



# Ecosystem-based DRR in the dry rangelands

**Peter Laban**

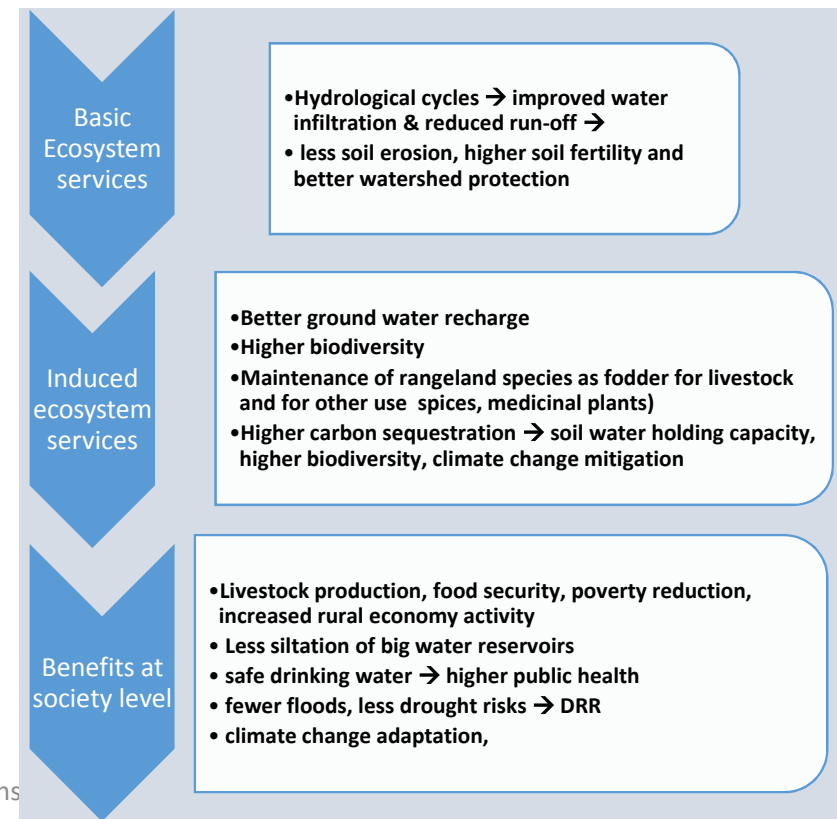
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# Ecosystem-based DRR in the Jordan Rangelands

## SRM and ecosystem service benefits; a possible hierarchy ?



## A case Study for Eco-DRR

# Sustainably Investing in the rangelands of the Jordan Badia



Flock of sheep near Castle Shoback, Karak Governorate  
(13.04.2015; Huda Odeh)

