be used as a global source of inspiration and vision.

- ▶ Recognition of the ecological, cultural and socioeconomic diversity throughout the WANA region must be taken into account.
- ▶ Adaptation of HIMA products or results will benefit the whole society without any exceptions.
- ▶ Do No harm: uses have to take account of the welfare of all, including all created beings.
- ▶ No privatization of water or harming others by removing water from human community or all created beings.
- ▶ For user groups, ensuring that the adoption of the HIMA does not favor one's interest/stakeholder group, and harm another stakeholder group.

As the HIMA system promotes good governance, it is a multi-stakeholder approach that builds on indigenous knowledge and practices. Also, HIMA ensures equity, creates new social values, respect for nature – trusteeship, common responsibility, social cohesiveness and solidarity. HIMA's legal framework is therefore a dynamic, responsive to needs such as local needs, future water needs, climate change, and is to avoid a rigid definition. There is the need to encompass a great variety of approaches and uses, avoiding setting parameters for participation (e.g., environment, development) – communities know their priorities and it is not for outsiders to decide what issues they should focus on. The governing principles are given in previous section.

Section II: Definitions

HIMA is defined as a community-based natural resources management (CBNRM) system that promotes sustainable livelihood, resources conservation, and environmental protection for the human well-being.

- ▶ Natural resources are considered to be public and owned by the State or the legitimate authority.
- ▶ Natural resources include:
 - ▶ Water resources (surface and groundwater)
 - ▶ Sources of energy and
 - ▶ Land resources including minerals, wastelands rangelands, woodlands, and forests, etc.

Section III Provisions for Right to Use

- ▶ Non-exclusive (open) and equitable access rights are given to public and common properties such as HIMA land allocation for development system.
- ▶ Right to use natural resources can be given to individuals or legal entities.
- ▶ Right in the second is a restrictive right to use in accordance with public interest criterion.

Section IV: General Provisions for Private Ownership

Private property right can be achieved by 8 mechanisms such as Inheritance, compensations and trade-offs, gifts, will, benevolent, charity, war bounties, and regenerated or revived (ihya) lands. Revived lands can be owned after their allocation.

- ▶ Chattel (movable) properties can be owned within HIMA zones.
- ▶ Private ownership of natural resources is limited by the following
 - ▶ No waste/ conservation principle
 - ▶ It can be accumulated, but spent for common good
 - ▶ Taxes can be introduced on wealth accumulated by use of natural resources.

Part V: Provisions for Water use and ownership

- ▶ Water is the source of life and equitable water rights for all (humans, animals and the environment) should be ensured.
- ▶ Right of drink is recognised for humans and animals.
- ▶ Customary water rights are recognized including groundwater resources system.
- ▶ Riparian water rights are recognized as priority of use.
- ▶ Private groundwater rights to groundwater are recognized by owners of private wells.
- ▶ Return river (excess) flows are publically owned and should not be stored and should be directed back to the river.
- ▶ Private water is defined as water in private containers, treatment plants, distribution systems, and reservoirs
- ▶ Private Waters can be traded. Pricing is decided by market forces; no fix pricing except for the public interest criterion.

- ▶ Right to thirst clause (second item) implies that public drinking water installations for human and animal consumption can be built in HIMA zones.
- ▶ Aesthetics water needs should be established:
 - ▶ Water for green belts and parks, and
 - ▶ Enough water for rivers to keep their aesthetics or basic functions.

Part VI. Provisions for Land Use and Ownership

Publically owned land allocation systems are ensured in the following:

- ▶ HIMA zone land allocation system is for sustainable development and conservation.
- ▶ Haram (boundary) sanctuaries can be established for source protection including rivers and wells.
- ▶ Green spaces around populated areas in HIMA zones.

Privately owned land use systems are allocated to the following:

- a. Irrigated and dry farmland can be owned privately. Sustainable agriculture is encouraged including farming and fruit growing: “Agriculture is the greatest treasure”
- b. Ihaul-Mowat land allocation system is for development and the regenerated land can be owned privately.
- c. The provision in the second is a restricted private ownership and is only provided if it is not neglected.

Part VII: Provisions for Environmental Protections

Land Resources

- ▶ HIMA zones can be assigned as conservation zone if necessary and used rights can be restricted or prohibited for a prescribed time in exceptional circumstances such as droughts
- ▶ During easement and restricted right to use in HIMA conservation zones is only established if there is no hardship to local community and general public and extensive damage to the environment.

- ▶ Haram (boundary) sanctuaries can be established for source protection including surface and groundwater resources. Landfills and sewage should be kept out of the sanctuaries.
- ▶ Wild and planted trees and vegetation that need to be conserved should be protected from deliberate fire or cuts.

Water Resource

- ▶ No sewage should be dumped in streams, rivers and water bodies.
- ▶ No poisonous chemical should enter water resources.
- ▶ Polluted water should not be used, as it is potentially a health hazard.
- ▶ Groundwater resources are to be protected from sewage and dumping sites.
- ▶ River and sea coasts are to be protected from human and animal sewage.

Part VIII: Provisions for Natural Resources Management

- ▶ HIMA zones are managed by community-based local institutions which are non- rigid self-governing entities. The devolution is based on good governance principles.
- ▶ Informal local institutions are nested within the institutional system to ascertain local needs and provide traditional and local knowledge systems for an effective management.
- ▶ Research and development are undertaken to understand both local and scientific knowledge about HIMA zones:

Possible research pathways are as follows:

- ▶ Identify shared opportunity/problem focus with all stakeholders (determine who are user groups)
- ▶ Design interdisciplinary research that covers production functions, human well-being, environmental/ecosystem functions
- ▶ Trade off analysis who gains/losses, and develop intervention options (technical, institutional policy and financial options)
- ▶ Extrapolation and dissemination.

2. Research-scoping analysis, research design and existing HIMA and pilot projects should work on as follows:

- ▶ Determining specific environmental studies for the HIMA site, including but not limited to wildlife, fisheries, and range ecology and management, zoology, botany, hydrogeomorphology, climate/ weather, range ecology, ethnoecology, intangible cultural values.
- ▶ Site monitoring and adaptive management, potentially restoration, conservation and captive breeding programs-reintroduction of endangered species, and collecting the germplasm and seed bank of the site to maintain for perpetuity.
- ▶ Study of the technological evolutions within HIMA including Agro ecology, grazing management, and wild land harvesting for material culture, food or medicine.
- ▶ Ensuring that all scientific studies are published in peer-reviewed scientific papers and disseminated to the larger scientific and policy global community.
- ▶ Study of the structures and functioning of social systems including kinship, authority and regulation of HIMA.
- ▶ Conducting pilot project on ethnographic and participant observation of women and youth in existing HIMA's, determining their role and perspective.
- ▶ Determining how these HIMA systems are working and evolving.
- ▶ Study on the relations of HIMA's with other scales of governments, within which they are embedded.
- ▶ Funding benefits of HIMA are allocated, how users are made accountable, how disputes and conflicts of interest are resolved, and how changes in management objectives and rules of use are effected.
- ▶ Determining socioeconomics, cost-benefits, and profitability.
- ▶ Marketing the success and benefits of the HIMA.
- ▶ Developing education and research programs as integral components of HIMA pilot projects.
- ▶ Recognizing adaptive (and demand) management: Principle of 'Necessity' Rules: new rules can be made according to new conditions.
- ▶ Management of the HIMA zones are based on no hardship clause to allow for social justice in addition to the conservation and protection of the natural resources.
- ▶ International good practices and standards from conventions and treaties can be incorporated into HIMA governance system. HIMA can respond to the global economic and environmental crisis, while address environmental services and broader

goods from biodiversity. HIMA is not only focus on environment – it ensures that economic interests are captured – ensures job creation, even as it addresses health issues. HIMA, as a sustainable development model, is linked to socioeconomic benefits, as well as ecosystem degradation. It creates a Win-Win situation between community-environment-economy. It was also suggested using HIMA as a label only, where it is relevant, with focus on goals and worrying about the labels afterwards. HIMA can promote sustainable agriculture, ecotourism, and sustainable use of biodiversity, e.g., medicinal plants. Other concerns of HIMA may be the following:

- ▶ HIMA can enhance local governance and civic responsibility, with government endorsement/blessing for this work, willing and able to support community plans and priorities, ensuring that plans are informed in conformity to new realities related to climate change (adaptive capacity).
- ▶ HIMA can improve working relations between government, communities, civil society, private sector, multistakeholder engagement, and empowerment of local communities.
- ▶ As the HIMA system promotes local knowledge, it is recommended to promote water recycling and purification – role of ecosystems– looking at adopting older technologies rather than replacing them – giving space to people on the ground to decide what to do and how to do it.
- HIMA ensures gender equality– ensures women’s involvement, education/awareness onraising of women.
- Need for long term monitoring plan – economic outcomes, ecosystem and biodiversity outcomes, governance outcomes – these are the 3 pillars of sustainable development – developing tools for strong and credible assessment.
- It can strengthen capacity to use customary law/institutions for conflict resolution.
- HIMA can be a conservation approach that spans all IUCN PA categories; HIMA can also be a part of ICCA.
- Participatory approaches must be responsive to local needs, e.g., if communities want to keep livestock, this is where support needs to be focused.

- HIMA as part of societal learning and transition to a green economy, transformative education, in order to show the relation between people and nature.
 - HIMA can operate in areas of lower ecological or biodiversity value (the value of landscape connectivity).
 - There is the need to dialogue between sectors and ministries etc., create strong dialogue between different practitioners, maintain openness to innovation and learning.
 - HIMA can be part of a rights-based approach – if efforts are exerted to restore or protect land rights of ownership can be owned; and if land is degraded, the right to ownership is forfeited.
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- ▶ Monitoring HIMA zones are supervised by the relevant authorities in cooperation with local administration.
 - ▶ Actions are based on environmental sustainability, and good governance principles should reflect local realities and social justice principles.

The Presence of HIMA Concepts in *Aflaj* System in the Sultanate of Oman

Presentation in Session I: HIMA Governance System: The Underlying Principles and Legal Framework

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Abstract

Aflaj (pl. *Aflaj*) is a channel constructed above or below the ground surface extending from the water source to the irrigated lands including water management and *Aflaj* administration. The *Aflaj* has played the key role in the creation and maintenance of the villages in Oman. In addition, it plays significant roles in the cultural and social fabric in the *Aflaj* community. Since the *Aflaj* is essential to life, everyone has played a range of different roles to maintain it in good working order. This paper describes the presence of Human Integrated Management Approach (HIMA) concept in the *Aflaj* system in Oman with emphasis on the community based natural resources management (CBNRM) system.

Keywords: *Aflaj*, inviolate zone, CBNRM, human management, traditional irrigation

Introduction

The Sultanate of Oman is one of the driest regions in the world, classified from semiarid on the coastline (3,500 km) to arid inland regions where it is characterized by little vegetation and a very dry climate. The mean annual precipitation is 350 mm on the Al Jabal Al Akhdar and 90 mm on the alluvial plain (MWR, 1996). The low average precipitation 100mm/year indicates very limited renewable water resources per capita. Precipitation is related to local summer convective storms and winter frontal storms, approaching from the north and northwest and originating from the Mediterranean Sea (Juerg *et al.*, 2005). Evaporation varies from 1660 mm/year in the Batinah plain to 2200 mm/year in the interior. Day time temperature is high, generally above 30 °C and seasonally above 40 °C.

Aflaj is a canal system which supplies water for a community of farmers for domestic and/or agricultural use (Wushiki, 1997). Agricultural production in Oman is almost fully

dependent on irrigation in which more than one third of irrigation water is supplied by *Aflaj* (Norman, *et al.*, 1998 a; b). The rural communities of *Aflaj* system are fully dependent on *Aflaj* as their integral part of their life (Abdel and Omezzine, 1996). The flow of water in *Aflaj* systems is continuous and the water shares are divided on a time basis and not by volume of water.

A HIMA "inviolable zone" refers to an area set aside for the conservation of natural capital, typically fields, wildlife, and forests - contrast with *haram*, which defines an area protected for more immediate human purposes (Alabsi, 2002). HIMAs have been practiced throughout Asia and Africa under different local names. The revival of community-based HIMA governance systems has started in more recent times to revive the CBNRM (Saleh and Hashemi, 2011). The FAO (2009) called for the incorporation of HIMA in forestry management and noted the quasi-religious force of HIMA prescriptions (UNU, 2013). The International Union for Conservation of Nature IUCN in their last congress meeting in 2012 endorsed HIMA as a natural resources protection management system. Wet land International, also in 2011, endorsed HIMA as a natural resources and ecosystem management scheme (UNU, 2013).

Water Resources in Oman

Groundwater is recovered by wells (estimated to 127,000) and *Aflaj*. Annual recharge is estimated in the order of 1,645 M m³. The status of water consumption is shown in Fig. 1. Renewable water resources are very low due to low and unpredictable rainfall, limited groundwater recharge, and lack of any significant surface water bodies such as perennial rivers or lakes (Ian *et al.*, 2002). Water resources in Oman can be divided into two major categories such as the following:

- Traditional Water Resources (Surface and Underground):
 - Groundwater–130,000 production wells available.
 - *Aflaj* -4112 (3017 still running)
- a) Nontraditional Water Resources:
 - Desalination from sea water
 - Wastewater treatment
 - Virtual water

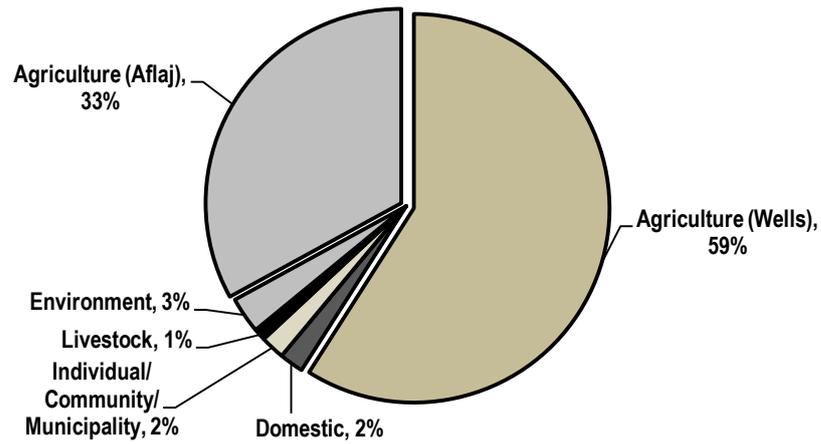


Fig. 1. Status of water consumption in Oman where Agriculture demand is about 92% of available water.

The *Aflaj* constitutes 33% of the total renewable water resources available in the Sultanate of Oman. The date palm trees are irrigated by *Aflaj* water, amounting to 70% (Al Mamary, 2002) of the total irrigated area. Other crops, such as lime, mango and other trees accompanied by intercropping with cereals and vegetables, occupy 15 %. Fodder crops occupy 9% and 6 % (Al Mammary, 2002). From the total demand for *Aflaj* water of 460 million m³/yr, 99.8 % goes to agricultural use (MRMEWR, 2001). In most *Aflaj*, water is first allocated for drinking, then water will pass through mosques, forts, men's public baths, women's public baths, and then to the areas for washing dishes and clothes. After domestic use, *Aflaj* is utilized first to irrigate the permanent cultivated lands, mostly date palms and then the seasonal cultivated lands, called *Awabi*. However, if drought occurs, farmers cut the area of seasonal crops (Wilkinson, 1977, Dutton, 1995).

Aflaj* System and Types of *Aflaj

In Oman, *Aflaj* are clustered around the Hajar Mountains in the north (Fig. 2). There are 4,112 *Aflaj* in which 3,017 are operational and producing water about 680 million m³/yr in which 410 million m³/yr is used. These *Aflaj* are irrigating 26,500 ha (Al-Hatmi and Al-Amri, 2000). The total discontinued or dead *Aflaj* was 1004 (MRMEWR, 2001). The irrigated areas under *Aflaj* were estimated at 18, 536 hectares which represents 30% of the total irrigated area in Oman. In addition to that about 7961 hectares are under cultivation.

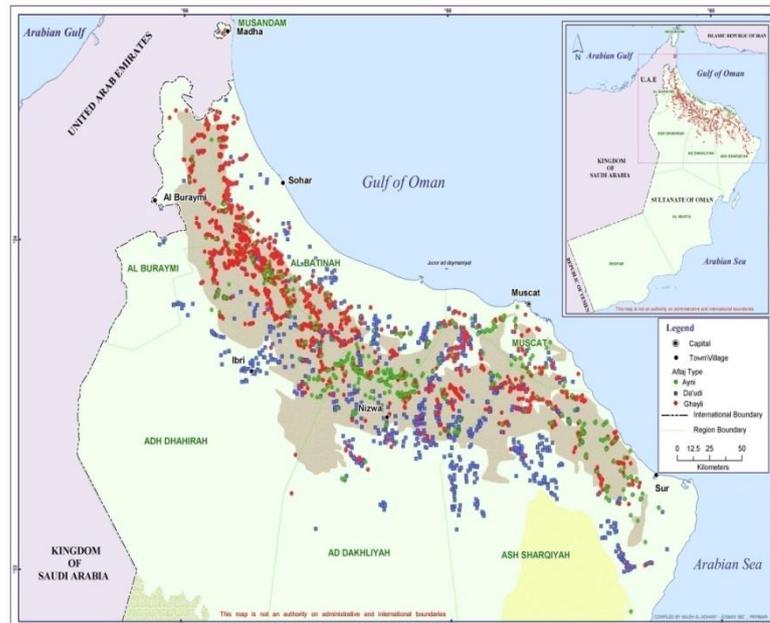


Fig. 2. Distribution map of *Aflaj* systems in northern Oman (Red dots: Ghaili, Green: Aini, Blue: da'udi) (Source: MRMEWR, 2001).

Aflaj Types. Lightfoot (2000) reported that *qanats* spread from northern Oman to the southern part (Dhofar) as early as first century A.D. There are three types of *Aflaj* in Oman; *ghaili*, *daudi*, and *aini*. Among these three systems, only the *daudi Aflaj* is very similar to *qanat* irrigation systems of Iran.

Ghaili Aflaj (Spate Irrigation Type). Depend on base flow in wadis to provide sufficient water (Fig. 3a). During rainfall, the flow in wadis increases rapidly as runoff contributes to the hydrograph. *Ghaili* type represents 59% in Oman but is dead (MRMEWR, 2001). This is because this type is a simple diversion and canalization of surface wadi flow, using a shallow aquifer.

Aini Aflaj. Depends on springs (*ain*) to provide a perennial water source (Fig. 3b).

Da'udi. This taps groundwater through one or more wells, from which water flows by gravity through downward sloping underground tunnels and eventually, surface channels that convey the flow to the users (Fig. 3c). The water flows along the tunnel, and when it reaches the surface, water is distributed to the fields. They are found up to 100 km from the mountains. *Da'udi Aflaj* represents 23% of the total *Aflaj* in Oman (MRMEWR, 2001). The source of water is a mother-well. In these, *Aflaj* water is driven from deep water table by long

underground tunnel followed by a canal system. The slope of the tunnel is carefully chosen so that the water will flow in calm speed. The gradient must be less than that of the gradient of the ground water table, or the ground surface. This is to reduce water erosion and damage to the tunnel, (Birks, 1984).

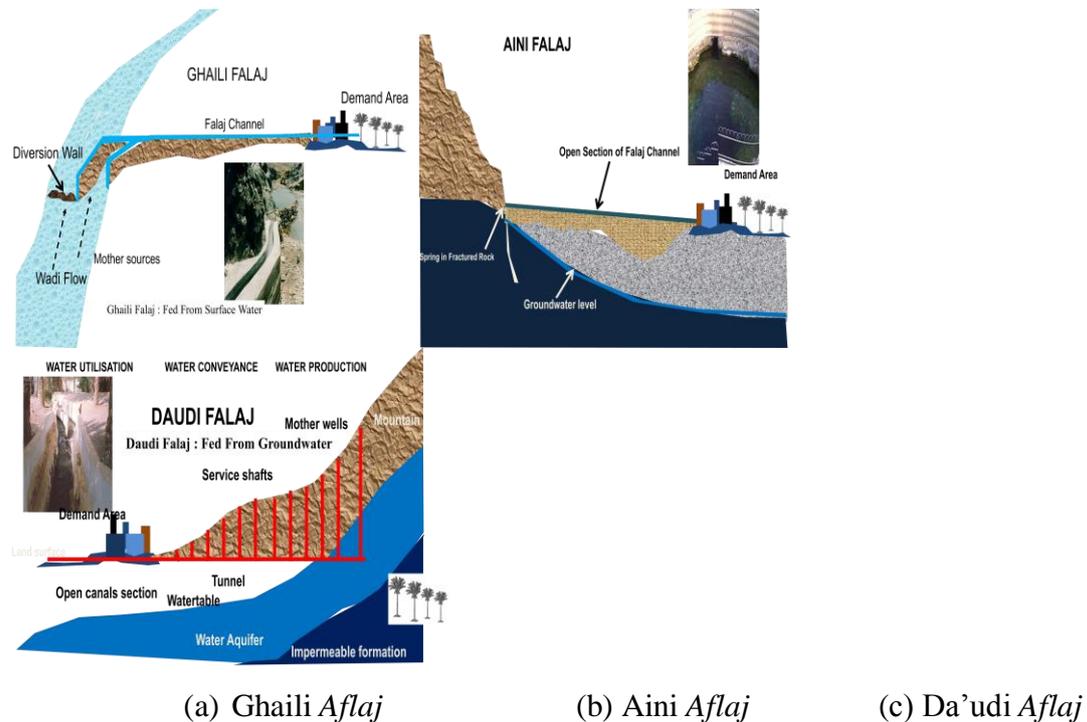


Fig. 3. Types of Aflaj systems in Oman.

Challenges for Development of Aflaj

The Aflaj are facing several problems and challenges due to the recent development in Oman. The change in the current life patterns and attitude has economically influenced the agricultural societies especially Aflaj communities. The date palm trees which occupy about 70 % of the cultivation in Aflaj communities have displayed a reduction in economic returns due to the change in the life pattern which requires a good variety compared to the existence old style varieties. Additionally, the poor marketing systems and lack of agribusiness is worsening the problem. This change negatively affects the Aflaj area resulting in a low income and reduction in value of the lands.

Most of the land holders in villages are the older generations who are very resistant to change. The agriculture extension centers in villages have spent great efforts to convince

farmers to accept change. The farmers' concern is not on change, but that the date palm tree requires more water; and trickle irrigation might not provide such quantity.

Water rights are a major challenge to improve water management. The excess water accumulated from improving irrigation efficiency will be used to irrigate additional cooperative land, and the returns will be distributed according to each farmer's percentage of water rights. Solving this problem was the "green light" for commencing project implementation (Al Mamari and Al Kalabani, 2012). Moreover, the *Aflaj* continues to discharge water day and night giving the farmer inconvenient times for irrigation; whereas, the fluctuations in *Aflaj* water flow from time to time creates difficulties for the farmer trying to invest in new crops. The water rotation cycle sometimes continues over longer than 15 d and this means, the trees become exposed to a severe moisture deficit phase especially during summer, which leads to low production for permanent crops and prohibit farmers from growing seasonal crops.

Problems Facing *Aflaj*

There is more than 25% of Omani *Aflaj* classified as dead (MRMEWR, 2001). These systems have been discontinued due to several factors, not only by hydro-physical reasons but also by socio-economical problems. *Aflaj* have become less and less important as a source of income. Regular maintenance becomes less practiced. The major pressure facing *Aflaj* is socioeconomic, in the form of competition from higher paying employment outside the community, and the perception of an improved lifestyle, fuelled by the ready availability of amenities such as electricity, television, and other media, communications, and transport infrastructure.

Due to the rapid modernization, farmers get attracted to another source of higher income in oil companies and governmental organizations. The migration of farmers to work out of the community had led less manpower to take care of the *Aflaj*'s regular maintenance. Due to the developed passive attitude of farmers toward the *Aflaj*, technical knowledge about *Aflaj* remained only with older generation, and new generations have no interest to learn it. In many systems, farmers even do not know the time of the construction or the location of the water source (Wushiki, 1997).

Starting from the 1950s, farmers who get better incomes from working out of the *Aflaj* communities depart from the community and establish their own farms. These new

farms are irrigated by diesel or electric pumps. The large numbers of new farms affect the water table feeding the *Aflaj*. Much *Aflaj* flow is reduced and dries out in some cases. Oman government has exerted much effort and regulations to stop or reduce the effect of this problem on *Aflaj*, for example, by implementing new regulations to control the digging of new wells.

Urbanization is one of the threatening problems to *Aflaj*. Farming lands are shrinking in favor of expansion on residential areas. In many *Aflaj* systems, agricultural lands (which have low prices per square meters) are converted to housing land. Many farms were reduced or abandoned. The terminology and nomenclature for scheduling irrigation and units for water share have become too complicated and unorganized, and over knowledge is disappearing. This fact, beside the ridge fixed irrigation cycle has caused make the modernization of water management very difficult. Another potential hazard to *Aflaj* is chemical and physical pollutions. The country is moving fast toward heavy industry, tourism and economical activities. The combination of these activities with other social problems can harm the fragile ecosystem of *Aflaj*.

Aflaj areas are divided according to a smallholder system and utilize earthen canals to distribute the water to manually prepared basins. This method contributes greatly to the loss of water through deep infiltration. The use of large basins to irrigate trees results in water waste through evaporation and deep percolation. In addition, weed growth consumes considerable quantities of water. Irrigation is distributed by a complex network of channels; typically, the main channel is cemented, while other distribution channels are earthen channels which contribute to the high loss of irrigation water. The Ministry of Agriculture estimates losses of water to be about 40%, mainly from distribution networks and flood irrigation methods (MRMEWR, 2001).

It is obvious that times have changed that *Aflaj* do need to adapt to the different circumstances if they are to survive. Therefore, it is time to conduct various researches for evaluating the quality of soil and water environment in *Aflaj*. For example, in many cases in Oman, the source of one *Aflaj* is located just downstream of another. Thus, applying agro-chemicals in the upper stream may lead to polluting the lower *Aflaj*. Biological pollution from residential areas is also expected. The sewage water from houses is stored in underground tanks; this water may seep into the *Aflaj* tunnel or canal.

Water Allocation

One of the historical features of *Aflaj* is the system of water allocation among different farms or owners. Once the flow reaches the community, there are traditional methods for allocating it among the various users, typically on a time basis. Users receive their time share of the flow regularly every 7 to 14 d with the interval termed the *Dawran*. The time-sharing is measured in various units, such as *athar*, which corresponds approximately to half an hour. There is a distinction between daytime and nighttime units due to seasonal changes in daylength (Fig. 4).

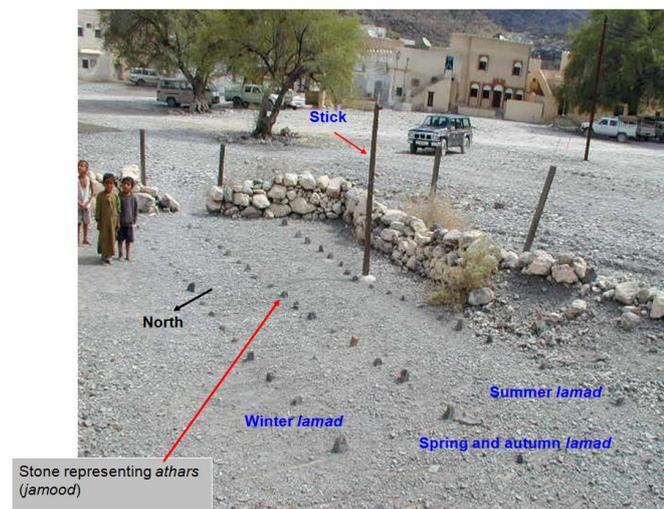


Fig. 4. Sundial system used for Daudi (Source: Al Ghafri *et al.* 2003).

The system of allocating water at a fixed interval, in an amount per unit area of land that depends on the flow rate, is an obstacle to the production of many crops. Traditional crops, such as date palm may produce well under this system, but other higher value crops require more frequent but smaller irrigations in order to maximize production and quality. If the current system of water allocation is to be retained, then the only way to introduce some management flexibility into the system is for individual farmers to have storage capacity.

Currently, there is no standard unit of time of water distribution for all *Aflaj* of Oman. As the traditional way of irrigation scheduling differs from one *Aflaj* system to another, the standardization of time-sharing is likely to be tricky. Even though in most of the *Aflaj*, farmers use *athars* as a standard unit, the way of inspecting the length of each *athar* varies among *Aflaj*.

Although water within an *Aflaj* community is not a commodity that directly carries a price, it does nonetheless have a high value in terms of the agricultural production it enables.

In order to provide a livelihood that is competitive with those outside the community, the income generated per unit volume of water must be increased.

Theoretically, ways to increase income include the following:

- Increasing the overall area irrigated by the *Aflaj* flow,
- Increasing the value of the crops grown with the water, and
- Developing added value products and sources of nonagricultural income.

Each of these has advantages and problems, and there is no single simple solution.

Community-Based Natural Resource Management (CBNRM)

Aflaj system has been existing for centuries because of implementing CBNRM (Saleh and Hashemi, 2011). The CBNRM is aimed at HIMA concept, as land zoning is applicable through the following (Fig. 5):

- Allocation of protected recharge zone of 3.5 km.
- Allocation of maintenance buffer zone for channels' maintenance
- Allocated places for drinking and municipal uses
- Allocated area for permanent and seasonal crop cultivation

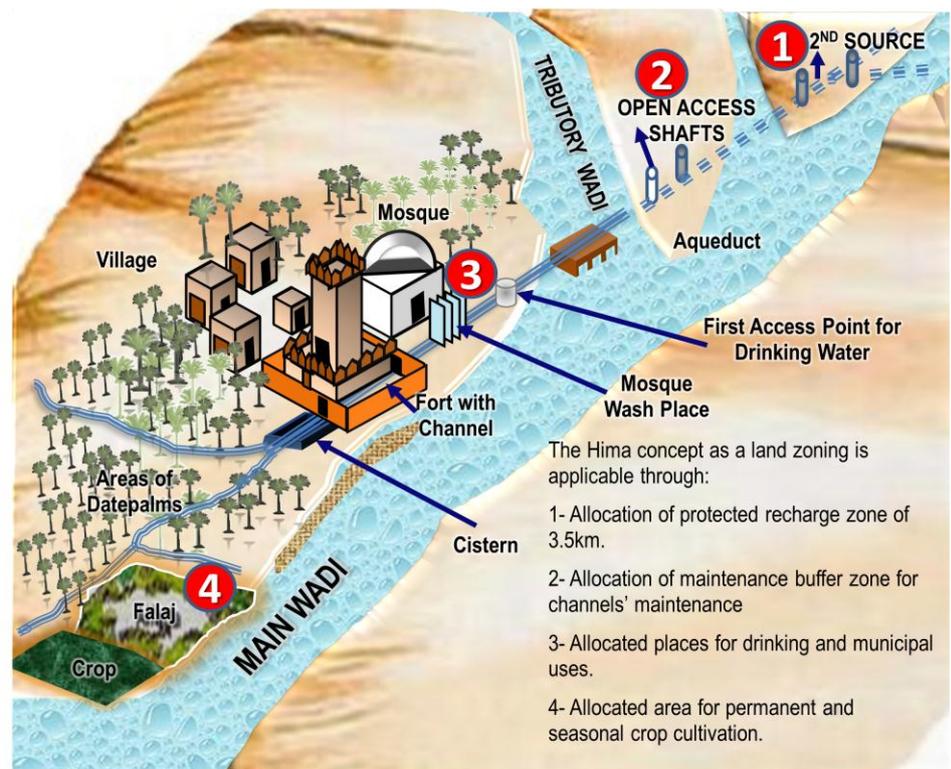


Figure 5. The HIMA concept as a land zoning is applicable through the four concepts.

HIMA

The word HIMA literally means ‘protected or forbidden place’ (Saleh and Hashemi, 2011). The area under the HIMA protection is not to be built upon or used to trade commodity nor is it to be cultivated for financial gain. It can imply closing certain areas to grazing for a specific period; this period starts with the first showers, in the rainy season or winter, and continues into the dry season to allow sufficient time for grasses, forbs, shrubs, and trees to grow and set seed for subsequent regeneration. The system sets aside an area as a grazing reserve for restricted use by a village community clan or tribe as a part of grazing management strategy. In recent times, the importance of informal system such as HIMA in sustainable resources management has been widely recognized and that is why the HIMA concept is relevant in modern times (Saleh and Hashemi, 2011). There are five types of HIMA as follows:

- areas where grazing of domestic animals is prohibited
- areas where grazing is restricted to certain seasons
- beekeeping reserves where grazing is restricted during flowering
- forest areas where cutting of trees is forbidden, and
- reserves managed for the welfare of a particular village, town or tribe

HIMA Governance Framework. Environmental management is fundamental to both the cultural and spiritual survival of the rural society. The control of land use and urban form in rural society have been through consensus rather than prescribed legislative or institutional control. Such consensus brought political control and influence which were vital in the effort to bring ecological sensibility to the management of natural resources in tribal lands (Gari, 2006).

In order to bind these environmental ethics, a human development model consisting of four essential principles needs to be adopted (Saleh and Hashemi, 2011) as follows:

- *The Ethical principles* which include the HIMA development vision and describe the aims, objectives and the ethical dimensions.
- *Environmental sustainability principles* are based on reverence to natural resources and no harm.
- *Institutional principles* recognise (a) the role of the state in providing basic needs; (b) role of the voluntary sector to contribute to socio-economic and non-material development of the community and (c) the devolution of HIMA management within the local community.

- *Good governance principles* provide a framework for the adequate management of the natural resources in HIMA zones.

The HIMA governing principles that foster sustainable development through social justice, economic growth, conservation of resources, and environmental protection, under new governance system, must meet the following requirements (Saleh and Hashemi, 2011):

- Must be constituted by the legitimate governing authority;
- Must be established for purposes pertaining to public welfare;
- Must avoid causing undue hardship to the local people by, for example, depriving them of indispensable resources;
- The actual benefits brought to society must be greater than its societal costs.

The HIMA's principles of community-based conservation include empowerment of local communities, increasing public participation, equitable use and sharing of natural resources, preservation of indigenous knowledge and local customs, and recognition of indigenous customary rights (al HIMA, 2007). Many are located in areas of high species diversity, and many support key biological habitats, such as juniper, olive, and *Ziziphus* woodlands. Their role as seedbanks to rehabilitate the surrounding rangelands is valuable and will become increasingly important as grazing and development pressures increase. They can play a role in halting and reversing desertification and sand dune encroachment. As they represent a range of areas that have been managed under a type of protection for long periods of time, they provide an indicator of range health and potential under particular environmental conditions, and should be utilized for ecological research (al HIMA, 2007).

HIMA (CBNRM) Governance in *Aflaj* System. The HIMA governance framework for *Aflaj* system is based on a set of environmental principles and human development models. The aim of CBNRM in *Aflaj* system in Oman is to serve public interest by achieving two criteria which is repulsion of harm and removal of difficulty and hardship in developing, maintain and sharing the resources of *Aflaj*. The specific principles that deal with the three elements of HIMA approaches are social cohesion and sustainable livelihoods for HIMA communities; criteria on property rights and resource use which is based on carrying capacity and regeneration of resources; and environmental protection, conservation and adaptive management.

Wakeel, Areef and Qabidh are trustees with responsibility for environmental and *Aflaj* protection and are accountable. There should be no harm to soil, agriculture, and water and no excessive use. Water as the central element should be protected from pollution, overuse,

and misuse. Finally, a respect for the role of law that promotes these principles must be maintained.

One of the salient characteristics of the HIMA in *Aflaj* system is its inherent flexibility. The four principles of HIMA governance in *Aflaj* are described below Fig. 6.



Fig. 6. Four governing principles of HIMA in Aflaj system.

Ethical Principles in Aflaj System. The main purpose of establishing the *Aflaj* is human well-being through securing continuous water supply for the village (food security in the past). For example, free municipal water use for everyone, free water for animals, allocated water shares for public welfare (*waqf*) and flexible system in selling and renting water shares. These ethical principles have led to society in cohesion and solidarity, feeling of justice and feeling of brotherhood.

Environmental Sustainability Principles. The environmental sustainability principles are implemented through the following:

- The 3.5-km distance is a protection zone in the recharge area for each *Aflaj*.
- Expansion in cultivating seasonal crops would be during wet seasons.
- Water circulation period is related to soil type and flow rate.
- Setting certain rules of prohibiting water pollution are to be prescribed.
- Protection of living animals constitutes securing free drinking water for them.

The environmental sustainability principles have allowed respected protection zones by the general public, creation of sustainable environment, developing a culture of non-

extravagance in water use, because it is a bounty from God and the creation of a micro-climatically location in each *Aflaj*.

Institutional Principles in *Aflaj* System. The institutional principles in the *Aflaj* systems are implemented through the following:

- Existing elected management team (*Wakeel, Areef and Qabidh*),
- Establishing precise water shares distribution system,
- Development of traditional knowledge,
- Linking the system with the culture,
- Separation of water ownerships from land ownerships, and
- Allocated water shares for *Aflaj* maintenance and administration.

These principles have led to the presence of management and administrative system, and innovation by creating their own distribution system benefiting from natural phenomena (movement of stars and sun). In addition to these, development of understanding more about sciences (astronomy, hydrogeology, agriculture), encouragement among scholars to find solutions in water dispute based on *Sharea* and finally existence of an archive system has also been established.

Governance Principles in *Aflaj* System. Finally, the good governance principles in *Aflaj* system are applicable in accountability, transparency, effectiveness and efficiency, fairness, strict implementation of rules and regulations, and implementation of gained knowledge and experience. These principles have created the following:

- Presence of election concepts through electing the management team.
- Clear responsibilities for each member of the management team (*Wakeel, Areef, and Qabidh*),
- Presence of society-based management,
- Presence of self-financed system, and
- Presence of archiving system (some of *Aflaj* have records of share ownerships for centuries).

The HIMA concept in Oman for *Aflaj* system has been adapted to the needs of local communities, and it will continue adapting to new socioeconomic realities to fulfil the changing needs of the communities in the future. In particular, there is a need to demonstrate

that protected areas are for the public good and to ensure that their benefits remain greater than their costs. This has been done through close collaboration with the local farmers using *Aflaj* water. The traditional management of HIMAs is close to the people who used them. Now the authorities who manage the protected areas are in the respective villages.

Conclusions and Recommendations

This paper focuses on *Aflaj* in Oman, and appraises HIMA strategies. This paper describes types of *Aflaj* systems and HIMA concept adopted for sharing the water. Types, principles, and mode of governance of HIMA concept in Oman are described in the paper.

Aflaj system is regarded as an important part of the Sultanate's cultural heritage and an important source of water for a large segment of society, and its preservation is a priority commitment. This system is a sustainable one that can be applied in arid and semiarid regions of similar nature and it will help to benefit from every drop of water without stressing the aquifers and with low cost of operation and maintenance. The system has been existing for centuries because of implementing CBNRM.

Aflaj are facing some severe challenges as to their long-term viability. They must retain their essential character while adopting new practices that will increase income and ensure that they will not become depopulated. Such practices could include water storage, adoption of drip irrigation, and production of specialized high value crops with distinctive packaging, limited tourism, and watershed management including water harvesting. Reliable supplies of irrigation water are essential to sustain *Aflaj* villages around Oman. Unfortunately, climate change and drought affect these systems causing reduction in flow or even dryness. Research is needed to identify practices that are feasible and which will increase economic returns to water, and pilot programs to evaluate these practices should be set up to identify weaknesses, strengths, and modifications. Developing and keeping *Aflaj* sustainable requires integrated efforts and research. One has to consider *Aflaj* as hydrological, social, ecological and economical systems.

The HIMA governing principles in *Aflaj* system promote sustainable development through social justice, economic growth, conservation of resources, and environmental protection, under new governance system. This had led to the HIMA development in optimal utilization of the water resources based on appreciation, i.e., no excessive use; rather equitable use and distribution of water based on justice and environmental integrity.

Recommendations which emerged from this study for good governance and implementation of HIMA concept in *Aflaj* system are as follows:

- Collecting and recording all inherited knowledge related to *Aflaj*.
- Introducing new courses and research and modules for CBNRM.
- Developing the concept of CBNRM implemented in *Aflaj* and using it for other natural resources protection and conservation purposes.

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AGDAL, PASTORAL PRODUCTION AND SUSTAINABILITY (High Atlas of Morocco)

Presentation in Session I: HIMA Governance System: The Underlying Principles and Legal Framework

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Abstract

This study estimates the economic contribution in a qualitative and quantitative way of the pastoral mountain territory of the *Yagour* (High Atlas of Morocco), governed by the locally emerged institution of the *agdal*. The maghrebian *agdal*, like the HIMAS in the Mashrek, is a system of communal management of natural resources, but in this case mainly of the amazigh (the Berber ethnic community). In the case studied here, a high mountain pastoral *agdal* consists on prohibiting herding during three months in spring, allowing vegetation regeneration, establishment of new seeds, and continuity of local pastoralism and ecological cycles. Specifically, and after giving a general overview of the *agdals*, the economic contribution of the *Yagour* to the population of the Ait Ikiss that belongs to the Mesioua tribe was studied. Field work was conducted from 2003 to 2008 adding up to one whole year of cohabitation with the Ait Ikiss through all agropastoral seasons. As main result it was found that the *agdal*- managed *Yagour* providing an important annual agro-pastoral income through its fodder contribution. Nevertheless, since highly rigorous accounting is impossible in a society that weakly monetizes its production, all along the text complementary qualitative data were presented to gain a better understanding of all the dimensions of the *agdal* of *Yagour*. Based on these findings, it could be concluded that even if highly underestimated by national administrations, the *agdal* communal management system, like the HIMAs of the Mashrek, could be considered an important practice for the functioning of the local agropastoral economies, at the same time, as it favors the ecological functioning of the present environments in a culturally embedded and highly legitimate way.

Key words: Berber/Amazigh; Morocco; Agdal; Commons; Agropastoralism; Economy; Cultural regulation.

Introduction

There has been wide international recognition about the potential contribution of local institutions of communal natural resources management to sustainable practices (Folke et al., 2007; Ostrom, 1990; Neves-Garca, 2004; Byers et al., 2001). Nevertheless, little research has analyzed the existing traditional institutional options of communal natural resources in the Maghreb (Auclair and Al Ifriqui 2005). The *agdal* is one such existing institution and can be defined as a seasonal prohibition that, like HIMAs in the Mashrek (Kilani et al., 2007), forbids access to an agro/sylvo/pastoral resource to allow the pastures a resting period during the most sensitive period of growth (for example the three months of spring in the case of the High Mountain pastures of the *Yagour*. The dates, resources and spaces affected by this prohibition are established by customary law or yearly by the tribal assembly (*jmaa*) according to its own history, territorial heritage, political structure, and economic strategies.

In socio-ecological terms, when imposing such prohibitions to access space or natural resources, local populations mainly seek to assure the following: a relatively just access to local natural resources, as all members of the community have equal rights on the common pool or territory and decide together its management rules according to the community's interests, a maximal vegetative growth of the local species from which users will directly profit, and the flowering, pollination, and fructification or seeds formation, guaranteeing the reproduction of the ecosystems. In other words, it is an agreement between the people who have the right of access to these natural resources, for the opening and closing of the space in order to optimize its pastoral production and assure its continuity. This practice determines a sustainable use as it is thought to only take the year's produce, without jeopardizing the seeds for the following years.

As several ecologists have indicated, this practice seems to have particularly beneficial effects on plant cover against erosion and biodiversity conservation (Kerautret 2005; Hammi et al. 2007; Alaoui-Haroni 2009; Montes et al. 2012). For example, analyses of aerial and satellite photographs by Hammi et al. (2007) have shown how forest vegetation in the Ait Bougmez persists, or had even increased since 1964 in areas subjected to *agdal* regulations; whereas in non-*agdal* areas where natural resources are freely harvested, there is a net reduction of vegetal formations. In fact, almost the entire deforested areas in this site (21.5% of the forest surface in 1964), concerns only non-*agdal* areas. In addition, Montes et al. (2012) demonstrated how *agdal* management of the Ait Bouguemez forests has contributed to biodiversity conservation in terms of plants and insects. Moreover, in her work

Alaoui- Haroni (2009) has demonstrated the proactive conservation of certain plant species through *agdal* prohibitions, in pastures such as the Oukaïmeden. Domínguez and Hammi (2010) also reported a higher number of species present in the more traditional *agdal* -managed summer pasture areas of the *Yagour* than in the less intensely *agdal* -managed areas. At areas surrounding the *Yagour* several spaces, particularly cemeteries, which are called *tagdalt* (small *agdal*) were found. They have abundant vegetation, permanently protected from grazing animals and from any removal by the sole power of the beliefs and prohibitions that weigh on these sacred places. In fact, like everywhere in the High Atlas Mountains, around the *Yagour* there are different types of *agdals*: pastoral, forest, fruit, cereal, etc. As a general rule, the different *agdals* have more abundant vegetation than those surrounding areas that are not managed by the *agdal* and a different type of vegetation in each one. This, by means of a mosaic of ecosystems in the whole territory due to the specialized and differentiated use of these spaces, has clearly an impact on biodiversity, especially concerning habitat (tertiary biodiversity). *Agdals* would be acting here as a seed distribution point.

