



A Toolkit for Mainstreaming Biodiversity in Jordan



INTERNATIONAL UNION
FOR CONSERVATION OF NATURE

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L I S T O F A C R O N Y M S

ADDSSR	Agriculture Directorate for Developing the Sharah Region (MOE)
CBD	Convention on Biological Diversity
DBR	Dana Biosphere Reserve
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
IBA	Important Bird Areas
ICARDA	International Centre for Agricultural Research in dry Area
IUCN	International Union for Conservation of Nature
MAB	Man and the Biosphere
MOE	Ministry of Environment
MOA	Ministry of Agriculture
M&E	Monitoring and evaluation
MSP	Medium – Size Project
NSAD	National Strategy for Agriculture Development
NBSAP	National Biodiversity Strategy and Action Plan
RBG	Royal Botanic Garden
RSCN	Royal Society for Conservation of Nature
SLM	Sustainable Land Management
UNCCD	United Nation Convention for Combating Desertification

About the Toolkit

This toolkit is a component of a Global Environmental Fund (GEF) Medium-Size Project (MSP) "Mainstreaming Biodiversity in the Sylvo-pastoral and Rangeland Landscapes in the Al Sharah Agricultural Development Region of Southern Jordan". This GEF funded project aims at promoting a novel approach to mainstream biodiversity in Jordan by supporting new approaches to ecosystem management, policy implementation, partnerships, more effective capacity development, institutional development and community collaboration. The specific objective of the project is to mainstream biodiversity conservation in sylvo-pastoral and rangeland management activities particularly in buffer zones associated with existing (and proposed) Nature Reserves and to produce local economic benefits and poverty alleviation in a sustainable and replicable manner.

Another aim of developing this tool-kit is to support the implementation of the National Biodiversity Strategy and Action Plan (NBSAP) through "mainstreaming" biodiversity into other sectors. Mainstreaming biodiversity aims at particularly avoiding the unintended loss of/or negative impacts on the environment .The most strategic pathway is to work for a "win-win" arrangement for biodiversity conservation that meets the obligations or mandate of the biodiversity and rangeland sectors involved. This tool-kit will be mainly designed for policy makers and is intended to support biodiversity. The toolkit also aims to develop mainstreaming efforts by synthesizing experience to date that can help make a strong business case for integrating biodiversity in policy, planning and budgetary processes.

The information in this toolkit is largely based on a review of existing literature and case studies from experts on biodiversity – development mainstreaming, and the fifth national report on the Implementation of the Convention on Biological Diversity in Jordan.

Who is this toolkit for?

The Biodiversity Mainstreaming Toolkit will be useful for any actors and decision makers working on, or affected by, land-use planning and environmental degradation, biodiversity loss or whose decisions impact the environment. Among those are:

- Spatial planners.
- Environmental practitioners.
- Politicians.
- Local and provincial governments.
- Local communities.
- NGOs.
- Community-based organizations.
- Private sector organizations.

Introduction

Drylands are defined by water scarcity and characterized by seasonal climatic extremes and unpredictable rainfall patterns (Davis et al., 2012). This definition is in line with the definitions of International Union for Conservation of Nature (IUCN), United Nations Environment Programme (UNEP), the Convention on Biological Diversity (CBD), and the United Nations Convention to Combat Desertification (UNCCD). Drylands, including dry sub-humid, semi-arid, arid and hyper-arid lands and cover 41.3% of the earth's land surface. The Revivala drylands biodiversity and species will play a pivotal role in the global fight against poverty, climate change and desertification. Yet despite their relative levels of aridity, drylands contain a great variety of biodiversity, much of which is highly adapted to dryland ecology. Paradoxically, many people also consider drylands to be barren with little value or interest (Davis et al., 2012).

However, species in drylands adapt to aridity in many unique ways creating a variety of dryland ecosystems. The cultural diversity, dramatic landscapes and iconic wildlife of drylands contrast starkly with the negative attitudes that some people hold towards them. Many traditional land management practices have proven to be more economically viable than more 'modern' alternatives, whilst simultaneously providing conservation benefits.

Biodiversity must always be approached in terms of two inseparable concepts: pattern and process. Pattern' covers the composition and structure of biodiversity. It refers to a snapshot of different categories of biodiversity (e.g. species, habitats, communities or ecosystems) that have been mapped or otherwise identified in a particular place, at a specific time. Process refers to the ecological and evolutionary processes that maintain the variety and distribution of biodiversity and allows it to persist over time.

Although the conservation status of dryland biodiversity is not well monitored, many known drivers of biodiversity loss are present in the drylands. These drivers include rapid demographic shifts and urbanization, agricultural expansion, land use change, weakening of governance arrangements and the introduction and spread of alien invasive species.

IUCN, the International Union for Conservation of Nature, is strongly committed to the conservation and sustainable management of drylands biodiversity. As a Union of more than 200 government organizations and over 900 non-government organizations, as well six Commissions of 11,000 voluntary scientists and experts, IUCN is strongly positioned to champion dryland biodiversity and to demonstrate and promote innovative ways to achieve the shared goals of biodiversity conservation and sustainable development.

This toolkit provides policy makers with tools to use for mainstreaming and embedding biodiversity considerations in national policies and strategies. An illustration of this proposed kit is a major component of this chapter.

1

Overview of the Biodiversity in Jordan



Figure 1. Map of Jordan

1.1 Jordan Geographical Characteristics:

Jordan covers an area of 89,800 km² of which 88,802 km² is land and 540 km² is water including a 26 km long coastline. The Fifth National Report on the Implementation of the Convention on Biological Diversity ,2015. With its varied topography it includes a range of mountains which form the Highlands that runs from north to south with altitudes ranging from 500 m to over 1,700 m, (Figure1).

East of the mountain range, the land slopes gently to the east to form the eastern deserts. In the west, the land slopes steeply towards the Jordan Rift Valley, which extends from Lake Tiberias in the north (elev. 220 m below the sea level) to the Red Sea at Aqaba. The Dead Sea lies about 120 km south of Lake Tiberias, with water level at about 405 m below the sea level. Less than 5% of the country's land area is arable land. This variation of physical environment is strongly reflected in the diversity of life in the country in terms of cultural and natural heritage and in particular as related to biological diversity The Fifth National Report on the Implementation of the Convention on Biological Diversity,2014.

Major topographic features in Jordan, is classified into four main physiographic regions (Figure 2):

1. Jordan Rift Valley and Wadi Araba. The rift valley extends from Lake Tiberias in the north to the Gulf of Aqaba in the south. It is the Jordanian part of a continental shelf extending from Aqaba in the South to the Adasiyyah in the north. This zone is divided into three areas: (a) The Jordan Valley which lies be-

tween 200–400 m below sea level, extending from Lake Tiberias in the north to the Dead Sea, with a length of 104 km and a width of between 4 and 16 km; it is surrounded in the east and west by high mountains. Rainfall decreases from approximately 300 mm in the north to 102 mm in the south; (b) The Southern Ghor: this also lies below sea level to the south of the Dead Sea. Annual rainfall is less than 100 mm; (c) The Wadi Araba: this area extends between the Southern Ghor and Aqaba on the Red Sea. It is extremely dry, with limited cultivated areas using underground water. The Jordan Valley and the Southern Ghor are among the most important agricultural areas, as there is a permanent source of water from the Yarmouk River and side dams for the former, and from surface water for the latter. Due to their position below sea level and high temperatures (microclimate), these two are the most important winter vegetable producing areas. Cultivable lands in Ghor total approximately 34,000 ha, which are all irrigated. The majority of holdings are between 3 and 4 ha. Farmers use modern agricultural techniques in irrigation, production and marketing.

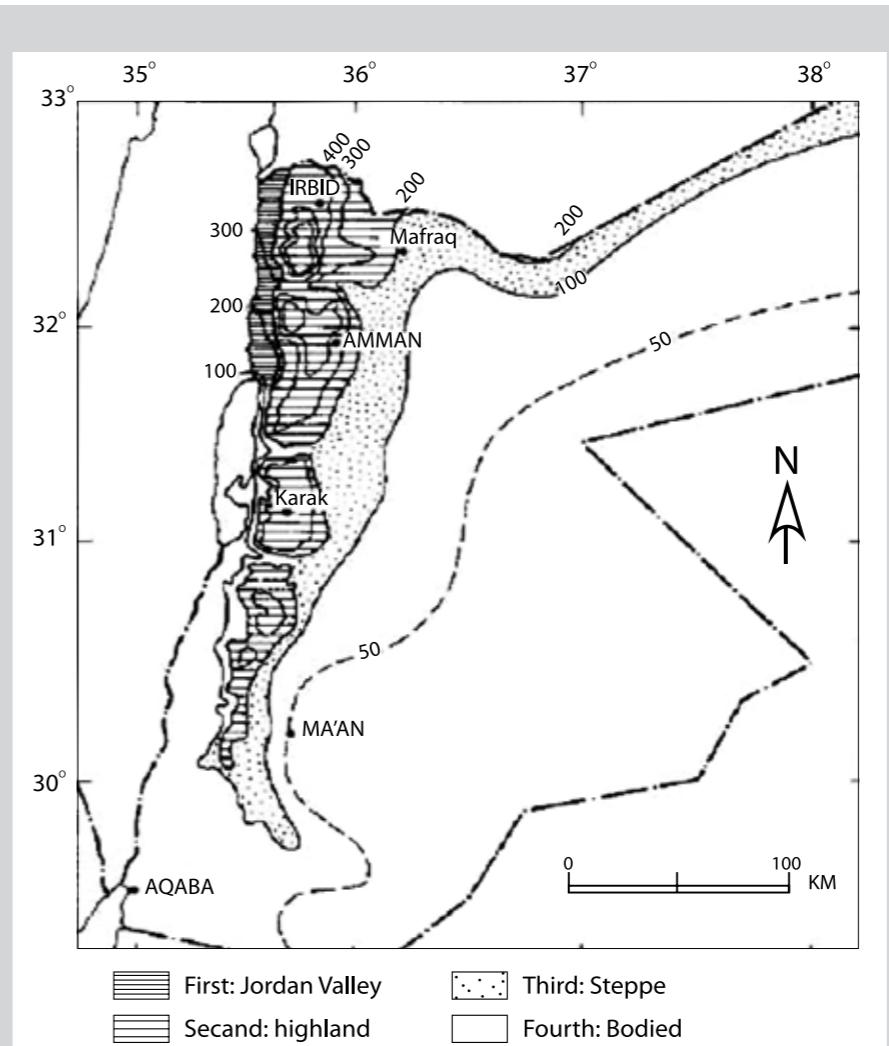


Figure 2. Physiographic regions of Jordan

Source **GCEP, UNDP & GEF** (1998): Jordan Country Study on Biological Diversity. Prepared under project No. GF/6105-92-65 and GF/6105-92-02 (2991).

2. The Highlands: They extend from the Yarmouk River in the north passing through the Ajloun mountains, the hills of Ammon and Moab, and the Edom mountains. Many creeks and wadis drain from the east to the Jordan River, Dead Sea, and Wadi Araba. The average altitude ranges from 600 m in the north to 1000 m in the middle and 1,500 m in the south. The highlands, which are a succession of catchment and sub-catchments, comprise: a semi-arid zone (350–500mm annual rainfall) and a small sub-humid zone (over 500 mm annual rainfall).
3. The Arid Zone (Plains): This comprises the plains between the Badia (semi desert) and the Highlands. Rainfall ranges between 200 mm in the East and 350 mm in the West. More than 50% of the arable land is in this zone, and the rain-fed crops are mainly barley (areas of 200–300 mm of rainfall), wheat and fruit trees (where rainfall ranges between 300 and 350 mm).
4. Badia (Eastern Desert): This covers about 8,090,000 ha or 90% of the Kingdom. It is characterized by a very sparse vegetation cover and an annual rainfall of less than 200mm. In the past it was only used for grazing. In the last two decades, however, 20,000 ha have been irrigated, by using underground water to grow vegetables, especially tomatoes, watermelon and potatoes), plus fruit trees and cereals, especially wheat.