# Bedouin Camp near Dhulail, 17.10.2011







## Ecosystem-based DRR in the Jordan Rangelands

### **Key data for the Steppe and Badia Rangelands in Jordan**

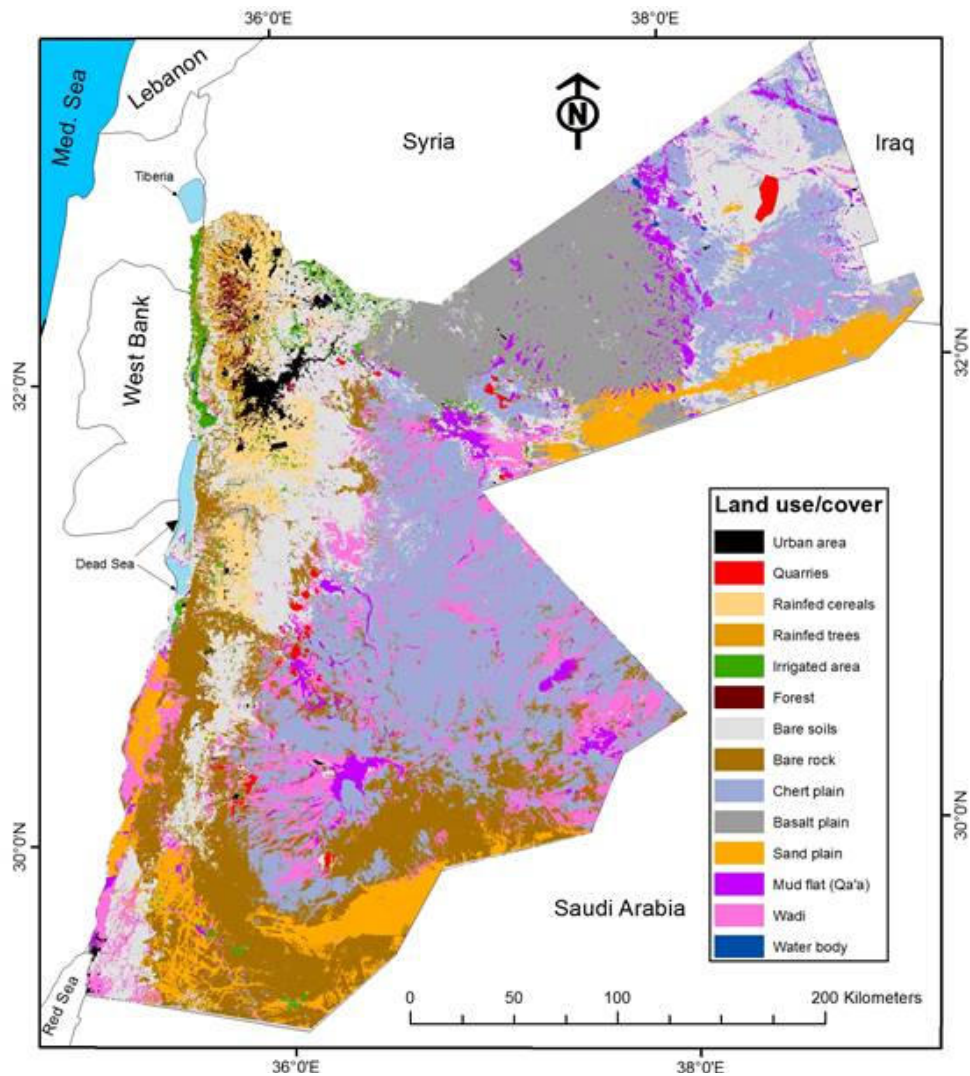
Rangelands are considered in Jordan as *“the wide-open, non-fenced lands where fodder grow naturally, that are not suitable for traditional farming due to lack of rain, low fertility, rough terrain and high rockiness or because of a combination of these factors, which makes the lands optimum use restricted to production of fodder for animals”* (MoA, Rangeland Strategy, 2013).