At an economic level, various small scale studies have already revealed that the contribution of collectively managed areas in the High Atlas Mountains can add positively to local economies. In the case of the leaves coming from forest *agdals* of *Quercus ilex* (control of seasonal leaf and wood extraction) found in the vicinity of villages of the Ait Bouguemez tribe (150 km northeast of Marrakech) represent a complementary economic opportunity during the snow period when other pastoral resources (herbs, bushes, etc.) are covered by snow or are in latency (Genin et al. 2012; Genin and Simenel 2011). In certain villages, the rights of access to the pastoral *agdals* are exchanged for rights of water use between neighboring tribal groups (El Gueroua, 2005). In the forest *agdal* of the village of Ait Ourhayn (Mesioua tribe), herders from nearby villages without forest *agdal*, buy loads of leaves and wood during snow periods, providing the Ait Ourhayn people with complementary collective income (Auclair and Alifriqui, 2012). Pastoral *agdal*-managed lands also contribute to agricultural enrichment through the recycling of nitrates and derivatives which are returned to the soils through fertilizing animal manure collected during the night in the animal folds.

As discussed above, it has been suggested that the maintenance of the *agdal* system contributes to social, economic, and ecological sustainability, but it is currently in crisis in many parts of Morocco (Auclair and Alifriqui 2012). In order to contribute to building up against this tendency, this research put forward the quantitative and qualitative economic

importance of an *agdal*- governed territory. It is important to note that the present work has been carried out in a region where no previous studies of this type have been conducted; thus, the information provided could contribute new views about the herding economies of the Atlas Mountains. One of the original aspects of the present work lies not only in the complex object of the *agdal*, but also in the conjoint interdisciplinary and meticulous approach in agro-economy and socio-anthropology based on various long stays with the population studied from 2004 to 2008.

Context of the Study: Organization and Utilization of the Agro-Pastoral Spaces

The study area is the territory of the Ait Ikiss people and its protagonist the Ait Ikiss, situated less than 50 km from Marrakech, in the heart of the Mesioua tribe (Fig. 1). Like other high mountain areas, it is terraced in a vegetation altitudinal gradient. Between 1.000 and 2.500 masl, several types of ligneous vegetal structures (scrubs, bushes, and Mediterranean forests) occupy the mountain sides, and are especially dense on the northern slopes. From 2.000 masl upwards, high mountain plants, many thorny, and rich pastures appear, followed by steppic vegetal structures with a strong presence of cushion-shaped xerophytes, although some thick pastures still remain up to the highest points nearly at 3.600 masl, combined with some very resistant *Juniper Thurifera* trees up to 3.000 masl. The humid prairies that most foster (but not only) the existence of the *agdal* system are in fact one of the rarest vegetal types. They occupy small and very specific biotopes of the high mountain Yagour territory such as the bottom of little valleys, little faults, on low slopes, or water resurgences (Domínguez et al., 2012; Bellaoui, 1989).

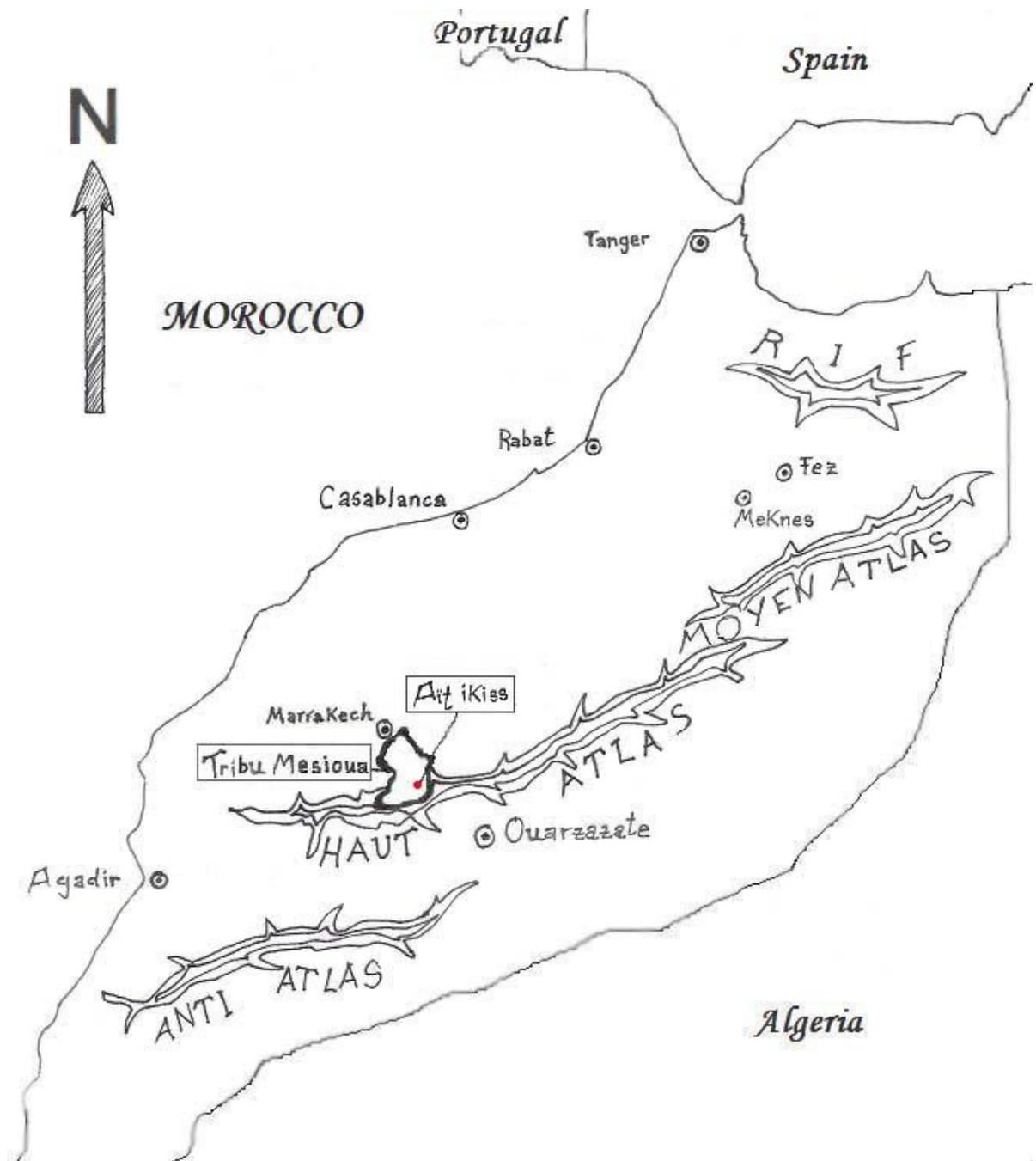
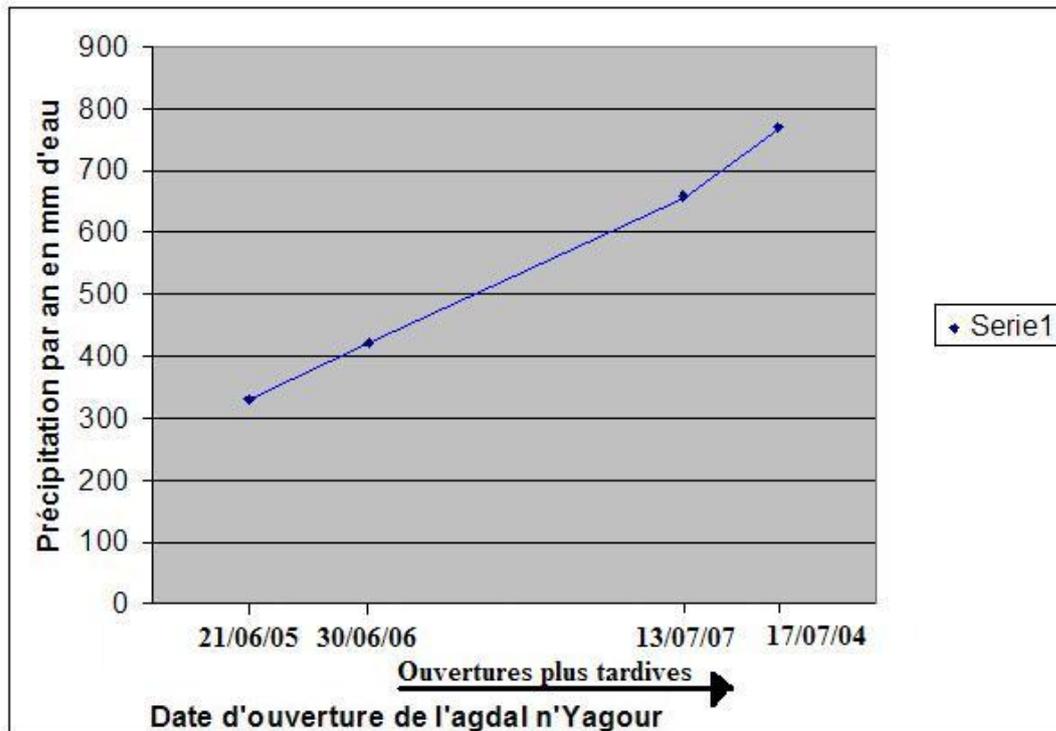


Fig.1. Situation and borders of the *Mesioua* tribe and the *Ait Ikiss* population in its interior

The Yagour is a large pastoral territory of about 70 km² located in the center of the Mesioua highlands. The Yagour is just one of the several territories in a larger and more complex agro-pastoral system of cultivation and breeding, in which this pasture is most oftenly combined with the use of other *agdal*-managed territories or resources. Its importance lies in its bigger size (Yagour means “bigger than” in the local language), determining the opening and closing dates of other *agdals* that allow access before or after the Yagour does.

Each year's access to herding in the Yagour is prohibited by the *agdal* system from approximately the 28th of March to the end of June or beginning of July. In fact, these dates, especially the opening one can largely vary from year to year according to the *agdal*'s adaptability to each year's rainfall (Fig. 2). This prohibition is enforced by persons elected by the community of users called guardians, *Naibs* or *Ait Rbain*, who apply sanctions for the different types of delinquents in agreement with the local assembly.



The higher the pluviometry, the later the *agdal* opens

Fig. 2. Example of interannual variation in the opening dates of the *agdal* of Yagour in relation to each year's pluviometry.

The *agdal* prohibition period was traditionally legitimized and supported strongly by long-held religious beliefs in the descendents of the main local Saint, Sidi Boujmaa. These descendents were and still are in some cases, considered by locals as saints themselves (*marabouts*). They constitute a small village neighboring the Yagour, created around the Saint's tomb, forming a local *Zawiya* institution, which in the Maghreb stands for a center for Islamic teaching and thinking homologous to the Arabic *Madrasas*. These center and tomb are frequently seen by local populations as a mediators to God, even if more urban/orthodox Islam increasingly and fiercely contests this. Until the 1970s the annual *agdal* prohibition of the Yagour was only lifted once announced by the Sidi Boujmaa descendants in the

Wednesday market just before the first Friday of Berber summer, starting the 28th of July. As Friday is the Muslim day of prayer, this was used as a blessing of the opening. Some days later, all the Mesioui people would honor Sidi Boujmaa with ritual offerings as vegetables, grain, cooked food, butter, sacrifices of cattle, etc. These were presented to the descendents of the Saint next to the patron's grave. In return, tradition stated that the buried saint assured prosperity and fecundity to those who honored him, as well as their animals, the space and the natural resources they profited from.

However, today, it is usually the local government appointed authority, the *Caid*, who finally decides the opening date of the *agdal* after certain negotiations with the different tribal fractions. This is because the tribal assembly is rarely able to reach a complete consensus on account of its size and the deconstruction of the old tribal edifice that started with the protectorate and further developed with the post-colonial state. Thus, today the *Caid* has supplanted the role of the saints in the role of arbitrator and peacemaker. Nevertheless, even if the belief in the saints and their relationship with the *agdal* prohibition have decreased from among a large part of the population (mainly due to a re-islamization process that are suffering in greater or lesser measure in most countries of the Maghreb), all this cultural heritage can still be felt among the users of the Yagour *agdal*.

There are about 7,500 people in almost 50 villages that use and depend on agronomic terms on the *Yagour*. These populations keep more or less the traits of the old tribal organization, described by British anthropologists as segmentary structure (Gellner, 1969). This is characterized by fitting one social group (or segment) into another, from the smallest to the biggest (Evans-Pritchard, 1970). Thus, the Mesioui continue to organize themselves in tribes, tribal fractions, villages, lineages, and nuclear families. These human groups or segments, generally organize their community activities (such as collective works, irrigation rules, herding rights, different *agdals* concerning different group levels, festivity organizations, and religious celebrations) through the *jmaa* (traditional assemblies) that constitute one of the most fundamental institutions of their autonomous political performance.

The Ait Ikiss population is a small community of Yagour users made up of some 700 souls dispersed between four habitats in a territory of approximately 20 km², who speak *Tachelhit*, a South Moroccan Berber dialect, as its mother tongue. Practically all men speak Arabic, which they learn through television, social relations, working, administrative procedures, or in school which was introduced to the area around the 1990s. Some of the women too, mainly the younger ones who have reached schooling during their pre-adolescent

years speak the language. Up to 75% of the local income is represented by the agro-pastoral sector, which is usually combined with seasonal emigration or some specialized local works such as masonry, smith, or others of the sort (Bellaoui, 1989). Rearing animals consist mainly of cows, sheep, and goats. The *Mesioui* are patrilineal, and like other Berber societies, all the decisions regarding the household use of the agro-pastoral resources are made by the male household head, and in his absence, by the oldest adult male of the family (depending on each family's case, it can be a brother, the eldest son, etc.).

Methodology

Data collection

Most of the qualitative data of this paper was collected through intermittent participative observation from 2004 to 2008 adding up to one whole year of co-habitation with the Ait Ikiss community through all the agro-pastoral seasons. More systematic semi-directive interviews concerning the animal production structure and the uses of the *Yagour* n'Ikiss (that portion of the *Yagour* belonging to the Ait Ikiss) and other territories of this same community, were carried out during the months of June to September of 2004 (corresponding to the local summer and the most intense period of utilization of the *Yagour*). Both previous works helped to prepare the quantitative survey which took place from June to September of 2007, and were focused on the socioeconomic attributes of the households. Questions were asked regarding things like the number of adult female sheep, goats, and cows in the household, their breeding rate and their selling price at the local market among others. Data were regarding the agricultural economy of the Ait Ikiss such as the main vegetable and fruit products obtained during the 2006-2007 cycles and their mean price in the local market (barley, wheat, corn, pulses, nuts, etc.). Finally, net family income from emigration in the 2006-2007 cycles was also estimated.

In all cases, from 2004 to 2008 data were collected with the help of native Berber speakers who were in charge of the translation and/or enquiry process. Most interviews were held with the male household heads of the Mesioua tribe members of the Ait Ikiss. In the case of the male household head being absent, the interview was held with the oldest man of the household present at the moment of arrival to the house. Male household heads were mainly targeted due to the nature of the data examined which are mainly managed by men (i.e., choosing the opening date of the *agdal*, the number of animals a family owns, the

agricultural production or the extension of its cereal fields on the *Yagour*). The survey was conducted from 83 of the 107 households that make up the Ait Ikiss, which represented about 77 % of its population and almost 100% of the owners of pastoral animals using the *Yagour*. The remaining 27 households were not interviewed because there was no male adult present in the period of the survey, mostly due to seasonal migration.

Physical and Monetary Value of the Adgal of Yagour

This text presents an estimation of *Yagour's* contribution to the Ait Ikiss' global livestock feeding system. In actuality the real contribution to the Ait Ikiss economy is in fact higher than that obtained related to livestock, since the fieldwork was developed in a context where some data were difficult to measure and had been omitted (i.e., higher feeding rates in summer than in winter, production of milk, wool and manure not counted, other resources that the *Yagour* provides are not accounted here, etc.). However, the fact that the real contribution of the *Yagour* would be higher only reinforces the initial hypothesis that these types of large rangeland territories administrated by the *agdal* are not only qualitatively fundamental for rangeland management and pastoral socio-ecosystem continuity, but also quantitatively important in economic terms. At the same time, the present work was carried out in a region where no previous economic studies of pastoral production of this type have yet been conducted; hence, it will provide access to new information about the herding economies of the Atlas Mountains.

Results

The basic data concerning the number of herding animals (ZUs: 1 Zoo-technique Unit is equal to 1 reproductive female and her progeny which constitute more than 95 % of the livestock) that use the *Yagour n'Ikiss*. Table 1 shows the alimentary contribution of this space to the different types of livestock.

Table 1. Number of ZUs and Analysis of the Yagour n'Ikiss Nutritional Contribution

	Sheep	Goats	Cows
Number of ZU per animal species in 2007	1,261 ¹	1,794 ²	138 ³
FU ⁴ taken from the Yagour per ZU	Mean average: 33.3 FU/month/ZU ⁵ . 33.3 FU/month x 5 months on the Yagour ⁶ = <u>167 FU/ZU</u> obtained at Yagour throughout the year ⁷	Mean average: 27 FU/month/ ZU ⁸ 27 FU/month x 3.3 months on the Yagour ⁹ = <u>89 FU/ZU</u> obtained at Yagour throughout the year ¹⁰	Mean average: 167FU/month/ZU ¹¹ 167FU/monthx 2 month on yagour ¹² = <u>333FU/ZU</u> obtained ayt Yagour throughout the year ¹³
Percentage of the annual alimentary contribution of the Yagour per ZU.	167 FU of the Yagour / 400 FU / annually ¹⁴ = <u>42 %</u>	89 FU of the Yagour / 325 FU annually ¹⁵ = <u>27 %</u>	333.4 FU of the Yagour / 2,000 FU annually ¹⁶ = <u>17 %</u>

¹Number obtained from survey conducted with the 83 households of the Ait Ikiss in 2007.

² Number obtained from survey conducted with the 83 households of the Ait Ikiss in 2007.

³ Number obtained from survey conducted with the 83 households of the Ait Ikiss in 2007.

⁴ Fodder Unit: quantity of fodder corresponding to the energetic value of 1 kg of barley harvested at the grain's maturity, equivalent to 1,650 calories (Jarrige ed 1995).

⁵ 1 sheep and her progeny need approximately 400 FU/year (Jarrige (ed.) 1995), thus, if we divide it by 12 months = 33.3FU/month.

⁶ Demay, 2004 and Dominguez, 2010.

⁷ The sheep received no complementary alimentation during the 5 mo period that they herded on the Yagour (mainly summer, beginning of autumn and end of winter) because, except in years of high drought, and the agricultural year of 2006-2007 was an average year for the Zat valley, they are not given complementary food (Demay, 2004). Because of this it could be said that in 2006-2007 the 167 FU/ZU was obtained almost exclusively from the resources of the Yagour.

⁸ 1 goat and her progeny need approximately 325 FU/yr (Jarrige, 1995), thus, if divided by 12 mo = 27FU/mo.

⁹Demay, 2004 and Dominguez, 2010.

¹⁰The goats received no complementary alimentation during the 3.3 mo period that they herded on the Yagour (mainly summer and beginning of autumn) because, except in years of high drought, and the agricultural year of 2006-2007 was an average yr for the Zat valley, they are not given complementary food (Demay, 2004). Because of this in 2006-2007 the 89 FU/ZU was obtained almost exclusively from the resources of the Yagour.

¹¹ 1 cow and her progeny need approximately 2000 FU/year (Jarrige, 1995), thus, if divided by 12 mo = 167FU/mo.

¹² Demay, 2004 and Dominguez, 2010.

¹³ The cows received no complementary alimentation during the 2 -mo period that they herded on the Yagour (mainly summer) because, except in years of high drought, and the agricultural year of 2006-2007 was an average year for the Zat valley, they are not given complementary food except some weeds and grasses obtained from the “cleaning” of cereal fields in lower Yagour (Demay, 2004). This small complementary alimentation coming from the cereal fields is approximately equal to the grass fodder cut off on the Yagour during the first three days after the opening of the *agdal*, which is given mainly dried to the cows during the autumn and winter. Because of this it could be said that in 2006-2007 the 333 FU/ZU was obtained almost exclusively from the resources of the Yagour.

¹⁴ Jarrige, (ed.) 1995.

¹⁵ Jarrige, (ed.) 1995.

¹⁶ Jarrige, (ed.) 1995.

Discussion

Although the total contribution of the *Yagour* was not taken into account, the results suggested a relatively important weight of this territory with regard to the economy of the Ait Ikiss community, since the agro-pastoral gross income of the Ait Ikiss was estimated at 68% of their total gross income (Domínguez 2010) and the Yagour *agdal*- managed territory contributed a third of the goats and a fifth of the cows with almost half of the alimentary needs of the sheep.. In fact, the present results could only be approximations and moreover estimations of minimums, since the real contribution of the *Yagour* to the gross income of the Ait Ikiss was undoubtedly higher than these data could offer. The present paper does not include. The cereals also produced in the *Yagour*; the mules that are partially fed from the *Yagour* and that which contribute to whole community’s functioning, especially agriculture and the sale of products; the herding of animals that do not fulfill their complete production cycles because of accidents, illnesses, etc., and which are not reflected in the number of livestock gathered but that are in fact also auto-consumed or even sold at lower prices between the herders; the fact that summer is the period of highest food ingestion and when animals obtain most Fodder Unit (FU) per month. Although the annual animal feeding was divided by 12 mo to obtain the FUs consumed in the *Yagour* (Table 1), the overall reliance on the *Yagour* may be said to be undoubtedly higher. In the calculations other elements were omitted such as the natural resources obtained in the Yagour that contribute to local economy, wood for building or heating, honey sold at 300 DH/kg in the local market, the water that irrigates the fields of *Yagour* n’Ikiss, and other resources that are likely to contribute to the local income.

However, the economic weight in the agro-pastoral gross income of this *agdal* managed territory is not only quantitative. It is central to point out that also, *Yagour’s* fodder contribution arrives in the summer, when other pastures are dry in the lowlands and no other

fodder is available. In fact, natural grasses of the Yagour at this season can reach an opportunity to cost as high as tilled barley. Without the highland pastures, especially abundant in summer because of the *agdals* herding prohibition that permitted them to exponentially grow during the months of spring and early summer, the current system of ecological and economic equilibrium would simply collapse and change its nature.

Conclusions

The highland territories are of great economic importance to the Berber populations of agro-herders of the High Atlas Mountains, which are all generally managed directly or indirectly through the *agdals*. The joint symbolic weight and local religion that accompany the *agdals*, associated with the economic interest of these practices, are fundamental to the maintenance of the highland pastures, coordinating in a relatively peaceful way the movement of a great number of herds (in the case of the Yagour it corresponds to over 50,000 animals belonging to more than 50 different villages). Many *agdals* have broken down in Morocco in the last 30 years, for example in the Middle Atlas Mountains. The explanations for this are multiple but are usually associated with a weakness in customary and tribal vitality. This has, in turn, led to overgrazing to such an extent that the systems of animal rearing have been totally modified and in some cases, have also led to new restrictions for the herders. The animal production in these sites generally has not decreased, in fact it has increased, but it has changed in nature: construction of higher animal folds, modern fodder production, importing of animal feed, mechanization of the system, new transports, full integration into market economy, etc. (Bourbouze, 1999). Although such a transformation could be an alternative to maintain or improve the levels of agro-pastoral productivity, it would not work in the sense of sustainability that the traditional *agdals* productive systems seem to offer. In fact, such transformations and intensifications in the modes of production in the Mountains of the Maghreb could lead to biodiversity loss, erosion of the pastoral ecosystems and their possible patrimonial and cultural values (Auclair et al., 2007). Hence, other alternatives seem that should be researched for the development of local societies in these regions and the maghrebi *agdals* as the more oriental *HIMAs*, seem to offer a way.

In this sense of economic development in combination with the *agdals* systems, different lines of possible research open up. Firstly, to analyze how the reinforcement of the saints and *agdals*'s symbolic traditions could contribute effectively to the maintenance of this

pastoral management system that has proven to be sustainable throughout the centuries seems an obligatory step. On a general note, it is important to emphasize the advantage of a traditional cosmological and agro-pastoral production system that has proven to be sufficient, sustainable, and has produced successive levels of productive yields over time. In such a cultural-environmental operation as the *agdal*, there is little room for doubt since it has proven its validity over the centuries if not millennia.

Secondly, and from a more materialistic perspective, it could eventually be interesting to seek a more profitable spatial-temporal scale readjustment of *agdals* in order to improve their natural resource production, since the scale has not always been chosen through an integrated eco-territorial analysis, but many times through a centenarian ethno-territorial and historical basis that could now be revised in some cases.

A third future line of research could be to explore the possibilities of the *agdal* in new approaches of sustainable agriculture promotion. Although these points should be explored in a different sense to that exposed in this article, there is potential for establishing a certain policy of local *agdal* or HIMA product certification by orienting the production toward the external market (red meat, cheese, or honey) and offering at the same time an *agdal* guarantee where the consumer would be acquiring products adapted to the local ethno-ecological conditions, generated respectfully with the environment and equitably vis-à-vis of the local farmers. This type of product certification could be based on the territory-resource-cultural specific characteristics of the *agdals*.

Finally, one last line of research that could be plausible would be that the *agdal* system can help conserve certain landscapes and current images of the territory, a main source of attraction for the always growing tourism. Thus, after showing the *agdal's* services as a qualified and especially legitimate local institution in natural resource management, it could perhaps also be used in the protection of certain tourist resources. The high pastoral *agdals* participate in shaping and maintaining the local landscapes through the abundant grass, open spaces, the solitude of uninhabited mountains three or four months per year, lack of big constructions and great agricultural production due to the fact that it is forbidden to live there all year round (Domínguez, 2012). In other words, the *agdal* system is an example of Moroccan landscape construction, and overall, it would be interesting to carry out a more in-depth study about whether the *agdal* communal resource management system could be promoted as a touristic tool for future economically sustainable development. At the same time, it could be considered as yet, on ecologically enriching land use and with respect and reinforcement of the cultural and cosmological system that accompanies it, sees itself

challenged among others by new Islamic movements, western globalization, or simply advancement of modernity.

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Misali Marine HIMA - Using Islamic Ethics to Promote Marine Conservation in Zanzibar

Presentation in session II: Developing Implementation Framework – How to Implement HIMA with Reference to Current Practices

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Summary

Misali Island is a small (one-hectare) coral islet located off the west coast of Pemba Island, north of two main islands that make up the Zanzibar archipelago, off Tanzania. During the nineties, a foreign investor wanted to establish a tourist resort in Misali, but the local community successfully fought this off, because in addition to its benefit as a food source, Misali had religious connotations for local people. With the support of the Tanzanian government, CARE Tanzania and the UK-based Islamic Foundation for Ecology and Environmental Sciences (IFEES) a conservation program incorporating Islamic ethics was launched. This programme was developed to work with mosque Imams to bring out the strong environmental teachings of Islam in support of fisheries co-management. With the encouragement of IFEES, Misali was designated a marine HIMA, the first of its kind, however, sustaining this idea became problematic due to many local and political challenges.

Introduction

Pemba is the smaller of the two main islands that make up Zanzibar, covering a landmass of 868 km². With 74% of the land cultivated, and the vast majority of the Pemban population involved in agriculture and/or fishing with no formal training, the island's communities are highly dependent on its natural resource base, especially its forests, agricultural land and fisheries.

Misali marine HIMA is a small island with unique marine and terrestrial ecosystems of remarkable diversity situated within the Pemba Channel, off the southwestern coast of Pemba. The conservation area covers a total of nearly 22 km² with the marine area encompassing 21 km² and the terrestrial area of 1 km².

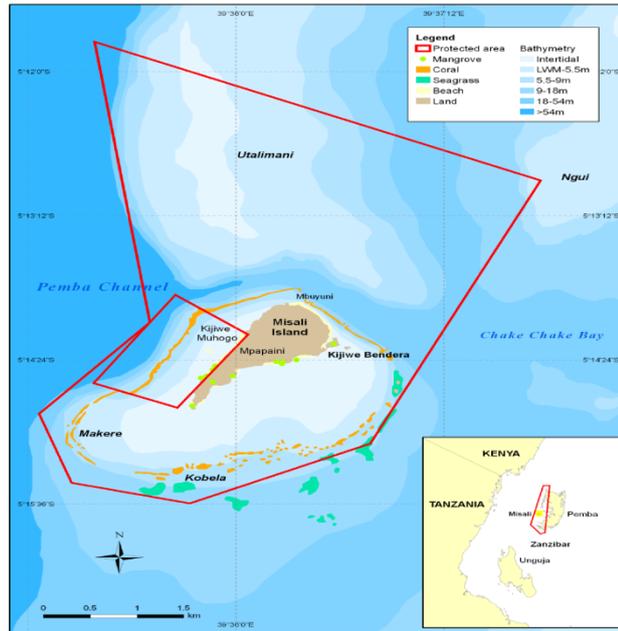


Fig. 1. Map of Misali Island.

Misali Island's importance for fishing stems from two sources. First, the coral reefs surrounding it are rich fishing grounds. The reef surrounding Misali supports 300 species of fish and 42 genera of coral and is known as a world-class snorkeling and diving site. The fishery also supports over 1,600 fishermen and their families or 12,000 people from around Pemba. Secondly, it is a *dago*, that is, a temporary fishing camp. Many fishermen who use the island waters camp out on Misali, which has no permanent habitation. When exactly, and for how long they stay, depends on which type of fishing gear they use, and on the monthly lunar/tidal cycle that is appropriate to the target species. Octopus fishermen, for example, tend to camp during neap tides when the coral reef is most accessible.

The fascinating marine environment surrounding Misali Island is a high-class tourist venue used for diving and snorkeling that helps in collecting revenues to support management cost, as well as community development projects.

The Misali fishery is currently the only known area in Pemba where active conservation and observation of fishing regulations is taking place, under the combined efforts of the fishing community, a local fishermen's Non Government Organization (NGO), the local government, and CARE Tanzania.

Misali Island embodied religious values to the predominantly Islamic Zanzibar community. According to tradition, the 'Saint' (*Nabiyyullah*) Hadhara once visited the island and asked the fishermen for a *msala* or prayer mat. The fishermen did not have one and so the 'Saint' declared he would use the island itself as his prayer mat. It was this act of

praying directly on the island that is said to have given the island its name and has been established as a sacred site.

However during those times, the fishery and fascinating reef system were continuously threatened by unsustainable fishing methods and increasing population pressure due to dependence on fishing combined with the poor income that fishing brings, thereby contributing to poverty in Pemba and also resulting in overexploitation of the resource base. This resulted to the founding of Misali Marine HIMA project.

Misali Island marine HIMA Project

The Project

During the period if 2000 ton 2005, CARE Tanzania invited IFEES, UK to join with the Zanzibar Commission for Natural Resources in a trial to incorporate use of customary Islamic principles to promote in the management of the Misali marine HIMA. Building on this local tradition and the fact that Misali's fishermen are almost exclusively Muslims, this groundbreaking program named the Misali Ethics Programme (MEP) was developed to work with the mosque Imams and brought out the strong environmental teachings of Islam in support of fisheries co-management and sustainable tourism at Misali. This operations research project has formed an integral component of a larger program aimed at conserving the resource base while improving livelihood security.

Program Goals. The program goal was aimed at improving the income and food security to fishers and their families deriving income from fishing activities in a way that maintains the Misali ecosystem and its productivity.

Project Interventions. In corporation with IFEES, an initial workshop was organized that brought together religious leaders, government officials and the fishing community to discuss the teachings of the *Qur'an* on the environment and the use of natural resources, using an instruction manual entitled *Qur'an, Creation and Conservation*. The workshop was very successful and was followed by more meetings where participants delved deeper into the *Qur'an* and how it pertains to use of the environment. Various *Qur'anic* verses and *hadiths* and their relationship to environmental protection and conservation, were studied. Other communication, conservation education interventions include the following;

- Extending building capacity of religious leaders and madrasa teachers to be able to extract religious conservation practices from the holy book and Islamic tradition.
- Introduction to policy makers and politicians on the project interventions and asking for their support.
- Religious leaders using religious congregation to sensitize the rest of communities within their localities on the obligation of each Muslim to protect and respect the environment.
- Building capacity of schools through the religious teachers to be able to introduce Islamic conservation messages in the subjects
- Students programs in Madrasa and school including these conservation practices in class and competitions.
- Preparation and use of appropriate educational materials such as guide book to religious leaders, Islamic calendars displaying environmental messages.
- Building capacity of NGOs to be able to continue with intervention as to the exit of CARE interventions.

Islamic Conservation principles. Some of the Islamic conservation principles used include *Qur'an* quotes and *hadiths* which relate to the conservation of nature, basically instructing the promotion of resources and human responsibility toward the world's environmental management.

It is He who produces gardens, both cultivated and wild, and palm trees and crops of diverse kinds and olives and pomegranates both similar and dissimilar. Eat of their fruits when they bear fruit and pay their dues on the day of their harvest, and do not be profligate. He does not love the profligate. (Qur'an, 6:142)

The common principles used to deliver the Islamic conservation messages are the following:

- The principle of *Khalifa*: - the Arabic or Swahili term used to explain human responsibility as Guardian/stewards of the world's environment;
- The principle of *Khalq* denotes Allah's Creation and the ownership of the world and everything and how we as human beings should respect the environment;
- The principle of *Insaan* meaning Human being who interprets the position, level, grade or rank of human being above other creatures' and how he/she responds to them;

- The principle of *Mizaan* which means balance, this interprets the need of living with harmony and respecting the rights of each creature living in this world.
- The principle of *Fassad* (corruption) to the environment and its creatures including trees, animals and its ecological structure and what are God's prohibitions.
- The principle of *Amana* (Trust). This is how a human being is required to live in trust with others and how he/she should practice and take responsibility in a good manner and trustworthily.

Successes. Although shortly after the project was funded, Pemba Island suffered from violent political clashes; thus, implementation was delayed for 6 mo and resulted to an official 1 year no-cost extension to continue to implement activities through the end of phase one in 2002. Successes, harbored on the following:

- The program has had positive impacts on Pemba. A baseline study at the outset of the project showed that only 34% of fishermen thought that Islam was relevant to their use of the sea and its resources. Later in the project this was found to have increased to 66%. Fishermen were practicing some specific conservation measures, and lessons learnt had spread to other villages. A key output of the project was publishing and distributing a teacher's guidebook (Khalid and Thani, 2007), which has been translated into Swahili and is being distributed throughout the fishing communities of Pemba. It has a wider relevance to Islamic communities elsewhere.
- Islamic environmental messages disseminated to a wider cross section of the community
- Program successes were well- shared to wider community, including international community
- Today, the waters of Misali Island are much calmer, with only the occasional illegal activities and reduced pressure as reported in Misali and other nearby areas. Instead, the communities are trying to make ends meet through other activities.
- Within the scope of the MEP, enterprise development services (including a credit and savings scheme) have been incorporated to help people start other businesses and develop other skills. Agricultural activities, bee keeping, and handicrafts are some of the alternatives that are being exercised to supplement incomes.

- The project is also promoting ecotourism at Misali Island, ensuring that the funds generated from visitation go toward the management of the area and support for community projects.
- Slowly but surely, community awareness about careful natural resource use is filtering through to communities as they are reminded of their stewardship duties over Allah’s great Creation.
- Community willingness to participate in Natural Resource Management (NRM)/conservation efforts increased significantly – more supportive to conserving Misali as well as their surrounding resources, planting trees (mangroves).
- Probably the very first occasion when a conservation project based on Islam ethics has been successfully employed in a marine conservation environment and its uniqueness lies in the fact that it is driven from the bottom up by the community itself.
- The only conservation project in Africa recognized as a “Sacred gift for the living planet” - WWF International recognized Misali project as a Gift of Islam, as part of its global Sacred Gifts of Nature Programme.
- Strong and close cooperation with Zanzibar Mufti Office and Good support from government institutions such as the Ministry of Education, particularly in area of provision of awareness program to schools.
- Strong collaboration and working relation with local and religious leaders including Imams, Sheikhs, and Madras teachers.

Challenges and Lessons.

Challenges.

- Suspicious of perception by religious leaders due to the nature of project introducers,
- Political instability during the project implementation,
- Inactive irresponsible NGO working to link communities and fishers Fishing across using Misali,
- No regular and conservation education programs to sensitize community at all levels,

- Introduction and change of Misali Conservation Area Management to new Pemba Channel Conservation (PECCA) has changed the community trust on conserving Misali HIMA Resources.

Lessons.

- If communities involved in decision making and see tangible benefits derived from resources conservation, they will fully participate and support conservation
- Effective involvement of community in the management of their resources can help to build trust in conservation.

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Conserving Biodiversity and Sustainably Managing Land through Indigenous and Community Conserved Areas

Presentation in Session II: Developing Implementation Framework – How to Implement HIMA with reference to current practices

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Abstract

The HIMA approach to strengthening natural resource management is a powerful tool for both conservation and sustainable development. Its greatest value lies not in its ability to exclude people from conservation areas, but in its ability to integrate food production with conservation goals. Protected areas often exclude local users and thereby miss out on important opportunities for tapping into their local knowledge and the institutions that enable its use. The HIMA approach legitimises Indigenous and Community Conserved Areas (ICCAs) as a way to achieve both sustainable land management and biodiversity conservation on land that is used primarily for food production. Healthy productive rangelands offer a genuine win-win situation of agricultural production (through livestock) and biodiversity conservation. The HIMA model provides the key to unlock this potential by improving landscape connectivity and harnessing the role of (domestic) herbivores more effectively for ecosystem management.

Introduction

International Union for Conservation of Nature's (IUCN) work in Jordan to develop HIMA has been initiated through a European Commission (EC) - funded initiative in four countries entitled Securing Rights and Restoring Lands for Improved Livelihoods. The work

is coordinated by IUCN's Global Drylands Initiative and contributes toward a union-wide effort to strengthen implementation of the United Nation (UN) Convention to Combat Desertification. In Jordan, HIMA has emerged as a locally known and accepted strategy for strengthening governance. It is being developed in Jordan with the dual purpose of enabling sustainable land management and biodiversity conservation in rangeland areas.

Desertification, biodiversity loss, and climate change are closely related phenomena that are all addressed through Multilateral Environment Agreements that were negotiated in the aftermath of the Rio Earth Summit (UNCED, 1992). Desertification affects between 10 and 20% of drylands worldwide and exacerbates poverty, creates food and water insecurity and aggravates conflict (Millennium Ecosystem Assessment, 2005).

Many drivers of desertification are identified in National Action Programmes (NAP's) to combat desertification, but analysis of these drivers is sometimes lacking, and there is confusion between ultimate and proximate causes. Many NAPs, for example, cite poor management practices of farmers and livestock keepers, but do not explore the factors behind these. Some land use practices are reported to have been traditionally sustainable but are now leading to desertification, which demands the question of what has changed. IUCN's analysis (based on surveys conducted) is that, the principal drivers of desertification are the following:

- Weak consultation with resource managers;
- Weak communal tenure arrangements and governance;
- Unsupportive policies and investments;
- Fragmentation of landscapes;
- Human poverty and population dynamics;
- Climate change and climatic uncertainty; and
- Poor understanding of dryland ecology.

These drivers of desertification appear to be fairly common across project sites. Several of these drivers are also closely related to governance and have therefore led to a strong governance-focus of the intervention. Security of tenure and governance are related to the low level of consultation and the lack of supportive policies, and they contribute to fragmentation of landscapes. The low level of consultation and participation with land users also contributes to the low understanding of dryland ecology and the application of approaches that are sometimes incompatible with local knowledge and context. In particular challenges have been identified in supporting rational livestock herding strategies (including transhumance) and the communal tenure arrangements that enable this.

Profile of the Badia of the Zarqa River Basin, Jordan

The Zarqa River Basin is one of the most significant basins in Jordan with respect to its economic, social, and agricultural importance. It is located in the central north part of Jordan and covers an area of 3,567 km² from the upper northeastern point to its outlet near King Talal Dam in the west, and is part of five governorates; Amman, Balqa, Jarash, Mafraq, and Zarqa. Most of the land in the Zarqa River Basin is characterized as arid or semiarid land.

Land degradation is extensive in the basin and is largely the outcome of human mismanagement and development that has not been well -informed of environmental risks. This degradation has compromised human well-being, social and economic development. Biodiversity is being lost, and improper land use and heavy groundwater extraction are important causes of degradation of land and vegetation. Specific factors in degradation include population increase; land tenure and ownership conflicts; lack of environmentally friendly national land use management plans and policy; weak enforcement of agricultural legislation and guidelines for best practices; and other barriers that include knowledge, communication, and institutional coordination (MOE, 2006).

In both the western and eastern parts of the Zarqa River Basin, economic viability and long-term sustainability considerations have been absent in the decisions regarding land management. Depletion of natural resources is, for an important part, caused by short-term financial interests in the use of land and water by affluent individuals, often having the right connections in the capital. This has been furthered by external economic developments and the weaknesses or quasi-absence of both environmentally sustainable policies and their enforcement. As a result rural livelihood strategies are shifting from livestock production/range management and rain fed cereals to highly intensified agriculture such as poultry, cattle production, irrigated vegetables and orchards, partly linked to export markets. Inevitably this production takes place on a small proportion of the land but uses the majority of available water resources. The promise of short-term financial gains, even in the more remote and eastern/southern regions of the country, have also led to a trend of Bedouin tribal families, that had their livelihoods from range management, increasingly making fixed ownership claims on either tribal land or government lands (IUCN, 2011). In the project sites in western Zarqa very little grazing land is left (less than 3 km² in each village) and livestock range management has become a marginal activity both in terms of land use and livelihoods. However, sites have been identified as places where it is possible to

demonstrate how, under rapidly changing demographic and industrialization conditions, alternative models for extensive range management can be established. The project therefore focuses on strengthening rangelands-based livestock production on communal lands whilst protecting these areas from further degradation and restoring their primary-productivity and biodiversity.

Land Use Change and Land Rights in the Jordan Badia

In Jordan, most of the drylands with rainfall less than 200 mm/yr are considered as rangelands, with rainfed agriculture, being a very marginal exercise. These rangelands in the semiarid regions constitute between 85 and 91% of the land (about 8 million ha). The natural rangelands are defined as “the wide-open, non-fenced lands where fodder grow naturally, that are not suitable for traditional farming due to lack of rain, low fertility, rough terrain, and high rockiness, or because of a combination of these factors, which makes the land optimum use restricted to production of fodder for animals” (Abu Zanat, 1997). In Jordan, the Agriculture Law (20) for the year 1973 defined the rangelands as “all lands registered as such and any other state-owned lands where annual rainfall is below 200 mm and that do not have sustainable irrigation, or the lands confined for public use”. Thus, this law took only the average annual rainfall into consideration, and disregarded other factors which play important roles in defining the rangelands, such as the land topography, fertility, physical and morphological characteristics which have a close relationship with rangelands’ utilization and sound management (MoA, 2001).

In the Zarqa River Basin, a substantial part of the land is classified as sparsely vegetated and constitutes the main part of the Badia rangelands. These rangelands, found mainly in the eastern part of the Basin, are deteriorated mainly due to human misuse. Overgrazing, uprooting of shrubs for firewood, ploughing rangelands for cereals crops and establishing land claims are the main factors that contribute to the misuse of range resources (NCARTT, 2004). In this area, where rainfall is rarely adequate to produce a reasonable crop (100-500 kg/ha) and limited vegetative growth is common, barley is only cultivated for hay. Before the advent of the tractor, marginal lands were rarely ploughed because of the high labor input required for animal drawn ploughing. With the introduction of the tractor on a major scale in the early 1950s, expansion of tillage into the steppe lands speeded up (HTS, 1956). In recent years, this expansion has become increasingly rapid. Although 91% of Jordan is constituted by rangeland, no long- term development and land use policy were set

up for Jordan as a whole. The political neglect of rangelands development has led to pasture degradation, desertification processes, and overgrazing of Badia's pastureland.

In the last two decades, livestock owners had started to shift from subsistence to commercial production. This change resulted first in an increase of livestock numbers in Jordan from 2.1 million in 1990 to 4.1 million in 1993. After that period, livestock numbers started to decrease to 2.6 million in 1998 and less than 2 million in 2002. This decrease was due to government subsidy cuts, the availability of veterinary services and the increased prices of live animals in the export market (OPTIMA, 2006). Land use in the rain fed arable areas, partly used for grazing, is highly dynamic and changes according to different conditions. In addition to the afore mentioned changes in livestock production, technological and demographic progress enhanced the development of urban areas, infrastructure, and agricultural areas. These latter factors increased the demand for agricultural land, and have put more lands under cultivation, especially in the western parts of the Badia around the Sail Amman Branch of the Zarqa River between Amman and Sukhna. Indeed, during the period 1992-2002 about 28% of the area of open spaces here was converted to arable lands (OPTIMA, 2006). As a result, livestock does not constitute anymore the main source of income for the Bedouins, although herds remained until now an important form of wealth and status, rather than a mere source of income (Van Aken et al., 2007).