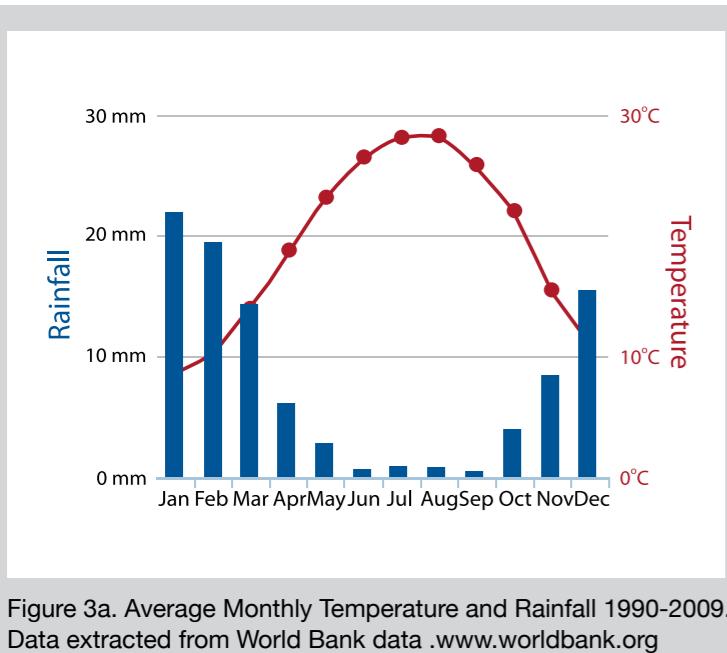


Figure 3a. Average Monthly Temperature and Rainfall 1990-2009.
Data extracted from World Bank data .www.worldbank.org

1.2 Jordan Climate

The main characteristics of Jordan's climate reflect the transitional location of the country between the Mediterranean climate to the west and arid climates in the east and south. There is a great variety in temperature and precipitation from one morphological unit to another (MacDonald's, 2000). Jordan climate is characterized by a relatively short rainy season between November and April (Figures 3 a and b). It is a drought-prone country largely influenced by the range of mountains in the West. The western part of Jordan, or the Highlands, has a Mediterranean climate characterized by a hot, dry summer (up to 45°C) and a cool, wet winter (average 13°C), which are separated by two short transitional periods. The southern and eastern parts of the country are arid with hot dry summers and cold dry winters in the highlands with less than 50 mm in the east.

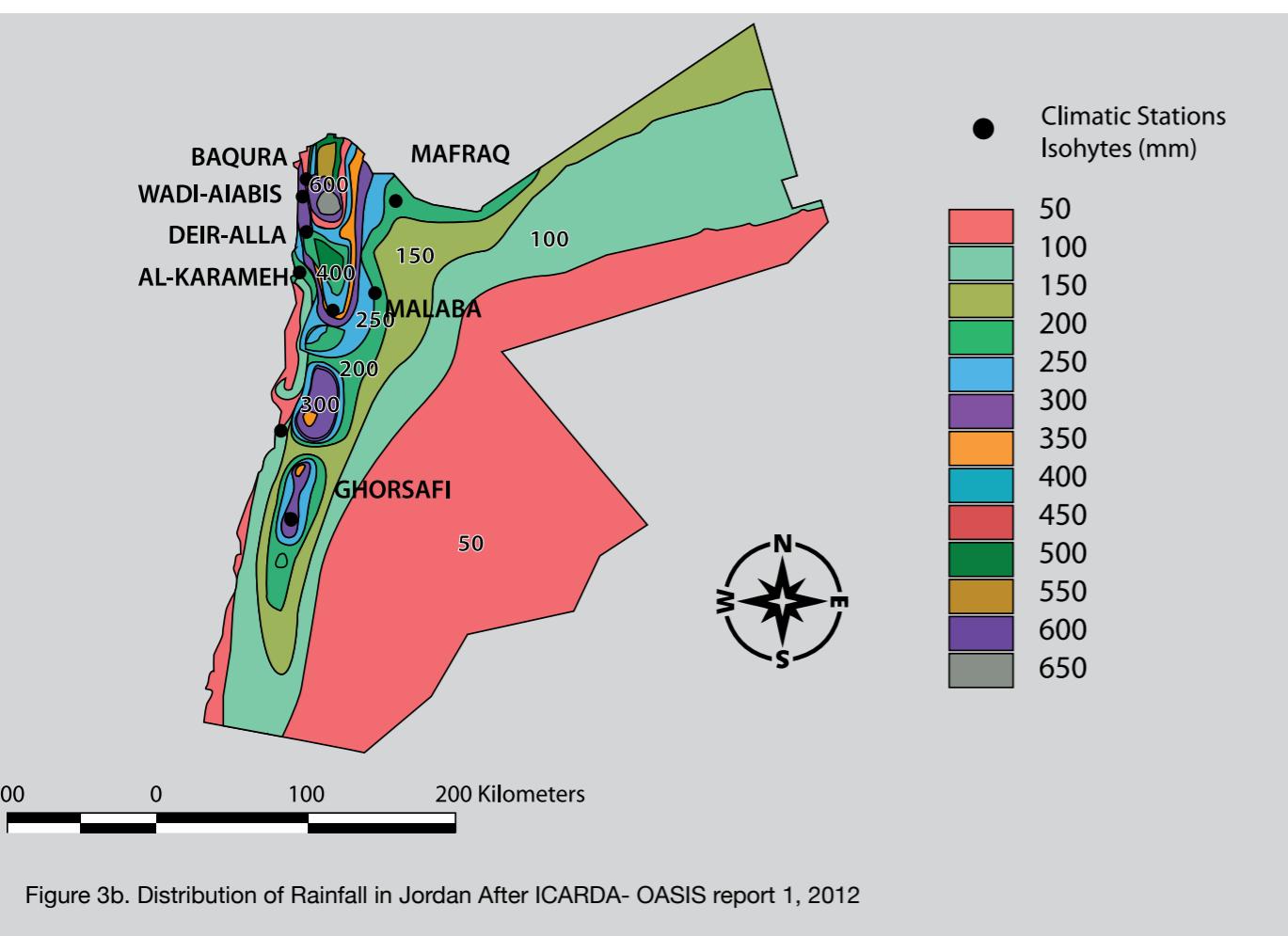


Figure 3b. Distribution of Rainfall in Jordan After ICARDA- OASIS report 1, 2012

1.3 Socio Economic and Biodiversity in Jordan

Demographically, Jordan is home to around 10 million people (DOS 2015), and is considered a young population; more than 70% of the population is under 30 years of age, which suggests that an investment in youth can be an instrument for national development and sustainability. Those between the age of 15 and 24 comprise 22% of the population, 80% of which are urbanized with literacy ratio of almost 96%, one of the highest in the region. There is also good reputation of educational systems, including those related to environmental education and biodiversity centered learning and sensitization.

Jordan's economy is among the smallest in the Middle East, with insufficient supplies of water, oil, and other natural resources underlying the government's heavy reliance on foreign assistance. Other economic challenges for the government include chronic high rates of poverty, unemployment, inflation, and a large budget deficit. Jordan is an upper middle-income country, with a per capita gross domestic product (GDP) of US\$6,100 with agriculture contributing around 4%, industry 30% and services around 66%. The country has limited natural resources, potash and phosphate are its main export commodities. Limited agricultural land and water is severely scarce, as the country is the world's fourth poorest country in terms of water resources. As one of the most open economies of the region, Jordan is well integrated with its neighbors through trade, remittances, foreign direct investment (FDI), and tourism.

1.4 Major soil types

The soils of the Rift Valley in Zor, Wadi Araba and parts of Ghor belong to the order entisols and eceptisols (ustochrepts). The other parts of the rift are covered by aridisols. In the north of the Valley, the soils are deep and of moderate to medium structure (Al Qudah, B. (2000). These soils have good water holding capacity and are relatively fertile. The soils of the Highlands are non-cracking soils (xerocrepts), cracking clayey soils (vertisols) and shallow loamy soils (xerotents). The soils are generally calcareous with a fair nutrient level but suffer from nitrogen and phosphorous deficiency and occasionally iron and manganese deficiency. Their organic content is less than 1%. The texture is heavy loam to clayey with high water holding capacity.

The soils of the Steppe region are aridisols and entisols. They are deep to moderately deep, slightly gravelly, with fine silty loam texture in the surface and subsoil horizons. The subsoil horizons are rich in CaCO₃ (calciorthids). The surface layer is dark, yellowish brown to brown. The high silt content of the surface soil and the absence of suitable organic content are responsible for the poor infiltration rate that leads to higher run-off and decreases the water storage capacity of the soil profile. Consequently, the vegetative growth is retarded and further soil degradation occurs. In general, the soils of this region suffer from deficiencies of nitrogen and phosphorous. These soils are highly susceptible to gully and wind erosion particularly when disturbed by ploughing or subjected to over grazing.

The soils of the Desert region are aridisols and entisols. Soil depth varies considerably from one place to another. In the basalt area in the north, the deep clayey, well structured soils occur below moderately weathered basalt pavement (camborthids). Recent soils are saline, rather silty due to the effect of wind sediments or are like the soils which occupy the mudflats. Older soils are clayey, deep, and contain higher amounts of CaCO₃. In the middle of Badia and to the south of Azraq, the soils become saline and contain gypsum (gypsiorthids). In the south around Disi and Mudawwara, the weathered sandstone shale and granite have resulted in the formation of sandy soils. The soils are in general low in organic matter, sandy to sandy loam in texture, often highly saline or alkaline and are generally devoid of vegetation. Their water holding capacity and fertility status is very low.

1.5 Jordan phytogeography

Jordan Phytogeography is part of the biogeographical zones of the Middle East (Figure 4). The phytogeography of Jordan (Figure 5) is influenced by the Mediterranean, Saharo-sindian and Irano-Turanian biogeographical zones. Jordan's wide range of physical conditions and location at the junction of three continents – Europe, Asia and Africa – contribute to various differentiated biogeographical regions and ecosystems (Table 1). These ecosystems include deserts with poor plant cover; sub-tropical ecosystems, including Sudanian species of tree and dwarf shrub prominent in the sparse and very open vegetation; aquatic ecosystems, comprising rivers, wadis and wetlands, the latter varying from salt marshes to marine ecotypes; and the scarp and highland ecosystems, comprising of escarpments and mountains, hills and undulating plateaus with natural woodland (*Pinus*, evergreen/deciduous oak woodland) and steppe, the latter consisting of a transition area where desert biota is gradually replaced by "Mediterranean" biota (Figure 6).