# Ecosystem-based DRR in the Jordan Rangelands

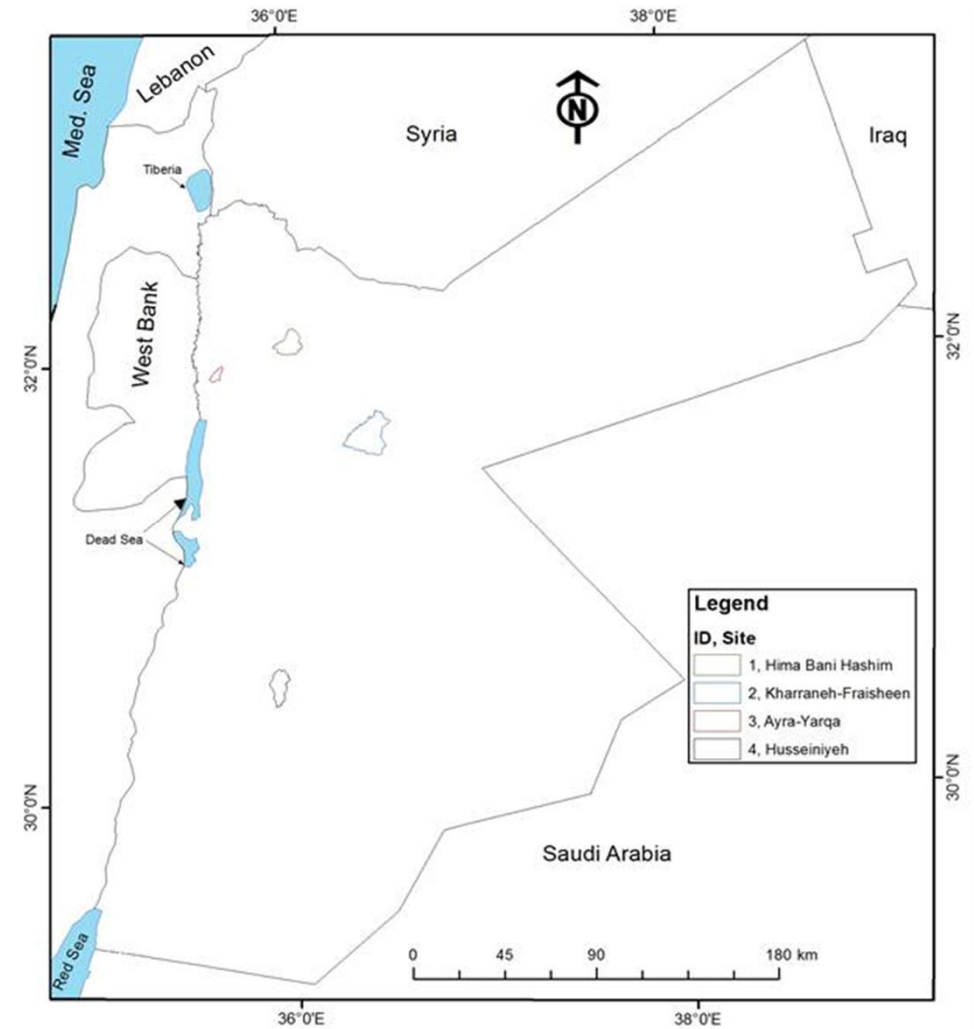
## KEY DATA

Ecozone	Area km <sup>2</sup>	% of country	Altitude asl	Rainfall	Vegetation Type	Biomass Productivity	Land use
Steppe	10,000	10%	500 – 700 m	200-350 mm/yr	Shrubs and herbaceous (40-60% ground coverage)	1990: 200kg/ha 2013: 80kg/ha	Bedouin pastoralism + barley
Badia (desert)	71,000	80 %	600 – 1000 m	<200 mm/year	Shrubs and herbaceous (20-40% ground coverage)	1990: 100 kg/ha 2013: 40kg/ha	Bedouin pastoralism

Figure 3: Land use/cover map of Jordan (Ababsa, 2013; Al-Bakri et al., 2013).



Map of the selected sites  
/ replace by same from Mahfouz document.





## Rangeland Ecosystems in Jordan

Ayra (left-up)

Bani Hashim (right-up)

Badia in Shaumari and  
in El Hasa (left-down)