The shift from animal husbandry /rangeland management to permanent agriculture during the last four decades notably in the western part of the Zarqa River Basin has resulted in a direct improvement of the living standards of people here and in indirect socioeconomic benefits to the country. Agriculture is scattered within the basin from orchards, olive and field crops in the drylands to irrigated agriculture on the river banks (OPTIMA, 2006). In Jordan, irrigated agriculture now represents the main economic activity in terms of population employed and economic return (Jabarin, 2001). Although highly unsustainable and not in its natural habitat, olive trees are the most important crop in the Zarqa Basin (52% of the total irrigated surface), while irrigated vegetables represent 22%. Other important crops include trees like apple, peach, and grapes (8, 5 and 2% of the irrigated surface) along the Zarqa River bank and seasonal crops like alfalfa (5%), barley and wheat 5%, and vegetables and melon 22% in the Sail Amman Valley and the upper stream of the Lower Zarqa River. However, it is important to realize that most of this irrigation is based on treated wastewater (Venot, 2003), especially in the western part of the Basin.

Apart from these earlier developments, irrigated agriculture in the Badia of the Zarqa River Basin mainly developed during the last three decades through large private investments

such as the investors concerned belonging to high society (MPs, senators, entrepreneurs, sheikhs, etc.). While part of this agriculture is highly capital intensive and profitable, around 30% of irrigation water was used in low-value olivetree farms. Orchards were a legacy of a time when the drilling of wells was subsidized, and were held for reasons of prestige, as a means of keeping ownership and control of land. Negative impacts passed on to the more vulnerable rural groups, notably low-income Jordanian categories (refugees, Jordanian tribes of low status, female laborers) and male migrants (Van Aken et al., 2009).

Land ownership in Jordan can be categorized as the following (Al-Oun, 2008):

1. Land that is privately owned and called (*Miri* and *Mulk*), which is land that is registered and documented owned by individuals;
2. Tribal land (Wajehat El-Ashayeria), which is claimed by the tribe and historically distributed by the sheikhs;
3. The state land with free access to all resources (Al mawat), which is the land owned by the state, but at the same time claimed by tribes, although it is not divided among the tribe members.

For a long period in the past (prior to the 1950s), Jordan's rangelands were characterized by effective land tenure systems and grazing rights that were associated with tribal institutions. This arrangement protected the resources within those lands and provided for their use in ways that assisted in rangeland conservation and continued productivity under the prevailing environmental and social conditions. Upon elimination of these systems and rights and the declaration of rangelands as State-owned areas that are open for everybody to use, new unsustainable land uses encroached upon the rangelands. Many of these areas were overused without consideration to the resource sustainability requirements or their long-term productivity. The elimination of tribal ownership also led to lack of incentives to encourage Bedouins and other pastoralists to maintain and conserve the resources and rangelands under their control and use. Therefore, the identification and definition of the ownership (and/or use rights to rangelands would greatly assist in setting up plans for rangeland development and improvement. According to the Agriculture Law (20) for the year 1973, as already noted, all natural rangelands are owned by the state but in practice, the case is the opposite. The area of these lands is about 80 million dunums (8 million ha), or 90% of the Kingdom's total area of 89.3 million dunums (MoA, 2001).

As in many other parts of the world, and notably in Africa, the parallel existence of formal registered land ownership and customary tenure arrangements is the cause of profound conflicts between government officials and local people over state land and tribal

land (Al-Oun, 2008). One peculiarity of the formal land tenure system is the role of the state as the ultimate owner of the land and water. State land covers most uncultivated, so called dead land (*Al mawat* which means “nothing will survive in the area”), which includes grazing lands operated under common property regimes (Forni, 2001). Another type of land owned by the state is what is called as *Miri*, mainly derived from what had been community land in pre-Islamic times, with the state later representing the community. Due to the changes in the role of the state in most of the developing countries during the last few decades, the tendency throughout the region has been toward privatization. A gradual and deliberate withdrawal of the state from land ownership and direct operation on these lands for the benefit of private landownership is obvious. Whereas traditional resource tenure systems were communal in nature, introduction of private ownership has broken down the social bonds that regulated resource use and conservation. Especially for the poor or the landless, individualization and registration of land as private property has meant in many cases losing access to necessary resources like water, grazing areas, and firewood. Contrary to the belief that an individual land title improves security of tenure and production, traditional systems had the advantage of being flexible allowing various forms of land borrowing and leasing arrangements that accommodate needs of the landless (Al-Oun, 2008).

In the past, land and water were controlled by the Ashira (tribe) represented by the Sheikh (tribal leader) and were linked to the notion of *Dirah*. The term *Dirah* refers to the tribal territory, together with a system of exchange organized around the Khuwa (the payment to tribes to obtain their protection). Much like in the Sudan/Sahel Zone in Africa, access to resources was allowed to other tribes depending on demographic pressure, climatic conditions, resource scarcity, and existing alliances. Thus, the borders and the geographical extension of a *Dirah* were often flexible but within customary perceptions of land and its tenure that still persist nowadays (Bocco, 1987). This notion of communal territory is thus interlinked with indigenous ideas of resource property. As Lancaster (1999) indicated, ownership comes through access, use, action, and is validated by defense and reputation.

Strengthening Governance

The initial analysis showed that weak governance is at the root of many of the environmental challenges faced in the project sites. In Jordan, the Bedouin land users have historically maintained strong practices of rangelands management based on community agreements and sanctions. This has traditionally enabled herd mobility and intercommunity

relations that go beyond herding strategies. The breakdown of these practices has created a Tragedy of the Commons (Hardin, 1968) in which disincentives are created that prevent land users from actively managing or investing in sustainable land management.

Governance is a broad term that encompasses many complex issues, at different scales, but it can be broadly defined as “how citizens, leaders and public institutions relate to each other in order to make change happen” (DFID, 2006). In the project under study, the term governance is used to refer to the rules and regulations that determine (or ‘govern’) natural resource use and the way those rules and regulations are developed and enforced. Governance essentially refers to the rules (laws and other norms), institutions and processes that determine interaction between citizens, between citizens and the state, and between states. Governance therefore relates to the power and responsibility to make and to implement decisions: who makes decisions over natural resources, who manages them, who benefits and who enforces the rules, and in each case, how this is achieved.

In Jordan International Union for Conservation of Nature’s (IUCN) approach to strengthening governance stems from building relationships between principal actors in natural resource management through multistakeholder dialogue. This dialogue is designed to build trust and revolves around participatory approaches for problem solving and visioning. Visioning exercises consist of mapping natural resources in their current state, including areas of degradation, followed by mapping of desired future states. Participants then agree on a plan of action for getting from the current state to the envisioned state, with a strong emphasis on defining the roles of the participants.

The participatory approach is not a one-off action related to delivery of a project but is viewed as an appropriate way to conduct business in the long -term. IUCN therefore trains partners in the community and in government to continue participation and to institutionalize it as a standard local planning practice. Through these participatory approaches and consultations, it became clear that HIMA was a preferred approach for strengthening natural resource governance. IUCN therefore support negotiations between various branches of government and communities to identify land that the community could manage and restore for their own use. The four sites are here discussed:

Bani Hashem. The community (supported by their governorate) has identified 1500 hectares of official forest land that they have described as “the last green area” in the rapidly industrializing Zarqa river basin. Negotiations between the Bani Hashem community and the Department of Rangelands, involving the prime minister’s office were carried out to provide

the community with the right to manage the lands as rangelands. Approval was given to the community to start management on 100 ha, to be scaled up to 1500 ha on condition that the government would maintain some control, and management has proven successful. Bani Hashem has developed a local tribal law, called “Mathak Sharaf”, to help enforce the new land management system by restricting grazing. Mathak Sharaf has been approved by the governor and strengthened through the support of the local police who can help enforce the law. The Ministry of Agriculture has established a community group to take the process forward (the CBO is called HIMA Bani Hashem).

Duleil. Duleil means shade and is an indicator that this was once a heavily forested area, although it is now largely devoid of trees. After a community exchange visit, Duleil community members have agreed to stop cultivating an area of approximately 100 ha initially, to allow vegetative regeneration and provide livestock fodder. Atriplex seedlings were provided by the government to demarcate the boundary (atriplex does not make a good fence, but it is an indigenous plant that thrives in these drylands, and it was used simply as a boundary marker).

Halabat. The community identified a significant area of land that is currently owned by the Ministry of Tourism and Antiquities. They have negotiated with the department to have access to the land and to manage it in order to demonstrate improvements through livestock keeping (the land is currently idle and heavily degraded through lack of management). They will integrate management of this area with the management of adjacent areas in order to create a larger buffer zone of environmental rehabilitation.

Hashmiyah. A government project had been designed to rehabilitate a state-owned forest (it is worth noting that – dryland forests such as these are open canopy rangeland-forests that provide important livestock forage). However, after the work began, the community requested that the government adopt IUCN’s approach to conferring management rights to the community. The government finally accepted the terms and has given the community access to 50 ha as a trial to demonstrate that they have the capacity to restrict access, to manage and to restore the rangelands, but on condition that if they are not capable, the land would be taken back into government care.

An important principle in the IUCN’s approach is that governance is built through dialogue to strengthen trust and enable local leadership. It is important to avoid starting with

expensive infrastructural projects that create unrealistic expectations and dependence on external solutions. Communities are assisted to work with local government support to accomplish whatever they can depend on their skills, knowledge and resources. For example, community agreements are developed to protect an area of land from mismanagement, and the project does not encourage the use of fences, which are considered an unrealistic solution for large-scale communal rangelands protection. Investments and technical advice are expected to be provided only once local governance solutions have been found, since there are concerns that external interventions can undermine governance and may be part of the challenge to be overcome. IUCN supports communities to identify and access resources, including technical advice, for example with support for establishing local management institutions and developing fund raising and investment skills. The key is to develop community autonomy and leadership with government support.

Outcomes

The establishment of the four HIMA sites above outlined had been achieved in 2011 and 2012; and therefore, it is not expected to observe profound changes in ecosystem health, and biodiversity could yet be observed. Nevertheless, a number of important results can already be identified. IUCN uses an outcome mapping approach to monitor complex governance approaches, since it is assumed that long- term impacts cannot be observed in the life cycle of a project, but important changes can be observed that may be expected to ultimately lead to long -term goals.

A significant outcome can be observed in the attitude of different partners in the project, including communities and government staff. There has been a major change in attitude among communities, from being suspicious of discussions around land rights and governance toward being enthusiastic leaders of the project. Similarly witnessed a significant change has been witnessed in attitude amongst government partners, who initially doubted the capacity of communities to organize themselves for improved management but have quickly been seen how capable the communities are. An important indicator of this change is the proactive support from the Ministry of Agriculture, which is planning to revise its national rangelands strategy based on experiences in strengthening HIMA. The Minister of Agriculture himself visited the project and was filmed in a TV documentary which has lent important legitimacy to the project and would enable steady scale up.

Another outcome of improved government support is the technical input given to project implementation. The government conducted a floral assessment of the Beni Hashem site in early 2012 (Beni Hashem was the first site to be established, and therefore, work is more advanced). Biodiversity benefits can already be observed after one year of protection with an increase in biomass and a return of floral species, although the extent of improvement remains to be validated. Similarly in Duleil HIMA site, there have been reports of an increase in numbers of partridge and there is an expectation that the site will soon become a partridge, nesting ground. However, resources are inadequate to provide the necessary monitoring to validate this at the moment.

In conservation terms, these HIMA sites are moving towards *de facto* IUCN Category 5 Protected Areas, and it is necessary to establish an adequate monitoring system to validate and authenticate them. It must be stressed that these are areas which are still primarily intended for livestock production, but managed in order to capitalize on the environmental benefits of herbivore action and to minimize risks associated with sustained low-pressure grazing. The HIMA sites are built on local knowledge and expertise in conservation and rangeland management and are presenting dual development and conservation impacts. A number of species with high market value have been identified (e.g. *Artemisia* spp.) through the floral assessment, and support will be provided to strengthen marketing with a view to providing economic incentives for sustained environmental management.

Discussion of Lessons and Remaining Questions

This project is providing valuable evidence that communities do indeed have strong capacity for environmental management, and that this capacity can be harnessed by providing a stable governance foundation on which people can manage their land. From personal experience, it appeared that the key is to build on what people know and do and to tailor technical advice to that, rather than the other way around. In particular, there is enthusiasm for strengthening current livestock management through rangelands rehabilitation and restoring customary practices for seasonal resource use. However, it has also been noted that communities have aesthetic, as well as economic motives, and for many participants, their goal is a beautiful environment as much as it is economic gain.

Healthy rangelands offer a rare win-win in terms of increased agricultural productivity and resilience (through livestock) combined with biodiversity conservation. However, in the project site, this need to be monitored over time to identify potential risks

and trade-offs. The project illustrated an initial hostility among communities to discuss land rights, but as the discussions proceeded, and as communities got to witness similar approaches, they gained confidence. The existing success stories should now be documented and shared in order to encourage wider adoption of this approach in new communities.

Establishing HIMA in the way described here has had positive implications for community-government relations. The multistakeholder forums have been effective for building consensus and identify mutually agreeable goals and have fostered productive partnerships at the local and national level. Political support has given an important sense of credibility and legitimacy to the work. By partnering closely with the community, the government is also better equipped to draw lessons from the project and to use this to influence national policy.

An important observation, made by the Director of Rangelands, is that the extension approach required to build HIMA is very unique, and it may not be suited to every government extension worker. The government needs to identify staff with the appropriate character and should explore ways to build their own institutional capacity, for example, by working with a University to establish more courses on participatory development approaches. Other roles of government are still being explored through the project, including identifying where government technical services can enrich local knowledge and the role government can play in establishing and monitoring standards for HIMA.

Although the project was not initiated for direct biodiversity conservation, it is clear that this is an important outcome of the HIMA approach. However, since this was not a priority goal, there were inadequate resources for monitoring. The next step in project development should therefore be to build locally suited biodiversity monitoring systems (including ecosystem services). The project will explore ways to link community knowledge and monitoring with monitoring services from government. HIMA sites can contribute to national biodiversity goals directly, through for example, conservation of particular species, and indirectly, for example, through maintaining greater landscape connectivity through a matrix of different protected area types. However, attaining such goals will require a stronger working relationship between ministries responsible for biodiversity and agriculture, since the HIMA approach targets both agricultural and conservation goals.

There remains a concern that governance of water in Jordan is not yet integrated to discussions of rangeland governance, and this poses a risk to the future of the HIMA sites. Jordan has a high demand for freshwater through its growing industrial sector, and negotiations over water access and management are tense. However, it is possible through

improved ecosystem management to demonstrate significant improvement in water cycling and water quality. These environmental services need to be better evaluated economically in order to demonstrate the positive externalities of improved rangelands management. It is not unrealistic to propose systems of payments from urban centers and industry to rangeland users in order to incentivize management that protects important water sheds. Similar economic valuation is recommended for other environmental services of HIMA such as carbon sequestration and storage or habitat protection for migratory species.

Experience from other countries suggested that as people gain confidence in their renewed governance systems, the impact on the environment can be exponential. It may take several years and a long investment of time in building relationships, but the long-term goal should be to see the greater proportion of Jordan's communal rangelands under some form of protection, with communities throughout the country spontaneously investing effort in restoring and sustainably managing their resources.

These lessons have wide global appeal, particularly in the drylands that cover 41.3% of the earth's surface. The HIMA approach has parallels in other countries, although there is a higher degree of popular respect for HIMA in West Asia than can be found for similar customary systems in other parts of the world. These experiences therefore deserve to be widely promoted in order to push forward work to combat desertification and halt biodiversity loss in other regions.

Concluding Questions

IUCN's work in Jordan requires further research to develop adequate recommendations for future scale up or wider adoption. Nevertheless, results are undoubtedly promising, and the initial outcomes provoke important questions that will be posed over the coming year. The first of these is to establish the nature of land rehabilitation and ecosystem-scale impacts, and whether improved rangelands vegetation is leading to better water cycling and reduced drought or other ecosystem changes. These will need to be monitored over time with quantitative evidence of change in soil formation or fertility and changes in water cycles. Similarly, the benefit on species diversity and range needs to be tracked empirically in order to inform conservation-based investments and policies.

An important question needs to be addressed regarding the interaction between herbivores and rangeland health. It is the assumption that herbivores are part of the natural rangeland ecosystem, and that their natural influence is through intensive grazing and

trampling for relatively short bursts, dictated to a large extent by seasonal climate patterns. Such patterns have been replicated in other countries using domestic livestock, with dramatic impacts on the environment in terms of improved biomass and biodiversity. This has not been demonstrated in the Jordanian context, and it will be explored in the future, since it is a key argument toward promoting conservation through livestock management. This raises a further question of the relative value of livestock production and biodiversity conservation in a dual system, since policies and investments are likely to sway preference toward one or the other. A decision making tool is required that can identify the optimal land use strategy between a number of complementary and overlapping uses (e.g., livestock production, water cycling, production of medicinal plants, etc.).

Finally it is necessary to use improve monitoring of HIMA sites to determine whether they qualify as protected areas, whether there is any advantage in this, and whether national conservation strategies need to be adjusted to accommodate HIMA-based protected areas. HIMA offers a significant opportunity to meet Aichi biodiversity targets in terms of extent of protected areas (including indigenous and community conserved areas). Despite the evidence that communities are not only driven by profit motives, it is worth exploring market-based incentives that can further promote community conservation efforts.

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HIMA as a Model for Sustainable Development: Conceptual Framework

Presentation in the Session II: Developing Implementation Framework – How to Implement HIMA with Reference to Current Practices?

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Abstract

This paper was aimed at to develop a conceptual framework for sustainable development by presenting HIMA as a model for people-centered development. The model is inspired by Islamic values as the guiding principles for defining the relationship between man and ecosystems. Sustainability pertains to a balanced interaction between a population and the carrying capacity of an environment such that the population develops to express its full potential without adversely and irreversibly affecting the carrying capacity of the environment. Recommendations for promoting the HIMA concept as a model for community-based natural resource management are outlined.

Key words: Natural resource management, community-based natural resource management, sustainable development, HIMA, local knowledge.

Introduction

Sustainability pertains to a balanced interaction between a population and the carrying capacity of an environment. Sustainability is often viewed from economic, social, and ecological dimensions, but it overlooks the cultural dimension. Islamic values and thought form the foundation and underpin the spiritual dimension of sustainability, and it defines what constitutes a good life. Islam, viewed as a worldview and a way of life, evokes the soul-

focused integration of mind and heart in realization of the essential oneness (*tawheed*) between humans and nature.

The notion of natural state *fitra* or the balance in nature is a key concept in Islamic worldview. This implies that everything on earth is in balance (*qadar*). Islamic thought states that if conditions of equity are met, no scarcity of resources will exist. Islam views the current global ecological crisis as a problem of ethics and equity. Reports about the state of the world, ecological footprints, the metrics of the World Wide Fund for Nature's, and 'Living Planet Index' (LPI), show alarming indicators of the ecological crisis.

It has been arguing that the current concern for sustainable development needs to be replaced with a new and broader concern for 'environmental and human justice (*adl*)'. This must embrace both the familiar concerns for intra-generational justice (justice for the poor now) and inter-generational justice (justice for those yet unborn), and also justice with respect to other species. Justice (*Adl*) from an Islamic perspective is the cornerstone for good governance and a sustainable human civilization.

Cultural wealth and local knowledge are rarely measured, but are critically important to human welfare and well-being. Islam represents the local knowledge and the cultural wealth that needs to be harnessed to convey and re-define a new model for sustainability as a mercy for humankind (*rahma lel alameen*). The Islamic values articulate what constitutes good governance, public goods, public interest, and trade-offs between public and private interest.

HIMA, which is part of local knowledge in the Middle East, is a good example of sustainable development. The HIMA is a traditional system of resource tenure that has been practiced for more than 1400 years in the Arabian Peninsula. The Arabic word HIMA literally means protected place or protected area. In Islamic law, it signifies a natural area that is set aside permanently or seasonally for the public good, which may not be privately owned. Historically, HIMAs have helped conserve natural resources and biodiversity in the Arabian Peninsula and adjacent areas. The HIMA has been one of the most successful institutions integrating nature conservation with human well-being (Llewellyn et al., 2007).

Ash-Shafi'i reported that when a nomadic tribe came into a new area, it had been customary for the tribal leader to ascend an eminence and he would graze his herds and would exclude others from the use of *HIMA*. The institution was at times regarded as a tool to monopolize grazing and water rights (Llewellyn, 1992, 2003; Llewellyn and Ajlani, 2007).

Islamic law outlined the basic public policies for managing public resources including HIMA. Islam abolished the pre-Islamic practice of making private reserves for the exclusive use of powerful individuals, and ruled that a HIMA could be established only for the public welfare. Prophet Mohammad (peace be upon him) established a HIMA surrounding the Haram of Al-Madinah, in which he instituted a kind of zonation, forbidding hunting within a radius of four miles and the destruction of trees and shrubs within twelve miles. The HIMA thus has become a symbol of social equity, justice, and an instrument of environmental conservation.

Islamic Worldviews: Land Ownership, Public Goods, and Governance

The Islamic worldview in economics defines the rules for ownership, public goods, and governance of public lands. Chapra (1970; 1992; and 2008) outlined a set of concepts for the Islamic economic system. The cornerstone of Islamic belief is oneness or unity (*tawheed*) of the Creator, oneness of human origin, and oneness of human destiny. The notion of oneness is critical in re-defining sustainability since it is about the integration of norms, values, ecological, social, and economic domains. The influence of Islamic values to transform HIMA from private ownership to common resource that is lodged in the community is crucial to understanding the notion of public interest (*maslaha*). Protection of property interests, as part of the essentials (*daruriyyat*) of Islamic order, is subject to a public interest consideration as a matter of priority. Private property rights are well-established but constructed as a sacred trust based on the doctrine of unity (*tawhid*), stewardship (*khalifa*) and trust (*amana*). Property and land are temporally utilized by humans as a trust from God as the Owner (*Al Malek*) and Sustainer (*Al Hafeth*).

Humans are viewed as trustees and stewards who are responsible to respect the natural laws and ensure justice (*adl*) and sustainability (*tayebah*) approaches to harness natural resources. All human endeavors and acts are forms of worship of God. There is no dis-connecting between the spiritual and the secular or this life and hereafter.

The concept of dual ownership between human being and God is one of the key characteristics of the Islamic model as documented by Normani and Rahnema (1994), Abd Al-Khader (1959), and Khan (1994). Islam protects the personal right to own and consider it as a sacred right. Yet, from an Islamic perspective, human ownership is in fact a matter of

trusteeship, while having temporary authority to benefit from property. The Islamic property rights framework conceives land as a sacred trust but promotes individual ownership.

Muslim scholars had a consensus that property rights are one of the five essential values of Islamic law which must be protected. The Prophet Mohammed (peace be upon him) emphasized the importance of property rights in his farewell pilgrimage by declaring the following:

“Nothing shall be legitimate to a Muslim which belongs to a fellow Muslim unless it was given freely and willingly.”

Islam requires humans to maintain a balance between the attachment and pursuit for material things and the pursuit of the hereafter. This notion of living lightly on earth (*zohd*) is a key ingredient in Islam, since it provides a self-organizing mechanism to restrain the human from all forms of overconsumption and overuse of resources. This worldview ensures environmental stewardship and respect to the concept of the carrying capacity of our natural systems. Human stewardship implies that every generation should show consideration for the future generations in the use of resources. This worldview is in contrast to the market-based economic theory which is based on the assumption that humans are consumers and utility maximizers.

Islam however, recognizes the dual nature of human beings and dual nature of ownership. Human beings are selfish, as well as altruistic. Islam does however, recognize the balance between public and private ownership. Also, Islam seeks to control human selfishness and enhances human altruistic motives to help the community of life at large as part of social and societal responsibility.

The capitalist economic model places a very high value on material accumulation and links it as a means to pursue happiness. The capitalist approach to life had accelerated levels of overconsumption, pollution, depletion of nonrenewable natural resources, deforestation, and ecological imbalances which contribute to climate change as articulated (Al-Jayyousi, 2012).

Islam treats material possessions as means not ends and as secondary to the moral and spiritual development of the human and social capital. It does encourage enterprise and effort to increase one's material well-being within good means (*Tayebah*) so as to be rewarded in the hereafter (Day of Judgment). This change in the focus of human striving introduces a balanced approach to economic development in terms of time and space. The Islamic approach urges to embody and adopt restraints in the human endeavor to manage wealth,

natural resources, and material consumption. This is referred to as living lightly on earth or de-growth (*zohd*). The Islamic ethos on the wealth distribution is best illustrated by the Qur'anic injunction that wealth should not circulate only among the rich. Within the Islamic framework, the right of property ownership must be conceived as a trust to be exercised within the framework of its social function and subjected to moral responsibility toward society as a whole.

Ummah is a unique Islamic concept which describes a community of faith and universal community of voluntary association or membership. In this association, faith is the organic bond. Thus, loyalty to the community overrides loyalties to one's family, race, and nationality. The Qur'an states:

“O People! We have created (all of) you out of a male and female, and We have made you into different nations and tribes so that you might come to know one other; (otherwise) the noblest of you in the sight of God is the one most possessed of God consciousness (taqwa)” (Qur'an: 49:13).

The Quran views altruistic behavior as a means for personal growth, as an instrument of promoting societal wealth and as a manifestation of the individual's God consciousness. Fulfilling the covenants toward people and nature leads to *falah*. This means to honor personal commitments to the community and nature. This implies that abusing or polluting the environment is against achieving *falah* and efforts to harness natural resources are essential conditions to achieve *falah*. In sum, the above mentioned concepts in the economic and social system in Islam provide the foundations for sustainability and good life (*Hayat Tayebah*) as illustrated in Fig.1.

Islamic ideology can be characterized as a middle ground between extremes of capitalism and communism. While upholding the dignity and freedom of the individual, it stands firmly for social justice in its all-embracing supranational settings. The task before human society is to keep on advancing within the moral limits and thus ensure for itself an evolutionary progress with universal justice.

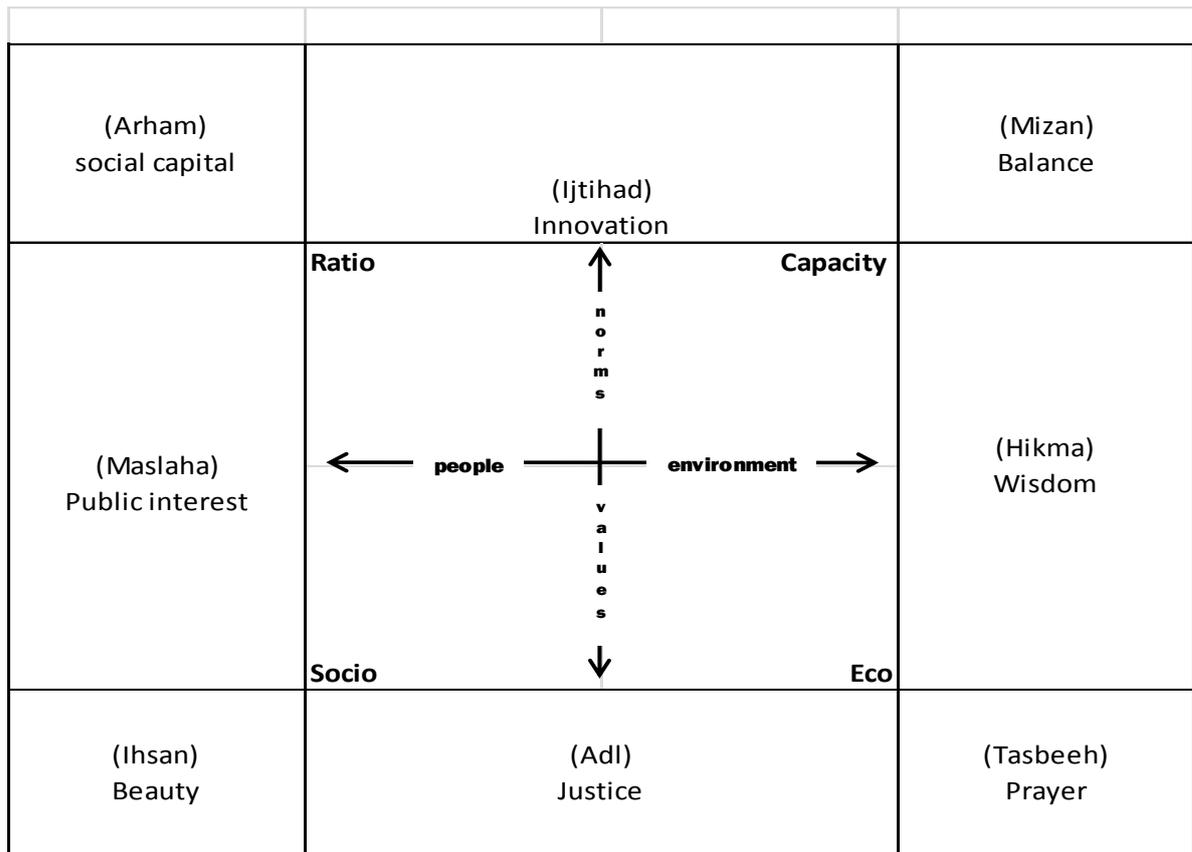


Figure 1. Key principles for conceptualizing sustainable development. (Al-Jayyousi, 2012).

Conceptual Framework

A model for sustainable development is proposed that will be linked to the concept of HIMA. The criteria for measuring and assessing sustainability are based on ecological, social, economic (ratio), and carrying capacity as shown in Fig. 1. The notions of equity, social justice (*adl*), public participation (*shura*), and the deep concern for future generation are cornerstones in Islam. The role of *Ummah* as a community of practice is to set standards for ethical codes of conduct and also to create new knowledge based on attaining public good and public interest as articulated by Al-Jayyousi (2001; 2008; 2012).

The following presents a set of arguments pertaining to why to rethink development and sustainability based on the need for new metrics of measuring sustainability, the pitfalls of using Gross National Product (GNP) as a sole indicator for sustainability and the cost of economic growth on our natural capital.

No Metrics to Measure Sustainability. One of the challenges of sustainability as revealed in the global statistics is the lack of objective and realistic metrics and indicators to measure it. Besides, the conventional framework or mental model for sustainability where the social, economic and ecological domains are viewed as overlapped circles makes the implicit

assumption that trade-offs could be made between the three domains. This perception resulted in irreversible losses in ecosystem services which represent our natural capital. Another conceptual model sees the three domains (ecology, society, and economics) as three circles which share the same center with the largest domain as the natural capital and the smallest one being the financial capital. This means that our natural capital underpins our social and financial capitals.

Addressing Poverty and Natural Conservation. The trickle-down effects of international aid need to be assessed to ensure that the local poor benefits. It is interesting to note that of the \$350 billion spent by the US Government in developing countries, 90 % goes to people above median incomes – this is essentially a subsidy to the middle class. Public policies and aid need to move beyond cash transfer which often involves a translation of a Western-style modernity, industrial, urban, democratic, and capitalist to a context and a culture that is not congruent with local norms and values.

Thinking beyond GNP as a Measure of the Health and Wealth of Nations. The twentieth-century fixation with GNP, as argued by Korten (1995), as a measure of human development is flawed. Developed countries do not provide good models for a transition to sustainability as articulated by Adams (2008): they are the least sustainable on earth. Their levels of consumption are the chief drivers of anthropogenic climate change and biodiversity loss; their economies draw poor communities in the developing world communities into systems of production and exchange; but even where they generate wealth, they do not stimulate equity. High quality of life and high scores on measures of human development are not necessarily associated with high GNP per capita. The major portion of what shows up as growth in GNP is a result of the following

- shifting activities for the non-moneyed social economy of household and community to the moneyed economy with the consequent erosion of social capital;
- depleting natural resources stocks such as forests, fisheries and oil and mineral reserves at far above their recovery rates; and
- counting as income the costs of defending ourselves against the consequences of growth, such as disposing of waste, cleaning up toxic dumps and oil spills, providing health care for victims of environmentally caused illnesses, rebuilding

after floods resulting from human activities such as deforestation, and financing pollution-control devices.

Mainstream sustainable development, according to Adams (2008), encompasses a series of ideas such as ecological modernization and market environmentalism that promise to steer the world toward sustainability in ways that do not demand too many dramatic changes, and that do not upset the comfortable, the rich or the powerful.

Transforming society and the world's economy to a sustainable one requires a fundamental shift in consciousness as well as in action. It calls for a fresh vision, a new approach for shaping a new reality. The following principles of sustainability that are based on the work of Ben-Eli (2005) are as follows.

- The First Principle: Natural State (Fitra) Principle: Contain entropy and ensure that the flow of resources, through and within the economy, is as nearly non-declining (mizan) as is permitted by physical laws.
 - This principle implies a number of policies and operational implications which include the following striving for highest resource productivity,
 - Amplifying performance with each cycle of use,
 - Employing 'income' rather than 'capital' sources where applicable and continuously recycling non-regenerative resources,
 - Affecting an unbroken, closed-loop flow of matter and energy in a planetary productive infrastructure,
 - Controlling leakages and avoiding stagnation, misplaced concentrations or random diffusion of chemical elements during cycles of use, and
 - Establishing a service, 'performance leasing' orientation for managing durable goods.
- The Second Principle: Account for Ecosystem Services (*Mizan*) Principle
 - The second principle: Adopt an appropriate accounting system, fully aligned with the planet's ecological processes and reflecting true, comprehensive biospheric pricing to guide the economy. This principle implies a set of policy options such as:
 - employing a comprehensive concept of wealth related to the simultaneous enhancement of five key forms of capital (natural, human, social, manufactured and financial),
 - Aligning the world's economy with nature's regeneration capacity and incorporate critical 'externalities' in all cost and benefit accounts,

- Embodying a measure of well-being and human development in economic calculations,
- Designing regulation and taxation policies to accentuate desirable and eliminating adverse outcomes, optimizing the whole.
- The Third Principle: Respect All Communities of Life (*Umam*) Principle: Ensure that the essential diversity of all forms of life in the Biosphere is maintained A set of policy and operational implications can be devised which
 - harvest species only to regeneration capacity
 - assume a responsible stewardship for our planet's web of biological diversity
 - shape land-use patterns to reduce human encroachment on other forms of life and enhance biological diversity in areas of human habitat, and
 - conserve the variety of existing gene pool
- The Fourth Principle: Promote the Role of a Trustee (ummah wassat) Global Community. Maximise degrees of freedom and potential self-realisation of all humans without any individual or group, adversely affecting others. Based on the afore mentioned principle, a set of policy and operational implications can be identified. These include the following:
 - Fostering tolerance as a cornerstone of social interactions,
 - enshrining human rights within a framework of planetary citizenship like the Earth Charter,
 - Providing for good governance,
 - Ensuring equitable access to life nurturing support, and
 - Establishing cooperation as a basis for managing global issues and planetary resources.
- The Fifth Principle: Understand the Symphony of Life (tasbeeh *and* sujood) Principle Recognize the seamless, dynamic continuum of wisdom, love, and energy that links the outer reaches of the cosmos with our solar system, our planet and its biosphere including all humans, with our internal metabolic systems. The afore mentioned principle may inform a number of policy actions. These include the following
 - Acknowledging the transcendent mystery (*ghayb*) that underlies existence,

- Seeking to understand and fulfil humanity’s unique function in Universe (*taskheer and istikhlaf*),
- Honouring the Earth with its intricate ecology of which humans are an integral part (*ummam amthalokom*),
- Fostering compassion and an inclusive, comprehensive perspective in the underlying intention, motivation and actual implementation of human endeavors, and
- Linking inner transformation (*dameer*) of individuals to transformations in the social collective (*taghyeer*), laying foundations for emergence of a new planetary consciousness.

The Five Principles as an Integrated Whole: Unity within Diversity. Deeper reflection on the concept of sustainability and the five core principles which together prescribe reveal that the spiritual dimension is fundamental to the quality and coherence of the whole. As a guiding principle, Islamic values and thought form the foundation and underpin the spiritual dimension. Islam, viewed as a worldview and a way of life, evokes the soul-focused integration of mind and heart in realization of the essential oneness (*tawheed*) at the center of being.

By anchoring the essence of human motivation and intention as framed in Islam as ‘the construction of Earth’ (*Emmarat al ard*) and stewardship (*istikhlaf*), the spiritual principle acts as the causal root which sets the tone for the whole. It drives the integration of the four principles, those related to the material, economic, life, and social domains. It integrates in a balanced way to evolve a value-based community (*ummah wasat*); it can infuse a common purpose, provide a common foundation, and stimulate common resolve.

A balanced and full integration of all five principles is essential, however, for conceptualizing and realizing sustainability as a state. The whole set has to be integrated into a single unity in which the five principles come together as one. The five domains underlying the principles interact and co-define one another to contribute in defining what constitutes a good life (*Hayat Tayebah*).

Good life (*Hayat Tayebah*) and the pursuit of happiness in Islam have little to do with material accumulation and consumption. In a consumer-based credit society, the media promotes the illusion that the more one consumes, the more he attains happiness. This illusion which the media promotes through the manipulation of minds creates a lot of consumer products and shift ‘wants’ to ‘needs’. The media also helps to promote universally

accepted ethos, standards, and norms in a globalized world which are risky to cultural and biological diversity.

Good life (*Hayat Tayebah*), from an Islamic perspective, has to do with the positive role of the human to construct and add value to life (*Emarat al Ard*) and to be a witness, a trustee and to leave a good legacy. Euro-centric or US-centric views of what constitutes a good life differ from the basic Islamic notions of simplicity or sufficiency (*Zuhd*) and using local resources and knowledge to attain a people-centered development.

The key concepts associated with sustainable development from an Islamic perspective and their linkages to HIMA are depicted in Fig. (1), these include the following:

- Wisdom (*hikma*): This represents the purposeful pursuit of acquiring and embodying wisdom from all cultures and nations. This cross-fertilization of knowledge is a critical element in transforming societies to value-based eco-communities that embrace sustainability as a way of life. The global expertise in managing protected areas should be incorporated in HIMA to co-create wisdom in managing natural resource management.
- Justice (*adl*): This implies the good governance in its broad sense which is the core of sustainable governance that is based on rights. The HIMA system is a community-based system that adheres to good governance of natural resources.
- Public interest (*maslaha*): A consensus from a community on what constitutes good for all are crucial to develop a social contract. This represents a ruling and a principle for defining collective goods. The cornerstone for sustaining a HIMA system is ensuring public interest for all peoples and nature and respecting social choices as part of collective action.
- Innovation (*ijtihad*): This refers to applying diligence and intellectual capital to solve current and emerging problems. It is also about re-inventing new tools and methods to make a transition to sustainable development. The HIMA system is part of social innovation system that entails learning from nature and ensuring harmony between humans and nature.

A balanced and full integration of all notions and principles as shown in Fig. 1 is essential for conceptualizing and realizing sustainability. The whole set has to be integrated into a single unity in which the five principles of sustainability come together as one. The five domains underlying the principles interact and co-define one another to contribute to define what constitutes a good life (*Hayyat Tayebah*).

Sustainability informs what constitutes a good life (*Hayat Tayebah*) from an Islamic perspective as illustrated in Fig. 2. Good life is founded on justice (*adl*), *Ihsan* (excellence), social capital (*arham*), and limit of mischief (*fassad*). It has to do with forming a positive role of the human to construct and add value to life (*Emarat al Ard*) and to be a witness, a trustee, and to leave a good legacy.

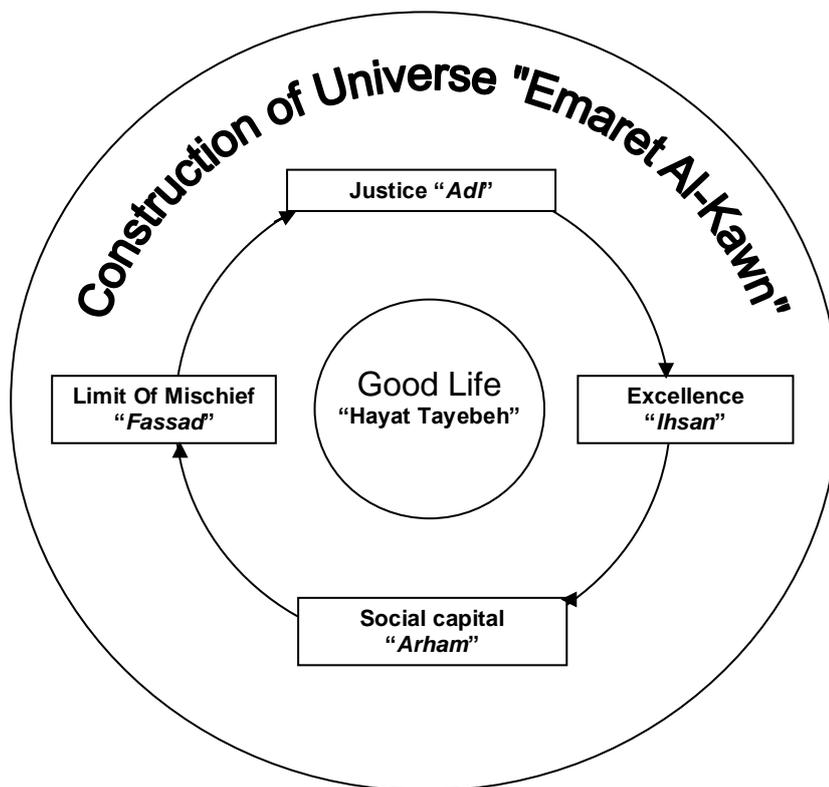


Fig. 2. A model for sustainable development based on Islamic worldviews (Al-Jayyousi, 2012)

Protected Areas (HIMA) as a Model for Sustainability. Historically, the Middle East and North Africa region had hosted and nurtured a system for communal natural resource management called HIMA, which means protected area. Local knowledge and wisdom promoted and refined appropriate local governance systems as a means to co-manage commonpool resources in a collaborative approach to overcome spillover effects, externalities and free-rider problem. Deep within local Arab culture, the notion of sustainability, resilience and managing bounded instability are key elements for survival in a harsh and scarce natural environment but rich in social and human capital. These natural

protected areas, HIMAs, were managed by sound local governance that are found on a culture of co-existence, integrity, trust, care and respect for nature and life.

The HIMA system was reviewed and proposed as a possible model for natural resources management by Ghanem and Eighamy (1984); Gari (2006); and Llewellyn (1992). In the Arab peninsula where the natural environment is characterized by aridity, fluctuation and uncertainty, it is crucial to understand the drive for community-based natural resource management which is based on sharing, solidarity, and cooperation. HIMA contributed positively to save and protect the natural resources, rangelands and forests in the Middle East region for 5000 years. Besides, HIMA system provided the enabling environment for managing conflicts over natural resources, rangelands, and forests. The deep understanding of the cycles of nature, the seasonal variations, and the carrying capacity of the natural environment in an arid and scarce environment constitute informed social innovation in community-based natural resource management known as HIMA. A new social contract evolved through social learning and adaptive management that is based on respect of human rights and nature, public interest (*maslaha*), and sustainable use of resources.

Historically, many types of HIMA existed to address various social contexts which range from restricted use of grazing to seasonal and sustainable use concepts. Islam contributed and added to the value system and ethical dimension for HIMA. It also instilled a rational imperative and judgement for measuring trade-offs between public and private interest and between human rights and nature conservation. HIMA can be viewed as civil society and communal approach to manage common pool resources in a collaborative and adaptive manner. HIMA system provided a framework for sustainable development with good local governance that can inform our existing governance structures in the 21st century. This system of local governance added value to the livelihood and well-being for local communities and demonstrated and activated the human role in the construction of the universe (*Imarat al Kawn*) and living lightly on Earth and enoughness (*Zohd*).

Sardar (1987) commented that one key pitfall of some western models of development is that they undermine communal existence by promoting urban development, increasing insecurity by displacing traditional agriculture, and promoting debt finance. Al-Jayyousi (2008) argued that Islamic values, local knowledge and practices can be viewed as a model for sustainability and good life (*Hayat Tayebah*) which embodies equity, economic prosperity, and environmental sustainability. Besides, public participation (*Shura*) and

reaching consensus through consultation are keys to community decision-making. The notion of social justice and equity (*adl*) for all people in a community regardless of their culture or belief system is the cornerstone in Islamic values.