Phytogeography of the Middle East

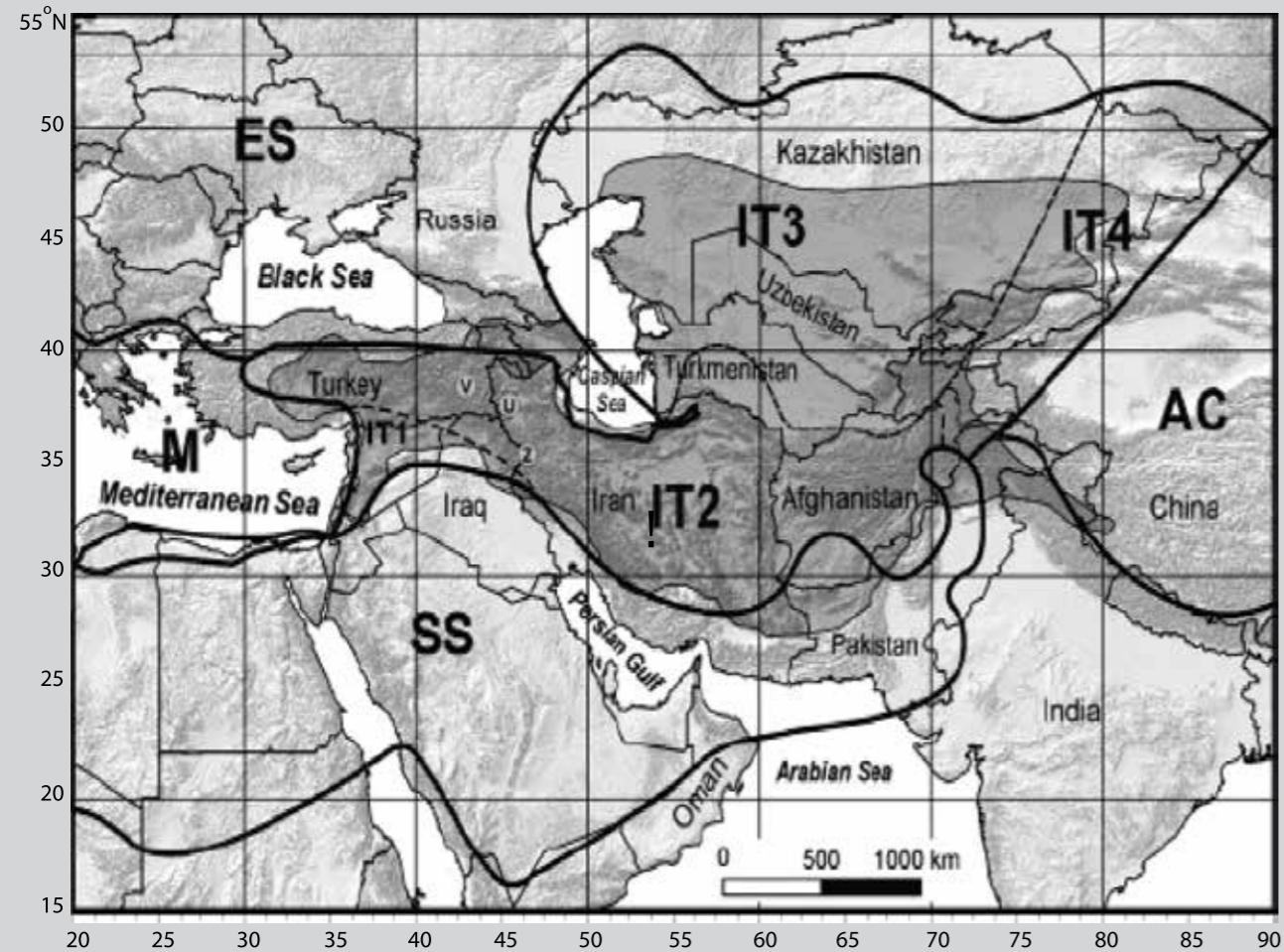


Figure 4. Phytogeography of the Middle East

M1. The Mediterranean Region: a narrow belt along the Mediterranean Sea, with a gap between Palestine and Libya where the desert closely approaches the Mediterranean.

SS. The Saharo-Sindian Region: occupies Egypt, Sinai, most of the Arabian Peninsula, southern Palestine, Jordan and Israel and South East Iraq

IT. The Irano-Turanian region: occupies about half of the Middle East, mainly central and east Turkey, Iran, Iraq, Syria, Israel, Jordan and Palestine. It is floristically rich and high in endemism and a centre of radiation of several genera.

After J. Leonard 1988-1989

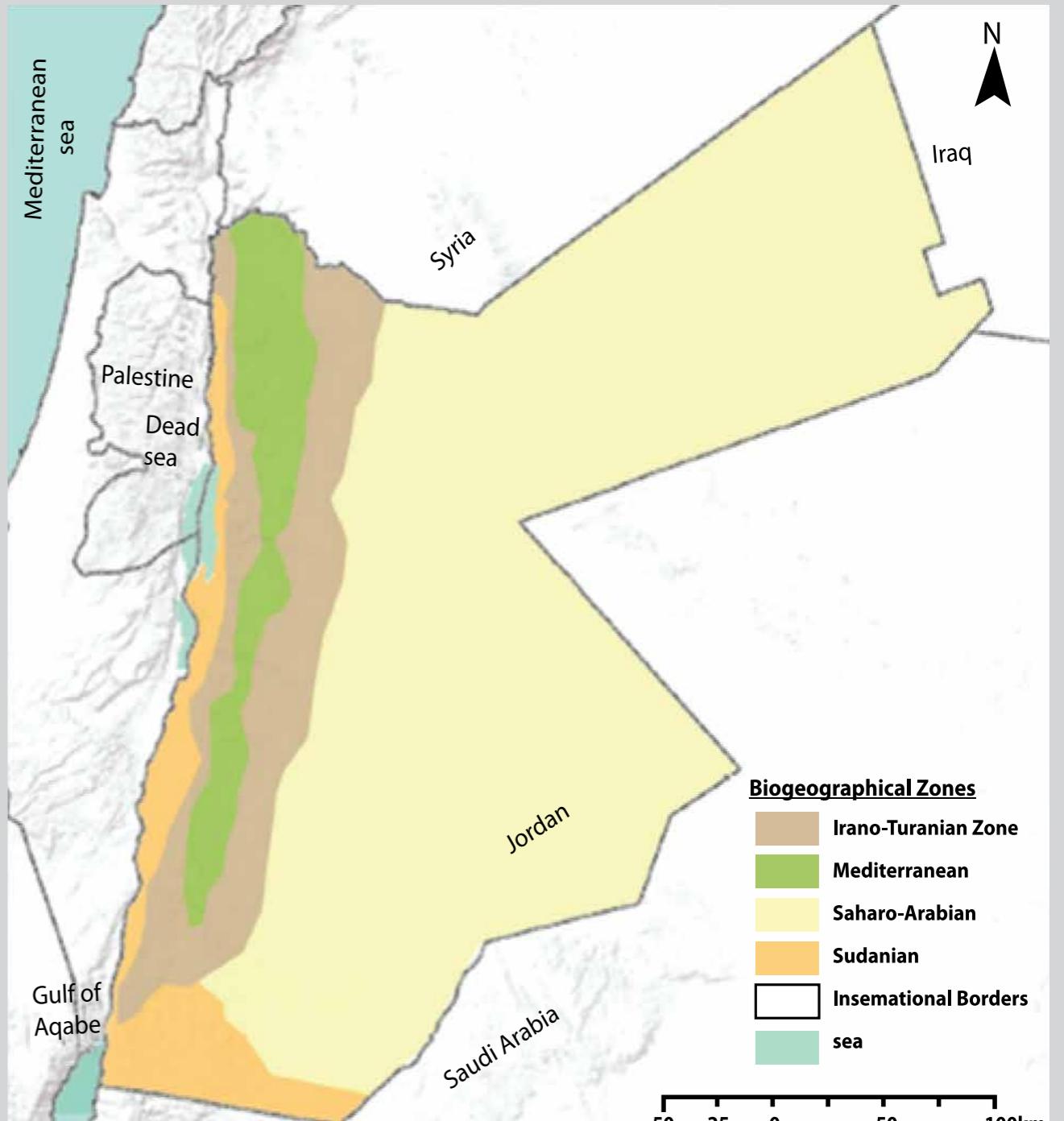
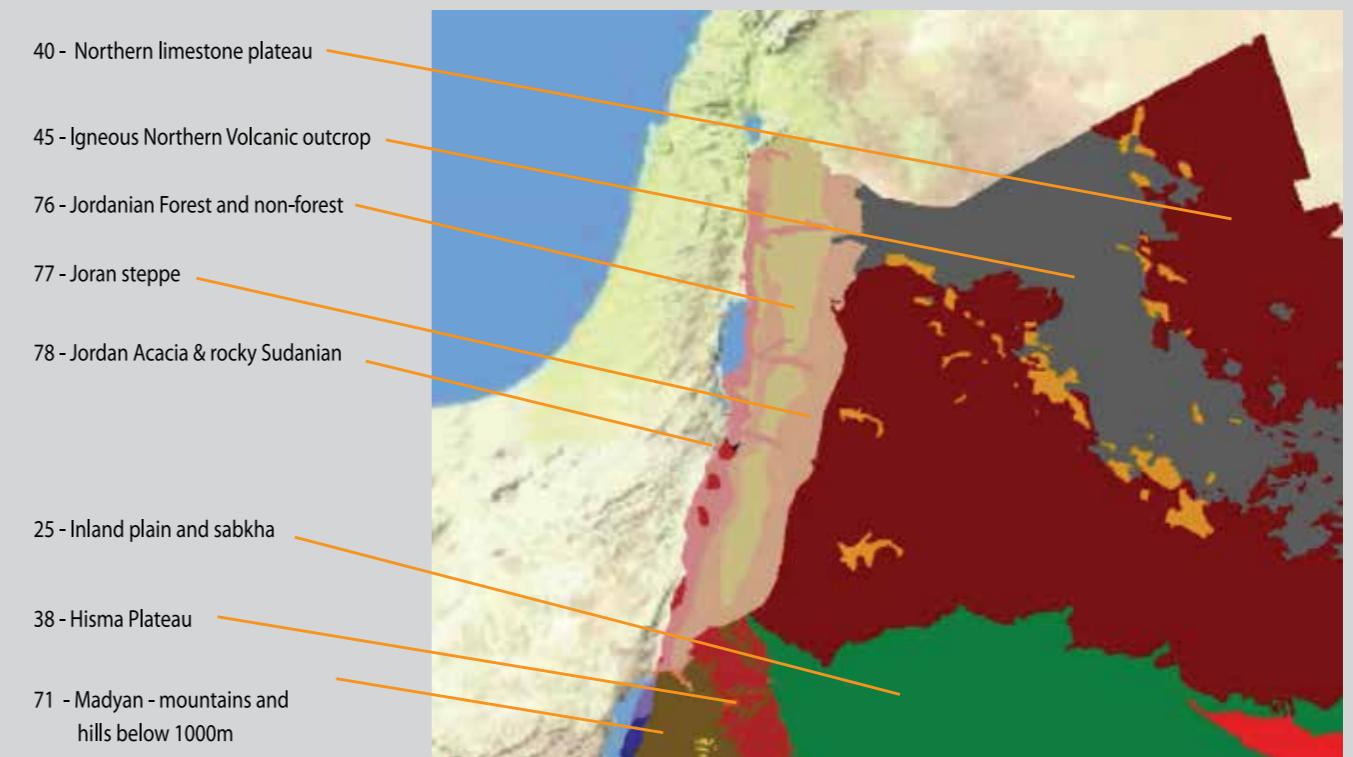


Figure 5. Phytogeography of Jordan

TABLE 1

Phyto -geographical regions of Jordan and the associated endemism

Irano-Turanian centre of endemism (IT) (Endemism: 19 genera, 59 species) IT1- SE Turkey, most of Syria, Parts of Lebanon, Israel, Palestine, N. Sinai, N. Jordan, N. Iraq	Saharo-Sindian regional Zone (SS) Saharo-Sindian (SS1), Arabian regional subzone (SS2), Nubo-Sindian local centre of endemism (SS3) Endemism: 6 genera, 17 species Representative of SS endemic genera in Jordan: <i>Anastatica</i> , <i>Eremobium</i> , <i>Gymnarrhena</i> , <i>Moltkiopsis</i> , <i>Neurada</i> , <i>Notoceras</i> , <i>Savigna</i> Species endemic to SS found in Jordan: <i>Alysum marginatum</i> , <i>Cardaria draba</i> , <i>Heterocaryum subsessile</i> , <i>Hyocyamus pusillus</i> , <i>Lxioliron tataricum</i> , <i>Ziziphora tenuior</i> , <i>Scorzonera pusilla</i> , <i>Anchusa strigosa</i> , <i>Artemisia sieberi</i> , <i>Ducrosia anethifolia</i> , <i>Gundelia tournefortii</i> , <i>Linum album</i> , <i>Minuartia picta</i> , <i>Pistacia khinjuk</i>
Arabian regional subzone + Nubo-Sindian local centre of endemism (SS2+SS3) Endemic genera in Jordan: <i>Anisosciadium</i> Species endemic to Arabo-Sindian (SS2+SS3) found in Jordan: <i>Anisosciadium isosciadium</i> , <i>A. lanatum</i> , <i>Haloxylon salicornicum</i> , <i>Zygophyllum propinquum</i> , <i>Paronychia Arctica</i> , <i>Trigonella glabra</i> SS3 : represented in Jordan by species such as <i>Ziziphus nummularia</i> , <i>Acacia pachyceras</i> , and <i>Cleome amblyocarpa</i> , which are considered as Sudanian relicts that migrated from western Arabia through flow cut channels during pluvial times during the late Pliocene (c. 2.5 MYBP)	Mediterranean regional centre of Endemism (m) Occupies most of the western Jordan, the mountains and Jordan Valley. Representative vegetation: coniferous forests of Aleppo Pine (<i>Pinus halepensis</i>) and Callabrian pine (<i>Pinus brutia</i> – not in Jordan), and dry oak (<i>Quercus spp.</i>) woodlands and steppe formations. <i>Plive (Olea europaea)</i> , carob (<i>Ceratonia siliqua</i>), oak (<i>Quercus coccifera</i> - most wide spread), pistachio (<i>Pistacia palestina</i> , <i>P. lentiscus</i>), and <i>Arbutus andrachne</i> are the principal species. In addition <i>Phillyrea latifolia</i> , <i>Pistacia terebinthus</i> , <i>Calicotome villosa</i> , <i>Genista acanthi</i> , <i>Rhamnus oleoides</i> , <i>Myrtus communis</i> , <i>Laurus nobilis</i> , <i>Styrax officinalis</i> and <i>Spartium junceum</i> also occur. Vegetation is degraded, in particular <i>Ceratonia siliqua</i> that it is only represented by a few individuals