## Ecosystem-based DRR in the Jordan Rangelands

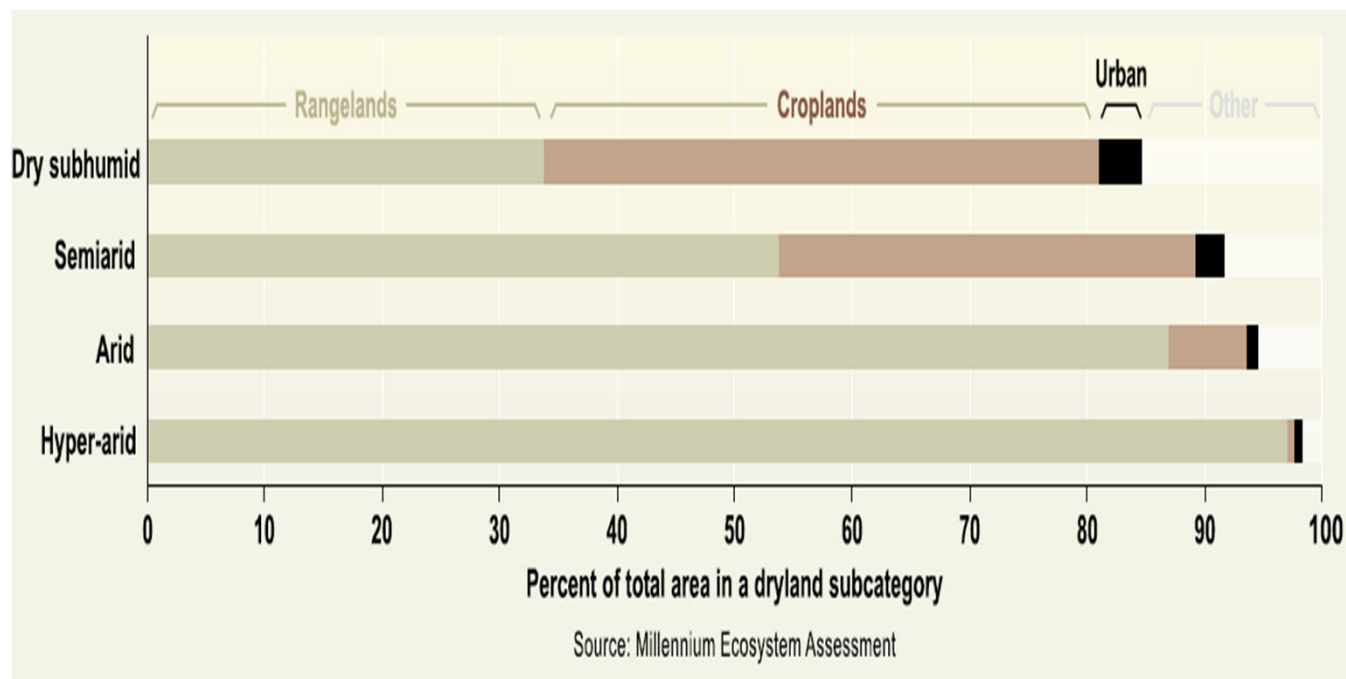
### **Some key figures worldwide**

- Drylands comprise 41.3% of the earth surface
- Drylands are home to a third of all humanity - about 2.5 billion people
- Rangelands cover between two thirds and three quarters of all the dryland area
- Rangelands cover 51% of the total land area of the world (rangelands also found outside drylands)
- Soil Organic Carbon in the Drylands store as much carbon as in all terrestrial vegetation (around 500PgC). All SOC (1500 PgC) is the second carbon store after the oceans.

# Ecosystem-based DRR in the Jordan Rangelands

## Rangelands within the Drylands

Figure 2: Land uses by dryland category (MEA, 2005)





# Ecosystem-based DRR in the Jordan Rangelands

## **Basic Eco-DRR / NbS concepts**

**With courtesy to materials of the PEDRR**

***Training Course on Environment and Disaster Risk Reduction  
for Sustainable and Resilient Development***

# What is a disaster?



“A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources”

UNISDR 2009

From PEDRR training Course



# What is disaster risk? (UNISDR 2009)



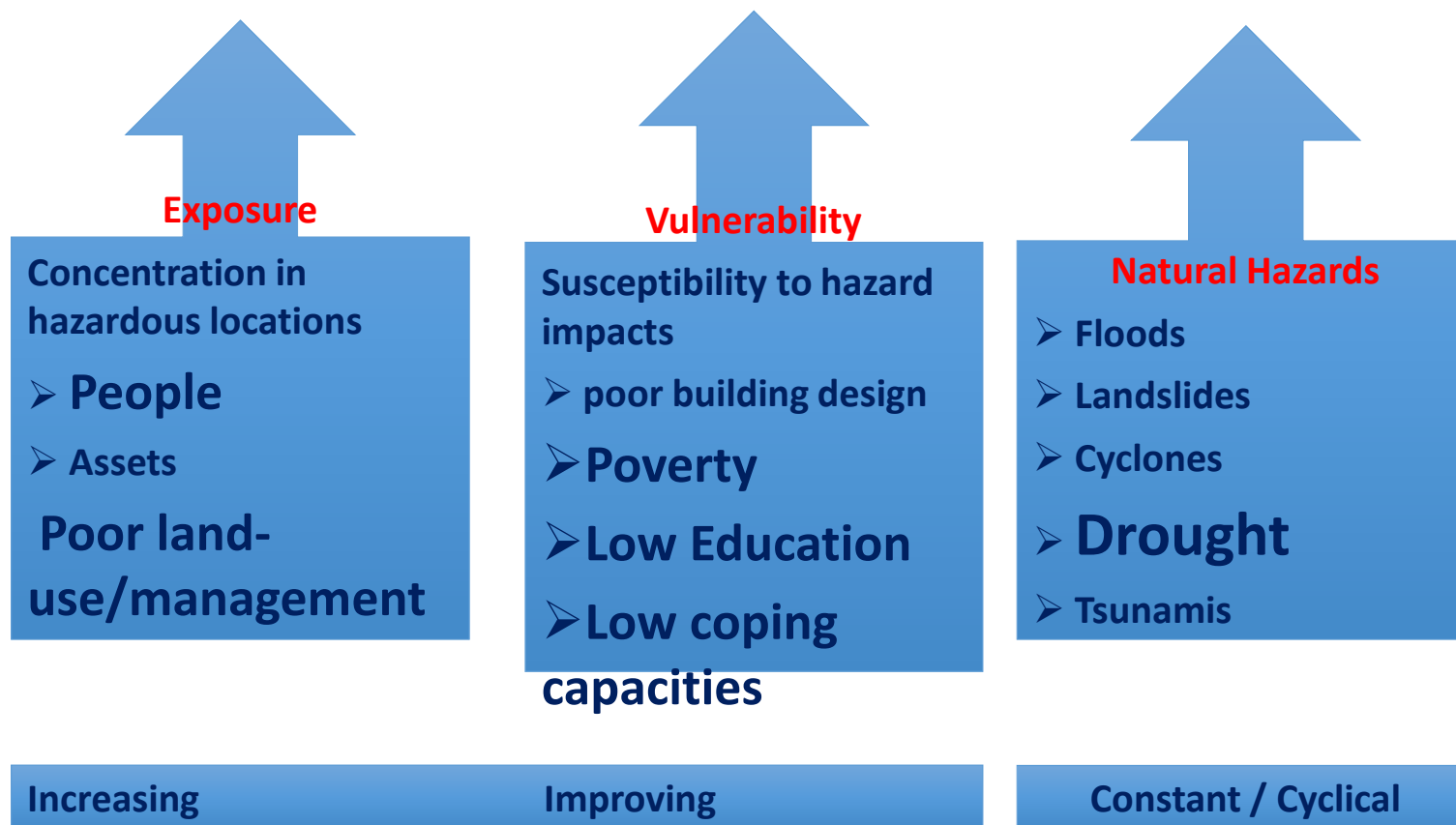
“The potential disaster losses – in lives, assets, livelihoods, etc. – which could occur to a particular community or society over some specified future time period” (UNISDR 2009)