Llewellyn (2007) reviewed the HIMA system in Saudi Arabia. He stated that in the 1960s, it was estimated that there were about 3,000 *HIMAs* in Saudi Arabia. They varied from 10 to well over 1,000 ha. Three types of *HIMA* were practiced. These included the following:

- Grazing is prohibited, but grass is harvested by hand at designated times and places during years of drought;
- Protected woodlands within which the cutting of trees (e.g. *Juniperus procera*, *Acacia* spp., *Haloxylon persicum*) or their branches is either prohibited or regulated;
- Managed rangelands within which grazing and cutting of grass are permitted on a seasonal basis to allow natural regeneration after the grasses and other plants have grown out, flowered and borne fruit, or in which grazing is permitted year-round, but is restricted to specified kinds and numbers of livestock such as milk cattle or draft animals, or in which a limited number of livestock may be grazed for a specified time during periods of drought;
- Reserves for beekeeping, within which grazing is prohibited seasonally; and
- Reserves for the conservation of ibex.

In Islamic law, to be legally valid a HIMA has to meet four conditions, derived from the rulings of the prophet Muhammad and the early caliphs as follows:

- Governance: It should be constituted by the *imam* – the legitimate governing authority;
- Public interest: it should be established in the Way of God, for purposes pertaining to the public welfare;
- No harm (*darar*) to community: It should not cause undue hardship to the local people – it should not deprive them of resources that are indispensable to their subsistence; and
- Net benefits to community: It should realize greater actual benefits to society than detriments.

The HIMA can be viewed as a real example of community-based sustainable development. The HIMA tradition is an important cultural precedent for protecting and

managing public resources over which individuals enjoy rights of use, including rights to grazing. This is especially significant in countries where most of the land is given over to communal grazing and where there are few designated landholdings. It represents a traditional recognition of the need to allocate access to scarce resources and illustrates that this need was perceived locally hundreds of years ago.

By allocating tangible benefits to people who benefit directly from conservation, it provides an incentive for local communities to invest in the maintenance of their natural resources and to protect them from abuse. It allocates resources equitably among members of local communities. It proved economically viable over time because of the benefits it yielded and the social security it provided. It had and still has popular appeal; it is socially accepted and desired by the people who carry the cost of implementing it.

Most traditional HIMAs are managed locally through processes involving consultation and consensus, so individuals in the community are able to influence management decisions. Customary management of HIMAs has proven pragmatic and flexible. Few established systems of protected areas are known to have a history comparable in length with traditional HIMAs. HIMAs are still regarded as an essential source of fodder; thus, they continue to play a role in times of drought and poor seasons. The HIMAs tradition is an important cultural precedent in using designated areas of land for protecting and managing public resources over which individuals enjoyed user rights. They provide a potential for ecological and socioeconomic research; they are national gems of which a great deal of knowledge and understanding can be derived.

Principles of community-based conservation include empowerment of local communities, increasing public participation, equitable use and sharing of natural resources, preservation of indigenous knowledge and local customs, and recognition of indigenous customary rights (Llewellyn, 2007). All of these principles adopted in HIMA systems are crucial for sustainability.

Islamic law has devised and formalized specific rules for formulating public policies and making trade-offs between public and private interest and in assessing costs or injury (*darar*). The notion of *maslaha* (public interest) may lead to an understanding of sustainability in its broader terms. HIMA system operationalized a social contract which prohibits ecological degradation (*fasad*) and human and social alienation. This social contract was constantly reformed and adopted by a community of practice (*Ummah*) who set

standards for ethical codes of conduct and also to create new knowledge based on the public interest and necessity.

In a synthesis of the key principles of HIMA system, it is evident that Islamic conservation laws and principles are in harmony with the key concepts of ecosystem approach as documented by Ba Kader et al. (1983). These include building consensus and sense of ownership with the stakeholders, dealing with the natural system as one integral unit including socioeconomic, ecological and governance, ensuring process for feedback and social learning as evident in local knowledge and culture which is framed and shaped by Islam.

Conclusions

HIMA as a social institution resulted as a response to a need to promote co-existence between humans and nature. This social innovation, inspired and informed by local culture, was developed through human reasoning, experimentation and innovation (*ijtihad*). HIMA is a good example of human-centered development model where the human is viewed as a trustee and a witness who is responsible for the construction of the world (Emmarat Al-ard). HIMA can be sustained and resourced by community-based financing models like *Waqf* (trust funds). This is an innovative way to secure resources like land, energy, and water for the poor by enhancing the social responsibility and solidarity. *Waqf* can be harnessed and institutionalized to promote people-centered development that is resourced and managed by civil society (Al-Jayyousi, 2012).

HIMA contextualized the notion of public goods that are co-managed by local community in accordance to customary laws. In terms of sharing natural resources and the definition of common pool resources, Islam teaches that water, fire (fuel), and grass are public goods. The prophet Mohammed (peace be upon him) declared free access to three types of public goods; i.e., water, pasture, and fire (Caponera, 1992). The prophet stated as cited by Zuhaily (1989):

“People are partners in three resources: water, pasture, and fire” (Ibn Majah after Ibn Abbas)

In conclusion, in a globalized world, there is a concern that natural resources will be commercialized and local people will suffer alienation from their land and culture. In today's economic model the institutions of money rule the world. This implies that inevitably, the interests of firm and financial institutions will take precedence over the interests of local people. The following section intends to outline some key conditions for the revival of HIMA which include a focus on knowledge synthesis, community of practice (reflective practitioners), investment in research and development (R&D), and implementing pilot projects.

In order to revive the HIMA system in the Middle East, it is imperative to embody the key principles of justice, human rights, and ecological sustainability along with adaptive management and community-based natural resource management. Four conditions are to be purposefully met to revive HIMA in the Middle East. These include the ability to assimilate and synthesize knowledge about HIMA; the formation of a community of practice (*Ummah*) of reflective practitioners and knowledge navigators who can de-construct and re-construct a new paradigm for HIMA in the 21st century; R&D using action learning; and implementing pilot projects based on HIMA concepts. The afore mentioned four requirements represent the value chain for co-creation of new knowledge about new models of community-based natural resource management inspired from culture.

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A Process to Establish Traditional HIMAs as Community Conserved Areas: Essential Skills Required

Presentation in the Session II: Developing Implementation Framework – How to Implement HIMA with Reference to Current Practices?

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Abstract

As an outstanding conservation practice indigenous to the Arabian Peninsula and neighboring regions, traditional HIMAs merit legal recognition as community-conserved areas (CCAs); without such legal recognition, they are in danger of vanishing within a

generation. An effective and equitable process for proclamation of traditional HIMAs as CCAs require a rapid survey of HIMAs that remain intact or nearly so, with sound criteria to identify those most suitable as pilot sites for proclamation. It then requires the setting up of equitable representative governance and management structures with agreed procedures for decision making and resolution of disputes. Equitable governance requires that all constituencies of local communities be enabled to participate in the conservation of these areas, and this in turn, will require capacity building to enhance their skills and competencies. Crucial skills for gathering information, assessment, monitoring, and evaluation include rapid rural appraisal, participatory rural appraisal, and stakeholder analysis; essential skills for conflict resolution include facilitation, principled negotiation, and community mediation.

Keywords: HIMA, community-conserved areas, traditional conservation practices, participatory management, rapid rural appraisal, participatory rural appraisal, stakeholder analysis, conflict resolution, facilitation, principled negotiation, community mediation.

Introduction

This paper grew out of a proposal to make proclaim some of the few traditional *HIMAs* remaining in Saudi Arabia as community conserved areas (CCAs). CCAs are one of two forms of community participation in protected area management; the other being co-managed protected areas. They are defined by International Union for Conservation of Nature (IUCN) as “natural and/or modified ecosystems containing significant biodiversity values, ecological services and cultural values, voluntarily conserved by indigenous peoples and local communities, both sedentary and mobile, through customary laws or other effective means” (IUCN, 2011).

The Need to Establish Traditional HIMAs as CCAs

As a signatory to the Convention on Biological Diversity, Saudi Arabia is committed to community-based conservation to empower local communities and to preserve indigenous knowledge and indigenous / traditional conservation practices. The Kingdom’s official policy is to promote community participation in protected area management, and actions are gradually being taken toward co-management of some protected areas, but as of 2012, no

community-conserved areas have yet been recognized by law. However, Arabia is the birthplace of one of the greatest heritages of community-conserved areas on earth: the traditional HIMA. The HIMA is the most widespread indigenous / traditional protected area institution in the Middle East. It is enshrined in Islamic law and has been practiced in Arabia for more than 1,400 years. The management regimes and conservation values of traditional HIMAs have been described by a succession of researchers (Grainger and Llewellyn, 1994; Llewellyn, 2003). In recent decades however, under the nationalization of rural lands, rapid population increase, and mechanization of agriculture, they have declined dramatically from an estimated 3,000 in the 1960s to a few dozen today, of which only a few are managed actively. Traditional HIMAs clearly merit legal recognition as community-conserved areas; without such legal recognition, they are in danger of vanishing from Saudi Arabia-and perhaps from the earth -within a generation.

The Ministry of Agriculture is the agency that holds the primary responsibility for traditional HIMAs in Saudi Arabia. It has converted two of the most prominent traditional HIMAs, HIMA Saysad near the city of At-Ta'if and HIMA Huraymila' north of Riyadh, into national parks. In so doing, however, it has cut them off from the local community management that had been their distinguishing feature as traditional HIMAs. Hence, the proposed project was aimed at to revive traditional HIMAs remaining in Saudi Arabia, such as those illustrated in Fig. 1-3, as CCAs under their local community management.

The nationalization of Saudi Arabia's rangelands has led inadvertently to the tragedy of open access, usually but less accurately described as the tragedy of the commons. When everybody has equal access to natural resources and the rights to use them are not linked to accountability for maintaining them in good condition, nobody has an incentive to conserve them for future generations. Saudi Arabia's rangelands are now among the most overgrazed on earth, largely as a result of the failure of individual responsibility, as in the often told tale:

An important job had to be done and everybody was sure that somebody would do it. Anybody could have done it, but nobody did it. Somebody got angry about that because it was everybody's job. Everybody thought that anybody could do it, but nobody realized that everybody wouldn't do it. It ended up that everybody blamed somebody when nobody did what anybody could have done.

This paper is aimed at to identify some measures to increase the likelihood that any HIMAs proclaimed as CCAs will be successful. Most of these requirements revolve around

good governance. Perhaps the most important aspects of good governance with regard to traditional HIMAs will be provisions to ensure that they do not lead to inequities or tribal conflicts. These provisions include representation of local people across the divides of power, ethnicity, lineage, gender, and age, as well as transparent processes for resolving conflicts of interest, disagreements, and disputes. Other essential provisions include a comprehensive capacity building program for the managers of HIMAs, as well as effective governance, management plans, and law enforcement that will enable HIMAs to meet the IUCN criteria for protected areas (Kilani et al., 2007). All these are likely to require negotiation and sometimes mediation between the local communities and the relevant conservation authorities.

The Proclamation Process

An effective and equitable process for proclamation of traditional HIMAs as community conserved areas will require several steps, beginning with a rapid survey of HIMAs that remain intact or nearly so, with sound criteria to identify those that are most suitable as pilot sites to be proclaimed. Once the pilot CCAs are selected, it will be necessary to initiate ongoing participatory rural appraisals to monitor the sites. It will then require the setting up of equitable representative governance and management structures with agreed procedures for decision making and resolution of disputes. Equitable governance requires that all constituencies of local communities be enabled to participate in the conservation of these areas, and this, in turn, will require capacity building to enhance certain skills and competencies. Crucial skills for gathering information, assessment, monitoring, and evaluation include rapid rural appraisal, participatory rural appraisal, and stakeholder analysis; essential skills for conflict resolution include facilitation, principled negotiation, and community mediation.

Selecting Pilot Sites

It is probably not feasible in a country like Saudi Arabia, where caution is the rule in social and legal initiatives, to proclaim all the remaining traditional HIMAs as CCAs at the same time. It is certainly easier and more effective to begin with two or three pilot sites. After these pilot sites have been established, they can serve as models for the establishment of other traditional HIMAs as CCAs. The process of selection envisaged would begin with a survey of

potential pilot sites by a multidisciplinary survey team, e.g., an ethnographer or ethnobiologist, a historian, an ecologist, and an environmental planner with local elders, managers, and users of the site. This team would conduct a rapid rural appraisal of each potential pilot site, and select two or three pilot sites, based on the afore mentioned criteria. Comprehensive participatory rural appraisals would then be conducted on the selected pilot sites.

Criteria for Selecting Pilot Sites. These should encompass both the inherent suitability of the site's natural factors and social factors such as support for its continuity as a HIMA and effectiveness of its management (Borrini-Feyerabend et al., 2004). Essential criteria include the following:

- Community support: desire by the local communities to maintain the HIMA and absence of serious conflicts between local communities or members of local communities.
- Intrinsic ecological value of the site: biodiversity values of the site, ecosystem services provided by the site, and the ecological integrity of the site.
- Effective management of the HIMA by local community: ecological, social, and economic benefits to local communities and effectiveness, legitimacy, and equity of the HIMA's management structure.
- Absence of conflicting plans from other agencies or communities.

Information-gathering Methods

The most essential information-gathering tools include rapid rural appraisal (RRA), participatory rural appraisal (PRA), and stakeholder analysis. Accurate information is an ethical imperative where the welfare of humans and other living beings is at stake, and qualitative methods like RRA, PRA, and stakeholder analysis help to understand complex situations in ways that quantitative information alone cannot (Schoonmaker-Freudenberger, 1999).

Rapid Rural Appraisal (RRA). is quick and cost-effective. It is typically conducted over a period of four days to three weeks by a multidisciplinary team of researchers in close collaboration with community members. It examines a set of issues defined by the study objectives, focuses on gathering information that is as rich and accurate as possible within the

limited period of time allotted, through semi-structured interviews with a diverse range of individuals and groups, including key informants and local experts, as well as the researchers' observations. It is typically documented in a report (Schoonmaker-Freudenberger, 1999).

Participatory Rural Appraisal (PRA). This is conducted by a team of community members with one or more facilitators, over a period of months or years. It involves not only gathering information but also its use by the community as it plans further activities. It focuses on the process of learning and planning, and involves the community in planning and decision making. This empowers members to influence and manage their own development, so that they are not dependent on the assessments, priorities, and values of benefactors. PRA methods and techniques are designed to be accessible to people who are not literate, so as to incorporate their knowledge and views. Such techniques include learning contracts, role reversals, and feedback sessions; transect walks, ranking, and social mapping; focus group discussions, semi-structured interviews, calendars, and historical recalls; and participatory mapping, Venn diagrams, matrix scoring, and timelines. A PRA is typically documented in a village log book and a community action plan (Schoonmaker-Freudenberger, 1999).

Triangulation. In an RRA or PRA, triangulation is essential to correct for researcher bias, informant bias, bias related to tools and techniques used, and bias related to the way the study is designed and implemented. Triangulation is best achieved by ensuring that there is sufficient diversity in the research team, the respondents, and the research methods: by having a team with a variety of disciplines, both genders, insiders and outsiders; seeking respondents of different genders, ages, wealth, ethnicities, and livelihoods; and using a range of tools such as participant observation, interviews of individuals and focus groups, mapping, transect walks, calendars, matrices, diagrams, and problem trees. It is also essential to monitor biases, assess them periodically, and correct for them as they are discovered (Schoonmaker-Freudenberger, 1999).

Participatory Rural Appraisal of Selected Pilot Sites. Participatory Monitoring of community conserved areas should aim to answer the questions (Borrini-Feyerabend et al., 2004) as follows:

- Is the community in control of governance and management of the CCA?
- Is the CCA helping to conserve ecosystems, species, and environmental services?

- Is the CCA improving the community’s social and economic situation?
- Are cultural and other values of the community being enhanced by the CCA?
- Are the less privileged sectors of the community adequately involved in decision making about the CCA and benefiting from it? Are inequities being reduced?

Stakeholder Analysis of Pilot CCAs. The aims of stakeholder analysis (Table 1) are to identify the key stakeholders and their interests (positive or negative) in the site and to link the key stakeholders to specific threat and opportunity factors (Golder and Gawler, 2005). Some of the key questions to be answered in the course of stakeholder analysis for CCAs are the following:

- Who is most dependent on the resources at stake? Is this a matter of livelihood or economic advantage? Are these resources replaceable by other resources?
- Who possesses claims – including legal jurisdiction and customary use – over the resources at stake?
- Who is responsible for decisions on issues important to this CCA?
- Who holds positions of responsibility in interested organizations?
- Who is influential in this CCA?
- Who will be affected by this CCA?
- Who will promote/support this CCA, provided that they are involved?
- Who will obstruct/hinder this CCA if they are not involved?
- Who has been involved in this area in the past?
- Who has not been involved up to now, but should have been?

Table 1. Provisional Stakeholder Analysis for a Hypothetical Traditional HIMA in Saudi Arabia.

Stakeholders	Stake / Mandate	Potential Role in Project	Marginalized?	Key
Local Community (adult male)	Sustainable development: Harvesting fodder? Grazing livestock? Honey production? Hunting? Strategic seed bank? Recreation?	Manage the CCA: Maintain the ecosystem, habitat, plant communities, wild animal populations (e.g., ibex), manage livestock	Possibly (Any ethnic or tribal groups marginalized?)	Yes
Local Community (adult female)	Sustainable development: Harvesting fodder? Grazing	Manage the CCA: Maintain the ecosystem, habitat,	Likely	Yes

	livestock? Strategic seed bank? Education and recreation?	plant communities, harvest fodder; education and awareness		
Local Community (children, youth)	Education, recreation	Education, awareness, and recreational activities	Likely	Yes
Saudi Wildlife Authority	Conserve biodiversity, plant communities, wild animal populations (e.g., ibex), Strategic seed bank	Technical support Training in biodiversity conservation, scientific surveys and land management	No	Yes
Ministry of Agriculture	Sustainable use of woodland & range resources; Strategic seed bank	Technical support Training in range mgmt., Extension services	No	Yes
Regional Emirate	Avert frictions and conflicts	Law enforcement	No	Yes
Ministry of Education	Environmental education	Education of local Scouts and schoolchildren on the site	No	May be
Saudi Commission for Tourism & Antiquities	Tourism & recreation	Ecotourism and nature-based recreation	No	May be

Institutional Structure for Community Conserved Areas

Without effective institutional arrangements, CCAs are unlikely to be sustained over long periods of time. The first requirement in this regard is to devise a legal instrument for recognition of traditional HIMAs as CCAs. The next step is for each CCA to constitute a board of management or other managerial structure that ensures that all significant interests are represented.

It is essential that the local communities choose their own representatives (although there have been situations in which the local communities have been unable to come to agreement in choosing representatives; in such cases, the local administrative authorities could assist them, but the conservation authorities should not do so). It will then be necessary to agree on rules for decision making and conflict resolution that are transparent, equitable, fair, and impartial across the divides of power, gender, ethnicity and tribal lineage. Finally, it

will be necessary to agree on the means and the process by which the decisions taken are implemented (Lewis, 1996).

Case Study: Waza Biosphere Reserve, Far North Province, Cameroon. Waza National Park became the core area of a Biosphere Reserve in 1979. In accordance with the guidelines for Biosphere Reserves, an equitable process and structure for management of a buffer zone had to be devised. This led to the first major collaborative protected area management scheme in the central / West African Sahel (Scholte, 2005).

A Consultative / Management Committee were established in 1998; while its role is consultative for Waza National Park, it manages the surrounding peripheral zone. Although this multi-stakeholder management structure was set up for a co-managed protected area rather than a CCA, the process for equitable selection of community representatives and division between voting and nonvoting members is also instructive for and applicable to CCAs. The local communities of Mousgoum farmers and fisherfolk, Kotoko fisherfolk, and Shuwa Arab, and Fallatah pastoralists elect 15 voting members: one man and one woman to represent the settled communities in each of four sub-zones into which the peripheral zone is subdivided (except for the southern zone, represented by two men and two women, because it has more villages), as well as male and female representatives from the nomadic and semi-nomadic cattle owners and the youth. The Ministry of Environment and Forests, its Provincial Delegation, and the National Park select eight voting members. The traditional chiefs of nearby villages, mayors of nearby towns, and representatives of local administrative, scientific, and Non Government Organization (NGO) bodies sit on the Committee, but do not have voting rights. There are six executive posts. Three are reserved for representatives of the National Park and three for representatives of the local communities. The President is chosen from among the community representatives; the Vice President is from the National Park (Saleh Adam, personal communication, 3-4 August, 2001; Borrini-Feyerabend et al., 2004; Scholte, 2005).

The Consultative / Management Committee was originally conceived to be for the buffer zone of the Biosphere Reserve, but significantly, the local communities rejected the proposal that their lands be part of the protected area, and insisted that it be made a peripheral zone outside it, because this gave them greater autonomy. The park authorities were apprehensive that events were not proceeding according to the plan, but this is, after all, what collaborative management means. The local communities were empowered to assert their

will, just as were the designated authorities, and the process of give and take has resulted in solutions that all the parties of stakeholders can live with.

Preparing the CCA Management Plan

As with any protected area management plan, stakeholders should begin by formulating values and a common vision for the CCA, and agree on goals. People with very different interests and uses of the land may be surprised at how easily they can agree on a common vision, the values of the site, and ultimate goals for it. As is often observed, the devil is in the details. In resolving issues over which they differ, stakeholders ought to begin with small issues that are easily settled, to help the parties develop a sense of trust in the process and in each other (Lewis, 1996).

After deciding the management objectives and formulating management policies, the major stakeholders should draft the management plan. It makes good sense for the protected area manager to have a leading role in drafting the management plan, because it will in essence be the set of formal instructions that he or she will be responsible to follow in managing the site. Once drafted, the management plan should be reviewed with all stakeholders and the public, and then put in its final form. It is essential to ensure that by the end of this process, the management plan is legally ratified (Lewis, 1996).

Conflicts in Protected Areas

The commitment to empower people entails recognition of the fact that they will not always agree, either with one another, or with governmental conservation authorities. Disagreements and conflicts can arise over the distribution of the costs and benefits of conservation. Protected areas, including HIMAs, are to be established for the common good of the country, humanity, and all created beings. Even so, the local people who are most affected by protected areas, and who bear most of the costs, merit special consideration. Conflicts are more likely to arise where local stakeholders are not involved in the planning, management, and decision making. Conflicts represent the competing interests and values of an area's stakeholders. Conflicts between stakeholders are normal and are not necessarily bad. They can be opportunities to identify and solve problems. However, conflicts can become destructive and break down relationships. The challenge is to avert and resolve

conflicts so that both human well-being and the natural environment are protected (Lewis, 1996).

Principles of Conflict Resolution

A good conflict resolution process is one in which the stakeholders learn to understand and respect each other's needs, develop a range of alternatives to address those needs, and reach a mutually agreeable solution. It enables parties to resolve their differences and secure their needs, in a manner that is fair, equitable, impartial, transparent, and effective. It is a process in which the parties focus on interests, not positions, and strive to satisfy all interests (a win-win outcome). It involves all significantly affected stakeholders in a fair, respectful process – including those who have been marginalized or excluded in the past. If the approaches that work for powerful groups do not work for less powerful groups, possible means should be looked into to reach these people and enhance their capacity to participate (Lewis, 1996). Conflict resolution tools include facilitation, principled negotiation, and community mediation.

A Framework for Resolving Conflicts

An equitable and effective framework for resolving conflicts must involve all affected stakeholders. Conflict resolution may take place through forums, advisory groups, management committees, or other arrangements. It makes use of facilitation, negotiation as needed, and mediation if necessary, and turns to adjudication only as a last resort. A verbal agreement does not mark the end of the conflict resolution process. It is necessary to document the agreement that has been reached, obtain the parties' commitment to implement it, then implement it, and after it is implemented, to evaluate the outcome (Lewis, 1996).

Facilitation. Facilitation, described in Schwartz (1994), is a process in which a neutral person helps a group work together more effectively. The facilitator must be familiar with group processes, communication, and conflict resolution skills, and must be accepted by the group as neutral, unbiased, constructive, and fair. The facilitator's job is to lead the group process; to help stakeholders improve the way they communicate, examine, and solve problems, and make collective decisions.

Facilitation brings out all points of view represented in the group and leads toward empowerment and consensus. Three core values guide the practice of facilitation rarely, valid information, free and informed choice, and internal commitment to those choices. To make an informed choice, people must have valid information. When people make free and informed decisions, they become internally committed to them. When people are committed to a decision, they are likely to make sure that the decision is implemented effectively (Schwartz, 1994).

Principled Negotiation. Principled negotiation, as described by Lyons (2007), is in its essence, to negotiate with integrity. This involves principles of justice, fairness, empathy, and reciprocity (Fisher et al., 1991; Lyons, 2007). Negotiators are instructed to do the following:

- See the larger picture,
- Use objective standards and criteria,
- Strive to understand and satisfy all parties' needs,
- Attack the problem, not the people, and
- Generate options for mutual gain.

Negotiators are instructed not to bargain over positions. Too often, stakeholders spend all their energy defending their positions rather than trying to understand the interests at stake and identifying and exploring a variety of positions that might satisfy those interests. Positions may not be related to the stakeholders' needs. Bargaining from positions can become a contest of will and can lock negotiators into defending their positions. Not achieving the stated position may be seen or feel like a failure or loss of face. Bargaining from positions can impede reaching agreement; it can lead to unwise agreements. It can be exhausting, confrontational and inefficient. It strains relationships and can break them (Fisher et al., 1991; Lyons, 2007; Lewis, 1996).

Mediation. If stakeholders are unable to resolve their differences through negotiation, they may resort to mediation. Mediation (Beer and Steif, 1997) is a process for resolving disputes, in which a neutral person helps the parties negotiate a settlement. Mediators are neutral parties who do not have a stake in the conflict and can understand the various interests. Mediators usually work in pairs, to divide tasks, give each other feedback, represent differences of race, tribe, gender, age, class, etc., and to model collaboration for the disputants. Mediation sessions are held in a neutral place, and typically last about two hours.

Principles of Mediation. Mediation is designed to enable individuals, organizations, and communities to handle their own conflicts. It provides a structure for parties to increase honest communication, air emotions, and solve problems. In contrast to adjudication, which is compulsory, participation in mediation is voluntary. The parties are free to raise all issues that matter to them. Expressing strong emotion is appropriate so long as it is not an attack. The parties, not the mediators, work out mutually acceptable solutions; they speak, think, and decide for themselves. Hence, the outcome is theirs. The goal of mediation is not only to solve the problem, but also to gain confidence and improve relations. Mediators strive to help each party arrive at a greater understanding of and empathy for the other party's points of view (Beer and Steif, 1997).

The mediation process, as described by Beer and Steif (1997) encompasses the sequence of activities as follows:

- **Opening Statement:** The mediators welcome the parties and explain what will happen.
- **Uninterrupted Time:** Each person has a turn to speak while everyone else listens.
- **The Exchange:** The disputants argue and discuss; the mediators listen for what matters to people and for possible areas of agreement, and help them get a clearer understanding of each others' interests and issues. Separate meetings can occur at any time during mediation, as needed.
- **Setting the Agenda:** The parties agree on an agenda of issues that need to be resolved.
- **Building the Agreement:** The parties work through each issue, testing alternatives to craft a workable solution.
- **Writing the Agreement and Closing:** If the parties have resolved their differences, the mediators write the agreement, everyone signs and takes a copy home; the mediators remind them of next steps.

Best Agreements

As described by Lyons (2007), the best agreements are those in which the interests of each party are satisfied as far as possible. The solution is the best possible one from among the options identified; the agreement is reached efficiently, it is possible and practical to implement it; and the agreement stands the test of time, and in which the relationship is managed in a positive and constructive way.

Conclusion

The process for proclamation of CCAs suggested in this paper involves site selection based on rapid rural appraisal, followed by participatory rural appraisal of the selected sites, stakeholder analysis, legal arrangements for recognition of traditional HIMAs, constitution of a management board for each *HIMA*, agreement on procedures for decision making and conflict resolution, and preparation and ratification of the management plan. This procedure is expected to lead to the desired outputs. These outputs are two or three functioning pilot CCAs that are legally constituted, with managers who are trained, and management plans that are approved and implemented. The expected outcome however is broader in scope and higher in aim i.e. functioning traditional HIMAs that are formally recognized as CCAs, that meet the IUCN criteria for protected areas, and serve as models for additional CCAs in Saudi Arabia and the surrounding region.



It is one of the best managed HIMAs in Saudi Arabia. The women used to harvest forage by hand in times of drought, cutting fodder in designated portions of the HIMA on a rotational basis. Now, camels are allowed to graze, and beehives are placed at the edge of the HIMA. Local people are eligible to use it, without regard to lineage.

Plate 1. HIMA al-Fawqa', 1.5 km² in area, lies southeast of Baljurashi, in the 'Asir Region.



The stone boundary wall was built in 1980s, every Thursday over three years, by some 600 local volunteers. It is patrolled on a voluntary basis; the access track is in a poor state of repair, which serves to protect the site by keeping it relatively inaccessible, but makes the HIMA hard to monitor.

Plate 2. HIMA al-Azahirah lies east of Baljurashi in Al-Bahah Region, and is some 7 km² in area.



For over 200 years the Bili tribe has managed it as a reserve for ibex. The local community has recently fenced off the wadi that provides access to the mountain, and denied to themselves the grazing of their livestock on it. The mountain vegetation is in excellent condition, in contrast to that of the surrounding plains.

Plate 3. Jabal Ral lies southeast of Al-Wajh in Tabuk Region, and is 69 km² in area.

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Community-Based Rangeland Rehabilitation Project (CBRR) Royal Botanic Garden, Tell Ar- Rumman, Jordan - Case Study

Presentation in Session III: Bridging the Gap between Traditional HIMA System and Global HIMA Initiative

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Abstract

The Community-Based Rangeland Rehabilitation (CBRR) project began in 2007 with the goal of relieving grazing pressure on the Royal Botanic Garden (RBG) of Jordan, by developing grazing protocols that maximize the biodiversity of a given range and the productivity of animals grazing on it. The project was first focused on five families committed to improving the land and their livelihood, and by 2012, was expanded to include 38 local families.

The CBRR project has several components such as grazing management, community education and awareness, increased forage production, and alternative income projects. The main obstacles faced were a lack responsibility taken by pastoralists, poor water harvesting techniques, poor herd health, and low economic status of families in the area.

The CBRR organized community meetings and classes to provide locals with a greater awareness and understanding of the issues and give them tools to combat overgrazing, poverty and herd illness. Managed grazing has been able to rapidly rehabilitate the land in and around the RBG. The implementation of alternative income projects is now giving families a better livelihood and will continue to help more families as the project grows.

Experience to date suggests that an expansion of activities using the same community-driven methodology is possible, with great potential for replication in other areas of Jordan. The next step is to undertake a more formal analysis of the results so that a statistically valid assessment can monitor feasibility over the coming years.

Keywords: Livestock, pastoralism, rangeland, herd management, community-based

Introduction

The Royal Botanic Garden of Jordan (RBG) is located at Tell Ar-Rumman, Jordan on the north-facing slopes of the King Talal Dam and reservoir. The RBG's mission is to conserve native biodiversity at the habitat level, establish a center for scientific research and environmental education, serve as a demonstration site for sustainable development, and provide a unique ecotourism destination. Its vision is to be internationally recognized as the leader in research on aridland ecosystems and the challenges associated with desertification. The RBG is spearheading research on Jordan's native habitats and interpreting research into practical, accessible tools to improve the quality of life for Jordanians and the region.

The RBG's Community-Based Rangeland Rehabilitation (CBRR) project was conceived in 2007 as a means by which to relieve grazing pressure on the RBG site. Livestock owners who had habitually grazed the site before the establishment of the RBG were offered forage replacement in exchange for removal of grazing while vegetation surveys and biomass estimates were being conducted, and sustainable stocking rates and grazing scenarios were being developed. Since 2009, the livestock owners who once grazed the site down to bare earth had been policing themselves and others to protect the benefits they are reaping from the CBRR project and the rapidly reviving ecosystem.

Jordan is host to some of the earliest known evidences of the domestication of sheep and goats, some 10,000 years ago. As well as constituting a deep cultural tradition, pastoralism has had an indelible impact on the environment and has continued to do so. Jordan's plant species have grown and been adopted over the course of ten millennia alongside this deep pastoral tradition. It is well-documented in other parts of the world that removing grazing from a landscape which has traditionally been grazed (but not *overgrazed*) often has a negative impact on species diversity. With this in mind, the RBG began developing a long-term sustainable grazing strategy in conjunction with local herders, to help the pastoralists survive current economic challenges while allowing grazing on the RBG site in an appropriate manner.

The five families living adjacent to the RBG, who had been grazed their herds on and around the site for generations, “lost” 180 ha of range when the site was fenced. Meanwhile subsidies were removed from fodder and the prices of fuel and fodder soared, even as alternative grazing sites shrunk steadily due to urban sprawl and environmental pressures on the range. Throughout Jordan and the region, this scenario was the same, and the resulting

pressure on herders led to severe overgrazing of the shrinking rangelands. Where once free range grazing supplied the 25% margin of profit which made herding feasible, its depletion began to drive herders out of business. After the third consecutive winter with low precipitation (2005-2008), many pastoralists were forced to sell their herds and had turned to other means of income.

From the outset (2008), the RBG involved the community in its project design. It is widely understood that one of the biggest problems in enlisting community involvement to confront overgrazing is that few pastoralists in Jordan believe that their livestock is the cause of the problem (Al-Sirhan, 1998, Blench and Sommer 1999, Al-Tabini 2008). The feasibility of introducing improved land utilization practices depends on the knowledge of the livestock herders and their attitudes toward changing aspects of their methods of pastoralism. The RBG recognized that it was necessary to establish an efficient extension system to deliver the training necessary to improve herd management practices.

Project Objectives

The CBRR was thus created by the RBG with a twofold goal; to maximize both the available range and the RBG site's biodiversity and richness. While this may at first seem counter-intuitive, there is plentiful evidence that historically, grazed habitats adopt to and thrive under managed grazing.

The overarching goal of the CBRR is to develop grazing protocols in order to maximize both the biodiversity of a given range and the productivity of the animals grazing on it. Habitat-specific grazing protocols for the region are thus being established and published.

Long-term benefits have been achieved in the CBRR project through the following objectives are as follows:

- Educating the local pastoralists on the importance and implementation of grazing management,
- Demonstrating water harvesting and forage production techniques
- Demonstrating livestock system responses to both grazing management and production techniques,
- Improving the health of flocks around the RBG in order to increase the productivity per head,

- Providing different grazing scenarios for sheep and goats in the RBG site,
- Observing the browsing and grazing behavior of sheep and goats feeding on plants at the RBG, and
- On the basis of the information gathered, suggesting a sound management plan to allow for grazing within a sustainable system.

CBRR Beneficiaries

The ultimate beneficiary is the local community in Tell Ar-Rumman, which includes the families of pastoralists and the villagers, considered to be some of the poorest families in Jordan.

The new generation is being targeted through the CBRR community outreach program, which has conducted many educational workshops in collaboration with the local school. This has increased awareness about sustainable ecosystem management, and enhanced the flow of knowledge and adoption of the new model by the younger generations.

As news of the success of the program in Tell Ar-Rumman spreads, the CBRR is being approached by pastoralists in other parts of Jordan. The number of direct beneficiaries is therefore expected to increase soon throughout the country.

Other beneficiaries are researchers and research institutions working on conservation and biodiversity. Finally, policy makers in many ministries can benefit from the CBRR model and the results of the research, for use to modify the national strategy and legislation related to ecosystem and natural resource management.

Plan to Reach the Beneficiaries

The local community has been involved in the CBRR project from the beginning. Problems, possible solutions, alternative grazing scenarios and timing of grazing activities were discussed during the early public meetings with livestock owners and local community members in the area. Further meetings constituted herd assessments, introduction of the management plan and feed replacement scheme, as well as addressing project implementation. The community continues to participate in discussions related to site grazing and herd management.

Successful community-based grazing management demonstrations and training encourage local herders to cooperate in the development and implementation of tactics to better utilize rangeland areas. The key incentive for the herders is improved grazing management that will directly benefit their livestock and more importantly, their livelihood.

After several community meetings, the project team and the pastoralists decided that the areas that required action in order to achieve the objectives of the project constitute the following:

- Alternative income generating activities (such as organic livestock production, wool manufacturing, and beekeeping);
- Sustainable improvement of livestock production integrated with sustainable management of rangelands;
- Improved marketing channels;
- Subsidies for feed materials, especially wheat bran and barley; and
- Opening the RBG site for grazing and implementing the grazing plan designed by the RBG team.

Important CBRR Partners

The CBRR's partners are the following:

- The local village and pastoral community by which through farmer-to-farmer interaction, will help implement the CBRR model in other communities.
- Governmental ministries: The RBG and the CBRR work closely with the Government of Jordan, which allocated the land for the Garden, and in particular with the Ministry of Finance, Ministry of Agriculture, Forestry Department, National Center for Agricultural Research and Extension (NCARE), Ministry of Environment, Ministry of Water and Irrigation, Ministry of Education, and Jordan Dam Authority.
- NGOs and research institutes: The CBRR team works in close association with NCARE, the Royal Society for the Conservation of Nature (RSCN), and the Badia Center for Research and Development (BRDC), and other universities and research institutes.

Project Activities

Since January 2008, the RBG has been engaging a range scientist and a veterinarian to work alongside RBG botanists, landscapers, forestry personnel, and the local herding community to set up the project and research design. To date, the subsequent activities had been carried out.

Activities Related to Flora

- **Vegetation survey:** During the spring seasons of 2007-2008 and 2008-2009, 80% of the site was surveyed and documented in order to develop a baseline assessment of species diversity and richness, and to serve as a basis for long-term research design.
- **Research design for tracking long-term vegetation change:** With the assistance of botanists from the National Botanic Gardens of Ireland, Glasnevin, a research design for long-term vegetation tracking was developed and is still underway. The site has been mapped into 105 vegetation sectors, throughout which over 300 10x10 m observation quadrates were assigned randomly. These quadrates are inventoried annually for species diversity and richness, and the information is entered into a variety of databases for analysis of vegetation change. This allows the RBG to document the response of the habitats to managed grazing regimes, among other things.
- **Biomass:** As part of the baseline research for the CBRR project, biomass surveys were conducted at the RBG site during April and May for three consecutive years, 2008, 2009, and 2010. The goals of the surveys were to provide information about the biomass production on the site in order to calculate the site's carrying capacity, develop grazing management scenarios, and determine the effect of grazing on biomass production.

A method known as the "transect technique" (Bonham, 1989) was used in the study to estimate biomass productivity. The site was first divided into 11 sectors according to landscape and vegetation features. Within each sector, three study points were identified randomly, albeit, with attention to distributing study points evenly across each sector. Three quadrates were positioned along each 30-m transect at 10-m intervals, totaling nine quadrates per study point, for a total of 270 quadrates.

The biomass studies showed a marked improvement. The biomass of the RBG site increased from 42 tons in 2008 to 97 tons in 2010, as shown in Fig. 1.

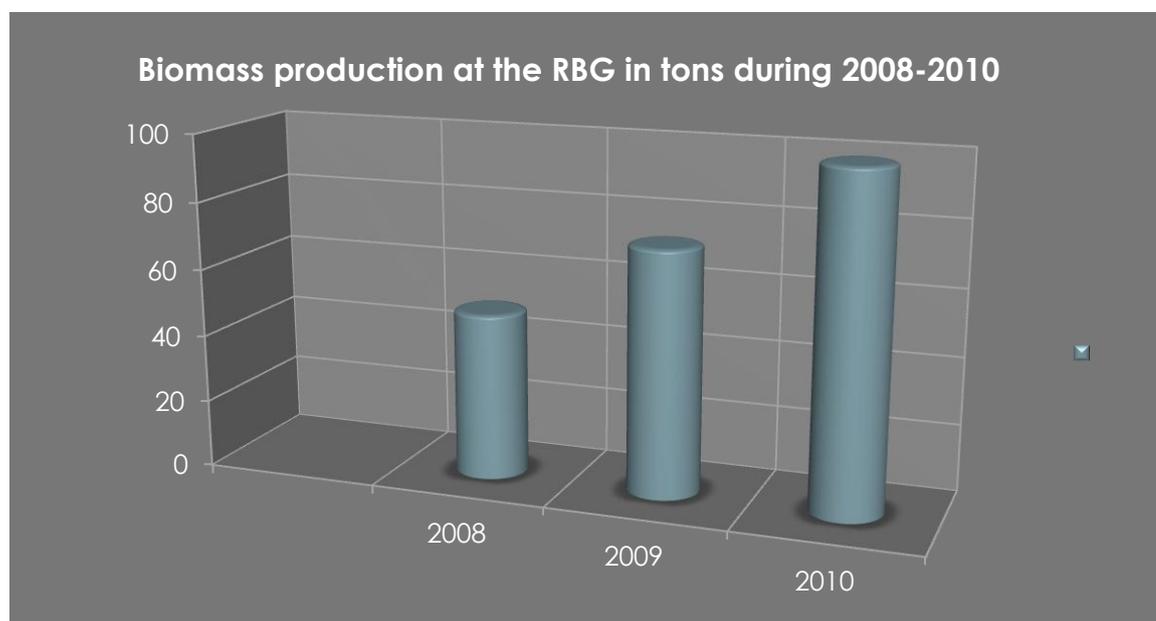


Fig. 1: Biomass production at the RBG, in tons from 2008 to 2010.

- **Carrying capacity:** After the vegetation survey was completed in spring 2008, the biomass study assessed the available forage potential of the site. Three hundred 1-m² plots were harvested, dried, and weighed. Based on the results, an estimated available forage and carrying capacity was calculated for the entire site. In 2008, the stocking rate was 1026 heads for 30 d. In 2009, it was 1162 heads for 40 d, and in 2010, it was 162 heads for 45 d.
- **Managed Site Grazing:** After managed grazing was started at the RBG site, a healthier, more diverse range of plants began to appear. When left unmanaged, open grasslands and woodlands are generally dominated by nonnative and/or invasive annual grasses and herbs. Such vegetation tends to inhibit the germination and growth of other plants by using up most of the available water and mineral resources in the soil and by producing large amounts of thatch. Managed livestock grazing controls the growth of nonnative grasses and herbs so that other desirable plants (wildflowers and native grasses) can regenerate and coexist with them. Many plants, including several endangered species, require grazing in order to maintain viable populations. Well-managed livestock grazing increases the diversity of habitats available to wildlife species. Many species, including several endangered species, benefit from the

vegetation management performed by livestock. Proper utilization of livestock grazing promotes healthier, diverse wildlife populations in parks and rangeland. The CBRR's studies on biomass and stocking rates have shown that it is possible, and desirable to allow managed grazing on the RBG site. Not only does managed grazing improve the biodiversity of the site, but also it is beneficial for the pastoralists, as it provides them with 50% of their feed invoice for free during the grazing period. The CBRR therefore allows the herders who had habitually grazed on the RBG site to once again have access, during late summer and early fall, for periods of time determined according to the biomass and stocking rate studies.

On pre-determined days, the herders are permitted to enter specified locations through RBG service gates. Each herd is allowed to graze for 2.5 h/d, which is enough for sheep to feel full in certain habitats, depending on the stocking rate of the habitat and herd size. After a determined period ends, the herds move to another habitat. The CBRR team supervises every day of managed grazing on the site and evaluates the vegetation and biomass of the grazed habitat. This win-win approach assists in improving the biodiversity and biomass productivity of the RBG site. The biomass increased nearly 30% per year during 2008-2011, and plant surveys found an increase in plant species from 436 to 580 in 2011.

Activities Related to Livestock

- Assessment of herd status: A veterinarian assesses the health of all of the livestock belonging to the stakeholder families, interviews the participants, observes herd management practices, and submits a set of recommendations to improve herd health and management.
- Herd management and health: The CBRR found that with a few simple flock management techniques, pastoralists can have better herds and higher revenue per head. For instance, ram isolation from the flock for one month before the breeding season could help create good breeding synchronization and a high percentage of pregnancies. As a result, the pregnancy rates in the top two flocks in the CBRR program rose to 97% and 80%, compared to 60% and 40% the previous year. Ram isolation could also result in lamb births grouped together within a shorter period of time, which in turn facilitates the management of newborns and the marketing of lambs and milk.

Other simple new herd management techniques introduced by the CBRR have optimized the pastoralists' operations and led to better overall productivity, fewer losses and higher profits. The CBRR's health program quickly provides low-cost, high-quality medication when animals get sick, while raising the participants' awareness of animal health and decreasing the misuse of medicine.

- **Animal Health Assistant training:** Two young local herders were trained by the veterinarian as para-veterinarians or animal health assistants (AHA), in order to respond in a timely way to emergencies, assist with vaccinations, and administer a range of common medications. The AHAs provide the main vaccines and treat common diseases (mastitis, respiratory infection, parasitic diseases, tick fever, and GI tract infections in newborns) in consultation with the veterinarian. In their first year of operation, the AHAs treated about 500 cases.
- **Vaccination program:** As part of the new management plan, a vaccination program was established and implemented with the assistance of the Ministry of Agriculture. The main vaccines made available are pox, brucellosis, Peste Des Petits Ruminants (PPR), Foot and Mouth Disease (FMD) and enterotoxemia. While the success of the vaccination program depends on the herders' cooperation and the availability of the vaccines, it enables safe and easy vaccination of animals all on one date, and prevents the misuse and mishandling of vaccines.
- **Forage replacement:** In order to remove the herds entirely from the RBG site during the vegetation survey period, the RBG contracted with the herders to supply them with supplementary feed to replace the approximated 25% of forage the range might have provided. This feed replacement program gave the RBG staff time to conduct a rigorous assessment of the available biomass onsite and develop a long-term plan.