Integrated Terrestrial and Marine Habitat Map of the Arabian Peninsula
Environment Agency Abu Dhabi (EAD), Abu Dhabi Global Environment Data Information (AGEDI), UNEP(2012)

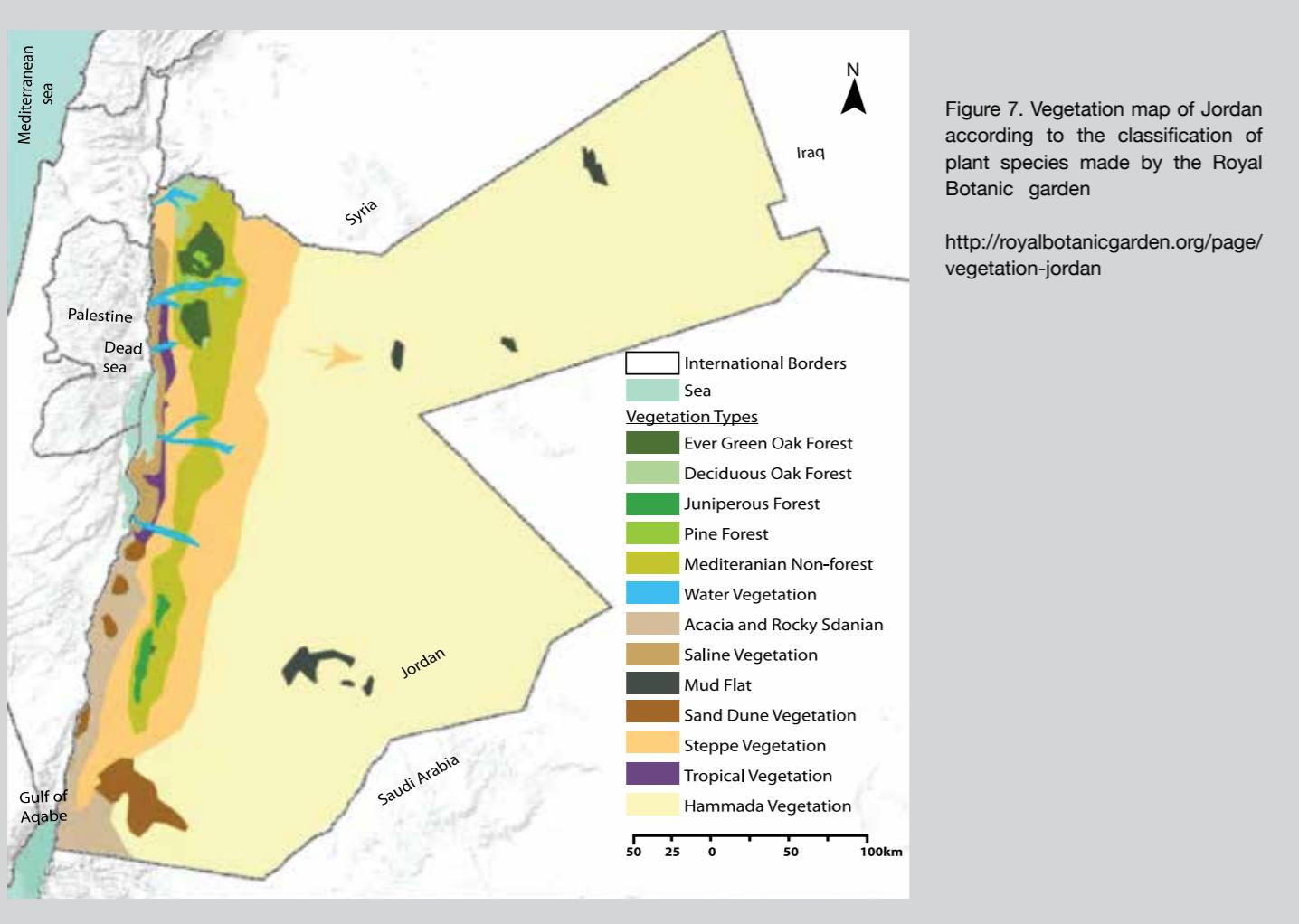
<https://agedi.org/?portfolio=local-national-regional-biodiversity-rapid-assessment>
Figure 6. Ecological Habitats in Jordan

Although Jordan has only about 1% of forest cover, a more detailed analysis shows that this cover varies widely between governorates. Forests are located mostly in governorates in the northwest, which receive more than 200 mm per year of rainfall, as well as in areas around the capital city of Amman and in some areas of the South. Forests occupy between 20% - 30% of the land area in these governorates, and play an important environmental role in protecting watersheds and in supporting tourism. However, in general, plant diversity in Jordan has declined dramatically and some species have been extinct totally from the wild. The main factors contributing to low forest cover and diversity are habitat encroachment by urban and agricultural development, deforestation, and deterioration of rangelands by overgrazing and soil erosion, illegal collection, and depletion of the major water resources. Afforestation and reforestation of rangelands are among the main forestry activities of the forestry department in Jordan as key measures in rehabilitating and restoring rangeland ecosystems and increasing their productivity.

1.6 Overview of Biodiversity in Jordan¹

Only 10% of Jordan's total area is arable. According to data from the Ministry of Agriculture in Jordan (2014), this represents arable lands with an area of 8.9 million dunum. In such conditions sustainable use of natural resources is a big challenge owing to the scarcity of water, the ongoing processes of land degradation due to water and wind erosion, and increase population, which reduces economic development gains. These challenges are more exacerbated due to the anthropogenic impacts of over-grazing, unsustainable agricultural and water management practices, and over exploitation of the vegetation cover. Poverty in arid and semi-arid areas of Jordan also contributes to the increasing rates of resource degradation. It pushes farmers and herders to produce their basic needs using unsustainable practices.

¹ The Fifth National Report on the Implementation of the Convention on Biological Diversity, 2014



As mentioned above, Jordan embraces four bio-geographic regions, (the Mediterranean, Irano-Turanian, Saharo-Arabian and Sudanian), each comprises of thirteen vegetation types, which provide the natural habitats for over 4,000 species of fauna and flora from the terrestrial, marine and freshwater environments in addition to genetic resources. Jordan's 2,622 species of vascular plants represent 1% of the worlds' flora. 100 are endemic, including *Iris nigricans*, Jordan's floral emblem, *Plantago maris-mortui*, *Crucianella transjordanica*, *Centaurea procurrens*, *Scrophularia nabataerum*, *Tamarix tetragyn*, and *T. palaestina*. Further, Jordan hosts 644 animal species of which, 83 are mammal species, including the globally threatened *Capra nubiana*, *Gazella dorcas*, *Gazella subgutturosa*, *Gazella gazelle* and *Oryx leucoryx*. (The Fifth National Report on the Implementation of the Convention on Biological Diversity, 2014).

The Jordanian Royal Botanic Garden (RBG) has taken the lead in the classification of Jordanian plant species and has assessed more than 1,000 plant species so far. Figure 7 shows the vegetation map of Jordan. (RSCN 2014)

Avifauna composition is especially rich in Jordan because of its geographic location, which is associated with the Great Rift Valley and lays on a major migratory bird's route. There are 436 species of birds including *Geronticus eremita*, *Chlamydotis macqueenii*, *Nephron percnopterus*, *Serinus syriacus* and *Vanellus gregarius* in Jordan. (The key attributes of Jordan's important bird areas (IBA) are summarized in Table 3 as quoted in the 5th national biodiversity report).

T A B L E 2	
The key attributes of IBAs in Jordan ²	
Total number of birds	329
Globally threatened birds	10
Land birds	226
Sea birds	24
Migratory birds	270
Water birds	100
Number of IBAs	27

The Gulf of Aqaba hosts more than 348 species of fish, 151 species of hard corals and 120 species of soft corals, in addition to a variety of invertebrate species including snails, crabs and sea worms. A total of three threatened species of sea turtles were recorded in the Gulf of Aqaba. The rate of endemism is considered high among the Red Sea fishes and represents 13.7% of the total fish species recorded with seven species of fishes recognized as endemic to the Gulf of Aqaba. More than 20% of mollusks and echinodermata as well as several species of algae occurring in the Gulf may be endemic (*The Fifth National Report on the Implementation of the Convention on Biological Diversity 2014*).

The country is also rich in agro-biodiversity, including a wealth of native and endemic species and varieties which have been adapted over centuries. Of particular importance are the medicinal and aromatic plants, as well as herbs and spices, distributed all over the country from the eastern desert to the western highlands and from the semi-arid north to the extremely arid south. However, this biodiversity is under threat as habitat is lost due to over grazing, ploughing for rain-fed cultivation of barley, and subsequent accelerated soil loss and degradation, and negative impacts of climate change.

For example, threatened range species, such as *Salsola vermiculata L.* which were subjected to continuous grazing pressure, showed high vulnerability to climate change as expressed by the predicted decrease in the areas of their distribution (A. O. Bel-gacem & Louhaichi, M. 2013). However, species with low palatability and broad ecological niches (i.e. *Haloxylon salicornicum* (Moq.) and *H. schmittianum*) had an advantage due to the reduced competition for water and nutrients.

Although much of Jordan Highlands was once covered by Mediterranean evergreen forests, most of the indigenous vegetation has either been cleared for wood and agriculture or has been degraded through human land uses.

Freshwater diversity is also high with 15 species recorded including the endemic *Aphanus sibirani*. Further, Jordan hosts 110 species of herpeto-fauna, including three species of amphibians, 107 species of reptiles where the latter constitutes of 37 snakes, one tortoise, one terrapin and 68 species of lizards; including the flagship species of the *Uromastyx aegyptia* and *Varanus griseus*.

Wild plants constitute a very important component of Jordan's biological diversity. They belong to represent 152 families and about 700 genera. Conservation of this natural heritage is listed high on the priorities of the government. The total number of plant species recorded in Jordan exceeds 2,500 wild plant species of which 100 are endemic. The endemic species include among others *Iris petrana*, *Cousinia dayi*, *Plantago maris-mortui*, *Crucianella transjordanica*, *Centaurea procurrens*, *Scrophularia nabataerum*, *Tamarix tetragyn*, and *T. palaestina*. Flowering plants constitute the most dominant group of species and are particularly visible in the spring. Several species have ornamental or medicinal value.

The importance of the medicinal plants as a source of preventive and/or curative health value (for both people and livestock) have been recognized by local communities since time immemorial. A total of 485 species of medicinal plants, which belong to 330 genera and 99 families, are reported from Jordan (project document: Oran and Al-Eisawi, 1994). Those identified medicinal plants are herbs, shrubs and trees. Flagship species would include *Iris petrana*, Jordan's floral emblem, *Iris negraneensis*, *Moringa peregrina*, *Salvadora persicum*, *Cyclamen persicum*, *Aloe vera*, *Pinus halepensis*, *Juniperus phoenicia*, *Acacia arabica*, *Pistacia palestina* and others.