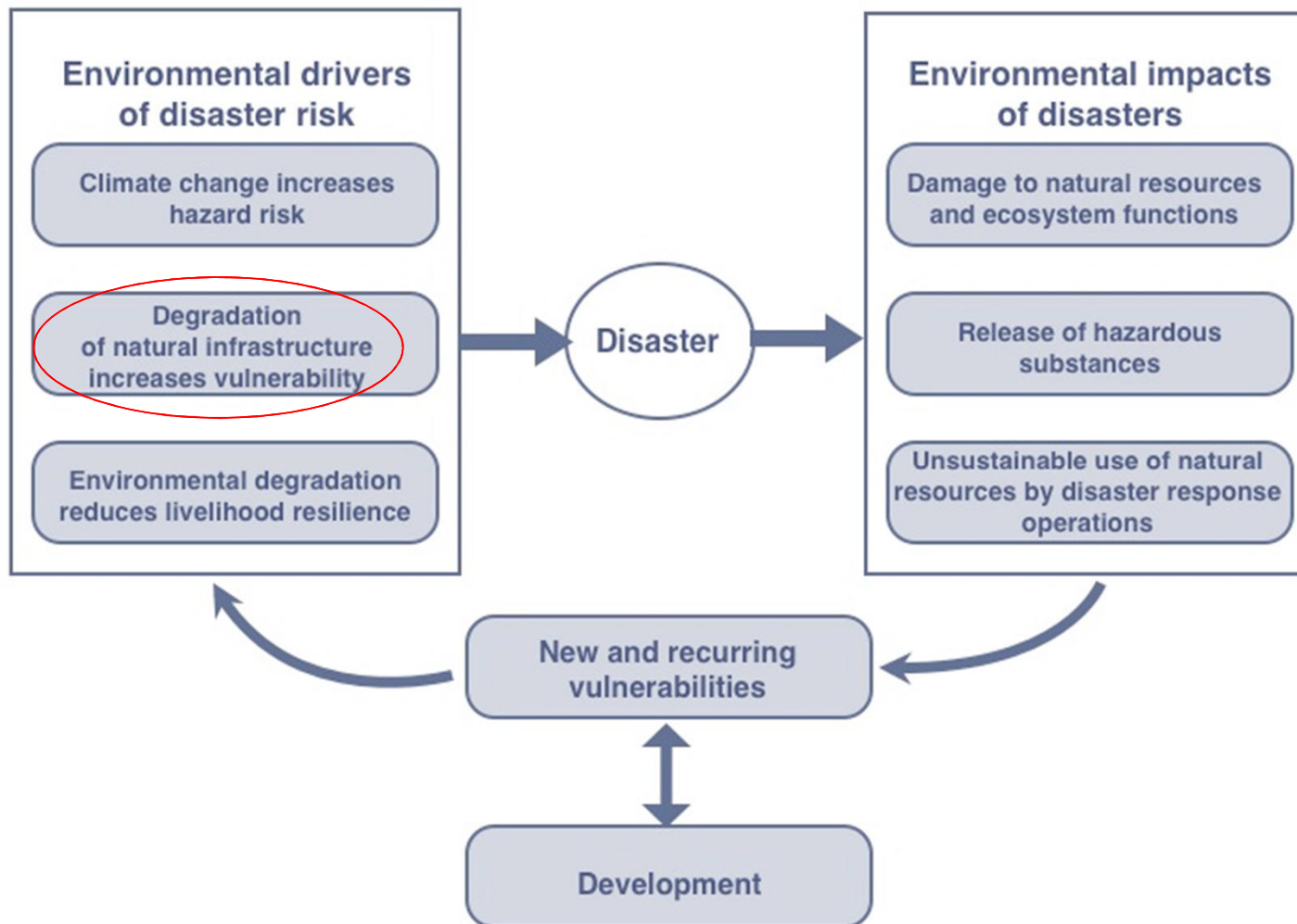
**Disaster Risk = Hazard x Vulnerability x Exposure**