Research and Studies

Local Knowledge (Livestock, Medicinal Plants and Rangeland Viability in Jordan's Badia, Through the Lens of Traditional and Local Knowledge (Tabini et al., 2012).

The CBRR's Local Knowledge study constituted investigating the traditional and local knowledge of Bedouin (Badu) communities in the dryland Badia region of the Hashemite Kingdom of Jordan with regard to livestock production, medicinal plant use, and rangeland management, and examining how such knowledge has changed over time. Badu customs

and practices from the last 50 years were compared with current realities, to get a clear picture of how modernization, social change and environmental factors have negatively affected the land, the people, livestock and plant biodiversity in the Badia. The findings indicated that the rangeland environment has become severely degraded; herd sizes have decreased; plant species are in danger and traditional Bedouin lifestyles have changed radically, due to unrelenting pressure on the land, water scarcity, manufactured livestock feed, government intervention, artificial borders and the abandonment of natural water harvesting and HIMA practices.

Economic Study (submitted for publication to Food and Agriculture Economics journal). The CBRR Economic Study examined the economic performance of five semi-nomadic small ruminant (SR) herders near the RBG, from 2008 to 2010. Their profitability was found to improve as a result of CBRR training and managed grazing on the RBG site. Results for subsequent years will be made public as the data analyses are compiled.

Since the decline in SR populations in Jordan is related to grazing conditions and rainfall factors, management decisions need to be closely monitored in order to maximize herd productivity. The low vegetation yield of overgrazed rangeland and the high cost of concentrated feed are major obstacles.

The study suggested that traditionally measured parameters such as lambing rates, cost per head and death rates, while found to affect net profits, are not enough to determine the best management practices in SR flocks. Herders should therefore strongly consider using profit analysis methods to determine and monitor the profitability of their flocks.

Grazing Behavior. The purpose of this study was to describe sheep foraging behaviors and use that information to develop grazing management procedures for Tell Ar-Rumman, so that forage resources at the RBG site can be sustainably utilized indefinitely and also serve as an effective demonstration and research center. Without a specific plan, unmanaged grazing at the RBG could have resulted in excessive use or grazing at inappropriate times, leading to a loss in forage and biomass production and potentially the established shrubs.

Twenty-five Awassi ewes were placed in 0.1- ha paddocks for 2.5 h a day for three consecutive days and were observed during each of the four seasons. The sheep were herded to and from the experimental paddocks in the morning and were fed 0.5 kg of barley in the evening. Virtually all grazing occurred in the experimental paddocks because areas where the sheep were housed contained very little forage ($< 40 \text{ kg} \cdot \text{ha}^{-1}$). The standing crop of

herbaceous vegetation in the study area averaged $165 \text{ kg} \cdot \text{ha}^{-1}$ and shrubs averaged $82 \text{ kg} \cdot \text{ha}^{-1}$. Sheep spent more time ($P < 0.05$) grazing than browsing, chewing, standing, or ruminating during all seasons. Sheep spent most of their time grazing during the first hour of grazing, and then the time spent grazing declined ($P < 0.05$), and the time standing and ruminating tended to increase near the end of the 2.5-h grazing period.

Under typical management in Jordan, where sheep are supplemented with barley, sheep clearly prefer herbaceous vegetation to shrubs. Rangeland restoration efforts in Jordan should therefore focus on the establishment of mixes of grasses, forbs and shrubs rather than monocultures of shrubs to meet the preferences of sheep.

Ethnobotanical Study of Medicinal Plants Commonly Used by Local Bedouins in the Badia Region of Jordan, submitted for publication to the Journal of Ethnopharmacology. As part of the bigger study on local knowledge, the CBRR conducted a small project on medicinal plants in Jordan's Badia in 2010 based on local and traditional knowledge, often in the context of traditional healing.

The target participants were livestock owners in the arid Jordanian Badia region. The objective of the study was to document traditional knowledge in using wild plants to treat health problems in order to conserve this valuable knowledge from loss; to identify the key plant species used; and to calculate the Informant Consensus Factor (ICF) for each category of health disorder, the Fidelity Level (FL%) and the Use Value (UV) of the plant species used by the Bedouin.

The data were collected by interviewing 80 participants of whom 21% were women. The participants were permanently interviewed and in a few focus groups. The team designed a questionnaire that helped in the data gathering, and also recorded the procedures used by the local communities on video.

A total of 47 plant species were found to be used by local Bedouins for medicinal purposes. The majority of these species are native to the study area, for example, *Artemisia judaica*, *Citrullus colocynthis*, *Ecballium elaterium* and *Rheum palaestinum*. The study showed that the plant species with the highest UV is *Artemisia herba-alba* and that *Ducrosia anethifolia* is a remarkable native plant species with a high FL% in curing dental pain. Moreover, the highest value of ICF was scored for dental disorders, followed by gastrointestinal disorders, and jaundice which may indicate the high incidental occurrences of these diseases and/or the lack of dental care services in the rural areas. Further investigation should be carried out in Jordan on the pharmaceutical value and production practices of these

native medicinal plants that have very low water requirements in a country with extreme water shortages.

Alternative Income Projects

Honey Production. The CBRR introduced honey production as a way to help families diversify their income source. Two families were trained initially, but this number is expected to go up due to the use of a revolving fund. The first two families are expected to pay back the initial cost of implementation, which will then be used to invest in new families. The families were chosen based on low income levels and their desire to implement the project. One of the families has four hives and the other one has three. In addition, there are nine hives in the RBG that are used for training.

Jameed Production. A pilot project was also set up to produce *jameed*, or sun-dried yoghurt, since most of the local community has dairy livestock. Using community knowledge resulted to the improved quality of the products already being produced, provided training on good hygiene practices for handling milk, and added value through the use of sun dryers and better packaging.

Mushroom Project. The CBRR's newest project is based on mushroom research being conducted at the RBG. Two local families were trained on how to raise mushrooms at home, as an alternative means of income generation. The families being interested in the work, had good initial results growing oyster mushrooms. There are plans for them to start growing a tasty local mushroom variety to start in 2013.

Forage Production. In winter of 2010-2011, the CBRR took the initiative of establishing a model for community-based grazing management by planting appropriate forage shrubs at a selected location in the RBG site to demonstrate the cultivation of drought-resistant native forage feeds. That location was initially protected from grazing until the shrubs and perennial grasses got established and became able to tolerate various managed grazing scenarios. This protection also gave small, endangered trees an opportunity to grow to a sufficient height to be safe from grazing. About 200 dunums were planted with *Atriplex* and *Salsola* species, and water harvesting techniques were put into place. In 2012, 300 sheep were allowed to graze in this area for 10 d based on the biomass and stocking rates determined by the CBRR team.

Conclusion

- The CBRR project was started with five families and grew to include 38 families by 2012, all of whom are benefiting from the livestock, health and income-generating programs.
- The CBRR continues to improve the economic performance of participating herders through the application of vaccination and herd management programs leading to healthier flocks.
- Five families have benefited from the alternative income-producing *jameed*, honey and mushroom projects.
- The CBRR team published a paper on local knowledge in the Badia in 2012, and five other papers are on track for publication.
- Successful community-based grazing management training and demonstration are convincing local herders to cooperate more and more in the implementation of plans to better utilize rangeland areas and develop participatory approaches to natural resource management and community empowerment.

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Implementation of the Traditional HIMA Process at the Regional and Global Levels

Presentation in Session IV: Management of Natural Resources

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Introduction

It was through the Society of Protection of Nature in Lebanon (SPNL) that the HIMA process was heard for the first time. This innovative participatory approach is aimed at conservation of natural resources and especially of the small coastal wetlands in Lebanon. The adaptation of the traditional HIMA process experienced by SPNL, proved to be efficient mainly by reinforcing the acceptance of local communities for the ideas and goals of nature conservation.

The concept of HIMA is a common cultural heritage of all Arabs and by extension, familiar to other Muslim populations. From Morocco to Turkey, for the ten of the twenty seven countries members of the Mediterranean Wetlands Initiative (MedWet) HIMA seems to be more anchored in their cosmogony than the simple concept of protected areas or *Mahmiyat*. It is thus important here to explain the background of MedWet and its mission, in order to better analyze the possible implementation at the regional level of North Africa and the Middle East, and further at the global level.

Presentation of MedWet and its mission

MedWet is a coordination mechanism for wetland activities in the Mediterranean Basin, designed to involve all major stakeholders. It owes its origin to an international conference in February 1991 organized by the International Waterfowl and Wetlands Research Bureau (IWRB) (now Wetlands International) in Grado, Italy.

The MedWet Initiative was established to support the Mediterranean region in its implementation of conservation and wise use of wetlands within the framework presented by the Ramsar Convention and the decisions of the Convention's Conference of the Contracting Parties (COP) and its Standing Committee. The legitimacy and legal authority of the MedWet Initiative are provided by the Convention on Wetlands (Ramsar, Iran, 1971), on the basis of Resolutions VII.22 and VIII.30 and Decisions SC19-19 and SC25-31 of the Ramsar Standing Committee.

The MedWet Initiative is a long-term collaborative effort between Mediterranean countries and entities. It includes representatives of 27 Mediterranean governments, the Palestinian Authority, the European Commission, intergovernmental conventions and UN agencies [(Barcelona/United Nation Environment Program (UNEP); Council of Europe/Bern; Ramsar; United Nation Development Program (UNDP)], non-governmental organizations [(BirdLife International, International Union for Conservation of Nature (IUCN), Wetlands International, World Wildlife Fund (WWF) International)] and the wetland centers Greek Biotope/Wetland Centre (EKBY), Station Biologique de la Tour du Valat in France, Centro Español de Humedales (CEHUM) in Spain, and the Centro de Zonas Húmidas, Instituto de Conservação da Natureza (ICN) in Portugal.

This endogenous mechanism based on voluntary participation, mutual trust and mutual benefit, has to foster synergies with all institutions dealing with conservation and wise use of wetlands in the Mediterranean basin. Its mission is

To ensure and support the effective conservation of wetlands and the wise use of their resources, values and services, through local, national, regional and international collaboration and implementation of activities in the Mediterranean region, within the framework of the Ramsar Convention (Ramsar convention, 2013)

The HIMA Can Play a Role in the Strategic Vision of MedWet

The Mediterranean Wetland Committee recognizes the close interdependence between man and wetlands, as well as the wide range of services and assets provided to people by these ecosystems. MedWet/Com is convinced that only concerted action on the part of all sectors of society, from the international to the local level, will enable achievement of the MedWet mission, and the benefits of wetlands to be secured for the present and future generations. MedWet's long-term vision is that:

All the wetlands and water resources of the Mediterranean are managed actively and effectively in the long term and restored in order to sustain and enhance all the services and values that they may provide, for the benefit of biodiversity and for human well-being.

The HIMA process can greatly participate to reinforce the main axes of the strategic vision including the following:

- the role of wetlands for the sustainable management of water resources at the river basin scale, in a context of water scarcity, focusing on key hydrological functions (drought and flood control, groundwater recharge, water purification);
- the relevance of wetlands to preserve biodiversity and natural habitats;
- the role of wetlands in supporting ecosystem services contributing to sustainable development activities (agriculture, grazing, fisheries, tourism);
- the need for an integrated ecosystem-based approach for the management of wetlands;
- the likely impacts of climate change on wetlands over the next century;
- the promotion of participatory processes (involving local stakeholders) as a component of sustainable use of wetlands; and
- the need to develop partnerships with other international and regional agreements of relevance to wetlands.

The HIMA Integrated in the Ramsar/MedWet Cultural Network

MedWet has been playing since 2001 a significant role in the acceptance by the Ramsar Convention to incorporate the cultural aspects of wetlands in its activities. These efforts took concrete form through the Conference of the Parties (COP) Resolutions¹ VIII.19 and IX.21. Ramsar established in 2005 the Ramsar Culture Working Group (CWG) and in 2008 issued 'Culture and wetlands: A Ramsar guidance document'², which was presented during a side event on the same theme at COP10 in Changwon, Korea (Ramsar Changwon, 2008).

¹ Resolution VIII.19 'Guiding principles for taking into account the cultural values of wetlands for the effective management of sites' and IX.21 'Taking into account the cultural values of wetlands'.

² Available in English, French and Spanish, the publication was supported financially by the MAVA Foundation and technically by Med-INA.

The interest of MedWet in the cultural aspects of wetlands started in the late 1990s, mainly due to the initiatives of one of its Wetlands Center: the SEHUMED³. In 2002 in Valencia, during COP8, SEHUMED organised an exhibition on the cultural values of wetlands and issued a book on this theme. In 2003, the MedWet Culture Working Group was established with the following members:

- Ramsar Secretariat, Gland, Switzerland
- MedWet Coordination Unit, Athens, Greece
- SEHUMED (*Sede Para el Estudio de los Humedales Mediterráneos*) Valencia, Spain
- Med-INA (Mediterranean Institute for Nature and Anthropos), Athens, Greece.

In 2004, a side event on this theme was organized during MedWet/Com6 in Tipaza, Algeria, during which a draft Ramsar resolution on culture was presented by SEHUMED and was discussed. In November 2005, MedWet was requested to organize a technical session on culture and wetlands during Ramsar COP9 held in Kampala, Uganda. SEHUMED presented an exhibition on this theme; while Med-INA produced a publication and distributed a CD-ROM on 'Action for Culture in Mediterranean Wetlands'.

As indicated briefly, activities on culture are continuing in the Mediterranean Region and have started attracting a growing interest among Ramsar Contracting Parties. MedWet however, has to reinforce the MedWet Culture Network, and the HIMA approach can help to re-enter into this field and plays in the future a leading and catalytic role. The main reasons for this are the following:

- The Mediterranean, inhabited since millennia, still maintains a very strong cultural heritage related to its wetlands and to water resources.
- The HIMA should be reactivated in the frame of the intangible heritage including the traditional knowledge, the spirituality and belief systems and as part of governance system of management.
- Two organizations that work consistently in this field (CEHUM in Spain and Med-INA in Greece) have strong links with MedWet and can provide significant support.
- Cooperation can be established with the Kuwait Institute for Scientific Research (KISR) in order to promote the HIMA revival process covering all of the Maghreb and Machrek countries.

³ SEHUMED has been changed into *Centro Español de Humedales* (CEHUM) in 2010.

The main objectives of the MedWet Culture Network are focused in the Mediterranean Region with a special interest for the neighbouring Black Sea and the South West Asia Region on the areas as follows:

- Strengthening the interest of experts, decision-makers and the public in the cultural values of wetlands.
- Promoting the preservation of culture related to wetlands.
- Promoting the protection of wetlands through culture.
- Catalysing activities for the incorporation of cultural aspects in the management of wetlands.
- Promoting the HIMA as community based management approach.
- Assisting in the implementation of Ramsar guidance and initiatives related to culture.
- Providing a means for exchange of information and experience among key actors in this field.
- Encouraging collaboration on joint activities among organisations, wetland sites and experts.

Potential Fields of influence of the HIMA approach

Water uses

Islam was born in a context of great water scarcity in the Arabian Peninsula, and this problem had spread to other arid and semiarid regions of the world. Water is considered vital and sacred; it is the central element of life in ecosystems and the common denominator of all species. It can be examined in terms of the Quran's prescriptions, religious practice, the Islamic Canonic Law (Shariaa) and finally in terms of its impact on society.

The HIMA approach can be used efficiently to deal with this prominent role of water. Key element of the wetlands flooding periodically or permanently, it is a resource that man has always found innovative ways to use for their benefit, for irrigation, navigation, and household including drinking. The varied characteristics of the Mediterranean wetlands (climate, local, and geo-morphology) had necessitated different approaches to garner and use water creating unique technologies and landscapes. In humid regions, the wetlands have been sculptured to create exceptional agricultural landscapes (agricultural canals, Neretva Delta, Croatia), while in arid zones, underground water has been harnessed to create intricate water channel system to bring water to settlements (the foggara system in the Western Sahara

oases). However, these traditional water use systems are under tremendous pressure from modern technologies and commercialization. The challenge today is to adopt the HIMA approach and consider the traditional knowledge and practices in developing contemporary techniques so that the use is sustainable and world preserve the wetlands.

Cultural Landscapes

Cultural landscapes are the product of continued interaction and organization of the natural landscape by human activities. Wetlands are an important cultural landscape in the Mediterranean, where, since the early civilizations, human beings have been trying to adopt, manage, and utilize the water and other wetland natural resources. They have adopted the land and constructed structures to create varied cultural landscapes in and around wetlands, which include Salinas, agricultural landscapes, water channel systems, etc. Traditionally, the human interventions have usually worked in harmony with nature, leading to a sustainable use of the available resources and resulting in unique landscapes defining the character and identity of the place or region. These local cultures, traditions, and wise use of the wetland resources could provide a concrete base to develop contemporary techniques for the conservation of wetlands.

Oases are characteristic of the southern Mediterranean and South West Asia regions, and they constitute a highly developed example of the meaning of the wise use of water. Effectively, they are often man-made wetlands, and provide a perfect example of the way in which religious teachings influence the way humans perceive, use, and manage the natural environment and its resources. In the arid lands where Islam first spread, strict water management was the only possibility for human survival, and so various techniques for this were developed. Although they are slightly different and go by different names in each country, these techniques are effectively based on the same concept.

Settlements/Structures

Rivers and other wetlands have been the genesis of human settlements since the earliest cities were founded all around the world, and the Mediterranean region is home to a wide variety of such towns along wetlands due to its diverse geo-morphological and climatic conditions. Water is an essential commodity for the development of human history, and thus, the wetlands have always played an important role in the establishment of the settlements and activities around them. Besides the settlements, there exist numerous buildings, structures and

water architecture such as the qanats and aqueducts that are important cultural elements and the manifestation of the intricate relationship between man and the wetlands. The settlements have also evolved through history adapting itself to the changing needs and human activities. However, the affiliation between the wetlands and the settlements has also endured pressures and disruptions resulting in neglect and destruction of one or both. Throughout history, the change or abandoning of traditional activities based on the natural resources of the wetlands, such as the shift from agriculture to other service-based industries, has affected the development of the towns and at the same time changed the boundaries and character of the wetlands (large- scale housing, resorts, infrastructure, etc.). This change in traditional activities is a major factor that influences and complicates the restoration of the wetlands and the preservation of the historic settlements while maintaining their historical association.

Traditional Knowledge

Traditional knowledge is developed by communities through their interaction with the natural environment; it is strongly influenced by values and beliefs and underlies many social practices and cultural traditions. Traditional knowledge and practices also lie at the heart of a community's culture and identity, as it is based on many generations of experience. For this reason, it is an invaluable heritage that has been and can continue to contribute to the wise use and management of wetlands. However, in most countries, local knowledge and management systems were viewed as an attribute of a poor and miserable way of life, and ignored and devalued by many stakeholders, governments, scientists, including the local people. In addition, most of the traditional knowledge is oral and at higher risk of being lost forever if not preserved on time. Modern way of life, depopulation of the countryside, technology and other factors pose a serious threat to traditional knowledge which may be lost forever if not recorded. A significant step to its conservation could be to consider whether this knowledge can be incorporated in contemporary technical approaches to wetland management.

Before the Second World War and the political separation, local people in Prespa (the catchment basin as a single geographical entity) lived in a subsistence economy and exploited the natural resources of the area extensively making use of the traditional knowledge passed down from one generation to another but generally not recorded. They employed technically rudimentary management practices, where family bonds and cooperation in social clusters were strong and essential, and formed a local governance system.

Consequently, traditional knowledge incorporated social, institutional, spiritual and cultural context, representing an entire way of life, preserving the wetland in a sustainable manner.

Spirituality and Belief Systems

Since antiquity, water has played an important spiritual role for the people in the Mediterranean, and many places related to water have long since been considered sacred. Baptism and blessing of the waters are religious rites that still exist in many parts of the region. In Islam, the conservation of natural resources, which includes wetlands, is a moral and ethical obligation, hence deeply rooted in religious and spiritual beliefs. Thus, these beliefs play an important role in maintaining the link between the local communities with the wetlands and can contribute significantly to the protection and promotion of wetland sites. In Evros Delta in Greece, on the eve of the yearly celebration of the Sotira chapel on the 5th of August, people from the surrounding villages would stay up all night, light fires and dance next to the chapel; while many of them dive in the shallow waters nearby.

Governance Systems

Water and land management systems, their governance and infrastructure in the Mediterranean have developed their own cultural context, which is under threat today due to new technologies and pressures of globalization. Human beings have adapted to the harsh climates of the deserts finding oases and managing the scarce water resources and harsh land conditions with optimal governance systems. These governance systems are more than the management of land and the water source, but constitute a complex hierarchy and social organization that is also based on cultural belief systems. They are also based on equitable access and conservation of this precious resource and guarantee its quality as well as maintenance of the system. However, the change in land use (increasing trends in monoculture), water (use of pumps for irrigation) and alternative forms of employment opportunities available for the younger generation (tourism, industries, etc.) are threatening the continuation and survival of these ancient systems.

The foggara system is administered by an assembly of co-owners, the djemaa, who decides on the maintenance and repairs that need to be carried out, resolves conflicts and approves sales, rental and sharing of water between owners. Although water is considered the property of the co-owners, the entire village has free access to it for domestic use, which is guaranteed at the main channel that crosses each village. In compensation, all villagers must

contribute to the maintenance of the foggara. Owners share the expenses of the restoration work and extension of the galleries needed periodically.

HIMA as Cultural Tool for Dialogue

HIMA is an ancient system of community-based protected areas that exists in the states of the Arabian Peninsula and certain other Arab and Islamic countries for more than 1500 years. It is a type of management system in which local stakeholders control the use of a community's common property in order to conserve water and vegetation in harsh environments. The HIMA, essentially an area set aside for conservation, has played a vital role in the struggle for survival in harsh environment with limited resources, by preserving such essential resources as forests, water, and grazing lands. In the past, there were thousands of HIMAS, but today only a handful remain, mainly as a result of rural de-population and settlement, changes in the rangeland use, and the recent centralization of protected area management systems.

The perspectives, principles, and laws of Islam relate very well to the concepts of modern ecology, and more specifically to the wise use of natural resources. The RAMSAR Convention on Wetlands requires its contracting party governments to promote the wise use of wetlands, a concept which implies that wetland conservation does not need to exclude the human element, but rather allows human use to be a positive factor in the sustainable management of wetlands. The concept's application is crucial to ensuring that wetlands can continue fully to deliver their vital role in supporting the maintenance of biological diversity and human well-being.

Furthermore, the RAMSAR Convention and the Mediterranean Wetlands Initiative value wetlands not only in terms of their role in conserving biological diversity, their hydrological significance and other physical functions, but also in terms of their cultural significance. Religion is part of the people's cultural heritage, and wetlands obviously feature this strongly in the southern Mediterranean. Moral conviction and ethical consciousness can motivate people to go beyond objectives driven by the short-term profit, and can lead them to make personal sacrifices for the common good. Hence, resource management systems that take into account the local religious context are likely to be more efficient than 'imported' ones.

At the same time, wetland users in Islamic countries are likely to be predisposed to accept and respect water and wetland conservation systems based on Islamic teachings, as

supported by the HIMA approach. In order to achieve these links between natural resources management and religious conviction, it is vital to promote the preservation of spiritual traditions related to wetlands, and to promote the protection of wetlands through culture and spirituality.

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Evidence for the Effectiveness of Faith-Based Land and Water Management as a Tool for Conservation

Presented in Session IV: Management of Natural Resources

Nigel Dudley and Liza Zogib

Abstract

Sacred natural sites, or lands and waters of religious significance, are common around the world and across virtually all faith groups; they often represent the last vestiges of natural ecosystems in heavily disturbed regions. A summary of evidence is here provided illustrating the important contribution of these sacred places to conservation goals. It is in this light that the Huma Integrated Management Approach (HIMA) (protection of environment and management of natural resources according to Islamic principles) currently being revived as a major conservation tool.

Introduction

The links between faith-based land management and conservation inherent in the HIMA approach is mirrored throughout the world by similar interrelationships between spiritual values and biodiversity conservation values. The following paper investigates some of the implications of this from a conservation perspective, focusing on those sites that are of particular importance to both faith and conservation, with a particular emphasis on *sacred natural sites* (fig. 1). We consider the motivations and history of such sites and then look at how effective they are at conserving wild nature. The core of the paper summarises a review of scientific literature relating to biodiversity values in sacred natural sites. Finally, we look at the implications of such findings for the development and restoration of the HIMA concept.

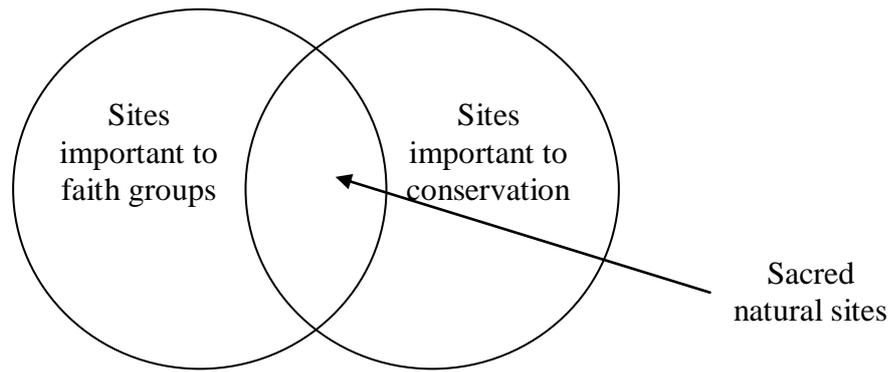


Fig. 1. The intersection between faiths and conservation management.

There have been numerous attempts to identify and delineate sites that are of particular importance to biodiversity and conservation (e.g., Olson and Dinerstein, 2002; Brooks et al, 2006). The world’s protected area network, currently consisting of over 160,000 recognized protected areas conserving 13 % of terrestrial areas and 1.6 % of marine ecosystems (Bertzky et al., 2012), provides one measure of conservation importance. Protected areas, defined by the International Union for Conservation of Nature (IUCN) as: “a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values” (Dudley et al., 2009) seek to preserve the most intact ecosystems and populations of wild species. However, many critical sites currently lie outside officially protected areas. Other attempts focus on various metrics including extinction risk (Parr et al., 2009), endemism (Stattersfield et al., 1998), biodiversity richness (Davies et al., 1994) and intactness (Mittermeier et al, 2003). While no complete global list of important biodiversity sites exists as yet, the understanding of places particularly important to biodiversity conservation is increasing all the time. IUCN is currently running a program to consolidate prioritization methods and data into one global information source.

Sites important to religious faith groups also have no global register, but exist in enormous numbers throughout the world. In this paper sacred natural sites (SNS) are the focus, defined by IUCN as “areas of land or water having special spiritual significance to peoples and communities” (Wild and McLeod, 2008). The precise relationship between spiritual values; and natural values varies among faiths; some religious philosophies identify certain natural areas as having particular spiritual values while others remain wary of such interpretations, because they fear it contains the seeds of idolatry. Here, the broadest

interpretation of sacred natural sites is to mean areas of land or water linked to one or more faith groups, because they are considered sacred, have links with particular holy figures, include pilgrimage sites, contain sacred buildings or relics, or are owned and managed by particular faith groups. Faiths also influence management of other areas of land or water through their teachings.

Links between faiths and nature

In 2006, a book about links between faith and protected areas in association with World Wildlife Fund (WWF) and the Alliance for Religion and Conservation (ARC) (Dudley et al, 2006). Clear evidence of use of sacred natural sites by the entire world's 14 so-called major religions and in most minor religions was found. The way in which such sites are viewed and managed changes between and within faith groups, but the basic link between faith and nature remains remarkably constant: sacred natural sites are found in virtually every country – rich and poor, large and small, and across cultures and faiths. Surprisingly, some sacred natural sites even survive changes in faith: replacement of one religion with another can take place while the site retains its sacred value (which also means that some sites have sacred values for several different faiths, simultaneously). Increasingly, as awareness of the importance and fragility of the natural world grows, faith groups are consciously including care of nature in places where they have influence (Palmer and Finlay, 2003).

Many sacred sites also exist within protected areas and these authors compiled information on a representative sample of over 100 sacred natural sites in protected areas – a tiny percentage of the total. In many countries, all protected areas contain one or more sites of sacred value to a proportion of the human population. Faiths have therefore been involved in some of the earliest forms of habitat protection in existence, both through the preservation of particular places and through religious-based control systems such as the HIMA system in Islam. Such areas are probably the oldest form of habitat protection on the planet and still form a large and mainly unrecognized network of sanctuaries around the world (Dudley et al, 2009).

However, sacred natural sites are far from a uniform land management prescription. Some sacred sites are completely sacrosanct and off limits to anyone (the tops of some sacred mountains for example); others are only accessible to a few people such as priests and pilgrims, or at certain times of the year; conversely, some are open, managed landscapes that also contain sacred values. On occasion, requirements of sacred values can even clash with

conservation values, for example, if a major pilgrimage site runs through an area of sensitive ecosystem. For this and other reasons, a number of conservation scientists have questioned the effectiveness of sacred natural sites as vehicles for conserving biodiversity arguing that their conservation benefits had been overstated.

Do Sacred Natural Sites Really Conserve Biodiversity?

To address these questions a survey of information was carried out on the conservation values of sacred natural sites focusing deliberately on information in peer-reviewed journals that would be convincing to scientists trained in a western tradition. Over 100 peer-reviewed papers were found relating to biodiversity conservation in sacred natural sites and these were used to carry out an assessment of conservation importance. The majority of the papers were in English, although journals in French, Spanish, and German were also considered. Most of the papers were from Asia and Africa, with the commonest studies being from India, Nepal, Tanzania, Benin, and Ghana. There are virtually no papers published in the languages surveyed on the conservation values of sacred natural sites in Latin America and the Caribbean, North America, Australia, or the Middle East although, all those areas contain SNS. India is the best surveyed country and sacred groves exist in 19 out of 28 states; it is estimated that there are between 100,000 and 150,000 SNS in the country, along with many sacred rivers, waterfalls, meadows, and individual trees (Subash Chandran and Hughes 2000; Bhagwat and Rutte 2006).

The results showed some clear benefits for conservation. Many sacred natural sites contain high levels of biodiversity including endemic species. Importantly, sacred natural sites can be the only remnants of natural or seminatural ecosystems in cultural landscapes, for example, in parts of Xishuangbanna, China, (Huijun et al., 2002) and in Coromandel-Cincar, southern India, the only remaining tropical dry evergreen forests occur in the sacred groves and temple forests (Parthasarathy and Karthikeyan, 1997). In Japan, the grounds of Shinto temples provide virtually the only sites of ancient lowland forests, sometimes deliberately preserved to provide building material for temples. In Hong Kong, feng shui woodlands form the only reference point for understanding the biogeography of some original ecosystems (Marafa, 2003) and preserving the species endemic to the island. The sacred forests of Burkina Faso are remnants of former deciduous dry forests that have otherwise now disappeared (Guinko, 1985). In a similar situation to Japan, in northern Ethiopia, remnants of

original forest are today largely restricted to churchyards and other sacred groves (Aerts et al., 2006).

Some SNS are dedicated to particular species. For example, the only surviving population of *Trionyx nigricans*, the freshwater turtle, is found in Bangladesh in a sacred pond dedicated to a Muslim saint (Kothari and Das, 1999). Similar examples exist for the deliberate protection of sacred species for crocodiles in Mali and cranes in Japan, among many others.

Protection is often more rigorously implemented than in official protected areas. As a result, levels of biodiversity in sacred natural sites can even be higher than in official protected areas. In India, comparison of fungi diversity in sacred groves and government forest reserves in the Western Ghats of India more diversity was found in sacred groves (Brown et al., 2006), and threatened tree species in sacred groves in Kodagu were more abundant than in a nearby forest reserve (Bhagwat et al., 2005). Davidar et al., (2007) found three times the density of plant species in sacred sites compared with other natural forests in Puducherry. In a survey in part of Orissa was found four species only recorded from the sacred groves (Deb et al., 1997). Similarly, a survey of sacred groves in Yunnan, China total plant species and endemic species were found higher than in a nature reserve (Liu et al., 2000). High diversity is also recorded from any sacred natural sites in Africa and for example, in Togo a survey of sacred forests 15 species new to science (Kokou et al., 2007) were found.

Some of these benefits also have important human values as well, such as by protecting important crop wild relatives, medicinal plants, and other valuable species. Sacredness in many cases goes hand in hand with practical uses, not to mention their often important sociocultural roles.

While sacred natural sites are often reported as preserving natural ecosystems, other SNS are rather unnatural but still contain important biodiversity. In Indonesia for example, small forest gardens called *Tembawang* function as both sacred burial sites and fruit gardens. In settled parts of west Kalimantan in Borneo, they are often the only seminatural habitat remaining. In fact, they have been carefully planted by local people, but over time have developed many of the characteristics of mature forests in terms of species structure and diversity (Marjokorpi and Ruokolainen, 2003).

However, research suggested that sacred natural sites also have some limitations as conservation tools. Many sacred natural sites are too small to maintain a full complement of

biodiversity. For instance, a study of 13 sacred forests in central Uganda found that the small size meant that they only contained a limited number of species (Gombya-Sembajjwe, 1998).

In addition, some sites undergo high levels of disturbance, one result of which was that although diversity often remains high, sacred natural sites may have a significantly altered population compared with natural ecosystems. Studies in Togo found that while species diversity remains high in sacred forest fragments, the original species composition has been altered, both through exchanges with surrounding vegetation and deliberate additions through human activities (Juhe-Beaulaton and Roussel, 2002). This tendency has also been reported from for example, India, Nepal, Ghana, and Ethiopia. Manipulation of biodiversity may be subtle, such as over-collection of a species or even planting and introduction of other species, particularly those that have medicinal or nutritional benefits.

Overall, the results of the survey suggested that while sacred natural sites in general provide useful and sometimes essential biodiversity conservation, these benefits are neither inevitable nor necessarily permanent. Increasingly, both conservationists and faith groups are recognizing the need for conscious management of such sites for their ecological values as well as their sacred values.

Some remaining challenges

Sacred sites of many shapes, sizes, habitats, and motivations therefore create a kind of shadow and often secret set of protected sites that sit alongside and sometimes overlap with official or private protected areas. An understanding of the number of sites and areas involved are still in a beginning stage. Unfortunately, however as fast the benefits are recognized, SNS are disappearing, and many throughout the world are currently under threat. These threats come both from inside communities and from outside pressures and developments. At a time when many traditional societies are changing more quickly than at any other time in recorded history, changing attitudes toward faiths or culture sometimes mean that sites previously considered extremely important fall into disrepair or are degraded and destroyed. External pressures from land use change and resource extraction can damage other sites. Finally and inadvertently, the impacts of large-scale tourism can also damage the very sites that visitors are interested in seeing.

In this context, the relationship between sacred natural sites and protected areas remains complicated. On the one hand, inclusion of sacred sites within protected areas sometimes results in local people being prevented from using it or could cause problems from

overvisitation. Conversely, in other situations, managers support local use and help preserve sacred values, and communities wish to have their sites included within protected areas, because of the additional safeguards this provides. Efforts have been made in the last few years to address potential clashes between religious and conservation values, such as a set of guidelines from IUCN about managing sacred sites within protected areas (Wild and McLeod, 2008).

The HIMA Approach

The HIMA approach, while best known today as embedded in Islamic traditions, actually pre-dated Islam. It was commonly used throughout pre-Islamic Middle East as a way for tribal chieftains to control the land and its resources. As Islam took hold across the region, the idea of HIMA was maintained and adapted to become a more inclusive protection and management system that was designed specifically to benefit the broader community (Gari, 2006). Such conditions were to be met for the HIMA to be considered valid under Islamic law. Tribal governance of HIMAs, but now adhering to Islamic principles, continued well into the 20th century.

Studies showed that HIMAs took a variety of forms. By far, the primary purpose of HIMA was to manage grazing, but others were forest reserves designed, for example, to stop desertification (Nomanul-Haq, 2003). They also ranged greatly in size, from small forest patches to expansive landscapes. They all had their specific rules and regulations and were generally policed fiercely, with offenders punished accordingly. However, in the latter part of the 20th century, for a variety of reasons, the HIMA system broke down across the entire region and in some ways replaced by state- run protected areas (Gari, 2006).

Today, with the mounting appreciation that local support for conservation goals is key to sustainable conservation, there is a growing interest from researchers and the conservation community in reviving and restoring HIMA practices (Hamed, 2003). In Lebanon, for example, HIMA revival is gradually taking off. The Society for the Protection of Nature in Lebanon (SPNL), a partner of Birdlife International, is spearheading this move, and has acknowledged the adaptation required of the approach to fit modern needs and aspirations. Their approach blends cultural values with modern science: “community-based approach to sustainably manage natural and human resources that merges between modern science with the values of the traditional HIMA embedded in our heritage” (SPNL, 2011).

Reviving HIMA practices in Lebanon is quite a groundbreaking endeavor that brings up the many challenges of re-adopting an ancient practice that had almost been entirely forgotten, and making it current. But, in spite of the challenges, it is firmly believed that embedding conservation practices in cultural and religious values is both appropriate and effective throughout the region. Since 2004, SPNL has to date, established six important bird areas and key biodiversity areas as HIMAs. The Anjar-Kfar Zabad Wetland is one example. They are reported to be working well.

A HIMA fund has been set up to support the revival of HIMA in the region from a generous contribution of one individual. Countries eligible for assistance are Qatar, Saudi Arabia, Bahrain, United Arab Emirates, Oman, Lebanon, Yemen, Syria, Jordan, Iraq, Kuwait and Palestine. In this light, it is hoped that a fruitful HIMA revival can take place where local communities can again take control of their places for the broader good of society and nature.

Conclusions

While the potential of faith-based management is clearly high, significant challenges remain. Careful studies of the relationship between biodiversity and community-based natural resource management are imperative. At the same time, to bottom up management advice for custodians regarding management and regeneration of sacred natural sites and in exchanging ideas, experience and lessons from sites around the world need to be generated.

This global survey has implications for the development of HIMA, which could fall into one part of the definition of sacred natural sites, as sites influenced or managed by faith groups. As one of the oldest of all conservation management approaches, the concept of HIMA itself has important resonances in a part of the world where currently, environmental degradation, overgrazing, soil erosion, and desertification are all causing serious concern. Notwithstanding further development means that a number of important questions need to be addressed. Is the modern concept of HIMA predominantly a management approach or a faith-based approach, or both? Should all HIMAs be protected areas, or are they part of a wider and more flexible land management category? If so, how do they relate to other protected areas? And importantly, is the HIMA concept confined to Islam? Answering these questions will be a critical part in the further development of these important initiatives.

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Best Practices for Ecosystem Restoration and Rehabilitation in Drylands: a Case Study from Kuwait

Presentation in Session IV: Management of Natural Resources

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Abstract

The Arabian Peninsula, which comprises the seven countries of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates (UAE) and Yemen, are all drylands. The region experiences some of the most extreme climatic conditions and is characterized by low, erratic rainfall, high evaporation rates and has the highest temperature variations/extremes on earth. Added to these are high levels of soil and water salinity.

The dryland production systems of the region, which have largely contributed to the land degradation problems, are discussed. Rangelands represent about 50% of the land area of the Arabian Peninsula. Unfortunately these rangelands and their native plant biodiversity, which comprises over 3500 plant species, are being rapidly degraded. Livestock are an important component of these rangelands; but the primary cause of this vegetation loss is overgrazing.

In the region, over the last 30 years, many land restoration and rehabilitation projects were developed, primarily to protect and conserve its important plant biodiversity. However, many of these projects have failed, and the overriding reasons for their failure and the main factors that reduce the risk of failure are here listed.

To illustrate further these factors a case study from Kuwait was presented. In conclusion it was proposed, that in the absence of indigenous people maintaining the livestock in Kuwait, one of the ways to take the pressure off these rangelands is to keep the camels off and to develop camel farms. It was also proposed that some of the initial research

could be done by Kuwait Institute for Scientific Research (KISR) at their Agricultural Research Station (ARS) at Sulaibiya/Kabd.

Keywords: Biodiversity, Camel farms, Rangelands, Arabian Peninsula, HIMA

Dryland Production Systems in the Arabian Peninsula and Factors Driving Land Degradation

The Arabian Peninsula, which comprises the seven countries of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates (UAE) and Yemen, are all dry land ecosystems. The region experiences some of the most known extreme climatic conditions (Le Houérou, 2003) and is characterized by low, erratic rainfall, high evaporation rates, and has the highest temperature variations/extremes on earth. (Böer, 1997; Ghazanfar and Fisher, 1998; Zahran, 1997). Added to these are high levels of soil and water salinity, which are exacerbated under irrigation. Over 90% of the total land area now suffers from some form of degradation, and 44% is severely or very severely degraded (Peacock et al., 2003). The dryland production systems of the region, which have largely contributed to the land degradation problems, can be considered in a matrix (Table 1).

Table 1. Dryland Production Systems in the Arabian Peninsula

Dryland Production Systems	Water Resource Management		
	Direct Rainfall	Water Harvesting	Surface And Groundwater
Rangelands	Restoration, Rehabilitation and grazing management	Micro-catchments for native shrubs	
Rainfed Agriculture	Legumes in rotation and soil surface management	Micro-catchments for indigenous trees	
Irrigated Agriculture		Small dams for supplemental irrigation of crops	Improved water use efficiency and optimization of productivity

The production systems axis in Table 1 reflects the predominant land use pattern in the Arabian Peninsula. Each cell within the matrix combines a water management strategy (Water is the region's most limiting resource), with the production and utilization of vegetation and crops in an integrated, and in theory, a sustainable way. Unfortunately, in the majority of countries in the region, this is not occurring.

Rangelands represent about 50% of the land area of the Arabian Peninsula, (96% in Kuwait); unfortunately, these rangelands and their native plant biodiversity, which comprises over 3500 plant species (Ghazanfar and Fisher, 1998; Gallacher and Hill, 2006), is being rapidly degraded.

It is important to distinguish, at the outset, between the two major processes of degradation, namely vegetation degradation and land degradation. Vegetation degradation leads to land degradation (i.e., land degradation is a direct result of vegetation degradation (Grainger, 1992). The primary cause of this vegetation loss is overgrazing (Khalaf, 1989; Schuster, 1998; Barth, 1999, Böer, 1999; Brown, 2003; Peacock et al., 2003; Gallacher and Hill, 2006). Since late 1960s, the region has been experiencing a sharp increase in the numbers of livestock, mainly because of improved veterinary services and government subsidies and increased income per capita that allow herdsmen to readily obtain and transport processed feed, baled hay and water. Herders have also become very reluctant to sell surplus unproductive animals resulting in large and sedentary herds. Even in 1998, it was estimated that there were 24 million heads of livestock, comprised mainly of sheep, goats, and camels; today this figure is probably closer to 30 million. These increases in livestock population could mean that the palatable indigenous plant species have been severely overgrazed, and now to meet the demands for fodder, exotic species are being grown.

Currently the main fodder crops are alfalfa (*Medicago sativa*) and Rhodes grass (*Chloris gayana*). These crops are often produced locally and require vast quantities of water (up to 48,000 m³/ha/yr) in areas that are clearly not suited to such intensive cropping. The water used is often derived from a nonrenewable groundwater source (Peacock et al., 2003). Apart from being unsustainable, production of these forages has contributed to further land degradation; particularly in coastal regions where over pumping of groundwater has led to infusion of seawater into the aquifer (e.g., The Batineh coastal region of the Sultanate of Oman). The current situation of vegetation and land degradation in the region can be summed up in, that the carrying capacity of the land has been greatly exceeded due to a livestock

production system that has become uncoupled from the resources the natural ecosystem provides.

Lessons Learned from the Arabian Peninsula

Over the last 30 years, the region on a country basis, initiated many land restoration and rehabilitation projects. However, most of the projects involving this project team failed for various reasons or had only been partially successful. The main reasons for failure were as follows:

- Insufficient time, effort and money spent on identifying the stakeholders in the project ;
- Breakdown of traditional land tenure systems ;
- Lack of water harvesting opportunities in the protected or surrounding catchment area;
- Irrigation water used that is often brackish or even very saline;
- Protection of the area with fencing that is inadequately policed or repaired when damaged;
- Insufficient scientific input or restoration research, particularly regular monitoring ;
- Projects developed with very poor (funding) and poorly funded national programs ;
- Lack of tools for restoration and rehabilitation, particularly availability of seeds of native plant species and seed processing equipment ;
- Use of exotic species that become invasive e.g. *Prosopis juliflora*;
- After protection, the area, not properly managed, livestock are excluded and the area(s) quickly reverts back to an unproductive state ;
- Introduction of subsidies on livestock fodder which escalates livestock numbers and subsequent overgrazing ;
- Lack of enforcement of laws on conservation issues and grazing ;
- Lack of interest by people in general and governments in particular, on environmental issues;
- Unwillingness to wait for long-term results to come through; and
- Lack of information/education (extension) for the stakeholders.
-

A Way Forward: Factors Which Reduce Risk

At the same time these failures have given clear guidelines to factors that reduce the risk of failure of a restoration or rehabilitation project. These are as follows:

- At the planning stage involve as many stakeholders as possible, including government decision makers;
- Need for sound protection and policing of the area, preferably by local herdsman;
- Grazing laws of the country need to be enforced;
- Need full government, donor and scientific commitment;
- Long-term, reliable and adequate funding required. In this region, changes are sometimes only seen after 15-20 years;
- Good monitoring of project and the associated control degraded area;
- Committed project leaders from the national programs;
- Use of native species rather than exotics;
- Availability of sufficient quantities of native seeds; and
- Control of invasive species.