² Data obtained from the 5th national biodiversity report 2014

In the past, Jordan's grazing lands were characterized by effective traditional land tenure systems and grazing rights³, which were associated with tribal institutions. These traditional arrangements protected the resource contributed to its conservation and continued productivity under prevailing environmental and social conditions. With the transformation of these systems, elimination of traditional rights, and the declaration of grazing lands as state-owned land, sustainable use of land resources has been disrupted and new land uses have encroached. Since 1960, the Ministry of Agriculture has developed and managed 34 range reserves to protect and manage the rangelands plant species and to conserve the ecosystem where these reserves include all ecological zones in Jordan. Under this management, specialists determine the grazing capacity and grant grazing licenses for a specific period of time for a specified number of animals.

1.7 Main Threats to Biodiversity:

Biodiversity is continuously exposed to several threats, which has led to a sharp decline in the majority of flora and fauna in the country, including the extinction of several species. The following, among others are the main causes of threats

1. Land degradation: Land transformations and urbanization , combined with population growth, are accelerating habitat degradation, climate change, species loss and the general depletion of key natural resources, especially soil and water. They are also affecting the livelihoods of local pastoral and agricultural communities, who now find traditional grazing areas, agricultural lands and hunting areas fragmented and degraded by infrastructure and urban expansion. As a result, overgrazing, over hunting and deforestation are widespread, adding more pressure on remaining natural areas. The dominant types of land degradation are water and wind erosion and consequently reduce soil fertility. In turn, the rapid population growth and urban spread coupled with the prevailing poverty of the people is forcing dryland farmers and herders increasingly to adopt non-sustainable land use practices to produce more food in order to meet their needs.
2. Tourism development: The tourism sector already poses a major threat to biodiversity, and given the planned exponential growth of the sector, this threat is expected to grow significantly. Although few of Jordan's current visitors are nature tourists per se, tourists do visit protected areas and high biodiversity areas. Biodiversity is being threatened by mass tourism across the landscape as a whole, and the tourism footprint on biodiversity is expected to grow over time. A further increase in agriculture and pastoralist activities is expected as the local population will aim to meet increased demand for food production from tourism establishments, causing additional pressure on biodiversity from overgrazing, loss of the vegetation cover, wood-cutting, etc.
3. Climate change: The expected impacts from climate change on ecosystems in Jordan, according to climate exposure and sensitivity of ecosystems in Jordan, are droughts, forest dieback, community composition change, expansion of drier biomes into marginal lands, habitat degradation and species loss. (Jordan's Third national communication (TNC) report on climate change, 2014 , unfccc.int/resource/docs/natc/jornc3.pdf). The highest exposure to climate change impacts is expected to be in the Eastern and Southern areas in Jordan and in the mountainous areas in the North, according to exposure and vulnerability analysis carried by the TNC. The highest sensitivity based on vegetation type is expected to be in the northern highlands and across the Middle areas in Jordan, especially the Jordan Valley. The responses of both fauna and flora span an array of ecosystems and organizational hierarchies, from the species to the community levels. Recent scientific research on global meta-analyses revealed significant range shifts averaging 6.1 km per decade toward the poles (or meters upward), and significant mean advancement of spring events by 2.3 days per decade .
4. Habitat degradation and destruction: Uncontrolled urban expansion occurs in the form of deforestation and transformation of forests and rangelands into agricultural and urbanized areas. Urban expansion is due to the increase of Jordan's population and industrial development. Overgrazing and extensive woody vegetation clearance, in addition to intensive agricultural practices, are major threats to biodiversity in Jordan as they result in soil erosion and destruction of natural habitats. Unplanned mining and quarrying are leading to further habitat destruction. Uncontrolled vehicle movement has led to habitat destruction and has caused disturbance to breeding grounds of migratory species, decreasing successful breeding and number of migratory birds visiting Jordan.

³ Updated Rangeland strategy for Jordan 2014-2013

5. Misuse of water resources: Improper water use and unplanned water extraction from surface and underground water resources threaten the biodiversity in many areas of Jordan, and consequently, the habitats and micro ecosystems of both animals and plants. Pollution of surface and underground water resources and aquifers due to agro-chemicals, sewage discharge and solid waste disposal causes further threat to the presence and reproduction of many faunal species.
6. Little is known about the status and transmission of diseases in wild animals. Increased contact with wildlife has led to the transmission of some diseases from livestock to wild animals and vice-versa, either through direct contact or predation. Further, several wild animal species in Jordan are thought to be vectors or reservoirs for some diseases. These diseases may affect both humans and wild fauna and could be a real threat to the distribution and relative abundance of certain species.
7. Invasive alien species: Invasive alien species is recognized as a major global threat to biodiversity and this is the case in Jordan. Alien species and invasive exotics can become pests by adapting to habitat changes and causing destruction to natural habitats and agricultural areas. On the other hand, feral species, which invaded the country long ago, might affect their wild relatives through competition and interbreeding. Examples of invasive species include *Acacia saligna* (tree), *Bemisia tabaci* (insect), *Corvus splendens* (bird), *Cyperus rotundus* (sedge), *Cyprinus carpio* (fish), *Eichhornia crassipes* (aquatic plant) , *Imperata cylindrica* (grass), *Myocastor coypus* (mammal), *Prosopis spp.* (tree, shrub) IUCN- The Global Invasive Species Database 2013 <http://www.iissg.org/>.
8. Weak enforcement of laws: Studies show that the weak in the enforcement of laws is a prevalent issue in Jordan, despite the improvements with designation of Protected Areas (all IUCN categories for protected areas) in recent years as a result of capacity building at the national and local levels. The problem of enforcement is predominantly related to the ineffective application of the bylaws and regulations by the judicial systems.
9. The Issue of Refugees: More than one million Syrian refugees have entered Jordan during 2012 -2015 (GIEWS Country Briefs, 2015). Escaping crisis in their country, the majority of these refugees integrated into the Jordanian society. It is not an easy task to assess or quantify the specific impacts of the refugees on the various natural resources and ecosystems in host regions; nonetheless, some of these impacts are easier to estimate than others. Impacts include pressures exerted on water resources, agricultural areas, rangelands, and open spaces. In the case of the refugee camps, most of the impact on natural resources is represented by water use (mostly for domestic purposes). From another point of view, the influx of refugees has increased competition with host communities on a large set of income sources and jobs. Further, the wave of refugees caused a sudden increase in the cost of services and real estate, which impacted the purchasing power of host Jordanian communities, thus forcing them to exercise more direct and indirect pressures on natural resources. One clear example is the increasing trend of illegal logging to compensate for increased fuel prices and overgrazing livestock in response to the inability to secure high costly fodder, and illegal wildlife hunting as a reflection of reduced ability to procure domesticated sources of meat such as chicken and lamb.
10. The existing land tenure system is considered as one of the reasons for a long conflict between pastoral groups from the local communities and the administration of laws. In addition to the above, the destruction of natural vegetation in the steppe and desert rangelands and failure to enforce existing laws has encouraged the cultivation of most productive rangelands, resulting in desertification.



The Biodiversity Mainstreaming Toolkit

The Convention on Biological Diversity (CBD) has long emphasized the need for integrating, “or mainstreaming”, biodiversity into national and local development and poverty reduction strategies, most recently in its alignment Strategic Plan for Biodiversity (2011-2020). Mainstreaming biodiversity is about more than applying “safeguards” to ensure that poverty reduction and development processes do no harm biodiversity but also recognizing the potential of biodiversity for achieving desirable development outcomes. It is thus as much a political issue —requiring a process of institutional change — as it is a technical one.

Based on the definition of Jamison Ervin, 2012, mainstreaming biodiversity is “Integrating biodiversity elements into natural resources sectors and/or into economic and social development sectors using a variety of policies and or economic methods and approaches to achieve specific biodiversity and or social and economic outcomes. This definition is further explained in Figure 8

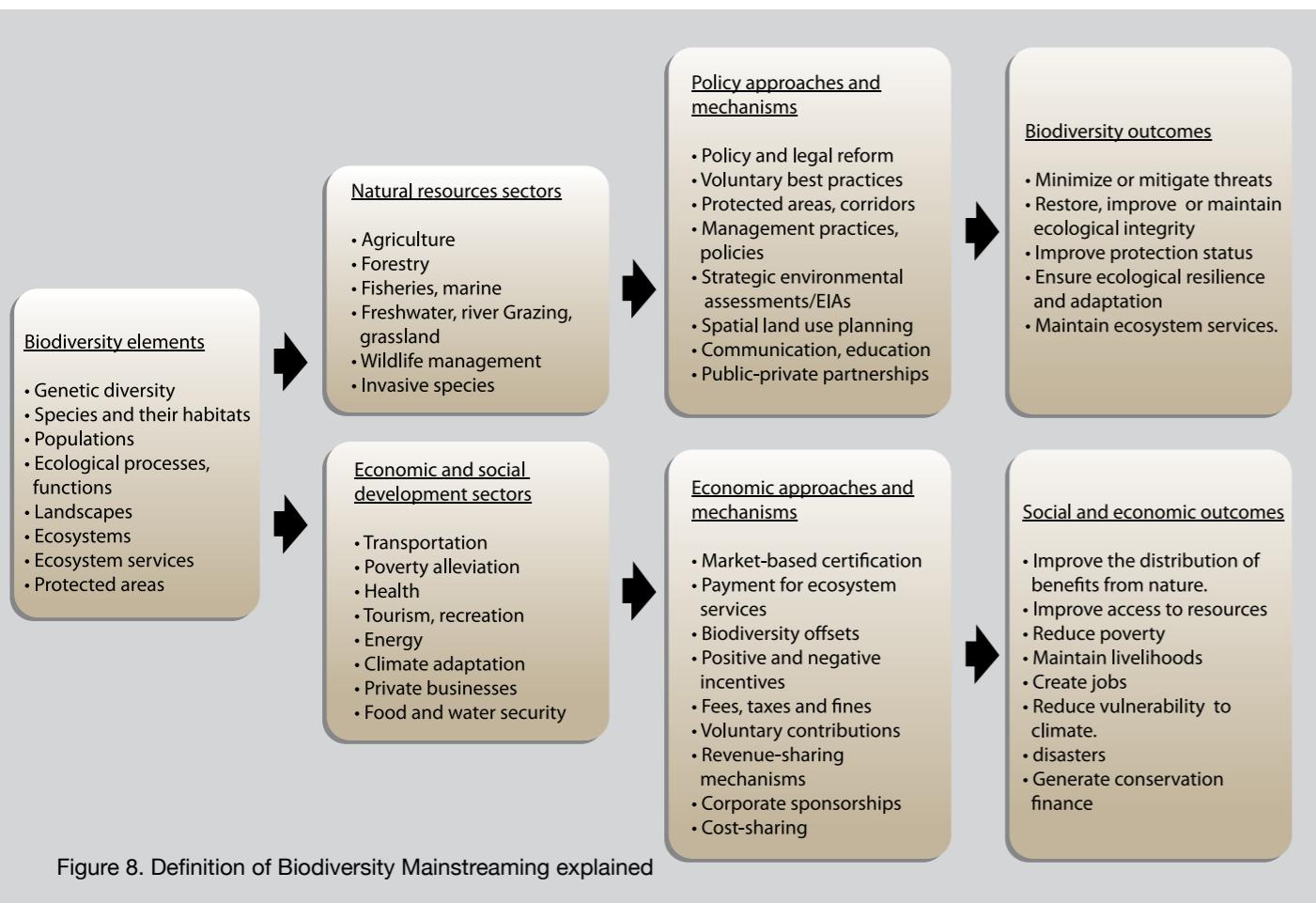


Figure 8. Definition of Biodiversity Mainstreaming explained

According to Jamison Ervin, 2012, biodiversity mainstreaming is important when there is a problem that mainstreaming can help to resolve. Examples are:

- When sectors are causing damage to biodiversity
- When benefits are inequitably distributed
- When conservation is under-funded
- When nature-based livelihoods are at risk
- When land use plans are absent
- When communities are vulnerable to climate change
- When protection is insufficient

A useful way to start addressing the challenge of biodiversity mainstreaming, or to add emphasis and impetus to existing efforts, is to establish a toolkit to be used by decision makers directly, or through environmental ‘champions’, or change agent , to address key leaders and different stakeholders. Change agents are important actors from NGOs, governmental or non-governmental organizations, that work formally and informally to examine what biodiversity mainstreaming means in the country context, identify examples of approaches used to date in the country, consider drivers, opportunities and problems, and make recommendations.

Change agents have different roles in different parts of toolkit. During stage 1, change agents play a role in comprehending how decision makers think about the issue of biodiversity conservation, and they help put the issue on the agenda by raising awareness and identifying the priority issues to be dealt as a business case.

Change agents also can help present compelling information, analysis and recommendations to be simple and understandable by the economists and planners leading development strategies. They tailor approaches to local context, are clear on the specific mainstreaming goal, and involve the right actors. During stage 2, and as a policy is formed, change agents can formulate the communication strategy that would work to draw out and balance the different ideas about how to proceed. Their role is vital in mobilizing stakeholders and explaining benefits of participation in biodiversity conservation issues.

The main aim of this toolkit is to help local governments plan for biodiversity mainstreaming combining knowledge from research and practice. It contains a business case from the field with the intent to provide ideas that can be used to incrementally mainstream biodiversity into policy. Before considering mainstreaming biodiversity issues, the following questions need to be answered with yes or no (Figure 9). These questions provide a self-evaluation to help overcome the barriers of recognizing the nature of biodiversity loss, to hold the desire for action and to coordinate the implementation of the toolkit.

Stand-alone initiatives for biodiversity mainstreaming try to strengthen environmental organisations or environment-development pilot projects, redressing the imbalance of environment invisibility and lack of influence. Figure 10 is a general and simple representation of the elements of the biodiversity mainstreaming process,. It starts by identifying goals, of mainstreaming, the context of the mainstreaming process in terms of values of biodiversity, drivers of biodiversity loss, and leverage actions to be taken for biodiversity mainstreaming.

Finally, who is involved, i.e. actors and players in relevant national sectors will implement the process of mainstreaming. The process ends by developing a mainstreaming toolkit.

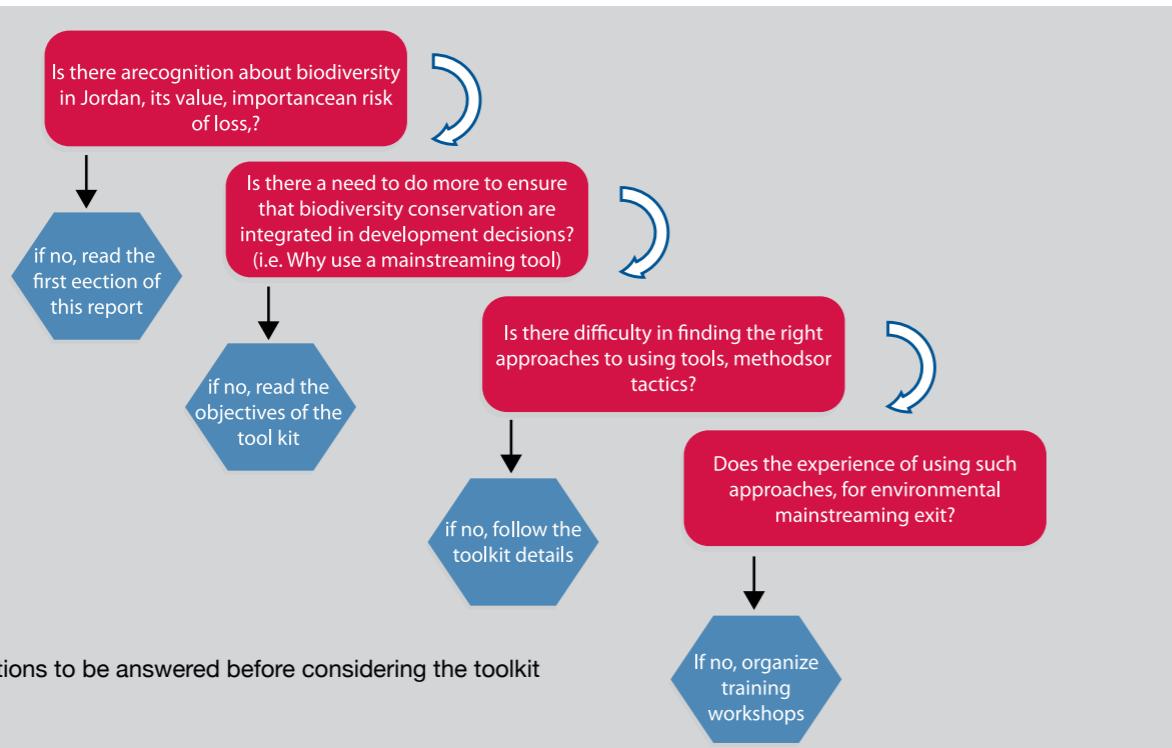


Figure 9. Questions to be answered before considering the toolkit (Author).

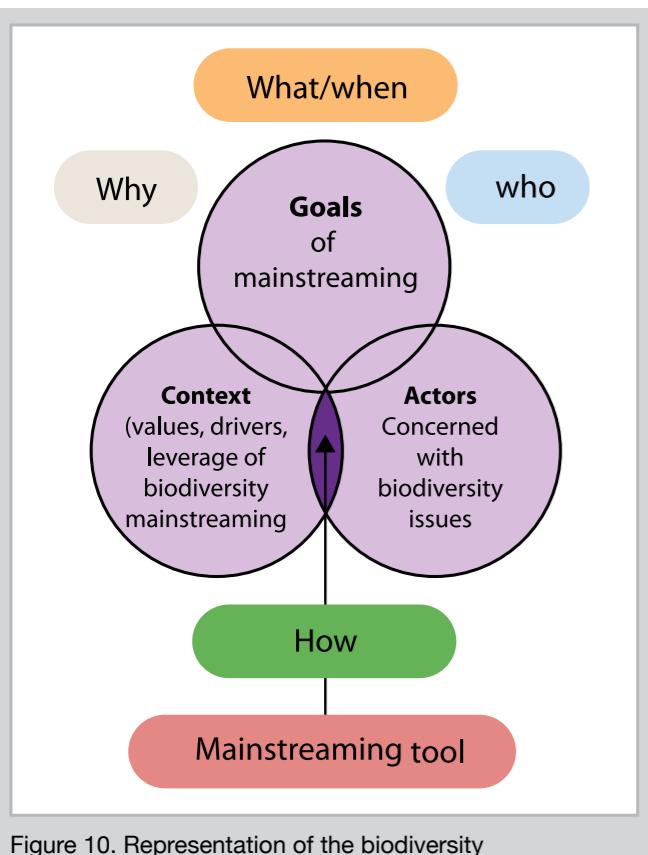


Figure 10. Representation of the biodiversity mainstreaming. (Author)

2.1 The Biodiversity Mainstreaming Tool:

One of the objectives of the toolkit is to demonstrate the process of mainstreaming biodiversity into policies, promote biodiversity conservation issues, and integrate them into national plans for the benefit of livelihoods. However, it is important to emphasize for users of this toolkit, change agents or decision makers, the fact that there are generic complexities of biodiversity mainstreaming, i.e. it's multi-issue, multi-layer, context-specific nature. Therefore, users of this kit need to tailor approaches to a local context, to be clear on the specific mainstreaming goal, and to involve the right actors. For this reason, applying the current mainstreaming toolkit requires mutual collaboration and integration between biodiversity and development. In this way, the mainstreaming process is considered as a process of political and institutional change, where cross-sector coordination is essential. The expected outcome of the toolkit would be improvement of the economic productivity of land and empowerment of communities affected by land degradation and unsustainable use of natural resources. A detailed flow chart of the stages and steps to be followed for use as biodiversity mainstreaming tool is provided in Figure 11 below.

Each of the items in this Figure is discussed below with a relevant example. The mainstreaming tool kit consists of two stages. Stage 1 is a general identification of the goals, context and actors of biodiversity as mentioned in Figure 10

above, as well as and identification of the desired biodiversity outcomes. Stage 2 is the main process of mainstreaming, to be followed by users which involve several steps each is explained separately below.

Stage 1. Identification

Step 1: Identification of goals context and actors

As a first step, it is important to identify the goals of mainstreaming biodiversity as a tool for promoting different biodiversity conservation practices and integrating them into national plans for the benefit of livelihoods and any particular area. Often biodiversity mainstreaming is led by the environment sector, which cuts across key actors from other sectors (for example, agriculture, mining, forestry). Step 1 is about identification of such actors and to ensure the required cross-sector coordination and strengthen links and the context of actions between such sectors and associated public and private institutions that affect and/or benefit from biodiversity. Change agents can help in this step, which necessitates that compelling information, analysis and recommendations are simple and understandable by the economists and planners. Data on economic valuation of rangeland ecosystems is an example of data to be considered, which links biodiversity actors and planners with economists and planners (Box 1).

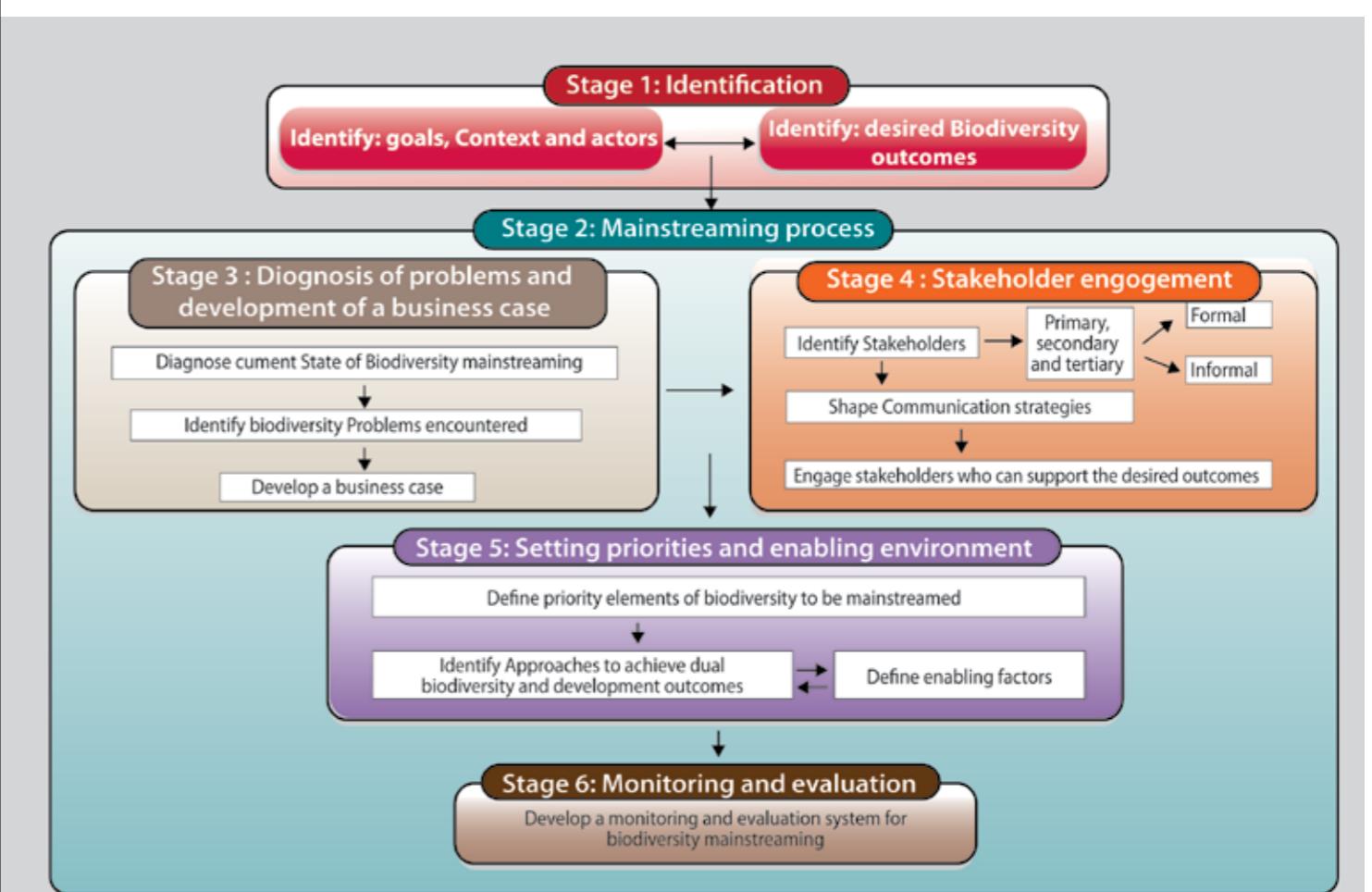


Figure 11. Flow chart of Biodiversity tool kit (Author)