Omar and Zaman (1998) have listed other important factors.

A Case Study on Restoration and Rehabilitation from Kuwait

To illustrate both the factors that lead to failures and those that provide success to a sustainable land restoration and rehabilitation project, a case study was selected from Kuwait. The main reasons for this selection were as follows:

- The principal author was actively involved in ongoing land restoration and rehabilitation projects in Kuwait while working for both International Center for Agricultural Research in the Dry Areas (ICARDA) and Kuwait Institute for Scientific Research (KISR).
- Kuwait is of particular scientific interest because of the relatively high annual mean rainfall (ca. 120 mm) and is in a transition zone corresponding to both semi-arid and arid ecosystems (Brown and Al-Mazrooei, 2003).
- The land and vegetation degradation in Kuwait is some of the most severe in the Arabian Peninsula (Brown and Al-Mazrooei, 2003) and occurs within an important bird migratory corridor between eastern and western Europe and Asia and Africa.

- The area, KISR's Agricultural Research Station (ARS) at Sulaibiya/Kabd (Fig. 1), represents one of the few perennial shrub communities (*Rhanterium epapposum*) remaining in Kuwait (Omar, 2000) and contains species which are facing extinction, e.g., *Farsetia aegyptia*.

In 2003, in an adjacent area, KISR constructed and protected another 20 km² as agricultural research station at Kabd (Fig. 1).

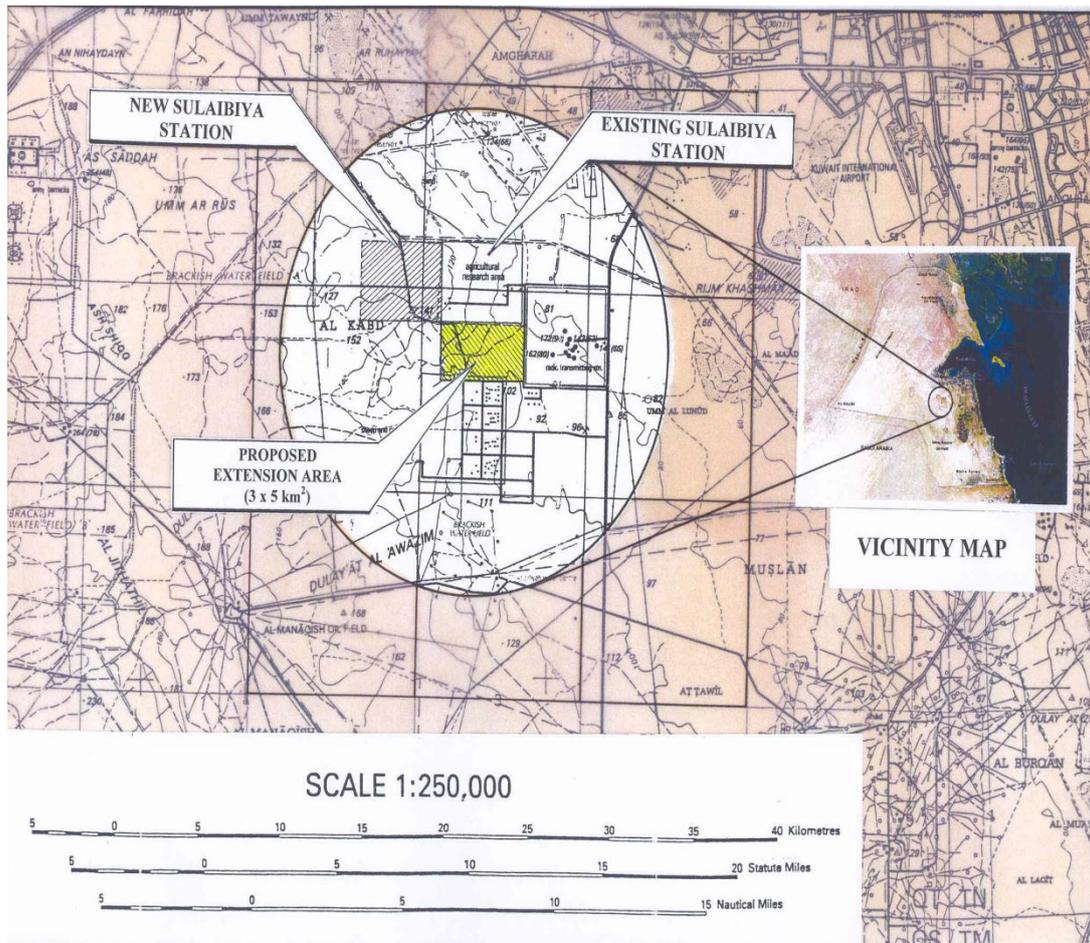


Fig.1. Agricultural Research Station (ARS); also showing is the new area and Transmitter station at Kabd (right of figure).

Agricultural Research Station (ARS), Kabd

The ARS was established in 1978 at Kabd, within the Kuwait KISR Range Management Project (Taha et al., 1980). It has since been protected from human interference and excessive livestock grazing by a 2-m high fence. The enclosure is about 20 km² (5 x 4 km), with a gentle SW-NE slope and an elevation of 75-130 m. The northern and western

boundaries are subjected to mobile sand movement that intrudes inside the boundary fence (Omar et al., 1988). These boundaries are protected by ongoing daily patrols of local Bedouin security guards.

The soils belong to three orders and their associated suborders: the Entisols and Typic Torripsamments are characterized by deep profiles without diagnostic horizons; the Aridisols and Typic Calciorthiss are characterized by their calcareous nature; and the Aridisols and Typic Salorthids are characterized by the presence of a salic horizon near the surface in which salt is accumulated through evaporation (Omar et al., 1988). The sedimentomorphologic map of the area prepared by Khalaf et al., (1980) and confirmed by Asem et al. (1982) showing that the area lies to the southeast of the Al-Huwaimliyah, which is the main source of mobile sand in Kuwait. The amount of sand transported along the Al-Huwaimliyah belt is estimated at $175,000 \text{ m}^3 \text{ yr}^{-1}$ (Omar and Zaman, 1998). In dry years, the area is also very vulnerable to mobile sand accumulation (Foda et al. 1984).

When ARS was first fenced in 1978 it was severely degraded (Plate 1) This degradation had led to reduced litter production, decrease in organic matter production, lower productivity, often less than 10% of that of pristine conditions (Le Houérou, 1986), reduced structural stability of the soils, less permeability, less water infiltration, diminished microbial activity, slower geobiogenic turnover, and lower soil fertility (Le Houérou, 1992). Prior to heavy overgrazing, this area would have probably been dominated by *Rhanterium epapposum*, which is a composite shrublet that branches from the base (Halwagy and Halwagy, 1974).



Plate 1. A degraded area of *Rhanterium* steppe (July 2003)

The fenced area was managed with livestock and detailed grazing studies, and measurements were taken from 1980 to 1989, with the exception of 1982 (Omar, 1991). These studies included details on species diversity, frequency, ground cover (Taha et al., 1980) and meteorological data. Data recording and management were interrupted with the invasion of Kuwait in August 1991, but more recently (2003), both vegetation and wild life monitoring has resumed and a *Rhanterium epapposum* ecosystem is the main feature of the area (Plate 2).



Plate 2. A restored area of *Rhanterium* steppe at ARS (July 2003).

The ARS project, like all similar conservation projects has had problems. One has been the lack of interest to incorporate livestock back into the protected area. Another drawback, as with many restoration projects (especially in the Gulf Cooperation Council (GCC) countries (Arabian Peninsula without the Republic of Yemen), has been the lack of participation of indigenous local herders, farmers, and communities in rangeland and land management issues in the protected area. However, overall, relative to many others in the region, the project can be regarded as a major success. The benefits of the protection and restoration of ARS are many, and are briefly listed as follows:

- Absence of sand movement, except on the west boundary adjacent to the degraded area. (This has been reduced with the erection of windbreaks outside the area (Al-Awadhi and Misak, 2000)).
- It presents an excellent educational facility and demonstrates to others, particularly Kuwaiti school children, how the landscape once looked, and what can now be done to restore other areas in Kuwait for the future.
- It has become a haven for wildlife and has contributed to biodiversity conservation, and may have prevented the local extinction of some animal species (pers. comm. with Loughland).
- It attracts and maintains migrating birds which are very important, as Kuwait is within an important migratory corridor between eastern and Western Europe and Asia and Africa.
- It is rich in plant biodiversity.
- It is an excellent facility for conservation, grazing, and rangeland management research.
- It has become an important source of seed for native desert plant species.
- The success of the reserve encouraged the Government of Kuwait in 2002 to provide KISR with another 20 km² of degraded desert in an adjacent area for restoration (Fig. 1). This was fenced in 2003, and restoration studies were started in the area.

Possible Action Plan

The drivers of both land and vegetation degradation in the Arabian Peninsula are fully understood; as well, to a large extent, the factors that would reduce this degradation, viz. control of livestock numbers and protection of certain areas from grazing by fencing and patrolling. It is also worth noting that in rangelands, in dryland production systems in the Arabian Peninsula, livestock are an essential component of the ecosystems. They are also of importance for the long-term maximization of rangeland productivity. However, as stated earlier, the carrying capacity of the land has been greatly exceeded for decades, and the rangelands are completely overgrazed. Apart from the Republic of Yemen, which is the only country in the Arabian Peninsula where the principal author has seen both ‘permanent’ and ‘temporary’ *HIMA* (Batanouny, 2001; Gari, 2006), and parts of the Kingdom of Saudi Arabia, there are almost no indigenous people/Bedouin herding the livestock. Most of the

herders are from outside the Arabian Peninsula and have little or no knowledge or interest in the health of the ecosystems. Therefore to re-introduce the HIMA to Kuwait or for that matter to most of the six Gulf Arab countries along traditional lines, with the indigenous people playing the major role, could be difficult, even impossible.

The question therefore arises, how can on the one hand animal production be maintained, but at the same time conserve the region's valuable diversity of plant species, in a sustainable way? One possible way to achieve this in the Arabian Peninsula is to develop camel farms. With such a farm, the camels, which normally graze in an uncontrolled manner on the rangelands, are simply kept in one location and the fodder and water brought to them. Camel farms can be used for milk and meat production and at the same time allow for the rangeland and ecosystems to recover. This is not a new idea, and the benefits of such a scheme are well documented in Breulmann *et al.*, (2007). It is also a scheme, believed to work well.

Interestingly, KISR, as indicated earlier, fenced and successfully managed the Agricultural Research Station (ARS) with livestock in the 1980s. KISR also carried out during this time detailed grazing studies and measurements. These grazing paddocks and animal houses at the ARS, although in need of repairs, are still there and could be used again for housing and as experimental grazing plots.

Breulmann *et al.*, (2007) listed experiments that need to be established to study the succession of plant species of the ecosystem, the "rate of recovery" and to investigate and demonstrate the advantages of a camel farm. KISR could work on these and also look at the fodder nutrient requirements of camels and establish whether the indigenous plants, particularly the grasses such as *Centropodia forskalii*, *Panicum turgidum* and *Pennisetum divisum* and maybe some indigenous salt tolerant plants are adequate. These plant species, well-adapted to the harsh conditions of the Arabian Peninsula, use far less water than the main fodder crops alfalfa (*Medicago sativa*) and Rhodes grass (*Chloris gayana*), currently being used in most parts of Kuwait. Detailed studies on the water use efficiency (WUE) could also be carried out at KISR (Peacock *et al.*, 2003). More importantly, it might also be feasible for KISR with Government and financial support to set up a viable camel farm at ARS. Many of the facilities to do this are available and underutilized at the ARS. Another advantage of setting up the farm at ARS/Kabd is that there are many camels in and around Kabd. Finally, to the right of these three areas, there is another protected area, the Government Transmitter Station. This, like ARS is essentially a *Rhanterium epapposum* ecosystem. The four areas

combined would give you almost 100 km² and could be a very viable commercial and scientific proposition for both KISR and the State of Kuwait.

A camel farm would clearly provide many advantages for Kuwait. If constructed efficiently, a camel farm makes use of all the 6 components of dryland production systems. Like any new initiative or development project the factors that reduce risk of failure must be considered. The most important ones are the following:

- At the planning stage, as many stakeholders as possible, should be involved including government decision makers.
 - Vital that all herders, local communities and livestock owners buy into the proposal
 - The Government of Kuwait should enforce all their grazing regulations.
 - All Kuwait's camels should be tagged and the owners breaking these grazing laws should have their animal confiscated and/or slaughtered.
- Full government, donor and scientific commitment, especially financial are needed.
- Use of native plant species rather than exotics is preferable.
- Availability of sufficient quantities of native seeds and non-brackish water should be ensured.

It is proposed that KISR and the government of the State of Kuwait work closely with the United Nations Educational, Scientific and Cultural Organization (UNESCO) Office in Doha to investigate in detail the setting up of camel farms in Kuwait and perhaps in other GCC countries. UNESCO Office is housed at

66, Lusail Street - West Bay

P.O. Box: 3945 - Doha (Qatar), (with telephone no.+ 974 411 32 90 and Fax: + 974 411 30 15)

The contact person is Dr. Benno Böer, b.boer@unesco.org.

It should be clearly understood however, that although this proposal implicates KISR and Kuwait specifically, it is just one possible example. Clearly, this development project could be carried out in any of the countries of the Arabian Peninsula and for that matter in any dryland country where camels are a major cause of overgrazing and subsequent degradation.

In conclusion the camel farm, coupled with sustainable grazing studies, proposed by Breulmann et al., (2007) would not only demonstrate the value of camel farms, but would also show clearly the benefits of combining the two approaches, dryland production systems would be enhanced and the biodiversity of the rangelands conserved. Finally, in those Gulf Countries, where the rangelands, have been fully restored the HIMA could again be introduced and practiced.

The proposed farm will be a significant contribution to rangeland restoration and the UN Convention to Combat Desertification (UNCCD), the UN Convention on Biodiversity (UNCBD), as well as to redress the enormous pressure on freshwater economics in agriculture, because using indigenous fodder plants will require less irrigation when compared with alfalfa and Rhodes grass. UNESCO's Global Network of Biosphere Reserves could play a significant role in this context with the support of the IUCN and the United Nations University, in partnership with KISR.

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Kuwait Integrated Environmental Information Network: Way of Developing National Environmental Indicators for Better Environmental Information Dissemination

Presented in Session IV: Management of Natural Resources

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Abstract

Kuwait is an overgrowth developing country that has many environmental challenges. One of these challenges is develop environmental indicators for sustainable development and harmonization of these indicators to sustain the biodiversity and ecological species. For this purpose the Kuwait Integrated Environmental Information Network (KIEIN) project was initiated in 1994 with main goal of developing an interactive and dynamic environmental information platform. The success stories of this project maintained the momentum to reach its final stage for developing the national environmental indicators for Kuwait, which will be embedded in a Web service interface. Such environmental indicators are valuable for the public as well as scientists, researcher, practitioners and experts in Kuwait. Such indicators offer decision makers, policy makers and planners invaluable environmental information for the sustainable development planning process. Key issues behind this project are the dissemination of these indicators and information among the society to maximize the societal benefits. Such dissemination fosters the synergy and integration between the scientists, researchers, planners, and decision makers in different organizations to obtain the utmost benefit from these indicators.

The Six main thematic areas including: atmosphere and climate change, land, coastal and marine environment, fresh water, biodiversity, and waste management were developed for the KIEIN GeoPortal. Based on a schematic hierarchy approach; underneath these themes there are key environmental issues, which are consequently broken down into indicators. In

this regard, 6 Themes, 22 Issues and 65 Indicators were listed. These environmental indicators are compatible with the Arab League initiative of developing environmental indicators for the Arab countries, as well as the Kuwait Environmental Protection Authority (KEPA) and Regional Organization for the Protection of the Marine Environment (ROPME). Technical discussion and synergy with experts in these main environmental themes have improved and enhanced our understanding of these indicators and provided insight on the driving forces, pressure, status, impact and response to these indicators. This will aid in improving our environment and reduce the hazardous implications of human activities on human health and ecosystem vitality.

Keywords: Environmental indicators; Biodiversity; driving forces; Ecosystem validity

Introduction

Kuwait Integrated Environmental Information Network project (KIEIN) is a national project executed by Kuwait Institute for Scientific Research (KISR). This project is funded by the UNDP office in Kuwait, and managed through the Kuwait Supreme Council of Planning and Development (SCPD). It consists of four phases. Phase I, II and III were successfully completed from 1994 through 2007, while phase IV was started on September 2012 and will be accomplished on February 2015.

The KIEIN project's strategic objective is to contribute to Kuwait's sustainable development program through the establishment of a National Environmental Information Dissemination Network to support decision/policy makers, planners, and researchers. It aims at establishing a state-of-the-art Geographic Information System (GIS) database for terrestrial, coastal, marine, atmospheric and socioeconomic and demographic compartments, to facilitate the optimum utilization of available relevant data, and to enhance decision support activities in the field of sustainable development.

During phases I, II and III of the KIEIN project, the Geo-environmental database of terrestrial, coastal, marine, atmospheric and socio-economic and demographic compartments were completed. By the end of Phase III, the data and applications were accessible via preliminary Web-based GIS interface.

The current final Phase of KIEIN project (KIEIN-IV) is focused on two issues namely; environmental indicators modeling and Spatial Decision Support Systems (SDSS). The previous success of this project provided the momentum to reach its final stage for

developing the national environmental indicators for Kuwait, which will be embedded in a Web based service interface or GeoPortal. Such environmental indicators are valuable for public society as well as scientists, researcher, practitioners and experts in Kuwait. Such indicators offer decision makers, policy makers and planners an invaluable resource for environmental information suitable for the sustainable development planning process. A key issue behind this project is the dissemination of these indicators and information among the society to maximize the societal benefits. Such dissemination will foster the synergy and integration between the scientists, researchers, planners and decision makers in different organizations to obtain utmost benefit from these indicators. Also, the SDSS that will be implemented during this phase will focus on the main environmental sustainable issues to customizing some web-based tools to support the decision makers and planners. By the end of this phase, the end user will be able to access the valuable content of the KIEIN Geo-environmental database and tools through the KIEIN GeoPortal and run any environmental indicator or SDSS application.

Recent experiences with environmental issues have highlighted the urgent need to improve the information base upon which decisions are made. Providing decision makers and planners with the needed environmental information in a comprehensive, balanced, accurate and timely manner, is essential for the formulation of environmental polices strategies and programs.

The KIEIN project and its Web based GeoPortal provide an important resources to those studying and/or managing HIMAs in the Gulf Region and around the world. In the Gulf region, HIMAs are places under conservation by indigenous people, guided by traditional Islamic land conservation practices. For the purpose of this paper, any place that is managed and conserved for the greater good of the indigenous people will be considered a HIMA (World Bank, 2010). KIEIN provides access to a wealth of spatial and scientific data, tools, and applications ideally suited to HIMA research and conservation.

Study Approach

The project approach was to identify, study, and document the environmental indicators and related data sets most relevant to Kuwait, and then to model the indicators in a Web GIS platform for dissemination via the KIEIN GeoPortal. The following steps were carried out to identify and study the indicators, collect and transform the geoenvironmental data sets and build the KIEIN GeoPortal:

2. 1 Literature Review. A literature review was conducted to survey existing knowledge about environmental indicators, the Kuwait environment, and Web based GIS framework for environmental data and information dissemination.

2. 2 Stakeholder Collaboration. Kuwaiti, regional and international stakeholder collaboration was conducted to get feedback and input from experts in the Kuwait environment. The KIEIN project worked closely with the stakeholders to develop, review, and finalize the Indicator Profiles, which were developed for each indicator.

2. 3 Indicator Profiles. A comprehensive metadata template was compiled for each of the candidate and final indicators that created and evaluated during the study. These profiles were reviewed and commented on by the stakeholders throughout the study period and during the workshop that was held especially for this purpose. This allowed project stakeholders to evaluate the information in a standard form.

2. 4 KIEIN GeoPortal. The spatial data and information acquired for modeling the indicators in the previous geoenvironmental database were translated to the KIEIN GeoPortal. By migrating to a Web based form, the KIEIN project tools will be more accessible to decision and policy makers, planners, researchers and any other interested parties with environmental issues in Kuwait and around the world. The prototype of the KIEIN GeoPortal consists of three components namely: data, environmental indicators, and spatial decision support systems (SDSS) modules.

I. Environmental Indicators

The environmental indicator informs about the state of a functioning system and tracks the conditions over time. Environmental indicators refer to what is happening in the environment and measure the interaction between the business and the environment. Since the environment is so complex, indicators provide a more practical and economical way to track the state of the environment than if we attempted to record every possible variable in the environment. They represent the quantification of the effectiveness and efficiency of environmental action with a set of metrics.

Environmental indicators often support defining goals that are linked to common objectives and consequently assess the progress towards meeting them. They provide information to support decision-making and management via measured and monitored mechanisms to determine whether change is taking place, understanding the process of

change, and help in understanding why change is taking place. The major functions of environmental indicators are as follows:

- Assessing the existing environmental conditions and trends over time.
- Comparing geographical places with environmental situations.
- Forecasting future environmental conditions and trends.
- Providing early warning information.

The KIEIN-IV environmental indicator profiles were compiled for six (6) environmental themes namely: atmosphere, land and land degradation, coastal and marine, water resources, biodiversity, and waste and waste management. These thematic areas were broken down into 22 environmental issues that are broken down into 65 environmental indicators.

The adopted framework for describing environmental indicators is the Driving Forces, Pressure, State, Impact, and Responses (DPSIR) framework (Figure 1). It represents the broader sustainable development framework by integrating driving forces and impacts to the pressure, state, and response factors. In the DPSIR framework, the chain of causal links begins with driving forces and through to pressures, states, impacts, and responses. Driving forces are human activities, which underpin environmental change (industry, agriculture) and impacts are results of pressures (on ecosystems, human health) which induce responses. This initiated the KIEIN team to use the DPSIR framework to develop the environmental indicators profiles relevant to Kuwait.

3. 1 Atmosphere Theme

The atmosphere is the gaseous envelope that surrounds the earth and constitutes the transition between its surface and the vacuum of space. The atmosphere is composed primarily of nitrogen (N₂) and oxygen (O₂) and is made up of many layers of air, each one identified by their thermal characteristics or temperature changes, chemical composition, movement and density. The first layer is called the troposphere, where people, plants, animals, and insects live in it. Atmospheric pollution is simply defined as the introduction of chemicals, particulate matter, or biological material that are harmful to humans or other living organisms and damaging the environment into the atmosphere. The main contributor of the atmospheric pollution is the man-made activities of industry and fossil fuel consumption.

Emission of CO₂ and other GHG gases, which are mainly produced from the developed countries, are the greatest contributors to the climate change phenomena. This theme interactively presents the list of the most critical indicators of atmosphere that are

directly linked to air quality and its consequences on human health as well as climate changes (Table 1).

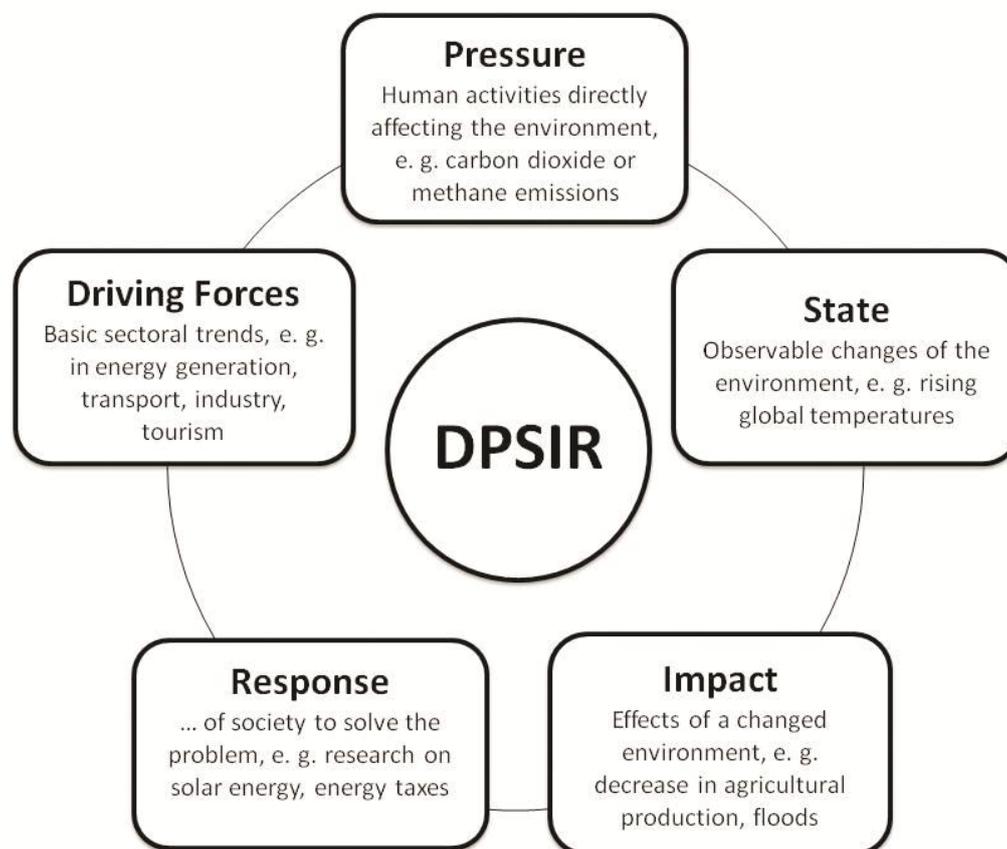


Fig. 1. The Driving Forces, Pressure, State, Impact and Response (DPSIR) Framework.

Table 1. Atmosphere Theme and related Issues and Indicators.

Theme	Issue	Indicator	DPSIR
Atmosphere	Climate Change	Emission of Greenhouse Gaseous (GHGs)	R/I
		Carbon Dioxide Emission and Sinks	R/I
		Consumption of Ozone Depletion Substances (ODSs)	R/I
	Air Quality	Ambient Concentration of Air Pollutants	R/I
		Average Visibility	R/I
	Health	Mortality Rate Due to Respiratory Diseases “all ages”	I
	Infant Mortality Due to Respiratory Diseases	I	

3. 2 Land and Land Degradation Theme

Land Use is a key element in urban development, agriculture conservation for food security and terrestrial ecosystems. Policy and environmental planning decisions largely influence land management process (Von Haaren and Albert, 2011). Land management is simply defined as the human activities directly or indirectly affect land cover. It comprises ecosystem exploitation, land use management, and also includes ecosystem management (Bennett et al., 2009). This includes land cover to the biotic and abiotic components of the landscape, e.g. natural vegetation, cropland, water, and human structures (Verburg et al., 2009). Land use refers to the purpose of human activities which make use of natural resources, thereby impacting ecological processes, and functioning (Veldkamp and Fresco, 1996). The analysis of ecosystem services to support land management decisions faces a number of challenges including: 1) Identifying comprehensive indicators to measure the capacity of ecosystems to provide services; 2) Dynamics of the link between land management and ecosystem services provision; 3) Quantifying and modeling the provision of ecosystem services by linking ecological processes with ecosystem services; and 4) Accounting for the multiple spatial and temporal scales of ecological processes and ecosystem services provision (Bastian et al., 2012).

Therefore, it was important to systematically select a list of indicators to analyze the link between land management and the provision of ecosystem services at the national scale of Kuwait. This theme represents the critical indicators of land and land degradation that suit the State of Kuwait (Table 2).

Table 2. Land and Land Degradation Theme and related issues and indicators.

Theme	Issue	Indicator	DPSIR
Land Use	Land Use	Land Use Change	D/S
		Arable and Permanent Crop Land Area	S
	Agriculture	Use of Agriculture Fertilizers	D
		Use of Agricultural Pesticides	D/S
		Vegetation Cover	R/S
		Area under Organic Farming	D/S
		Surface Albedo (Land Reflectance)	S
Land Degradation	Land	Area Affected by Erosion	S
		Area Affected by Salinization	S

Land Affected by Desertification	S
Population Living Below Poverty Line in Dry Land Areas	D

3.3 Coastal and Marine Theme

The coastal and marine environment of the Gulf region is under major threat of degradation due to the excessive pressure of man induced on both terrestrial and marine natural resources. The population growth on the coastal zone has led to major demographic changes such as rapid coastal urbanization, tourism development, and industrialization. Sewage remains the largest source of contamination, by color, of the marine and coastal environment. The coastal sewage discharges have increased dramatically in Kuwait in the last few years.

Indicators of marine environmental status are an integral part of the management systems put in place to ensure sustainable development. Since the 1970s, there has been ad hoc development of a range of objectives and targets for components of the marine environment such as nutrient discharges, contaminant loads of water and sediment, and the size of fish populations, and these are supposed to be routinely reported at national level. To assess the status of coastal and marine environment for improving the quality of these environments, 11 critical indicators have been chosen to represent a broad range of conservation objectives for the coasts, Gulf and marine environment of the State of Kuwait. This is shown in the Coastal and Marine environmental Theme. Table (3) lists these indicators that represent the degradation, pollution as well as reservation of the marine resources.

Table 3. Coastal and Marine Theme and related Issues and Indicators.

Theme	Issue	Indicator	DPSI R
Coastal and Marine	Coastal degradation	Percentage of Total Population Living in the Coastal Area	D
		Annual Fish Catch	D
	Fisheries	Maximum Sustainable Yield for Fish (MSY)	D
		Spawning Stock Biomass (SSB_{MSY})	D
		Fishing Mortality (F)	D

		Length-at-First Maturity (Lm ₅₀)	D
		Proportion of Marine Area Protected	D
Marine Environment		Area of Coral Reef Ecosystem and Percentage of Live Cover	D/S
		Algae Concentration in Coastal Waters	D
		Release of Nitrogen and Phosphorus to Marine Water	D
Marine Pollution		Oil and Hydrocarbons Pollution	S

3. 4 Water Resources Theme

Water is the most valuable resources on Earth; however, there is shortage of water in most regions of the world. The arid region, where Kuwait is located, is considered one of the world's most water-stressed regions (UNEP, 2007; UNEP-WCMC, 2011). Globally, there are unprecedented demands for water supplies, resulting from population growth and sectoral pressures, both as consumptive and non-consumptive uses. This includes in particular, agriculture, the provision of domestic water supply and sanitation, industry, energy production, tourism, ecosystems, changes in patterns of consumption as a result of industrialization as well as rural/urban shifts. This theme lists the most critical indicators of water resources for policy drivers and utilization of water resources and management (Table 4).

Table 4. Water Resources Theme and related Issues and Indicators.

Theme	Issue	Indicator	DPSIR
		Annual Availability of Conventional Water	S
		Annual Availability of Non-Conventional Water	R
	Availability of Water	Annual Withdrawals of Ground and Surface Water as of a Percent of Available Water	D
Water Resources		Aquifer Water Level	R / S
	Access to Safe Drinking Water	Access to Safe Drinking Water	S / R
	Water Utilization	Area Irrigated with Treated Wastewater	R
		Annual Utilization or Withdrawals of Water by Type (Agriculture, Industry)	S / R

	Irrigation Water Use Efficiency	S
	Intensity of Domestic Water Quality Monitoring	S / R
	Waste Water Treatment by Category (Primary, Secondary, Tertiary)	S / R
Water Management	Biochemical Oxygen Demand (BOD) in Water	S / R
	Waste Water Treatment Coverage	P / R
	Number of Water Professionals per Served Population	S / R

3. 5 Biodiversity Theme

Biodiversity is an essential component of the Gulf region environment in general and to the State of Kuwait in particular. This area is wealthy with wide variations in terrestrial and aquatic ecosystems, which play critical role in sustainable development. Key ecosystems include deserts and rangelands while marine ecosystems include mudflats, mangrove swamps, sea grass and coral reefs. These ecosystems contain a rich variety of the region's biodiversity (WB, 2010).

There are many factors, including population growth, changing diets, urbanization, and climate change, which are causing biodiversity to decline, and ecosystems are continually being degraded. The world's poor are most at risk from this continuing loss of biodiversity, as they are the ones most reliant on the ecosystem services that are being degraded. Degradation and fragmentation of unique terrestrial and aquatic ecosystems and loss of genetic resources are some of the main biodiversity issues in Kuwait particularly due the growth of the oil industry. This theme lists the most critical Bio-indicators in Kuwait. The Biodiversity theme is organized of 3 main biodiversity issues with 8 indicators (Table 5).

Table 5. Biodiversity Theme and related Issues and Indicators.

Theme	Issue	Indicator	DPSIR	
Biodiversity	Species	Percentage of Endangered Species	S	
		Abundance of Selected Key Species	S	
		Number of Invasive Alien Species	S	
		Number of Migratory Species	S	
	Ecosystems	Proportion of Protected Area by Total Ecological Area	R	
		Area of Selected Key Ecosystems	R/S	
		Percent Covered with Greenery Area	R/S	
	Management	Management of Effectiveness of Protected areas	R	
		Biodiversity	Number of Specialist in Biodiversity Conservation per	R/S
		Area of Selected Key Ecosystems		
		Number of Biodiversity Awareness Activities per year	R	

3. 6 Waste and Waste Management Theme

Waste generation and waste management is a crucial issue in developing countries such as the state of Kuwait. This creates an unhealthy environment and deteriorates both natural resources and human health. Waste generation from industrial estates and households end up in the terrestrial environment or the marine environment. This, creates major threats on the environment and consequently on the human health. Generally, waste is generated at all stages of the materials cycle including extraction (e.g. mining waste, oil), production and distribution (e.g. generating industrial waste, hazardous waste, packaging waste), consumption of products and services (e.g. generating municipal waste, waste electric and electronic equipment) and during waste treatment (e.g. sorting residues from recycling facilities or incinerator slag) (EEA, 2010).

As with use of material resources, the significance of waste can be seen from both an environmental and an economic point of view. Management and disposal of waste put pressures on both the environment for example through the emission of pollutants and the demand for energy or land, and on human health, especially in the case of poor waste management.

In considering sustainable environmental management, there is a need to establish some of the environmental indicators that represent such toxicity or geographically map and determine the implication of such toxicity on the ecosystem and human health. This theme

lists the most critical indicators of waste generation and waste management in the State of Kuwait (Table 6).

Table 6. Waste and Waste Management Theme and related Issues and Indicators.

Theme	Issue	Indicator	DPSIR	
Waste and Waste Management	Sanitation	Percent of Population with Adequate Sewage	S	
		Disposal Facilities		
	Solid Waste	Generation of Waste	S	
		Municipal Waste Disposal	R	
		Municipal Waste Collection	R	
	Hazardous Waste	Hazardous Waste Policies	R	
		Generation of Hazardous Wastes	S	
	Waste Management	Waste Management	Waste Treatment and Disposal	R
			Management of Radioactive Waste	R
			Rate of Waste Recycling and Reuse	S/R
		Health	Diarrhea Mortality in Children	I
			Mortality Rate in Children	I
			Mortality Due to Poisoning	S
	Blood Lead Levels in Children		I	

II. The KIEIN GeoPortal Framework

KIEIN GeoPortal is a prototype of a Web-based application which aims to build a GIS one-stop platform and provides an easy and user friendly interface to understand and interact with environmental data, indicators, and SDSS applications in Kuwait. The KIEIN GeoPortal is powered by state-of-art geospatial and Web technologies, such as Web mapping service (WMS) (OGC, 2006), Web feature service (WFS) (OGC, 2005a), and Web processing service (WPS) (OGC 2005b) from Open Geospatial Consortium (OGC) standards. Users can view, query, analyze, and share environmental data and indicators online without installing any specific GIS software or plug-ins.

The framework of the KIEIN GeoPortal (Fig. 2) designs four layers with six components to manage, publish, and visualize environmental data and indicators namely:

- Data management layer that aims to save, query, and update environmental data and indicators in the geodatabase, such as Oracle spatial;

- Web service layer targets on publishing the data and indicators as standard GIS Web services, such as WMS, WFS, and WPS, by open source GIS Server, such as GeoServer. In addition, geospatial programming library, such as geospatial data abstraction library (GDAL) (Warmerdam 2008) and Project 4, is the core spatial engine in this framework to run spatial analysis, to convert data format, and to project coordinate system on the fly;
- Data access layer contains application programming interface (API), which provides a easy and develop friendly interface for developers to connect published Web services and use implemented functions in the framework; and
- Web application layer provides Web applications where external map services can be integrated, and users can interactive with environmental data and indicators for different purposes.

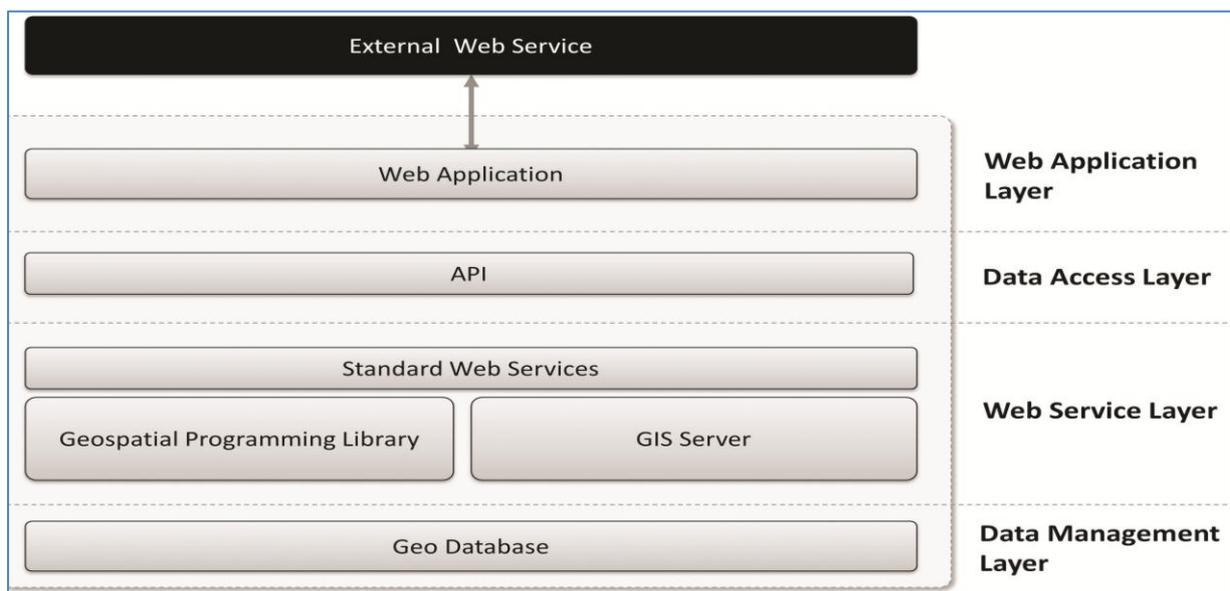


Fig. 2. The KIEIN GeoPortal Framework.

Based on this framework, the KIEIN GeoPortal incorporated three main divisions to provide the full aspects of environmental data, indicators, and spatial decision support systems (SDSSs) in a one-stop Web portal. The first one is the data domain, which collects environmental data sets from the previous atmosphere, base map, hydrology, marine, social economics, and terrestrial domains and links them with public Web mapping services, such as Google Maps, Bing Maps, and Open Street Maps to provide a data center for viewing, understanding, and sharing environmental data (Fig. 3).



Fig.3. The Data module of KIEIN GeoPortal.

The second component is the indicator module, which gathers environmental indicators from the previous identified six environmental indicator and use a hierarchical classification (e.g. themes, issues, and indicators) to classify different indicators. Each indicator is combined with environmental data to calculate and visualize the indicators on the map (Fig. 4), and also enable us to present the indicator profile metadata to the right of the geographic representation of the indicator (Fig. 5).

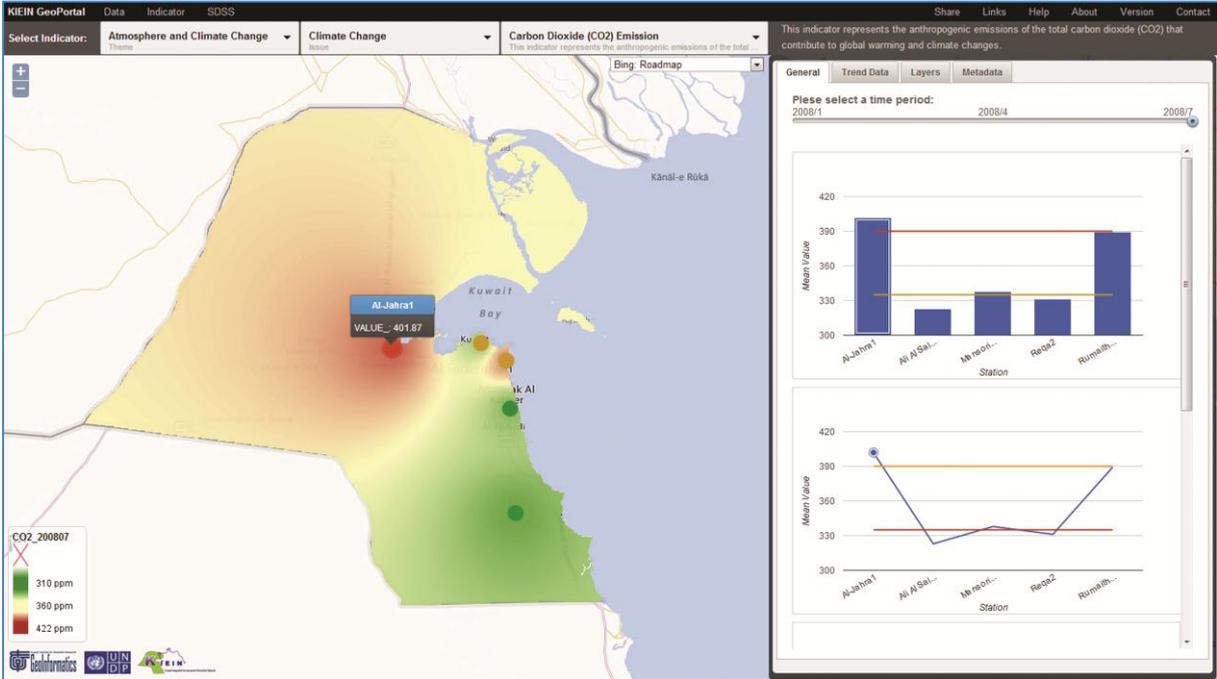


Fig. 4. The GIS representation of CO2 emission indicator.

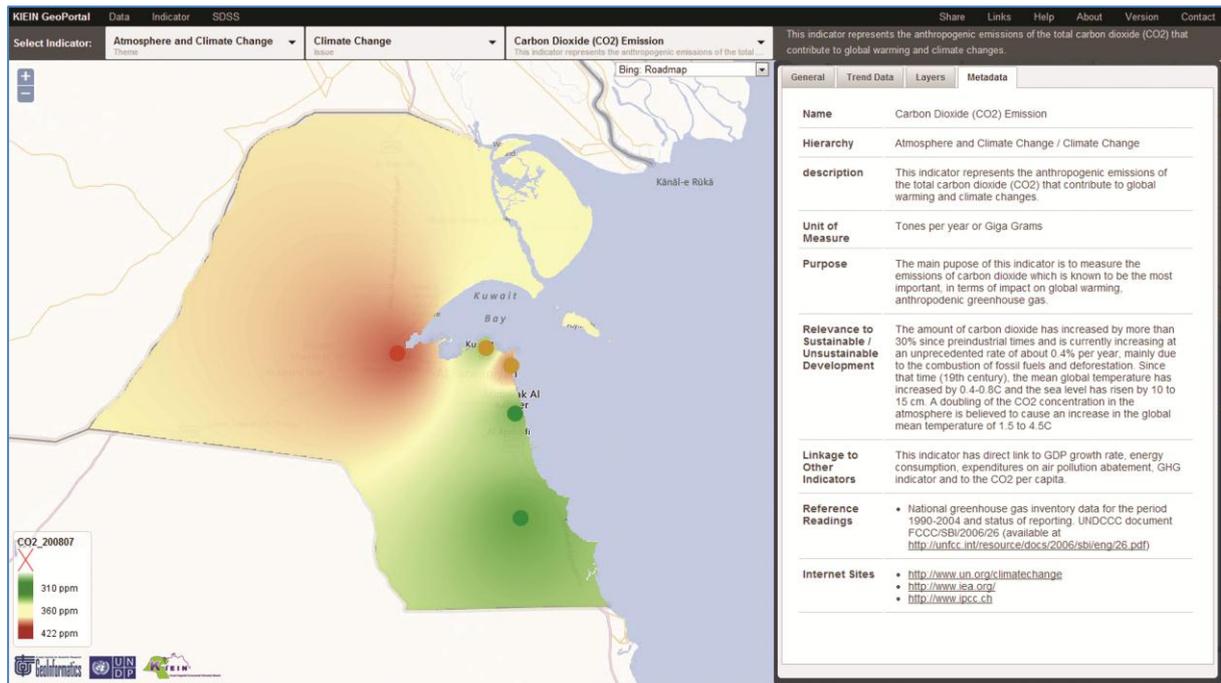


Fig. 5. Environmental Indicator Metadata of CO2 emission indicator (Indicator Profile).

The final component is the SDSS module, which develops a Web SDSS application tool. In this module, relevant environmental data, indicators, and information extracted from specific SDSS model are collected together and visualized into interactive maps and charts. For example, Fig. (6) presents the result of running the bird flu risk assessment model and gathering it with migratory bird locations, and their migratory paths, in support decision makers to evaluating situations and preventing potential risks.



Figure 6. Integration of Bird Flu risk assessment SDSS model with other relevant data and information.

III. Conclusion

It is recommended to establish a GeoPortal specifically for HIMA research and management, based on the KIEIN GeoPortal framework. This would allow individuals and groups from different regions to share the knowledge, data, and experiences at a local, regional, and international level in new and meaningful ways. The KIEIN GeoPortal framework makes a wealth of environmental, socio-economic and base map data and information available via the Web and could be adopted to meet the unique needs of HIMA experts. In addition to the spatial data resources, the GeoPortal provides the user with spatial analysis and statistical tools ideally suited for investigating, evaluating, and reporting on HIMA conservation areas.

Perhaps the most beneficial outcome of developing a HIMA GeoPortal is the ability to share and access information, insights, and lessons learned with others using a standard and intuitive platform. By adopting the KIEIN GeoPortal approach, HIMA experts would be able to share and compare information about their conservation areas with other experts. This opens the door for more advanced spatial and statistical analysis. Spatial regression analysis is a GIS tool, which allows you to model, examine, and explore spatial relationships, and can help explain the factors behind observed spatial patterns. For example, HIMA experts may

want to understand which underlying factors are the most significant in land restoration, so they can better allocate resources, or predict the amount of additional or lost vegetation growth based on manipulating a factor such as days of irrigation.

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Requirements for Successful Revival of the HIMA

Presented in Session II: Developing Implementation Framework-How to Implement HIMA with Reference to Current Practices?

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Abstract

“Working toward a vision of the HIMA” entails articulating guiding principles that are flexible, yet rooted in authenticity, and based in overarching ethical principles of governance. The vision should aim at the common good (of human societies, and of living beings), link biodiversity conservation with sustainable use, and emphasize the role of local communities in governance with equitable sharing of benefits at the local level. “Improving understanding of the HIMA and other traditional conservation practices” will entail multidisciplinary field research and literature review to assess the ecological, social, and economic role of historical and existing HIMAs, their geographical variations and evolution over time, how benefits have been allocated, users made accountable, and disputes and conflicts resolved. “Strengthening the legal and policy framework” is needed to enable existing HIMAs that are viable to gain legal recognition, to enable HIMAs that are not functioning well to be revived, and to establish new HIMAs. It should avert potential inequities and develop procedures to address them, and enable the HIMA to adapt to meet changing needs. “Improving implementation of HIMA revival projects” is needed to build the capacity of all constituencies of local communities to participate in conservation and to introduce effective assessment, monitoring, and evaluation methods as well as equitable procedures for resolution of disputes and conflicts.

Keywords: HIMA, traditional conservation practices, protected areas, biodiversity conservation, sustainable use, participatory management, governance.

Toward a Vision of the HIMA

“Working toward a vision of the HIMA” entails articulating guiding principles that are rooted in authenticity, yet flexible, and based in overarching ethical principles of governance. An authentic vision of the HIMA would be derived from best practices in the cultural heritage of the HIMA, informed by the diversity of historical experience in the regions in which HIMAs have evolved. It would be adaptive to evolving needs of changing societies and versatile in implementation, taking into account the social, cultural, and environmental specificities of different localities and communities. (Kilani, et al., 2007).

Authenticity is essential to a valid vision. While the HIMA should be open to lessons from around the world, it would not be authentic or honest to pluck unrelated conservation practices from distant civilizations and declare them to be the HIMA. Worse still would be to bind the HIMA to narrow or simplistic ideological agendas. I have come across bold proclamations and fierce debates over several contentious issues, which can be resolved by referring to authentic texts and records:

- Is the HIMA Islamic or secular (pre-Islamic)?
- Is the HIMA managed by government or by local communities?
- Is the HIMA managed for community or universal aims?
- Is the HIMA managed for nature or for humans?

Is the HIMA Islamic or pre-Islamic?

That HIMAs existed before the time of the prophet Muhammad, upon him be blessings and peace, there is no doubt. But declarations that the HIMA predates Islam seem intended to disassociate it from the faith. What was the HIMA before Islam? Was it used primarily as an instrument for conservation or for exploitation of natural resources? I do not know the answer to this question, and as far as I know, it has not been seriously investigated.

In pre-Islamic Arabia it had been customary, when a nomadic tribe came into a new area of pasture, for the tribal leader to ascend a hill and make his dog bark, and all the land as far as the sound could be heard would be reserved for his exclusive use, as his HIMA. In the lands outside the HIMA he would graze his herds along with those of his people, whom he

would exclude from the HIMA; in it he would graze his weaker animals and those of anyone else whom he chose to offer the privilege of sharing it with him. Such a practice was open to abuse, and it appears that it was widely regarded as an instrument of oppression (Ash-Shafi‘i, d. 820; Ibn Qudamah, d. 1223; see also Gari, 2006).

The prophet Muhammad, upon him be blessings and peace, laid down the rules by which the HIMA came to be one of the essential instruments of conservation in Islamic law. He abolished the pre-Islamic practice of making private reserves for the exclusive use of powerful individuals, and ruled that a HIMA could be established only “in the way of God and His Prophet” – for the public welfare. He established the HIMA of an-Naqi‘ for the cavalry and made a HIMA surrounding the Haram of Al-Madinah, in which he instituted a kind of zonation, forbidding hunting within a radius of four miles and the destruction of trees and shrubs within twelve (*hadith* related by Muslim from Abu Hurayrah; Abu Yusuf, d. 798; Ibn Qudamah, d. 1223; see also Llewellyn, 2003, p. 212).

The HIMA is undoubtedly one of the most important conservation practices of Islam. But this is not to say that it should be considered exclusively Islamic or exclusively for Muslims. I know of nothing that would preclude or discourage non-Muslims from establishing HIMAs or being beneficiaries of them in an Islamic society. The pre-Islamic tribal war of Al-Basus concerning the HIMA of Kulayb, ruler of the Banu Taghlib, was waged between non-Muslims on both sides, and the Prophet’s statement that “every ruler has his HIMA” (*hadith* related by Al-Bukhari and Muslim from An-Nu‘man ibn Bashir) refers to rulers who were not Muslims. Hence it can be safely said that the HIMA is Islamic but not exclusively so. It would be a great shame if the HIMA were to become an ideological football in skirmishes between secularists and fundamentalists.

Is the HIMA managed by government or by local communities?

Some advocates have portrayed the HIMA as a community conserved area, an alternative to protected areas proclaimed and managed by governmental authorities. It has even been suggested that they should be recognized by IUCN as a new category of protected area. While it is true that the great majority of HIMAs have been established and managed by local communities, to restrict their definition to indigenous and community conserved areas (ICCAs) would be to ignore the fact that the HIMAs established by the prophet Muhammad and the early caliphs were initiated and managed by a central government. Later governments

– the Umayyads, ‘Abbasids, and Ottomans, the Ashraf in the Hijaz, and Al Sa‘ud in Najd – continued to establish and manage HIMAs. Indeed, among the conditions that jurists stipulated for a HIMA to be valid are that it should be constituted by the “imam” – the legitimate governing authority (Ibn Qudamah, d. 1223; ‘Uthman ibn Fudi, d. 1817). Nonetheless, the most enduring HIMAs were those established by tribes and other local communities. This should hardly be surprising, as governments come and go, while the need of rural communities for sustainable livelihoods remains. Nor is the distinction between community and government always clear-cut, for the effective units of government were often tribal until the mid-20th century, and rulers often delegated authority to tribal leaders to establish and manage HIMAs (Eben Saleh, 1997; Gari, 2006). It can therefore be said with confidence that HIMAs can be and have been managed both by local communities and by governmental authorities.

Is the HIMA managed for community or universal aims?

Some skeptics of HIMA revival have suggested that its aims are less universal than those of modern protected areas. In Islamic law, however, the HIMA is clearly identified with universal aims. Among the conditions that jurists stipulated for a HIMA to be valid are that it should be established in the Way of God – that is, for purposes pertaining to public welfare – the common good. At the same time, they stipulated that it should not cause the local people undue hardship by depriving them of resources that are indispensable to their subsistence. The stipulation that it should continue to realize greater actual benefits than detriments applies equally to community and universal aims and indicates the jurists’ awareness of the inherent tension between theory and practice, the ideal and the real (Ibn Qudamah, d. 1223; ‘Uthman ibn Fudi, d. 1817, pp. 37–38, English trans., p. 70; see also Llewellyn, 2003).

The early caliphs established HIMAs for universal aims: the cavalry, the camels allocated for charity, and the livestock of the poor, with careful attention to the needs of local communities. ‘Umar ibn Al-Khattab instructed the manager of HIMA ar-Rabadhah, “Take care, O Hunayy! Lower your wing over the people! Beware the prayer of the oppressed for it will be answered. Let enter those who depend on their camels and sheep, and turn away the livestock of Ibn ‘Awf and Ibn ‘Affan, for they, if their livestock should perish, will fall back on their palms and fields; whereas the needy one, if his livestock perish, will come to me crying ‘O Commander of the Faithful...!’ It is easier for me to provide them with pasture than to spend on them gold or silver. Indeed it is their land, for which they fought in the time

of ignorance and upon which they embraced Islam.” He also said, “All property belongs to God and all creatures are servants of God. By God, were it not for its use in the cause of God, I would not have reserved a hand’s span of the land.” (Abu Yusuf, d. 798; Ibn Qudamah, d. 1223; see also Llewellyn, 2003, p. 213).

It would, of course, be unrealistic to imagine that the managers of tribal HIMAs have consistently thought of them in terms of the universal welfare of living beings or, for that matter, of humankind. These are, however, precisely the ethical dimensions that the *shari‘ah* brings to the HIMA. And it would not be so unrealistic to suppose that tribal managers were often aware of and sympathetic to the moral claims of other creatures living in or passing through the HIMA, or of the needy individuals from other clans or tribes. Community and universal benefits are not inherently incompatible, and indeed converge, especially when the beneficiaries are needy members of the community.

Is the HIMA managed for nature or for humans?

The usual way of putting this question is, is the HIMA managed for conservation of biodiversity or for sustainable development? Some advocates have promoted the HIMA as an institution by which protected areas are designed to secure human needs rather than to protect nature.

Like the previous three issues, this raises a false dichotomy, rather like asking, are you in favor of health care or education? The only sensible answer is, for both. On a deeper level, however, the question raises disturbing ethical and philosophical issues. Can one ethically aim at the welfare of a part of a community without consciously and explicitly considering the welfare of the whole? Can one aim at the well-being of one’s own nation and assume that this will not hurt other nations? Can one aim at the well-being of men and assume that this will not degrade women? Can one aim at the well-being of the wealthy and assume that this will lead to the welfare of the poor? Can one aim at human well-being and assume that this will lead to the welfare of other beings? Governments and economies are largely run by people who hold precisely these premises. Of all people, though, we who work in conservation should understand their fallacy. Moreover, such premises are incompatible with the deeper aspects of monotheistic ethics.

The HIMA has emerged in the region that has given rise to the fullest expressions of monotheism, and in Islamic law it is rooted in a particular understanding of the implications

of God's oneness, divine unity, or *tawhid*: it must be established in the Way of God – that is, for purposes pertaining to public welfare – as God is the Lord of *all* beings. Theologians and jurists have recognized that the common good includes the welfare of all created beings. A HIMA's management objectives must pertain to the common good, and the common good includes both conservation of biodiversity and sustainable use of natural resources (Bagader, El-Sabbagh, Al_Glayand, & Samarrai in collaboration with Llewellyn, 1994; Llewellyn, 2003). Traditional HIMAs in Arabia have combined both aims. It is fair, however, to observe that whereas conventional modern protected areas have largely been exclusionary, traditional HIMAs have predominantly accommodated human use (Al-Ajlani, 2006; Kilani, et al., 2007; Kilani, 2009).

The vision

The foregoing discussion shows the importance of understanding the HIMA not only as defined by the tribal links and customary practices that have characterized traditional HIMAs, but also by the broad ethical principles of the *shari'ah*.

The vision of the HIMA that I would put forward is based in the following overarching ethical principles: that it is a protected area constituted by a legitimate governing authority through procedures for equitable governance; that it is established for purposes that pertain to the common good (of human societies, and of living beings – without restriction to individuals, class, tribe, ethnic group, race, nationality, creed, gender, or species); that it serves the needs of local communities and secures their rights to equitable shares in the benefits and costs of conservation; and that it is designed and managed to maximize benefits and minimize detriments, and in fact realizes greater actual benefits than detriments in practice.

A HIMA can be initiated and managed at any level from local community to central government, and the full spectrum of IUCN protected area categories is applicable to it (Kilani, et al., 2007).

Improving Understanding of the HIMA

“Improving understanding of the HIMA and other traditional conservation practices” will entail multidisciplinary field research and literature review to assess the ecological, social, and economic role of historical and existing HIMAs, their geographical variations and

evolution over time, how benefits have been allocated, users made accountable, and disputes and conflicts resolved (Kilani, et al., 2007).

What is known?

What do we know about HIMAs? We know that the Arabian Peninsula is the birthplace of the HIMA and the region where the HIMA has been most widespread. Nearly every village in the southwestern mountains of Saudi Arabia was associated with one or more HIMAs. Other HIMAs were found in the northern and central regions. In the 1960's, Omar Draz (1965, 1969) estimated that there were about 3,000 HIMAs in Saudi Arabia, but he gave no basis for his estimate and it may be too high. HIMAs in the southwestern highlands varied from ten to well over 1,000 hectares (Grainger & Ganadelly, 1986). Although these HIMAs were relatively small, together they made up a vast area of land under management that combined conservation and sustainable use.

Management. With regard to the customary management of HIMAs, we know that most traditional HIMAs, as well as most governmental HIMAs, have been rangelands managed for conservation and sustainable use of forage. We know that they have included a wide range of management practices. In many traditional HIMAs, grazing is prohibited, and during years of drought, grass is harvested by hand at designated times and places on a rotational basis. Others are managed rangelands, in which grazing and cutting of grass are permitted on a seasonal basis, after the grasses and other plants have grown out and flowered, or in which grazing is restricted to specified kinds and numbers of livestock such as milk cattle or draft animals, or in which a limited number of livestock may be grazed for a specified time during periods of drought. (Draz, 1965, 1969; Gari, 2006; Ghanem & Eighmy, 1984; Grainger & Ganadelly, 1986; Zahran & Youness, 1990).

Not all HIMAs, however, have been managed to conserve forage for livestock. Some are protected woodlands within which the cutting of trees is either prohibited or regulated. Others are reserves for the production of honey, within which grazing is prohibited seasonally or is excluded altogether. Some of the most successful HIMAs are those used for honey production, as wildflower honeys of good quality fetch a high price in the market and are economically competitive against livestock. There are also reserves for the conservation of ibex (Draz, 1965, 1969; Grainger & Llewellyn, 1994; Llewellyn, 2003).

Governance. We know that traditional HIMAs have typically been managed by a particular village, clan, or tribe – the units by which traditional society has been organized. Tangible benefits were allocated to particular people who benefited directly from conservation, and these benefits served as an incentive for local communities to invest in the maintenance of their natural resources and to protect them from abuse (Grainger & Llewellyn, 1986; Llewellyn, 2003). Traditional HIMAs were managed locally; Eben Saleh (1997) has described the traditional governance structures of HIMAs in Saudi Arabia’s southwestern highlands and how their management was subject to community consensus. Significantly, HIMAs have been socially accepted and desired by the people who have borne their costs. Hence the HIMA is an important cultural precedent for protecting and managing public lands over which individuals enjoy usufructuary rights, such as rights to grazing. This is especially significant in countries where there are few private landholdings and most of the land is given over to communal grazing (Grainger & Llewellyn, 1986; Llewellyn, 2003).

The governance of traditional HIMAs was grounded in tribal loyalties and they were sometimes a source of conflict. Whereas the wider tribal territories or traditional grazing grounds were defended against encroachment by other tribes, the HIMAs were relatively small areas and appear to have been defended mainly against encroachment from within the tribes that managed them – even if they were defended against outsiders with special fervor. One question that arises in this regard is whether the customary governance of traditional HIMAs accords with the stipulation that they should be managed for the common good. There is an inherent tension between tribal governance and the common good, but they are not necessarily incompatible. The governance of traditional HIMAs reflects the structure of traditional society: through much of the region’s history, the effective units of government were generally tribal until the 20th century, and as noted above, rulers often delegated authority to tribal leaders to establish and manage HIMAs (Eben Saleh, 1997; Gari, 2006).

What needs investigation?

The traditional HIMA is imperfectly understood as an instrument of conservation. There is a need to document the remaining HIMAs, and their traditional management. How have they functioned in detail? In what different ways have they been governed? Who took management decisions, and by what processes? How, for example, did they decide that a drought was severe enough to warrant the opening of a HIMA to livestock, and how did they decide that it was time for the herds to leave? How were changes in the management

objectives and rules of use brought into effect? How were benefits allocated? How users were made accountable? How were disputes and conflicts of interest resolved? (Kilani, et al., 2007; Llewellyn, 2003)

Such information might be gleaned through interviews with local people old enough to have witnessed or participated in HIMA management, and through reviews of literature including books of *fiqh*, accounts of anthropologists and travelers, written and oral histories, court records, and *fatawa* (juristic opinions). Documenting the remaining HIMAs and their traditional management will require anthropological and sociological field research through oral histories, empirical measurements, photographic documentation, and case studies, to understand the details of how they have functioned and the changes that have taken place over time. It will also require empirical environmental audits and assessments to document levels of biodiversity, differences in species composition, plant cover and standing crop biomass, value as *in situ* seed banks, and the like (Kilani, et al., 2007).

Among the most important aspects of this research is the economic functioning of HIMAs and other traditional resource management systems with regard to allocation of benefits, accountability in the use of resources. Researchers should bear in mind the relationships between the various traditional resource management systems, customary practices and land tenure, and the wider environmental, social, economic, political, and legal contexts. This research would include assessment of the extent to which historical HIMAs were and existing HIMAs are sustainable ecologically, socially, and economically, what were their strengths and weaknesses. This knowledge can be used toward ensuring that new and revived HIMAs are ecologically, socially, and economically sustainable. Finally, as research, by its nature, is time-consuming and ongoing; it should not delay actions to strengthen the legal and policy framework of the HIMA or to implement HIMA revival (Kilani, et al., 2007).

Strengthening the Legal and Policy Framework

“Strengthening the legal and policy framework” is needed to enable existing HIMAs that are viable to gain legal recognition, to enable HIMAs that are not functioning well to be revived, and to initiate new HIMAs. It should avert potential inequities and set out procedures to address them, and enable HIMAs to adapt to meet changing needs (Kilani, et al., 2007).

The need for legal recognition

In spite of widespread official recognition of the value of HIMAs in Saudi Arabia, the country where the majority of HIMAs are found, they receive no government support. A 1953 decree abolished HIMAs (later clarified to mean the abolition only of the governmental HIMAs, not traditional HIMAs). A 1954 decree then nationalized rural lands under the Ministry of Agriculture. In practice, the governing authorities do not generally interfere in the management of traditional HIMAs so long as conflicts do not arise. But when disputes are not resolved, the authorities may abolish the HIMA concerned. Traditional sanctions no longer have legal force. A HIMA's continuity depends largely on the moral force of the shaykhs who manage it and the conscience of the society. In addition to the loss of their legal status, HIMAs have faced great economic and social pressures in recent decades: rapid population increase, mechanization of agriculture, mounting demands for land for housing, farms, commerce, and industry, and increasing demands for pasture for ever larger herds of livestock. As a result, most HIMAs have been abandoned; only a few dozen remain, and only a few of the remaining HIMAs are still managed actively. While expanding populations and increasing demands on natural resources have put additional pressure on HIMAs, they have also increased the need for them (Llewellyn, 2003; see also Al-Ajlani, 2006; Eben Saleh, 1997).

The traditional HIMA is likely to disappear from Saudi Arabia within a generation unless it receives a clear statement of support from governing authorities, backed by legislation that will enable the conservation authorities – and the local communities – to preserve those existing HIMAs that are viable, with provisions to ensure that this does not lead to inequities or tribal conflicts, and with transparent processes for resolving conflicts of interest, disagreements, and disputes. Hence the most crucial aspect of the required legal and policy framework is that it should enable existing HIMAs that are viable to gain legal recognition, and, in cases where local communities desire to do so, enable HIMAs that are not functioning well to be revived. It should also allow the establishment of new HIMAs.

Equitable procedures

The legal and policy framework should also provide instruments to avert negative potentials and set out procedures or protocols to address them. What potential inequities should the legal and policy framework guard against? Tribal, sectarian, political, and social conflicts should be forestalled, as well as ethnic, gender, and economic discrimination. What

procedures are needed to avert potential inequities? Most important are measures to ensure that all sectors of local communities are empowered to participate in the planning and management processes. It should include provisions that would enable the HIMA to adapt to meet the needs of changing societies, as many of the specific objectives that traditional HIMAs were established for no longer meet the needs of the local communities (Al-Ajlani, 2006; Kilani, et al., 2007).

Implementation of HIMA Revival

“Improving implementation of HIMA revival projects” is needed to build the capacity of all constituencies of local communities to participate in conservation and to introduce effective assessment, monitoring, and evaluation methods as well as equitable procedures to resolve disputes and conflicts. HIMA revival includes both reviving preexisting HIMAs and establishing new pilot HIMAs as examples of best practice. In either case, it hinges on the agreement and resolve of local communities and conservation agencies (Kilani, et al., 2007).

The aim of HIMA revival is not to replicate historical HIMAs, but to reinvigorate an authentic culture-based conservation paradigm from the Arabian Peninsula and the surrounding region that bridges traditional and contemporary approaches and responds to cultural needs, contexts, and values. It will build on positive elements associated with HIMAs, such as links with existing local livelihoods, low economic and social costs, and traditional environmental expertise, bearing in mind that HIMAs incorporate ethical principles that are not necessarily inherent in the understanding of other forms of protected areas within the region (Kilani, et al., 2007; see also Eben Saleh, 1997, Gari, 2006).

The need for adaptation

Traditional practices cannot remain static when the needs of the communities practicing them change. One of the salient characteristics of the HIMA has been its inherent versatility; it has adapted to the needs of local communities over more than a millennium, and it will have to continue adapting to meet the changing needs of local communities. Homogenous tribes are transforming into heterogeneous communities. As the basis of social organization shifts from tribal to geographic units, the management of traditional HIMAs needs to be shifted from tribal objectives, which inherently carry the potential for conflict, to geographical objectives, which tend more toward the common good. Historically, it has been common for outsiders to be allowed to use HIMAs upon agreement with the tribal authorities, and this practice should be encouraged and expanded. Provisions will still be

needed to ensure that allocation of the rights to use natural resources – and accountability for maintaining them in good condition – are invested in identified individuals so as to avert the tragedy of open access rangelands, but on a more equitable basis than tribal lineage (Kilani, et al., 2007; Llewellyn, 2003).

In recognition of the need for such adaptation, Eben Saleh (1997) and Al-Ajlani (2006) have called for an integrated approach that would enable local communities to participate with land management agencies, bringing together traditional, professional, and scientific expertise. Their recommendations amount to co-managed HIMAs in which local communities work in partnership with conservation agencies. This is one valid approach; concurrent approaches could include empowering communities to manage HIMAs on their own and extending HIMA precepts to the protected areas managed by conservation agencies.

Pilot projects

HIMA implementation should involve initiation and support of pilot projects to revive or create HIMAs that are informed by available knowledge and experience, as examples of best practice and to ensure monitoring and evaluation of management success. The traditional HIMAs that remain have significant potential for biodiversity conservation in addition to their value for sustainable use. Most are located in areas of high species diversity and support key biological habitats, such as juniper, olive, and *Ziziphus* woodlands. Their role as seedbanks to rehabilitate the surrounding rangelands will become ever more valuable as grazing and development pressures increase. As they represent a range of areas that have been subject to specific conservation measures for long periods of time, they provide an indicator of range health and of potential under particular environmental conditions (Grainger & Llewellyn, 1994; Llewellyn, 2003). At the same time, new and larger sites of immense importance for biodiversity conservation have been identified, and the principles of HIMA governance are no less applicable to them.

Pilot projects for HIMA revival could span a range of protected area governance types: community conserved HIMAs, co-managed HIMAs, and government managed HIMAs. All three types are represented in Saudi Arabia's revised protected area system plan: one traditional HIMA is already functioning as a co-managed protected area. Seven traditional HIMAs are proposed for recognition as community conserved areas (see Table 1, Figures 1 and 2). One new proposed protected area, Jabal Aja, has been put forward as a pilot

biosphere reserve embodying the HIMA concept and has been recognized in the WWF / ARC Sacred Gifts for a Living Planet program (Alliance for Religions and Conservation, 2000; Llewellyn, 1992; Worldwide Fund for Nature, 2000).

Pilot projects for HIMA revival should enhance the capacity of local communities to be wise and effective stewards of the earth (Eben Saleh, 1997). They should stress principles of equity and participation of all constituencies of local communities. This would entail effective assessment methods (e.g., participatory rural appraisal, rapid rural appraisal, stakeholder analysis, and surveys involving multidisciplinary teams, including anthropologists, ecologists, and protected area planners), as well as procedures for resolution of disputes and conflicts, such as facilitation, principled negotiation, and mediation, (Abdallah, 2013).

Conclusion

The word HIMA means protected area, but not every protected area is a HIMA. To be a HIMA, a protected area should be constituted by a legitimate authority with procedures for equitable governance; be established for purposes that pertain to the common good (of human societies, and of living beings); serve the needs of local communities and secure their rights to equitable shares in the benefits and costs of conservation; and be designed and managed to maximize benefits and minimize detriments, and realize greater actual benefits than detriments. As the main indigenous form of protected area in West Asia and beyond, a HIMA can be initiated and managed at any level from the local community to central government, but to be valid it must hold to these principles of governance. Hence the full spectrum of IUCN protected area categories is applicable to the HIMA.

Meeting the requirements for HIMA revival as discussed above would help ensure that new and revived HIMAs are ecologically, socially, and economically sustainable. The ethical principles of this regional paradigm could then inform the planning and management of contemporary protected area systems and make a positive regional contribution to global conservation.

The HIMA concept introduces a normative element that is absent from the value-neutral designation of the words “protected area.” The conservation authorities in the countries of the Arabic speaking and wider Islamic world might consider using the word HIMA instead of terms like *mahmiyah* for their countries’ protected areas. This would signal

a commitment to be responsive to the needs of local communities. It would suggest familiar patterns of consultation to involve these communities in the management of protected areas. Although the term *mahmiyah* is derived from HIMA, it lacks the profound moral force of the latter; there is a world of difference between obeying the dictates of a regulatory agency, and fulfilling the commandments of God and His Prophet (Llewellyn, 2003).

The HIMA is not a panacea; HIMAs have faced the same kinds of conflicts that other protected areas have faced, and will continue to face them. The moral obligation that it carries cuts two ways, for mismanaging a protected area that is called a HIMA will do greater harm than the same mismanagement of a protected area that is not called a HIMA. Nonetheless, as I have suggested elsewhere (Grainger & Llewellyn, 1994, Llewellyn, 2003), the revival and extension of the HIMA as a basis for protected area systems has far-reaching and exciting implications for the conservation of biological diversity and sustainable use of renewable natural resources, not only in West Asia, but throughout the Islamic world.

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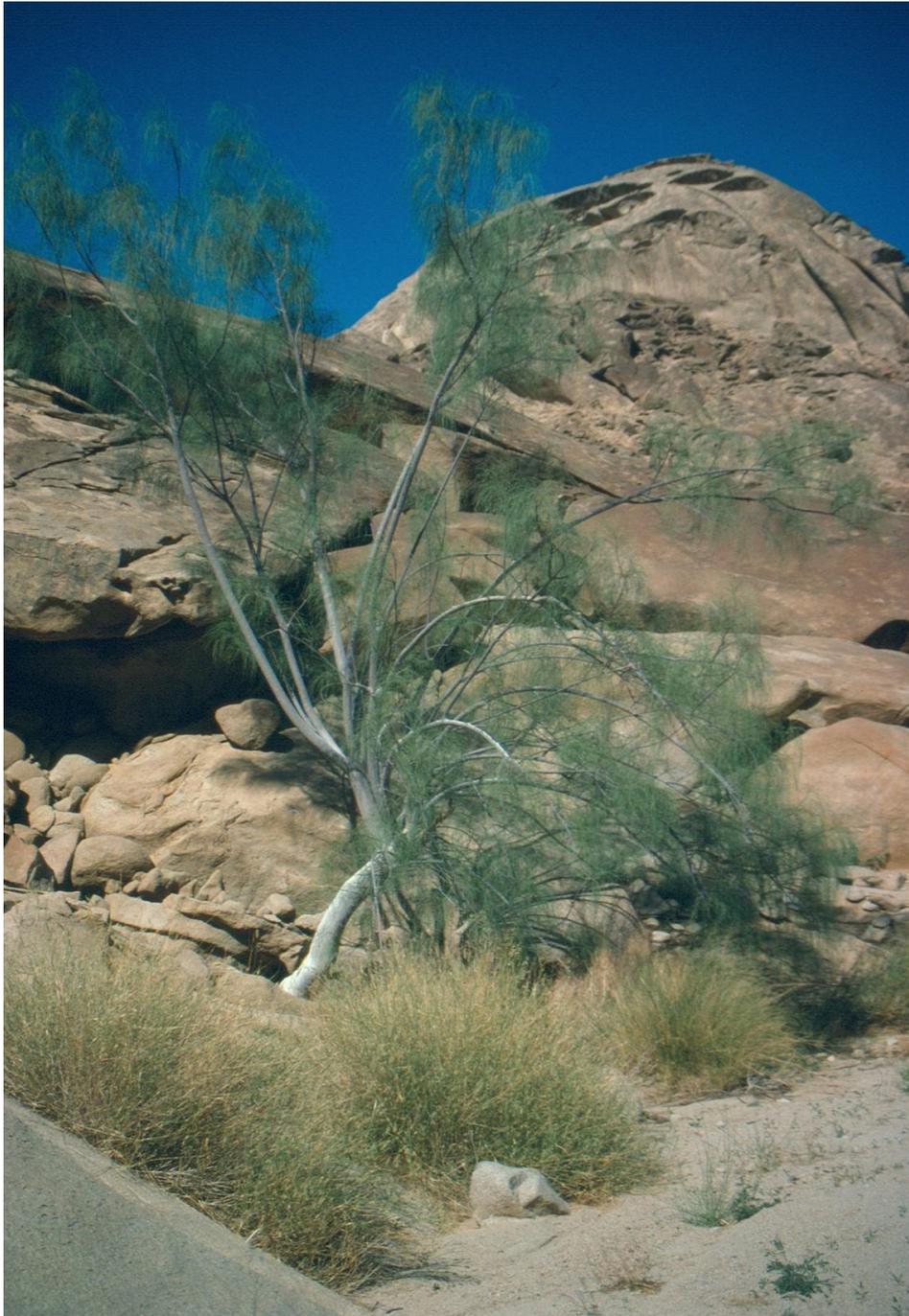
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FIGURES



The densely vegetated, brushy hills and wooded valleys are used for pasturing camels and donkeys; sheep and goats are excluded. The stone boundary wall was built around 1980, although the HIMA is far older.

Fig.1. HIMA Al Humayd, 5.3 sq km in area, lies east of Baljurashi, in Al-Bahah Region.



The local community has fenced off the wadi that provides access to the mountain, and no grazing of livestock is permitted. The mountain vegetation is in excellent condition, in sharp contrast to that of the adjacent plains. Jabal Ral constitutes a strategic seed bank from which plants may disperse to rehabilitate the surrounding rangelands.

Fig. 2. Jabal Ral lies southeast of Al-Wajh, in the Tabuk Region. For over 200 years, the shaykhs of the Bili tribe have managed this 69 sq km area as a reserve for ibex.

Table 1. HIMAs in Saudi Arabia's Revised Protected Area System Plan

Name & Location	Area sq km	Main Purpose		Notes
HIMA al-Ghada Al-Qasim Region 25° 50'N 043° 59'E	1,186.2	Conservation of <i>Haloxylon persicum</i>	Co-managed protected area. Harvesting of <i>Haloxylon persicum</i> regulated; livestock grazing permitted; recreation permitted on condition that visitors keep the sites they use in good condition.	Sand dunes with thickets of <i>Haloxylon persicum</i> . Visitors who infringe environmental regulations forfeit their deposits, which are used for site restoration.
HIMA al-Fawqa' 'Asir Region 19° 50'N 041° 50'E	1.5	Conservation & harvesting of fodder	Community conserved area. Fodder harvested by women. Camels allowed to graze, other livestock excluded. Beehives at the edge of the <i>HIMA</i> . Local people eligible to use the <i>HIMA</i> , without regard to lineage.	<i>Olea europaea</i> woodland and <i>Chrysopogon-Themeda-Hyparrhenia</i> grassland. Plant cover 47.2% (Sept. 1978), standing crop biomass 353.7g/sq m (June 1978).
HIMA al-Azahirah Al-Bahah Region 19° 52'N 041° 45'E	7.0	Sustainable grazing & harvesting of fodder	Community conserved area. Both cutting of fodder (largely by women) and grazing of camels and donkeys permitted on a seasonal basis. Stone boundary wall was built in 1980's,	The <i>HIMA</i> is comprised by the watershed of Wadi al-'Atfayn, characterized by grassy rangeland with tall trees of <i>Olea europaea</i> , <i>Ziziphus spina-christi</i> , and <i>Acacia</i> spp. in the lower reaches.

				every Thursday over 3 years, by 600 local volunteers. Now patrolled on a voluntary basis.
HIMA Humayd Al-Bahah Region 19° 52'N 041° 43'E	AI 5.3	Sustainable grazing & harvesting of fodder	Community conserved area. Both cutting of fodder (largely by women) and grazing of camels and donkeys permitted on a seasonal basis; sheep and goats excluded. Now patrolled on a voluntary basis.	<i>Olea europaea</i> woodland & grassland. The stone boundary wall built around 1980, although the <i>HIMA</i> is older. Suitable for nature-based recreation & ecotourism.
HIMA Bani Sar Al-Bahah Region 20° 08'N 041° 26'E	5.0	Conservation & harvesting of fodder	Community conserved area. Established to provide fodder during droughts. Grass & other fodder plants were harvested by men & women on alternate days. Divided into subsections of approx. 25 ha for rotational harvest. Livestock excluded & hunting prohibited.	<i>Themeda triandra</i> grassland with <i>Juniperus procera</i> . Plant cover 12.8% compared to 7.8% outside (Dec. 1977), standing crop biomass 135.75g/sq m, negligible outside (June 1978).
HIMA Thumalah Makkah Region 21° 06'N 040° 33'E	7.5	Sustainable grazing (cattle)	Community conserved area. Used as a pasture for dairy cattle, especially important in times of	<i>Hyparrhenia hirta</i> grassland with <i>Ziziphus spina-christi</i> & <i>Olea europaea</i> . Feral donkeys graze in it and there is

				drought. Boundaries pressure from sheep marked but not owners to graze their sheep walled. Used to in it. some extent for honey production.
HIMA Quraysh Makkah Region 21° 17'N 040° 19'E	15.0	Sustainable grazing (cattle)	Community conserved area. No livestock pastured except cattle, used for dairy products and to plow small fields, and formerly camels. Used to some extent for honey production.	Grassland with scattered junipers. Managed by four local shaykhs. Well situated for nature-based recreation & ecotourism. Possibly an Important Bird Area.
Jabal Ral Tabuk Region 25° 57'N 037° 08'E	69.0	Conservation & sustainable hunting of ibex	Community conserved area. No grazing of livestock permitted; a strategic seed bank from which plants disperse to the surrounding rangelands. The local community has fenced off the access wadi.	Granite exfoliation domes with <i>Acacia tortilis-Moringa peregrina</i> woodland. Vegetation maintained in excellent condition, in contrast to the surrounding plains.
Jabal Aja Ha'il Region 27° 25'N 041° 25'E	2,200.0	Biodiversity conservation, sustainable grazing & recreation	Government managed core zones, co-managed buffer zones. Designed as a pilot protected area embodying <i>HIMA</i> precepts, and proposed to be Saudi Arabia's first biosphere reserve,	Granite mountains with groves of <i>Acacia gerrardii</i> & dwarf shrublands. A bioclimatic refuge, Important Plant Area & Important Bird Area; recognized in the WWF / ARC Sacred Gifts for a Living Planet program.

with the rugged core
zones for
biodiversity
conservation & more
accessible parts for
sustainable use.

The information in this table is extracted from the draft revised protected area system plan (Llewellyn, 2012) and originally compiled from field survey notes and interviews, as well as from Al-Gilani, A. (2004), ARC (2000), Duba & Ellis (1979), Ghanem & Eighmy (1984), Grainger & Ganadelly, (1986), WWF (2000), and Zahran & Youness (1990).

HIMA Mesopotamia: Community Generated Conservation in the Tigris Euphrates Watershed

Presented in Session I: HIMA Governance System: The Underlying Principals and
Legal Framework Presentation

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Abstract

HIMA Mesopotamia means protection of the land between two rivers, referring to an ancient land stewardship system for common pool resources - in this case the Mesopotamian Marshes of Iraq. Water resources are the life blood of this arid landscape. The Mesopotamian Marshes, or *al Ahwar* in Arabic, are a culturalized landscape, consisting of a reciprocal relationship formed over thousands of years between Marsh Arab cultures and the marshes through traditional resource management. The biodiversity and cultural integrity of the Tigris- Euphrates River Basin is jeopardized by water scarcity, inequitable allocation of water rights, and high risk of desertification. Dams and upstream water diversions in Turkey, Syria, and Iran have reduced mean annual flows, resulting in water scarcity and impaired water quality throughout the watershed. Along with changes to water levels, there are changes in ecosystem-level metrics: salinity has increased and fish populations, reed availability, and grazing quality for water buffalo forage has declined. The Ma'dan are now becoming environmental refugees without land tenure, attempting to eke out an existence with their water buffalo, without clean water, adequate health care, or opportunities for education or earning a livelihood. One of the most challenging aspects for development of a community based conservation and sustainable development in this area will be ensuring the delicate balance between improving the standard of life locally, and respecting the traditional way of life of the inhabitants of the Marshlands. An international effort to develop a system of basin planning and equitable water rights allocation is urgently needed. Community based conservation and implementation of

local *al HIMA* land governance systems will be vital to helping Marsh Arab and local Iraqi people allocate increasingly limited water resources. Several innovative solutions are presented to promote the survival of the environmental integrity and biodiversity of the Mesopotamian Marshes for sustainable human well-being and socioeconomic stability.

Keywords: al HIMA, Traditional Resource Management, Mesopotamian Marshes, Eco-cultural restoration, Biodiversity

Introduction - HIMA Mesopotamia

HIMA Mesopotamia is an international nonprofit corporation whose name means protection of the land between two rivers; we hold the vision of restoring and managing the biodiversity and cultural heritage of the Mesopotamian marshes. We propose community generated conservation throughout the Tigris Euphrates watershed as a mechanism to provide social justice, biodiversity conservation, and equitable water allocation. Our commitment is to nurture the eco-cultural heritage of the Tigris Euphrates watershed through the following: outreach, coordination and capacity building; synthesis of scientific information, traditional and local knowledge systems; and to provide a forum for cultural and environmental information exchange. HIMA Mesopotamia aims to provide a forum for cultural and environmental information exchange by creating a network of individuals and organizations that are involved in social justice, ecological health, and equitable water rights in the Middle East. We are committed to listening deeply and restoring the ancient system of story, place and culture in the Mesopotamian Marshes. HIMA Mesopotamia actively promotes reaching across international borders to find solutions to the escalating ecological and humanitarian crisis occurring within the region.

This paper first describes the background of HIMA and Traditional Resource Management, using the wetlands of Lebanon as an analogue to the Mesopotamian Marshes. The body of the paper discusses the Mesopotamian Marshes, years of war and environmental degradation, and current challenges from attempts at eco-cultural restoration with the stressors of inadequate water supply and pollution of land, air and water. The conclusion and recommendations propose a new system of Community

Based Natural Management System that promotes sustainable livelihood, natural resources management, and biodiversity conservation (Saleh et al 2013). Human cultures are constantly changing over time; a new system of community based resource management will be based on reviving a regionally appropriate al HIMA system of local governance and resource management as a means for effective cultural and ecological restoration of degraded landscapes. Despite regional instability and uncertainty, *al HIMA* provides the possibility of revitalizing the human livelihoods, biodiversity and cultural heritage of the Mesopotamian Marshes. Some areas within the marshes are well suited to national park development as well as eco-tourism, similar to areas in Jordan and Lebanon. Nature Iraq has begun development of eco-tourism in the Central Marshes near Al-Chibayish.

Al HIMA and Traditional Resource Management

Al HIMA is a traditional system of resource tenure that pre-dates Islam, Christianity, and Judaism, and is an indigenous knowledge system that pre-dated the time of the Prophet Abraham. Al HIMA is the most widespread and longstanding indigenous / traditional conservation institution in the Middle East (Al-Jayyousi 2001; Bagader et al 2004; Bagader et al 1983; Faruqui et al 2001; IUCN 2007). The Arabic word “HIMA” literally means “a protected place” or “protected area.” Resources within the HIMA were collectively owned by the community, and access to outsiders was forbidden. Later its meaning evolved to signify managing a reserved pasture or other piece of land set aside seasonally to allow regeneration. In Lebanon and Jordan, modern al HIMA zones have been re-established around water bodies such as ponds, wetlands, wadis, rivers and coastal areas to allow ecological regeneration. Establishment of al HIMA zones prohibits human settlement in the protected areas, improving water quality, wildlife habitat and biodiversity in these zones.

Furthermore, *al HIMA* is an Arabic community based conservation practice of Traditional Environmental Knowledge (TEK) and Traditional Resource Management (TRM). TEK is an integral body of practical and spiritual knowledge that has evolved through the successful adaptation of an intelligent people to their particular ecosystem (Berkes 1999; Berkes et al 2000; Kimmerer 2011). The Mesopotamian Marshes provide a prototype of a culturalized landscape, sustainably managed for thousands of years (Stevens 2011). In order to support a sustainable harvest of their resources, the

Marsh Arabs actively managed the reeds (*Phragmites australis*), fish, water buffalo and other wildlife in the Mesopotamian Marshes (Stevens 2007). They employed various cultivation and harvesting techniques collectively called today Traditional Resource Management (TRM).

Traditional Resources Management practices include multiple species management; resource rotation; succession management; landscape patchiness management; and other ways of responding to and managing environmental uncertainty in order to optimize sustainable resource extraction (Berkes 1999; Berkes et al. 2000). TRM by Marsh Arabs included burning of senescent vegetation to stimulate new growth and create micro-habitats; multiple species management of plant resources of water buffalo fodder, waterfowl, fish, and macro-invertebrates; resource rotation; selective harvesting on a seasonal and phenological basis; spatial and temporal restriction of fish harvest during spawning; and landscape patchiness management (Stevens 2007). These traditional systems have similarities to adaptive management with its emphasis on feedback learning, and its treatment of uncertainty and unpredictability intrinsic to all ecosystems. Fire was the most important management tool for indigenous peoples around the world. Removing senescent vegetation through burning and tending also maintained a more open and park like physiognomy. Thus, the benefits from burning of senescent vegetation within this habitat would be three-fold. Burning maintained open water throughways for passage through the marshes, as well as providing habitat for fish and wildlife, water buffalo fodder, plant materials, and human habitation. Also, burning into organic soils created depressional micro-topography, creating prolonged ponding and extending aquatic habitat for longer durations during dry periods. The inundation period was also extended through reducing vegetation biomass, decreasing water loss through evapotranspiration.