Step 2: Desired biodiversity outcomes

Once the main goal of mainstreaming is identified, assessed and proved to be required by decision makers, the outcomes need to be identified. Examples of such goals are:

- Considering Biodiversity issues in the central and sectorial institutional plans and programs,
- Improved economic productivity of land,
- Enhanced empowerment of communities affected by land degradation and unsustainable use of natural resources,
- Improved investments in management of pastoral biodiversity conservation
- Control of alien and invasive species
- Poverty reduction

Box 1. Valuation of rangeland ecosystem services in terms of forage production		
	Valuation Tool	Estimated value
1	Monetary value of the rangelands in terms of cost of saved animal fodder purchase by its replacement by natural forage (dry matter, DM) from the rangeland (Westerberg, 2014)	16.8 mlj JD/yr
2	Monetary value of the rangelands in terms of cost of saved animal fodder purchase by its replacement by natural forage (dry matter, DM) from the rangeland (Jabarin, 2014)	16 mlj JD/yr (of which 13.5 mlj JD/yr is subsidized by the GoJ)
3	Monetary value of average lost rangeland productivity (forage DM) in tons of barley equivalents over the 1990 -2013 period (barley 211 JD/ton) - (Jabarin, 2014)	4.8 mlj JD/yr
4	Steppe Area (200-350 mm/yr): Monetary value of improved forage (DM) production due to range management (206 kg/ha as compared to actual productivity in open access grazing (100 kg/ha) in barley tons equivalent (220 JD/ton); average for Eyra and Bani Hashim range sites – (Abu Zanat, 2015)	4.7 mlj JD/yr
5	Badia Area (< 200mm/yr): Monetary value of improved forage (DM) production due to range management (100 kg/ha as compared to actual productivity in open access grazing (40 kg/ha) in barley tons equivalent (220 JD/ton); average for Hussineyeh and Wadi Al Fraisheen range sites – (Abu Zanat, 2015)	18.5 mlj JD/yr
6	4+5 for all Steppe and Badia rangelands (Abu Zanat, 2015)	23.2 mlj JD/yr
7	4+5 for 30% of all Steppe and 28.5 % of all Badia range lands (this author)	6.7 mlj JD/yr

Report on Sustainably investing in the Jordan Rangelands 2015
http://www.iucn.org/about/union/secretariat/offices/rowa/iucn_wame_resources/our_publications__library_/

Such outcomes would require capacity building on biodiversity issues at all levels including but not limited to:

- Concerned individuals and environmental program officers from different governmental and non-governmental organizations,
- Sectorial and central authorities involved in planning decisions,
- Public media and wider enabling environment.

It is important to note that effective mainstreaming identifies, mobilises, builds on and builds up. But such capacity can't be developed quickly. Thus, any mainstreaming 'project' needs to have particular role in a long-term process that will necessarily continue.

Stage 2. Mainstreaming process

The mainstreaming process involves four major steps based on the previous steps . These are listed and explained as follows:

Step 1: Diagnosis of problems and developing a business case

Stakeholders outside the conservation field are unaware of the importance of biodiversity and /or conservation action plans and CBD requirements, according to the country's commitment to CBD. They provide inadequate budgetary allocation to biodiversity conservation efforts. Accordingly, impacts on biodiversity are huge due to unsustainable planning practice in all fields. It is therefore important to diagnose the current state of biodiversity and identify examples of such practices impacting biodiversity and indicators

of biodiversity loss (Table 3). Change agents can help to diagnosis how well biodiversity issues are currently being addressed in development decisions, in terms of on-going practices and their associated problems. It is important that such problems be discussed with a wide range of stakeholders from government departments, NGOs, communities, private sector organizations. This will help with understanding the fundamental of biodiversity problems encountered, their drivers and actions required. The result of this step is a situation analysis that can be the basis for debating priorities with relevant stakeholders.

T A B L E 3

Irrational practices, associated biodiversity problems and indicators of impacts on biodiversity

Over grazing: According to the Ministry of Agriculture, early grazing of range plants, ploughing of rangelands to establish ownership rights, property rights, urbanization, arbitrary movement of vehicles, quarries and mining activities are going on in Jordan, also causing.	- Biodiversity under threat - Accelerated soil loss and degradation - Habitat loss - Degradation of rangelands - Reduced soil productivity
Dramatic human pressure due to intensive cultivation and ploughing for rainfed cultivation of barley .The poorest farmers are increasingly growing cereals on marginal areas (from the agro-ecological view) with little or even no rotation.	- Reduction of natural resources and agricultural productivity - Worsened sustainability of farming practices. - Depletion of soil seed bank - Insufficient natural replenishment of nutrients and maintenance of organic matter during fallow periods to maintain soil productivity over the long term
Unsustainable practice of over withdrawal of aquifers: In 2004 the National Water Master Plan reported that agricultural water withdrawal accounted for 64 % of the total water withdrawal, and 36% was recorded for domestic, industrial and tourism purposes.	- Lowered water tables and declining water quality - Salinization of ground water.
Uprooting of the green matter for use as fuel wood, medicinal, herbal and aromatic. Scarce use of organic fertilizers and manure	- Reduced seeding, reduced regeneration, and the consequent loss of plant production in the following year - Change in the floristic composition, and a decline in volume and frequency of plants. - Low nutrient status of many soils - Reduced soil productive capacity - Damage of soil structure and porosity - Crust formation and compaction of the soil.

The above biodiversity encountered problems set the stage for developing a business case to be presented to decision makers and stakeholders. Biodiversity is often unrecognized, unvalued and considered unimportant in economic and development decisions making processes. Therefore, it is critical to prepare a compelling and credible business case to convince decision makers. This business case should be formulated, often by change agents, to contain the importance and value of biodiversity to society, and to emphasize a core strong message that catch tangible benefits.

This business case should be a short well written document or a short verbal presentation. Compiling facts, figures and real life stories as compelling evidences of biodiversity benefits should be presented. An example of a business case would be the IUCN Project on "Economic Valuation of the Hima System: Bani Hashem Villages – Jordan". Box 2.

Box 2. IUCN Project on "Economic Valuation of the Hima System: Bani Hashem Villages – Jordan"

The project main goal is the Sustainable Rangeland for Hima development. This project assesses the situation of rangelands after 25 years if there is no change in the current rangelands practices, with the current rangeland productivity that is rapidly declining, and with the increasing number of livestock that is exceeding the carrying capacity of land. The project focuses on the increase of rangeland productivity by applying of the Hima restoration practices, considering Hima communities as service providers.

(http://www.iucn.org/news_homepage/news_by_date/?14627/Economic-Valuation-of-the-Hima-System-Bani-Hashem-Villages-Jordan)

Data compilation for business cases would involve both interpretations of existing data in new ways and collecting and analyzing new data. Social data is also important to be included, e.g. the dependence of poor households on biodiversity for income, the poverty rates, etc. The risks and the cost of inaction would be a good approach to justify benefits in investing in biodiversity. Other data may include:

- Values and benefits in relation to national policies
- Trends and changes in Biodiversity over time
- Different land use scenarios and its relation to GDP
- Costs of biodiversity loss under different development scenarios
- Cost-benefit analysis

Table 4 is a summary of the recommended data to be included in the business case.

It is important in this step to identify elements of biodiversity to be mainstreamed. This depends on the problems identified which might concern particular species (endangered species, endemic species, invasive species, etc.), populations (medicinal plants), habitats (rangelands), ecosystems (drylands) and ecosystem services (provisional and supporting), and/or genetic diversity. Any of these might be damaged by current development, and/or present potentials which are being ignored by development policy and activities.

T A B L E 4

Summary of Data to be included in a biodiversity business case

Information on biodiversity issues, benefits and values	<ul style="list-style-type: none"> Impact assessments on biodiversity, strategic analysis, sustainability appraisals Spatial and temporal analysis of the past and present conditions with comparisons Monitoring and assessments tools that are relevant to on-going practices
Planning and organization	<ul style="list-style-type: none"> Proposed plans e.g. protected areas, rotational grazing, organic farming etc. Sustainable land use planning Legislations and legal tools and guidelines National Sectoral Plans and Policies Relevant to SLM – Jordan Biodiversity Policy analysis and situation analysis. Corporate sustainability reports and appraisals
Deliberations and engagement	<ul style="list-style-type: none"> Participation by: <ul style="list-style-type: none"> • Stakeholders meetings (formal and informal) • Conferences and awareness workshops • Public/private partnerships • Multi-stakeholder consultations
Biodiversity management control	<ul style="list-style-type: none"> • Conflict management resolutions • Integrated environmental management • Indicators and bench marking of management practices and control. • Eco-labeling of biodiversity products • Business supply chains
Voluntary and indigenous biodiversity approach	<ul style="list-style-type: none"> • Local knowledge • Analysis of internal regulations

Step 2: Stakeholders engagement

Stakeholders are all sectors that are affected or affect biodiversity. A check list should be carefully prepared by change agents to build strategic alliances and potential partners. In light of the social and economic characteristics of the population, the main intended stakeholder beneficiaries comprise the poor women and men within the following three categories (i) small and medium farmers; (ii) landless households depending mainly on natural resources for their livelihoods; and (iii) other disadvantaged groups (Box 3).

This section also focuses on identifying sectors and stakeholders into which biodiversity concerns are to be mainstreamed. It is targeting potential production sectors such as agriculture, forestry or mining; and actors of particular development challenges such as food security, climate change adaptation; or poverty reduction strategy. Considerable emphasis would be placed on involving a wide range of stakeholders, drawing in agencies, organizations and communities active in conservation. Specifically at the national level, key stakeholder involvement would include but not restricted to the Ministries of Planning and International Cooperation (MOPIC), Environment (MOE), Agriculture (MOA) and Water Resources (MWRI) and the Royal Society for the Conservation of Nature (RSCN). Additional national level support would also be expected from university groups, especially from the Departments of "Agricultural Economics" from Jordan University and the Department of Natural Resources and the Environment from Jordan University of Science and Technology. Also at the local level, stakeholders would include districts, villages and community groups. It might entail working with government agencies, civil society and private sector organizations. (Table 5).

Effective communication is essential for bringing about the changes in policy, norms and behavior that are required for biodiversity mainstreaming. There must be strong communication throughout the mainstreaming stages; it is vital during problem articulation, stakeholder engagement and business case development. It is important to identify who needs to change, what behaviors need to change, and what decisions, methods and instruments best bring about these changes.