Prayer, thanksgiving, and asking permission to harvest are intrinsic components of traditional resource management, although the specifics vary among individuals and local traditions. In the Mesopotamian Marshes, Marsh Arabs are predominantly Shi'a Muslim. "The significance of the environment in Islam is something created by God or Allah to not waste. Earth is considered to be the womb for all life, for from it all life forms gain nourishment. It is one womb that produces different types of offspring, different fruits and vegetables, resonating the power of its Maker" (M. Izzi Dien, 2000, page 12).

Nature and Culture in the Mesopotamian Marshes

The *al Ahwar*¹ marshes of southern Iraq and Iran encompass the largest wetland ecosystem in the

Middle East and western Eurasia, historically covering 5,790-7,770 square miles (15,000-20,000 km²) of interconnected lakes, mudflats, and wetlands within what is now Iraq and Iran. Often called the Mesopotamian Marshes, the area is considered by Muslims, Christians, and Jews as the site of the legendary Garden of Eden. The *al Ahwar* marshes, derived from Aramaic and means "whiteness" or "the illumination of sun on water", are the homeland of a distinct cultural group-the mostly Shi'ite Muslim Marsh Arabs. The Marsh Arabs are integral to the marsh ecosystem through their management of the ecosystem over thousands of years.

The pulses of floods from the mighty Euphrates and Tigris rivers bring essential nutrients and replenishing water to the freshwater and marine environment. The large alluvial marsh floodplain had the capacity to attenuate peak flood flows, and absorbed the deposition of sediment before it reached the Gulf. When healthy the marshes sequester carbon, ameliorate local climate, and prevent the dust storms that now impair air quality and exacerbate respiratory health problems. Wetlands act as regional kidneys, filtering and purifying water for drinking, preparation for prayer, bathing, irrigation, and livestock. Additionally, the marshes support the agricultural production of dates, millet, rice and wheat. A major refugia of regional and global biodiversity, the marshes provide habitat for a diverse community of fish and wildlife (Eden Again/ Iraq Foundation 2003). The marsh ecosystem also sustains an economically important local and regional fishery, providing spawning habitat for migratory fin fish and pinacoid shrimp.

The marshes play a role in an intercontinental flyway of migratory birds, support globally endangered species, and sustain the productivity of the Gulf fishery. The ecoregion is a "river of grass", with reed dominated marshes, swamps, shallow freshwater lake and seasonally inundated plains between the Tigris and Euphrates Rivers. An entire flyway of 1 to 10 million migratory waterfowl and shorebirds made their way from Siberian nesting grounds to the Mesopotamian marshes and northern Africa in the winter (Porter & Aspinall 2010; Salim, Porter & Rubec 2009; Scott 1995; Shattersfield et al 1998). Nature Iraq surveys 2005–2010 discovered or confirmed 190 breeding bird species for Iraq (Ararat, Fadhil and Salim 2012). Gavin Young (1977)

wrote eloquently “The birds are the Marshes’ crowning beauty. From November to early spring, the lagoons and reed-beds are flecked with the flashing colours of halcyon kingfishers and the gaudy purple gallinule. And the sky is dotted with floating eagles or mottled with whirling concourses of geese from Siberia and wild duck of many kinds”. Marsh biodiversity includes 28 species that are deemed to be of Conservation Concern, six species of which are Globally Threatened. Five of these species of Conservation Concern are “endemic species” found only in the Mesopotamian Marshes in Iraq. 22 species of globally endangered species and 66 at-risk avian species reside in the marshes (Birdlife International 2005; Ararat, Fadhil and Salim 2012).

In the Marsh Arab culture, nature and culture are inextricably intertwined. The Iraqi poet, Dr. Rasheed Bander al-Khayoun spoke of the potency of this relationship:

The people of al Ahwar need water in the marshes ... Their spiritual need surpasses the material need, since draining the marshes means putting the boats out of service and an end to regional poetry specific to al-Ahwar, and to singing, which can only be performed in that theatre of water and reeds and rushes.

The well-being of indigenous Ma'dan people is closely related to their water buffalo; the buffalo represent both a cultural keystone species and an umbrella species for biodiversity conservation in the marshes. Historically, the homes of Marsh Arabs floated on carefully crafted islands made of reeds; the structure and craftsmanship of the homes and mudhifs (guest house) date back to the time of the Sumerians. Each year the family added new layers of reeds and mud, with structures atop the islands constructed from arched bundles of reeds. “The family inhabited one side while livestock enjoyed the other (typically more spacious) end (Alwash, 2013). One cannot discuss the Ma'dan without talking about their use of water buffalo. "There are no houses in the marshes without a water buffalo. They are the main source of livelihood of people in the marshes. In fact, water buffalo are considered indicators of the quality of marsh life and restoration of the Iraqi marshes. The Ma'dan depend on their herds of water buffalo; they are valued for their dairy products, and are part of the family. I expect that the absence of water buffaloes will lead to the disappearance of people in the marshes." (UNEP 2001)

Unfortunately recent history has not been kind to the marshes or the people that inhabit them, as the area has been the scene of three military conflicts -the Iran-Iraq War (1980-1988), the Gulf War (1990-1991), and the 2003 invasion of Iraq led by the United States and Great Britain. For thirty-five years the Iraqi people and marshes have been in the middle of a war zone. As Hassan Partow reported to the United Nations concerning the fate of the Marsh Arabs: "With the outbreak of the Iran-Iraq war in 1980, their homeland was transformed into a frontline combat zone" (UNEP 2004; UNEP 2001). After the Gulf War ended in 1991, more than 90 percent of the marshes were drained, meaning the demise of a way of life that people had practiced for tens of centuries. The Marsh Arabs became environmental refugees, displaced from their ancestral homeland, with many taking refuge in Iran and supported by Baroness Emma Nicholson and the Amar Appeal.

In 2003, the Ma'dan began returning home with their water buffalo as locals began reflooding the marshes, fiercely breaking down the dikes and dams that destroyed their way of life. With good water years from 2003 to 2005, water returned to about 60 percent of the former marshland area (Richardson et al. 2005). Some areas rejuvenated beautifully, with lush growth of reeds and rebounding fish populations. The Ma'dan people who lived as environmental refugees throughout the 1990's were returning to the marshes with their water buffalo. However, despite the rehydration of such a large area of the marshes, much of the marsh ecosystem is in poor condition. According to a paper in *Science* (Richardson et al. 2005), less than 10 percent of the original marshes in Iraq remain fully functioning wetlands (Stevens 2007).

I interviewed some of the Ma'dan that fled Iraq to San Diego, California, and recorded their thoughts on the relationship with the marshes: "We grow like a bird in the marsh. Everything is in front of us. We canoe inside the marshes for reeds, for the animals and for fish...the marshes are like our body, our blood. You cannot miss one part. It all should stay as marsh." (Stevens 2007).

Through extensive interviews, I discovered that the Iraqis who lived in the marshes had a great wealth of biological knowledge about culturally significant resources, such as reeds, water buffalo, and fish (Stevens 2007). This traditional ecological knowledge is an important source of information for emerging models of ecological restoration and ecosystem management of the marshes. Because the marsh

ecosystem is adapted to human management, any effort to restore the ecosystem must also be an effort to reestablish Marsh Arab culture and make use of their traditional management practices. Thus maintaining the integrity, identity, and culture of the Marsh Arab society must be preeminent in restoration planning, and this must include encouraging the sustainable livelihoods of Marsh Arabs who have returned to the area. "The future of the 5,000-year-old Marsh Arab culture and the economic stability of a large portion of southern Iraq are dependent on the success of this restoration effort" (Richardson et al. 2005). However, the converse is equally true, the success of the restoration effort depends on the actions of the Marsh Arab culture and the economic stability of a large portion of southern Iraq.

"But as man can be broken but never defeated, nature can revive and marshes could be resurrected to embrace her lovers once again, as is happening on some areas of the Mesopotamian Marshlands." Jassim al Asadi, Nature Iraq.

Despite hope beating in the hearts of the Iraqi people, continued water diversions and dam construction upriver of the marshes have resulted in continuous desiccation of the marshes, and once again less than 20% of the marshes remain. The Tigris and Euphrates Rivers gain their water supply from snowmelt in the montane headwaters in Turkey, Syria and Iran. The proliferation of dams and irrigation schemes have disrupted natural flows and choked off much of the water supply. While Iraq has water-sharing agreements with Syria, Turkey and Iran, they are not effective in equitable water allocation to downstream water users, and there is a continuous loss of water quality, water supply, ecosystem functions and human ecosystem services such as water supply and air quality.

In October 2008, the Hawr al Hawizeh (a transboundary marsh straddling the border of Iran and Iraq and proposed as a Peace Park) was designated a Ramsar Wetland of International Importance (Nature Iraq et al 2008). Simultaneously in 2008, Iran dammed the Karkheh River and constructed a barricade along the Iran-Iraq border, cutting off the water source which feeds directly into the Hawr al Hawizeh marshes. This resulted in the desiccation and destruction of Iraq's most pristine remaining marsh. Reduced discharge and changes in water quality and river flow patterns have had a

significant negative impact on both the Hawizeh marshes and the downstream marine environment in the north western Persian Gulf (UN Integrated Water Task Force 2011).

Water, air, and land pollution is still extremely severe in many parts of Iraq, including the Mesopotamian marshes (Center for Strategic and International Studies 2004; Nature Iraq 2008). Iraq's environmental problems include (1) water resource pollution (including groundwater); (2) ecosystem and biodiversity degradation; (3) waste and sanitation disposal; (4) oil and other cement, fertilizer, and pesticide industry pollutants; and (5) the direct impacts of military conflicts (Bowman 2005). Reduced flows have exacerbated water quality problems and salt water intrusion. With low flows, salinity in the Shat al Arab River (the river formed by the confluence of the Tigris and Euphrates Rivers) has increased from one part per thousand to four to five parts per thousand (Marine Science Center, Basra University, unpublished data, 2009). People suffer from health problems from salty and polluted water; there is an inadequate water supply to support quality of daily life. Shad (*Alose hilisa*), symptomatic of an important local fishery, have declined 75 percent. Increased salinity, decreased dissolved oxygen, and increased turbidity are adversely affecting fish production and biodiversity throughout the Shat al Arab and the Persian Gulf (Sheppard et al. 2010).

Unfortunately, the future does not bode well. Unless urgent remedial action is taken, desiccation of the Mesopotamian marshlands is likely to continue unabated. In 1990, the GAP project in Turkey went online, and for a while the Euphrates River actually ran dry through the area of the marshlands (UN Committee on Economic, Social and Cultural Rights 2011). The post-1990 flow through the Euphrates is approximately half of what had been, while in the Tigris flows have decreased to almost a third of their pre-1990 discharge (UN Integrated Task Force 2011). Dams have reduced not only the overall water supply, but also its seasonality and the suspended sediment brought with the river water. Future proposed dams in the watershed are projected to deplete 138% of the mean annual flow of the Euphrates and 78% of the Tigris.

Recommendations/ Conclusion

The deep reciprocal relationship between people and the marshes they love is a sacred bond. As the palm trees, rice fields, water buffalo, and myriad winged birds are

displaced by salt encrusted wastelands, children begging for mercy instead of sitting in classrooms, as goes the water (See Figure 1). Water is the life blood of this virid oasis in the midst of desert sands and time; for life to endure, the stories and songs of the marshes must continue, the memories heal, and water be restored.

International efforts to develop equitable water allocation must be in place to avoid a global wasteland and unmitigated suffering throughout the watershed (UN Integrated Task Force 2011; Caponera 1992; Caponera 1973). Efforts should be intensified with Iran, Turkey and Syria, to release enough water to sustain life throughout the Tigris Euphrates watershed. There needs to be basin wide environmental and social impact assessments conducted, and alternatives flows and water allocation proposed to minimize adverse impacts. The international approach provides a top down approach to water management, and community based conservation efforts provide a local approach to equitable governance.

HIMA Mesopotamia promotes an exchange of information and scientific data among riparian users, government agencies, projects, and neighboring countries. And we want to capture and share the stories of the people who are being harmed by upstream water diversions and oil operations in the marshes, to protect the rights of people. Water is the life blood of the landscape surrounding the Mesopotamian Marshes of the Tigris Euphrates basin. The value of water in Islam is epitomized in the Quran. “Dry land, which is revived when rain is poured down upon it by God, is similar way to a person dying of thirst but saved by timely intervention (M. Izzi Dien, 2000, page 30). The holy Quran gives water a central role in the creation of life. Apart from water preservation, Islamic law provides an environmental system which includes protecting water from misuse and pollution. The main objective of the protection is to protect these public areas from misuse by people, pollution and congestion” (M. Izzi Dien, 2000, page 36).

The ancient system of traditional ecological knowledge, resource management and local governance utilized by the Marsh Arabs has not been termed *al HIMA* to my knowledge. However, the traditional system of community based conservation of the Marsh Arabs is culturally relevant; more research needs to be done to authenticate its relevance as a broad community based land management concept, as well as to determine the specific knowledge and concerns of the specific cultural groups within

the marsh landscapes. Also, traditional knowledge and priorities of men and women is quite different, and efforts to interview both men and women are essential to implementation of a fair and just system of local governance and community based conservation. For example, in my interviews with Iraqi communities, men universally wanted to return to their lives in the marshes to fish, hunt, care for the water buffalo, and live a life of freedom (Stevens 2007). Women were concerned about health care, access to diapers, education for their children, and availability to have transportation, roads and modern amenities for their communities. Access to cell phones, computers, television, and modern conveniences is pretty much universally desired by at least the younger members of society.

Contemporary concepts of environmental protection, eco-cultural restoration, and sustainable development enhance and embellish traditional systems of land management and local governance. Community Based Natural Resources Management System that promotes sustainable livelihood, resources conservation, and environmental protection is justified in the *al ahwar* provided the following conditions are met: 1) it should be created in response to local public need; 2) it must be established for purposes pertaining to the public welfare; 3) it must avoid causing undue hardship to the local people by, for example, depriving them of indispensable resources; and 4) the purpose of the HIMA site is to protect public interest, human health, and revitalization of ecosystem services such as clean water and air (Saleh, Hashemi and Hawamdeh 2013; Kilani, Serhal & Llewelyn 2007).

“Reviving local knowledge and wisdom through HIMA system inspired from Arabic culture as a means for effective community-based resource management can inform new models for adaptive and responsive management. IUCN is keen to operationalize the HIMA concept in West Asia through working with members,” said Dr. Odeh Al-Jayyousi, IUCN West Asia Regional Director.

Reviving the HIMA system in Iraq requires a commitment to the principles of social justice, human rights and ecological sustainability along with adaptive management and community-based Traditional Resource Management. I recommend that in order to achieve just and equitable sustainable development, the concept of

reverential development be utilized. The germinative kernel of development is not just biological life, but life with meaning, dignity and fulfillment.

“A reverence for life and development are intricately connected in the framework of thinking and action in which the meaning of human life prevails, and in which respect for nature is part of our conscious and compassionate interaction with all there is. Reverential development is unitary in the broadest and deepest sense: it combines the economic with the ethical and reverential; it combines contemporary ethical imperatives with traditional ethical codes; it attempts to serve all the people of all cultures; and it promises to bring about a peace between humankind and nature” (Henryk Skolimowski (1990) p 103).

Implementing *al HIMA* in the marshes, prioritizing water allocation for flourishing marsh sites, and generating international water allocation agreements are the path to a sustainable future. Developing a contemporary *Al HIMA* system in the Mesopotamian marshes, based on community based conservation, will help to build a more reverentially sustainable marshland in Iraq. The ancient cultures and biodiversity of the marshes are a treasure at a world heritage scale. The Mesopotamian Marshes are a highly degraded and desertified landscape. Judicious and equitable allocation of water resources to sustain local human communities and environmental protection is critical to the sustainable future of the marshes.

The *al HIMA* system in Jordan and Lebanon provide an ancient and indelible trail for the Iraqis to follow. Despite regional instability and uncertainty, *al HIMA* provides the possibility of revitalizing the biodiversity and cultural heritage of the Mesopotamian Marshes, which are also well suited to eco-tourism. Nature Iraq has begun restoration efforts and development of eco-tourism in the central marshes near Al-Chibayish, similar to the eco-tourism developed in the Kfar Zabad wetlands in Lebanon (see Figure 2). In writing about the Kfar Zabad wetlands of Lebanon during a time of violence and duress, Gary Nathan (2008) writes “environmental injustice hurts individuals, disrupts their communities, and in a tragic way impairs their capacity to care adequately for one another and for the very land and waters than sustain them” (page 129).” Listen more deeply to the voices most often ignored in this world, much of what I hear is the keening of displaced peoples who feel they have been dismissed and

rendered refugees unworthy of access to the lands they most deeply love. They struggle to regain their dignity, which they pray will come through reconnecting with their ancestral lands one day.”

There is no doubt that the Iraqi people desperately want their environment and their lives to return to a natural and healthy state.

“All the people dream of is the marshes full with fishes, birds, cows, and buffalos with modernized passageways and islands, because it is this vision that is in harmony with their spiritual heritages as found in their songs, poems, and tales” (Rasheed Bander al Khayoun, pers comm., 2008).



Fig. 1. Restoration of traditional mudhif in contemporary Marsh Arab village site. Photo by Jassim al Asadi, Nature Iraq.



Fig. 2: Photo of drying Mesopotamian Marshes. Photo by Jassim al Asadi, Nature Iraq.

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THE HIMA SYSTEM – HOPES AND IMPEDIMENTS: A commentary on global trends

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Abstract

This paper will deal with the HIMA as an universal idea practiced by most traditional societies and which has been debased and corrupted by the development oriented economic model which puts huge pressures on local resources. There may be differences in emphasis depending on local conditions, for example, geography, climate, culture etc. but the basic idea is one of conservation of a specified zone for the benefit of the community. The HIMA system that emerges from the Islamic ethos lends itself to considerable flexibility and adaptability and it could therefore be widely applied as a potential answer to some of the conservation issues we are confronted with today. Another question that would be germane to ask is would an institution that was created to work under one set of conditions produce the results it was intended to deliver in another, particularly in an economic climate that is almost exclusively consumerist. This paper is an attempt at thinking outside the box and will also examine the potential relationship between sustainability and the HIMA system and pose the question of viability in a milieu that is hostile to the environment.

THE HIMA IN CONTEXT

Most traditional societies lived “sustainably” in their relationship with the environment to a greater or lesser degree long before this term was invented. The HIMA system is one such expression of sustainability as defined by the ethics surrounding a developing knowledge base now coming to be known as Islamic natural resources management. The revival of interest in the HIMA system which had reached its nadir in recent times is to be welcome but this renewal throws up other issues which we need to consider especially as the conditions today couldn’t be more distant than those that existed when the first HIMA was created by the prophet of Islam nearly 1500 years ago. Sustainability was as far away from people’s minds in those distant days as one could imagine as this was not an issue as the natural world was not subjected to the kind of abuse it is experiencing today. If the HIMA system is worth reviving today it is only because it is part of the conservationist Islamic ethos and it will thus hopefully address, if only in part, the issues relating to environmental degradation in Muslim countries. As the HIMA system is only one of several conservation tools that Islamic societies have developed over the centuries it would be germane to consider what the wider teaching has to offer.

Islamic environmentalism has its roots in the Qur’an and the sayings and actions of Prophet Muhammad known as the *Sunnah*. The Qur’an asserts that everything belongs to God: “He to whom the kingdom of the heavens and the earth belongs..... He created everything and determined it most exactly” (25-2). The real owner of the natural world is the Creator and He has “showered His blessings upon you both outwardly and inwardly” (31-19). He appointed us as His “*Khalifs* (stewards) on the earth so He could test you regarding what He has given you (6-167). This situates us in the arena of a moral relationship with the rest of creation which demands both self-restraint as a control over greed and an awareness of the needs of others which in its best manifestation is generosity. The Qur’an and the *Sunna* formed the basis of the *Shariah* out of which Islamic law (*Fiqh*) evolved

The *Sunnah* of the Prophet defined these injunctions of the Qur’an as follows –

- The elements that compose the natural world are common property
- The right to benefit from natural resources is a right held in common

- There shall be no damage or infliction of damage bearing in mind future users

As an extension of this foundational code Muslim legalists have over the centuries established the following principles. A person invalidates his rights over a particular natural resource if by exercising it he

- Causes detriment to another
- Causes detriment to another without corresponding benefit to the other
- Causes general detriment to society

Additionally –

- Every member of society is entitled to benefit from a common resource to the extent of his need so long as he does not violate, infringe or obstruct the equal rights of other members of society
- Accountability rests with the user
- In return for benefits derived from a renewable resource the user is obliged to maintain its value
- If the user causes destruction, impairment or degradation he is held liable to the extent of putting right the damage caused

Over time the following legislative principles evolved to define human relationships with the natural world -

- Allah is the sole owner of the earth and everything in it. People hold land on usufruct - that is for its utility value only. There is a restricted right to public property.
- Abuse of rights are prohibited and penalised.
- There are rights to the benefits derived from natural resources held in common.
- Scarce resource utilization is controlled
- The common welfare is protected.
- Benefits are protected and detriments are either reduced or eliminated.

At the same time numerous land management systems including the HIMA, which is pre Islamic in origin, evolved in parallel to the fiqh to meet the daily concerns of an expanding Muslim community. The following environmental tools are representative of these developments -

- People who reclaim or revive land (*ihya'al mawat*) have a right to its ownership.

- Land grants (*iqta* ') may be made by the state for reclamation and development.
- Land may be leased (*ijara*) for its usufruct by the state for its reclamation and development.
- Special reserves (HIMA) may be established by a community or the state for use as conservation zones.
- The state may establish inviolable zones (*al-harim*) where use is prohibited or restricted. People have a right in the Shariah to create such zones managed by themselves and where use is severely restricted. Additionally, it is permitted to establish these zones adjacent to sources of water and other utilities like roads and places of public resort.
- Makkah and Madinah are known as the Two Inviolable Sanctuaries (*al-haramain*) where trees cannot be cut down and animals are protected from harm within their boundaries. They served as examples of best practice.
- Charitable endowments (*awqaf*) may be established with specific conservation objectives.ⁱ

SUSTAINABILITY

Sustainability is a reaction to the unprecedented attack the human race is perpetrating on the natural world. As the once autonomous HIMA systems will now be functioning within the economic and development model that is now the modus operandi of the modern world it will be useful to look at this idea in some detail and draw some conclusions about the viability of our intentions.

The idea of Sustainable Development was popularised by the Bruntland Reportⁱⁱ which was published in 1987. This report was an attempt at refocusing the nature of economic development given the discovery that the natural world was being denuded by human activity. Bruntland defined sustainable development as follows -

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs". It contains within it two key concepts:

- the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and

- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."

Nobody would disagree with the first of these propositions as it is about meeting the needs of people with emphasis given to the neediest. But the second idea appears to be missing a point when no recognition is given to the limitations imposed by the carrying capacity of the planet as this over rides the state of technology and social organization. There is no reference to the over consuming developed world and no indication as to how in a finite world resources could be shared more equitably. As we see –

Given current technologies, levels of consumption, and socioeconomic organization, has ingenuity made today's population sustainable? The answer to this question is clearly no, by a simple standard. The current population of 5.5 billion (This article from which this quote is drawn was written in 1992 and world population has passed the 7 billion mark in 2011) being maintained only through the exhaustion and dispersion of a one-time inheritance of natural capital [], including topsoil, groundwater, and biodiversity. The rapid depletion of these essential resources, coupled with a worldwide degradation of land [] and atmospheric quality [], indicate that the human enterprise has not only exceeded its current social carrying capacity, but it is actually reducing future potential biophysical carrying capacities by depleting essential natural capital stocks.ⁱⁱⁱ

The International Institute for Sustainable Development (IISD)^{iv} in its attempt to define this term proposes that we see the world as a system that connects space and a system that connects time. The idea of space helps us to understand that climate change does not recognise national boundaries and the idea of time helps us to understand that the earth is a legacy we inherit and bequeath from generation to generation. The IISD extends this idea of systems thinking to the concept of sustainable development. System thinking helps us to understand our world and us. “The problems we face are complex and serious and we can't address them in the same way we created them. But we can address them”. That is, the thinking that produced the problems cannot produce the solutions.

This is an instructive way of looking at the issues that surround Sustainable Development but IISD manifest a universal reluctance to deal with what we consider to be the root cause of the problems that have been thrust on us and which are now addressed in dire terms by all the main international agencies involved in this matter. This is the financial system which has been engineered to drive all our lives. Can the very system that has created the most advanced civilisation ever be the cause of its downfall? Our position is that any solution that is based on this system will fail because as it is contrived today it is deeply flawed and dangerous to the well being of planet earth. At the root of this is our very notion of money and how we have managed to trick ourselves into believing that material progress can be endless and refuse to face the fact that planet earth is finite.

Bruntland was clearly committed to redressing economic imbalances but the UN's 2011 Human Development Report^v "projects a disturbing reversal of trends if environmental deterioration and social inequalities continue to intensify, with the least developed countries diverging downwards from global patterns of progress by 2050". One suspects a failure of comprehension if not irresponsible obfuscation at this point because redressing social inequalities on the scale envisaged at the level of the Millennium Development Goals (MDG)^{vi} launched in 2000, for example, requires such a massive effort that drastic environmental deterioration will follow as night follows day. But there is a way out of this conundrum: Will the developed countries agree to an upper limit to growth - to a tightening of their belts - so the poor can loosen theirs a little?

Here needs to be a radical shift in thinking in the current received economic wisdom as there cannot be a perpetual increase in living standards and everlasting growth for all as the Earth is finite. "The 2011 Report concludes with a call for bold new approaches to global development financing and environmental controls, arguing that these measures are both essential and feasible". This again studiously avoids the global financial crisis that has been upon us since 2008 and hardly a mention of the irresponsible manner in which certain parts of the developed world have been conducting their affairs.

Sustainable development has yet to live up to the expectations of policy makers and turn into the practical reality that it is intended to be. The problem is that

sustainable development is expected to function within the bosom of an economic growth model which is hostile to it. Economic growth is exponential and there is no longer any doubt that this is the driving force causing the global economy to breach the physical limits of the earth^{vii}. The driver for this growth is the global financial system that has contrived to provide the liquidity that lubricates the kind of activity that is destroying the planet. The Muslim thinker Seyyed Hossein Nasr describes this condition thus, "There is near total disequilibrium between modern man and nature as attested by nearly every expression of modern civilisation which seeks to offer a challenge to nature rather than to co-operate with it"^{viii}.

AN AWAKENING?

Rachel Carson wrote *Silent Spring*^{ix} in 1962. That was fifty years ago and it was a wakeup call that could not be ignored. She was the first to make the connection between pesticides, pollution and human health and rightly given the credit for ushering in the modern conservation movement. The knock on effect this triggered ultimately led to our flirtations with sustainability and this fifty year time span has seen a revolution in matters environmental. What emerged in this period particularly at the top end of the institutional spectrum are a proliferation of organisations, conferences, declarations and a plenitude of platitudes framed in a background of perpetual crisis.^x

With hindsight these international endeavours could be seen as three separate but overlapping initiatives in attempting to resolve the issues Rachel Carson uncovered. These initiatives could be roughly categorised under the following headings^{xi} –

- Conservation and Biodiversity
- Environment and Development
- Climate Change

The issues relating to Conservation and Biodiversity were first addressed in 1968 when UNESCO convened the Intergovernmental Conference for Rational Use and Conservation of the Biosphere^{xii}. This conference was perhaps the first to recognise that resources are being irrationally used and where early discussions on the ideas associated with ecologically sustainable development took place. In 1980 Jimmy Carter when he was President of the United States (1977-81) commissioned *Global 2000*.^{xiii}

This report recognized biodiversity for the first time as “critical to the proper functioning of the planetary ecosystem”. The UN World Charter for Nature^{xiv} came out in 1982 and added to the work done by *Global 2000* and adopts “the principle that every form of life is unique and should be respected regardless of its value to humankind. It calls for an understanding of our dependence on natural resources and the need to control our exploitation of them”. The Qur’an asserts in this regard –

There are no creatures that dwell on the earth nor birds that fly who are not communities like yourselves

Qur’an 6:38^{xv}

The Millennium Ecosystem Assessment (MA)^{xvi} was published in 2005, the same year the Kyoto Protocol came into existence. The bottom line of the MA findings was that human actions are depleting Earth’s natural capital and this is putting such strain on the environment that the ability of the planet’s ecosystems to sustain future generations can no longer be taken for granted.

Initiatives that fall under the heading of Environment and Development were given a lead in 1971 by a panel of experts meeting in Founex, Switzerland. The Founex Report^{xvii} that emerged from these deliberations called for the integration of environment and development and it identified industrially advanced countries, high levels of economic development and large productive capacities amongst others as being responsible for the damage caused to the human environment and also threatens the whole world. The venerable International Union for the Conservation of Nature (IUCN) released the World Conservation Strategy report^{xviii} in 1980. It would seem that by the early 1980’s the fog that had clouded the connection between the environment and economic development was beginning to lift and the International Conference on Environment and Economics convened by the Organisation of Economic Corporation and Development (OECD)^{xix} in 1984 concluded that the environment and economics should be mutually reinforcing. The UN Commission on Sustainable Development was established in 1993 post the Earth Summit that was held in Rio de Janeiro in 1992 that produced Agenda 21.^{xx} The World Summit on Sustainable Development held in Johannesburg In 2002, was reported as a frustrating experience and concluded that “... sustainable development was deemed to be whatever compromise governments happen to reach on trade, subsidies, investment and aid, and whatever projects corporations see

fit to finance”^{xxi} There was no reference to sustainability in the UN Millennium Development Goals^{xxii} that was launched in 2000.

The third category of initiatives in the post Carson world related to Climate Change. This aberration was first recognised as an issue in 1985 when global warming was predicted at a conference in Villach, Austria.^{xxiii} The Intergovernmental Panel on Climate Change (IPCC)^{xxiv} was established in 1988 and the Kyoto Protocol,^{xxv} which committed national governments to reduce global warming, came into force in 2005.

The international community is now having their work cut out to reach a consensus on the successor to the Kyoto agreement.

The sober truth is that after all this coming and going it has just been announced that the carbon concentrations in the atmosphere has passed the 400 mark.

AN ISLAMIC RESPONSE

The primary duty of the Islamic state is to promote public welfare –

Let there be a community among you who call to the good, enjoin the right and forbid the wrong. They are the ones who have success

Qur'an 3:104

As part of these functions the state has the mandate to protect land and natural resources from abuse and misuse, provide market spaces where free trade can take place and mint gold and silver coins as means of exchange and stores of value. From its earliest years the Islamic state established an agency known as the *hisba* whose specific task was to protect the people through promoting the establishment of good and forbidding wrong doing. This agency was headed by a learned jurist (*muhtasib*) who functioned like the chief inspector of weights and measures and chief public health officer rolled into one. She (the very first *Muhtasib* was a woman) was also responsible among other similar duties for the care of the environment.

If we look at this from a systems thinking perspective discussed earlier (see Sustainability above) the HIMA should be seen as a part of wider system (see The

HIMA in Context above) and if the institutions discussed in the first section of this paper were in place there would have been no need to invent an “Islamic Environmentalism” to deal with the injuries we have been subjecting planet earth. Nor would we be discussing the reinstatement of the HIMAs.

Contrary to received opinion the *Shariah* (also a system) has been evolving continuously since the emergence of Islam in the 7th century. This process should be called upon to guide us in the formulation of a specifically Islamic science (or system?) concerning the environment and its protection. This has not been necessary in the past but the challenge of our times is to have recourse to Islam’s fluidity. We have in the past twenty or so years laying down the foundations upon which Islamic conservation practices could be built directly from the Qur’an and which would make sense for us in the present day. We have called this ‘Ilm ul Khalq (Knowledge of Creation) which could be summarised as follows -

Tawhid - the Unity Principle

This embodies the holistic approach which is intrinsically Islamic. *Tawhid* is the foundation of Islamic monotheism, which affirms the unity of the Creator and His Creation. This is the bedrock of the holistic approach in Islam as this affirms the interconnectedness of the natural world: “What is in the heavens and the earth belong to Allah. Allah encompasses everything” (*Qur’an* - 4:125)

Fitra - the Creation Principle

This leads us to an understanding the location of the human in the creational pattern. The *Fitra* principle describes the origination of the human species within the bosom of the natural world. It is a profound reminder of our place in the natural order: “Allah’s natural pattern on which He made mankind” (*Qur’an* - 30:29)

Mizan - the Balance Principle

This gives us an understanding of the quality of the natural order which is basic and all pervasive. The natural world, which we are a part of, is held together because it is in *mizan* – a state of dynamic balance. This is another way of saying that the natural

order works because it is in submission to the Creator. It is Muslim in the original, primordial sense. “He erected heaven and established the balance, so that you would not transgress the balance. Give just weight – do not skimp in the balance” (Qur’an 55:5, 6, 7)

Khalifa - the Responsibility Principle

This gives us an understanding of the role of the human species in the grand pattern of creation. This principle establishes our role as the guardians of the natural world. God created everything for humankind and appointed it the *Khalif* (vice-regent) on this earth. “It is he who appointed you *Khalifs* on this earth” (Qur’an - 6:167).

This approach in addition to facilitating a rapid spread of the conservationist language in the Qur’an is intended to start a scholarly dialogue with those who wish to participate in extending and improving this knowledge base. In this regard there is a second development that cannot be allowed to go unnoticed. Islamic scholars in Indonesia have been busy putting together a teaching they have chosen to call *Fiqhi Lingkunkan*^{xxvi} (Jurisprudence of the Environment; in Arabic *Fiqh al Bi’ah*). This was initiated at a gathering of high ranking Indonesian *ulema* who met in May 2004 under the sponsorship of the Indonesian Forests and Media Campaign (INFORM). The objectives of this gathering were to formulate a conservation policy grounded in Islamic teachings based on preserving the environment and the sustainable use of natural resources, and resulted in some seminal contributions derived from the Qur’an, hadith literature and classical texts. Except for a colloquium of scholars organised in Jakarta by the Birmingham based Islamic Foundation for Ecology and Environmental Sciences (IFEES) in 2007 news of this exceptional development has yet to reach the wider Islamic world.

IFEES has been working in many parts of the world with government agencies, NGOs, local communities and mosques attempting to give fresh expression to the Islamic Environmental ethic. The factors discussed above have influenced this work in various ways and the following examples will serve to illustrate the possibilities extant in this approach. The *Shariah* evolved over fourteen centuries in what was an Islamic milieu and until it can regain its rightful place amongst Muslims once again there is a need to work piecemeal and be inventive in giving the best expression of Islamic environmental tradition within the secular dominated global system. The challenge is

two-fold: firstly to discover the teachings and attempt to make sense out of them in their practical day to day usefulness and secondly to change attitudes and behaviour and reverse the negative impact of human activity on a finite planet. The following two examples will serve to illustrate the possibilities inherent in this approach.

Marine conservation in Zanzibar^{xxvii}

This project was funded by CARE International (USA) and had the full support of both the Government and the Mufti of Zanzibar. IFEES acted in the capacity of consultants and trainers to the project known as the Misali Ethics Pilot Project. The project objectives were to sensitize a particular fishing community to the Islamic conservation ethic and implement these teachings within the parameters of an integrated conservation and development project. The Misali Island Marine Conservation Area (MIMCA) the target zone of the project lies off the west coast of Pemba, the northern-most island of the two that comprises Zanzibar. MIMCA is 22 km². in area and has at its centre a small uninhabited island of coral rag known as Misali. It is this zone that was accepted by the community as a HIMA.

Promoting Farm Islam in Tanzania^{xxviii}

The Farm Islam project where IFEES are again acting as trainers and consultants manifests two aspects of the values embodied in the *shariah*. The first is the care and concern shown to orphans and the second, the protection of the environment. Islamic Help, the Birmingham based aid agency, has uniquely integrated the realisation of these two values into this pioneering project in Tanzania. Apart from providing housing for one hundred and twenty orphans in a family centred atmosphere in its thirty acre site this project will incorporate a pilot scheme involving the introduction of *HIMA* and *harim* systems. As food self-sufficiency is one of the primary objectives of this project it is intended to introduce modern techniques derived from permaculture and agro forestry practices within the fold of this project. Food security takes priority and this project will operate an open door policy when it comes to sharing the lessons learnt from this endeavour with the local population and further afield.

CONCLUSIONS

The development and application of principles governing Islamic Natural resources management and institutions such as the HIMA have seen a decline over the past two centuries as aggressive European colonial policies, creeping globalisation, the fractional reserve banking system, the economics of industrialisation and the profit motive gradually overtook this model. We are experiencing the consequences of this now. However, there are clear indications as to how this Islamic heritage could again be put to good use in order to address the issues surrounding sustainable development. We also need to consider that in today's global order of which Muslims are a significant part, conspicuous consumption tops the list of priorities. Muslim nation states^{xxix} of which there are now about sixty are willing co-optees to this consumer ethic. It should be obvious from this that it becomes almost impossible for Muslims whether individuals or nation states, to live according to a normative Islam today. There is now a schizoid tendency in Muslim society whereby it strives to maintain its deep attachment to Islam while it insists on enjoying the fruits of consumerism.

One could say with a reasonable degree of certainty that the environmental problems we see today would not have arisen in a society ordered in accord with Islamic principles because its world view "defined limits to human behaviour and contained excess".^{xxx} Safeguarding against human excess has the effect of protecting the natural world. Human behaviour is governed by the *Shari'ah* which evolved holistically and there is nothing to stop its further evolution to address contemporary issues. However there are important impediments to its proper application today in what is now a complex political climate. They are –

- The *Shari'ah* is marginal even in Islamic states because of the dominance of the global system now in place. The influence of international trade and finance is a case in point.
- The *Hisbah* is an agency that has the potential to set down environmental guidelines and act to resolve conflict in matters relating to natural resource utilisation but it is now virtually non-existent.

- The state and the apparatus of government have separated themselves from the body of Islamic scholars (*ulema*) who are coming to be known as "the religious authorities", a euphemism for a clergy, which is not recognised in Islam.^{xxxii}
- Following the Western model, the specialists and ministries of Muslim states increasingly function in watertight compartments. As a mirror of what is happening in the West, Muslim economists and environmentalists tend to be two separate species with opposing perspectives.
- The nation state model, which is now the universally accepted form of governance which all Muslim countries have adopted, considers economic development as its highest priority. Coping with issues relating to sustainability is much lower down the scale.

Whilst there are impediments to the implementation of solutions based on the Islamic world view it is important for Muslims to both engage in the debate concerning sustainability and at the same time work in partnership with the other traditions and like-minded groups and organisations. At the root of the crisis is personal behaviour and if Muslims were true to themselves their spontaneous inclination would be to prioritise the welfare of others with whom they share a finite planet, which needs to be cared for in the interests of the generations to come.

Muslims have their own unique part to play in finding solutions to our current dilemmas. Not only that, they could be strongly motivated to work with others if only for the fact that future unborn generations have a common inheritance. If anything this crisis should remind Muslims of the deep ecology of their faith - that is the unified and holistic nature of creation. Climate change makes no distinction between race, religion, culture and lines on the map. As they comprise a fifth of the world's population potentially they should at least be contributing a fifth part of the solution.

ⁱ For an extended treatment of this subject see

(a) Bagadeer A.A and others (1994) IUCN Environmental Policy and Law Paper No.20, second revised edition. Gland, Switzerland and Cambridge, UK.

(b) Llewellyn O. (1992) National Legal Strategies for Protected Areas Conservation and Management. Paper delivered at IVth World Congress on National Parks & Protected Areas, Caracas, Venezuela.

(c) Dien M.I. (2000) The Environmental Dimensions of Islam. Lutterworth, Cambridge, England.

ⁱⁱ Report of the World Commission on Environment and Development – Our Common Future (popularly known as the Brundtland Report), Oxford University Press, 1987.

ⁱⁱⁱ Gretchen C. Daily and Paul R. Ehrlich, Population, Sustainability, and Earth's Carrying Capacity: A framework for estimating population sizes and lifestyles that could be sustained without undermining future generations, American Institute of Biological Sciences, Stanford, BioScience, November, 1992. Also see

<http://dieoff.org/page112.htm>, accessed 14th May 2013.

^{iv} A Canadian based think tank set up in 1988 to look at development and sustainability issues; see <http://www.iisd.org/sd/#one>; accessed 14 May 2013.

^v Human Development Report 2011: Sustainability and Equity: A Better Future for All, UN, New York.

^{vi} Millennium Development Goals;

http://www.un.org/millenniumgoals/pdf/MDG_FS_1_EN.pdf; accessed 14 May 2013.

^{vii} Brown and others, The Driving Force - Exponential Growth, Earthscan, London, 1992.

^{viii} Nasr S. H., *Man and Nature*, Unwin Paperback, 1990, London. (First published 1968 by George Allen and Unwin).

^{ix} Rachel Carson, *Silent Spring*, Houghton Mifflin, New York, 1962.

^x For a summary of the post Carson initiatives that eventually emerged as Sustainable Development see http://www.iisd.org/pdf/2009/sd_timeline_2009.pdf; accessed 14 May 2013.

^{xi} For an extended treatment of this subject see Fazlun Khalid 2013. *The Environment And Sustainability – An Islamic Perspective* in Bell and others 2013. *Sustainability in Crisis*, Faraday Institute for Science and Religion, Cambridge, UK.

^{xii} Intergovernmental Conference of Experts on the Scientific Basis for Rational Use and Conservation of the Resources of the Biosphere; Paris; 1968. See <http://unesdoc.unesco.org/images/0001/000172/017269eb.pdf>; accessed 14 May 2013.

^{xiii} Global 2000; See

http://en.wikipedia.org/wiki/The_Global_2000_Report_to_the_President; accessed 14 May 2013.

^{xiv} [UN World Charter for Nature](#); see

<http://www.un.org/documents/ga/res/37/a37r007.htm>; accessed 14 May 2013.

^{xv} Assistance in the translation of the Qur'an has been sought from i. The Holy Qur'an Abdullah Yusuf Ali, ii. The Glorious Qur'an Marmaduke Pickthall, iii. The Message of the Qur'an Muhammad Asad, iv. The Noble Qur'an Abdalhaqq and Aisha Bewley, v. The Qur'an M.A.S. Abdel Haleem.

^{xvi} Millennium Ecosystem Assessment; See

<http://www.millenniumassessment.org/en/index.html>; accessed 14 May 2013.

^{xvii} The Founex Report; See

<http://www.stakeholderforum.org/fileadmin/files/Earth%20Summit%202012new/Publications%20and%20Reports/founex%20report%201972.pdf>. Accessed 14 May 2013.

^{xviii} World Conservation Strategy - Living Resource Conservation for Sustainable Development Gland : IUCN, 1980. Also See <http://data.iucn.org/dbtw-wpd/html/WCS-004/cover.html>; accessed 14 May 2013.

^{xix} The International Conference on the Environment and Economics; See

<http://sedac.ciesin.columbia.edu/entri/texts/oecd/OECD-4.02.html>. Accessed 14 May 2014.

^{xx} Agenda 21; see http://en.wikipedia.org/wiki/Agenda_21. Accessed 14 May 2014

^{xxi} Kenny Bruno, Sustainable Development: R.I.P. - [The Earth Summit's Deathblow to Sustainable Development in CorpWatch](#), September 4, 2002. See <http://www.corpwatch.org/article.php?id=3831>. Accessed 14 May 2013.

^{xxii} Millennium Development Goals; see <http://www.un.org/millenniumgoals/>. Accessed 14 May 2013.

^{xxiii} Villach Conference on Global Warming; see <http://what-when-how.com/global-warming/villach-conference-global-warming/>. Accessed 14 May 2013.

^{xxiv} The Inter Governmental Panel on Climate Change; see <http://www.ipcc.ch/>. Accessed 14 May 2013.

^{xxv} The Kyoto Protocol see <http://www.kyotoprotocol.com/>. Accessed 14 May 2013.

^{xxvi} K. H. Dr. Ahsin Sakho Muhammad & others eds. 2004. *Fiqhi Lingkungan*. Indonesian Forests and Media Campaign (INFORM), Java, Indonesia.

^{xxvii} Fazlun Khalid & Ali Thani 2007. Teachers Guide Book for Islamic Environmental Education. Islamic Foundation for Ecology and Environmental Sciences, Birmingham UK.

^{xxviii} Kamran Fazil, Ishak Ahamad & others 2013. Farm Islam – An Islamic Guide to Eco Friendly Farming. Islamic Help, Birmingham, UK & Tanzania.

^{xxix} By our reckoning there are only two countries that have declared themselves as Islamic States and they are Saudi Arabia and Iran. The rest of the fifty six states which are part of the Organization of Islamic Conferences (OIC) are states with Muslim majorities run on secular lines.

^{xxx} Fazlun Khalid, *Islamic Pathways to Ecological Sanity - an Evaluation for the New Millennium* (p.7). Ecology and Development, Journal of the Institute of Ecology no. 3, 2000, Bandung, Indonesia.

^{xxxi} This is the case in the Sunni tradition of Islam which accounts for about 85% of the world's Muslim population. The Shia tradition has an established clergy.