Box 3. Stakeholders

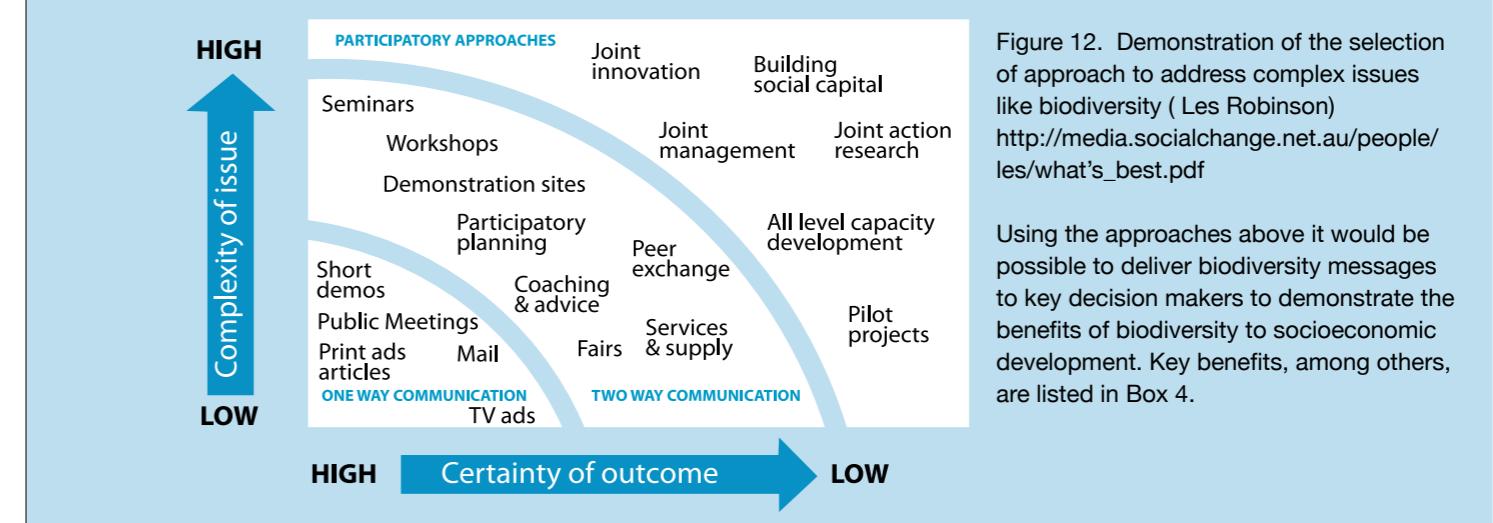
Stakeholders are those people or organizations which are vital to the success or failure of an organization or project to reach its goals.

- Primary stakeholders are:
 - a+ those needed for permission, approval and financial support and
 - b+ those who are directly affected by the activities of the organization or project.
- Secondary stakeholders are those who are indirectly affected.
- Tertiary stakeholders are those who are not affected or involved, but who can influence opinions either for or against.

CBD tool Kit Section3 How to engage stakeholders and mainstream biodiversity
<https://www.cbd.int/cepa/toolkit/2008/doc/CBD-Toolkit-Section3.pdf>

T A B L E 5	
Entry points for mainstreaming at different levels	
Level	Planning/policy target
International level	
Funding Agencies	GEF, World Bank, USAID, IFAD
Research & Development organizations	ICARDA, ACSAD (impact assessment)
National	
National Government	Poverty reduction strategy, national development plan, national vision
Development assistance agencies	UN development assistance , IUCN,
Sub-national	
Local government	Mayor of Local communities, rural villages, city councils
Sectoral	
Ministries	Development plans, strategies, policies and budgets
Private sector	Investment companies,
Public sector	NGOs, Forums and eco-clubs
Level	Planning/policy target
International level	
Funding Agencies	GEF, World Bank, USAID, IFAD
Research & Development organizations	ICARDA, ACSAD (impact assessment)
National	
National Government	Poverty reduction strategy, national development plan, national vision
Development assistance agencies	UN development assistance , IUCN,
Sub-national	
Local government	Mayor of Local communities, rural villages, city councils
Sectoral	
Ministries	Development plans, strategies, policies and budgets
Private sector	Investment companies,
Public sector	NGOs, Forums and eco-clubs

Each of the stakeholders identifies above will need a separate tailored way, either formal or informal, to address biodiversity due to the variability of each stakeholder prejudices and biases. A single message is rarely suitable for all. Therefore, shaping a communication strategy and a potential course of action that is deemed suitable for addressing stakeholders or decision makers must be aligned with their strategic interest e.g. governmental priorities, strategic interests, country's development needs, job creation, poverty alleviation, rural development, ecotourism plans, etc. However, when planning to engage stakeholders in the re-introduction of large mammals or the restoration of a forest landscape, more participatory approaches are appropriate (Figure 12). Therefore, the joint innovation and management are required as well as more pilot projects, participatory research, when uncertainty and complexity increases.



Step 3: Setting priorities and enabling factors

Reaching this step, means that the mainstreaming process is about to be finalized. However it is important to set the priorities of actions. The priorities should be based on the understanding of the relationships among economic activities, ecosystem functioning and human wellbeing. Of highest priority is the long term awareness plan at all levels on the biodiversity importance and values and the realization that poverty increases as environmental and natural resources get destroyed . It is also important to enhance the institutional synergy with regard to implementation of the Multilateral Environmental Agreements (MEAs), i.e. UNCCD, UNFCCC, and CBD to ensure integration and coordination of biodiversity conservation issue.

Mainstreaming biodiversity into sectors that have previously ignored or marginalized environmental concerns is a difficult process. Thus, poor governance (Smith and others 2003), weak capacity of organizations and institutions in all spheres of government and civil society (Wells and Brandon 1993; Infield and Adams 1999; Steiner, Kimball, and Scanton 2003), and a lack of scientific knowledge about biodiversity issues (Raven and Wilson 1992) are all major constraints to mainstreaming.

It is important to create the right enabling factor of creating the right enabling environment for mainstreaming biodiversity, pointing to the need for "an effective institutional and enabling environment where biodiversity is to be mainstreamed. This is critical for ensuring sustained biodiversity benefits. Unless the institutional structures are reinforced to mainstream biodiversity, they remain vulnerable (to alternative development options) and may become islands (in which case the biodiversity value may get eroded over time)" (GEF 2002). Table 6. shows the enabling factors and challenges associated with each factor.

Box 4. Biodiversity messaging that speaks to key policy priorities of most governments

Biodiversity provides myriad unique benefits that are critical to socioeconomic development, including:

- Service delivery — delivering key ecosystem services through a green, cheaper and low-energy infrastructure, eg pollination and water provisioning.
- Risk reduction — including disaster and climate risk reduction in key sectors eg providing a diverse resource base that offers alternatives if one food crop fails.
- Direct financial value — through certain products and species that may be tradable, eg medicinal plants and animals and species attractive to tourists.
- National economic diversification — through habitat, species and genetic diversity that present options and alternatives, eg in tourism and forestry.
- Intrinsic and cultural value — related to identity, tradition, social cohesion, recreation and spirituality.

Source: Entebbe Statement on Biodiversity in Development Planning (2013).
http://povertyandconservation.info/sites/default/files/Final20%draft20%Entebbe20%Statement_August202013%.pdf

3 Conclusions

T A B L E 6

Lists of enabling factors and challenges

Enabling Factor	Challenges
Political will and leadership	A government that lacks political will to integrate and mainstream biodiversity, and does not consider biodiversity on its agenda
Media and public perception and awareness of values	The public media ignores environment and biodiversity issues in its program and national publications
Inter-sectorial coordination	Competition between governmental programs with poor coordination and communication
Lobby by interest groups	Lack of interest in environmental issues and ignorance about biodiversity issues and its importance
Transparent, accountable and inclusive governance	Institutional corruption and dominance of economic sectors decisions that lacks integrating environmental and biodiversity issues
Stakeholder participation	Lack of interest by stakeholders and absence of awareness programs on environmental issues and biodiversity values
Availability of funds	Inefficient use of available funding and having proposals not aligned with national proprieties.

Step 4: Monitoring and Evaluation (M&E)

A proper M&E system needs to be in place to guide the mainstreaming process and assess its success. M&E should focus on the approach, enabling factors and outcomes. The lessons learned through the M&E process can help fuel a process of continuous improvement and provide valuable experience to share with others. It is good practice to get plans for mainstreaming peer reviewed by people who are doing the same thing in another government ministry or in another country. They will be able to share what has worked well or not so well for them (www.iied.org/nbsaps).

The main items of the Monitoring and evaluation are summarized in Table 6.

T A B L E 7

Monitoring and Evaluation questions

Relevance	Does the mainstreaming process meet the needs the stakeholders? To what extent the mainstreaming goals were in line with the priority of the stakeholders?
Efficiency	Do the methods of communication used lead to engagement of stakeholders? Which of the communication method used was appropriate to which stakeholder?
Effectiveness	To what extent does the mainstreaming lead to increased community support for action to tackle biodiversity loss? To what extent did the engagement method encourage stakeholders to infuse biodiversity in their policies and plans?
Outcome	To what extent has the mainstreaming lead to sustainable biodiversity concern? What are the positive and negative outcomes of mainstreaming biodiversity?
Sustainability	To what extent did the process of mainstreaming lead to a long-term change?

The next step is to identify what information is needed to answer the above questions. It is important to monitor questions (indicators) and where this information will come from (the data sources) and consider data collection, in terms of the type of data and quality.

Massive programs of integrated rural development, community-based resource management, and similar innovations had achieved little success in reducing the rate of biodiversity loss and improving the welfare of humankind to deliver the results expected. A new paradigm was raised to integrate the concept of biodiversity conservation into thinking and action at all levels of intervention and across all sectors. The concept of “mainstreaming” biodiversity conservation was entering the language of the new debate, but its meaning and relevance were poorly understood and rarely implemented. Mainstreaming biodiversity as a means of seeking solutions to biodiversity loss is a challenging activity. At present, biodiversity mainstreaming is still viewed as a luxury (Martens, Rotmans, and de Groot 2003). In the meantime, there must be solutions by being innovative, reflective, and adaptable.

The present toolkit presents a guiding procedure to be followed by concerned actors at all levels, as well as decision-makers in governmental and nongovernmental organizations, planners, environmental practitioners, local communities and NGOs to introduce the concept of biodiversity mainstreaming into national policies and plans. This builds on the recommendations of the Rangeland Strategy of the Ministry of Agriculture (2013-2014) and sustainable investment of Jordan Rangelands report (2015) in addition to the Fifth National Report on the Implementation of the Convention on Biological Diversity, 2015.

Mainstreaming of biodiversity may occur on the ground in production landscapes and seascapes or within economic sectors, particularly those directly related to natural resource use and management— agriculture, forestry, fisheries, invasive alien species control, wildlife utilization, mining, and tourism. Biodiversity may also be mainstreamed in areas of economic activity such as energy, infrastructure, manufacturing, transport, construction, international trade, and even in military activities (Petersen, et al., 2005)

Decision-makers in all sectors need to realize that biodiversity and healthy ecosystems are natural assets. They deliver vital benefits and services to society and to the national economy. Jordan is fortunate to have a particularly vast wealth of biodiversity in terms of natural flora and fauna, birds, natural rangelands, medicinal plants as well as endemism. In order to manage and conserve these assets and to reap the benefits that they provide, it is important that biodiversity is integrated into development planning.

The current kit elucidates that degradation of ecosystems and habitats caused by forces of overgrazing, desertification, urbanization and other forms of human settlements, industrialization, mining operations, wide scale irrigation of agricultural land, poverty-induced overexploitation of natural resources and climate change are the major threats to drylands. These forms of disturbances often cause a decline of resilience of dryland ecosystems and consequently are serious threats to dryland's biodiversity.

Although mainstreaming initiatives may be generated by conservation agencies, increasingly often they originate within economic sectors, and typically involve a broad range of actors, with partnerships between nongovernmental organizations (NGOs); government; industry; small, medium, enterprises; and communities. Change agents play an important role in establishing such partnerships. Mainstreaming also involves the integration of biodiversity values into the enabling environment, ranging from national policy making to global financial markets. This may include development policy, legislation, land-use planning, finance, taxation, economic incentives, international trade, capacity building, research, and technology.

For this toolkit to be more effective, it is recommended to convert it to a digital interactive tool online, which would contain digital maps (with active zooming feature) that highlights key habitats and species, key ecosystem services and estimates of their valuation, types of developments and their impacts. The digital toolkit would include detailed information on ecologically sensitive areas, protected areas, natural rangelands, and important bird areas with links to photos and species lists.

4

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