**From PEDRR training Course**

# What is a Disaster? Why are they Increasing?

Large-scale **exposure + vulnerability** to a **hazard**





Adapted from UNEP/UNISDR (2008)

# Ecosystem-based DRR in the Jordan Rangelands

*In Jordan, unsustainable  
use/neglect will lead to:*

- *Loss of and less resilient livelihoods*
- *Loss of economic activity, food production and income*
- *Range and land degradation*
- *Poor hydrological flows (ground and surface water)*
- *Soil erosion and reservoir sedimentation*
- *Loss of biodiversity*

*Neglect and unsustainable use of rangelands can turn into disaster; How to reduce the risk of such a disaster?*

*Negative drivers:*

- *Unsustainable dryland crops*
- *Groundwater over-extraction*
- *Urbanization*
- *Inadequate policies*
- *mining*
- *Climate change*



## Ecosystem services for DRR

= the direct and indirect benefits people obtain from nature

### **Provisioning services**

Food, raw materials, fresh water, medicinal resources

### **Regulating services**

Natural hazard control, erosion control, air quality, climate regulation, water purification, disease and pest regulation, pollination

### **Cultural services**

Recreation, tourism, spiritual experience, aesthetic and cultural inspiration

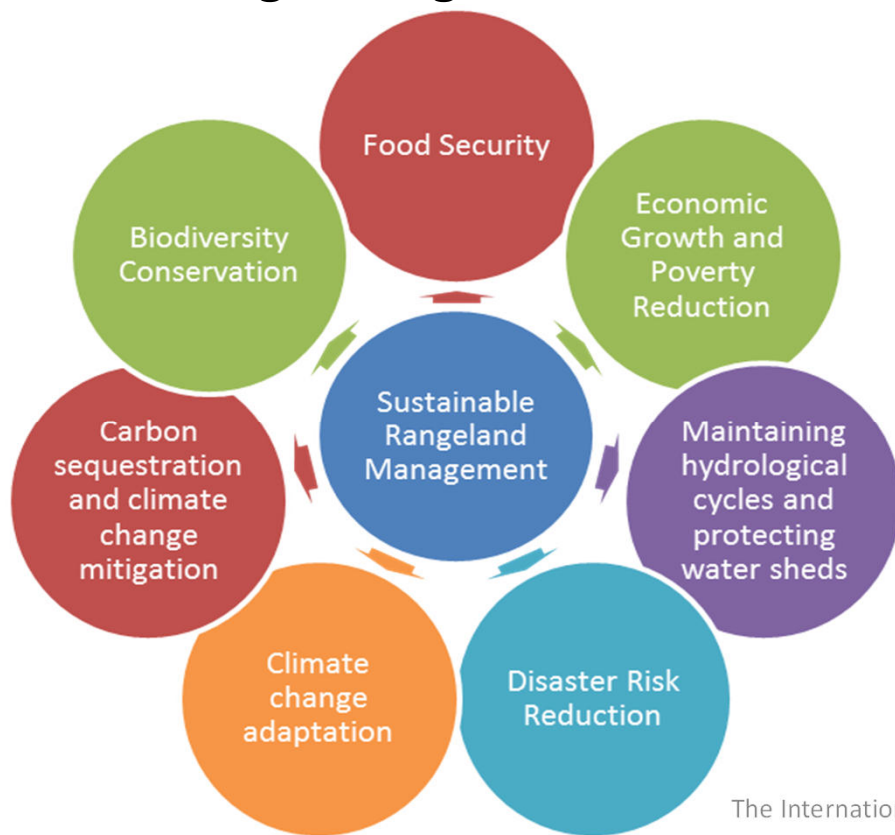
### **Supporting services**

Soil formation, nutrient cycling, soil organic carbon

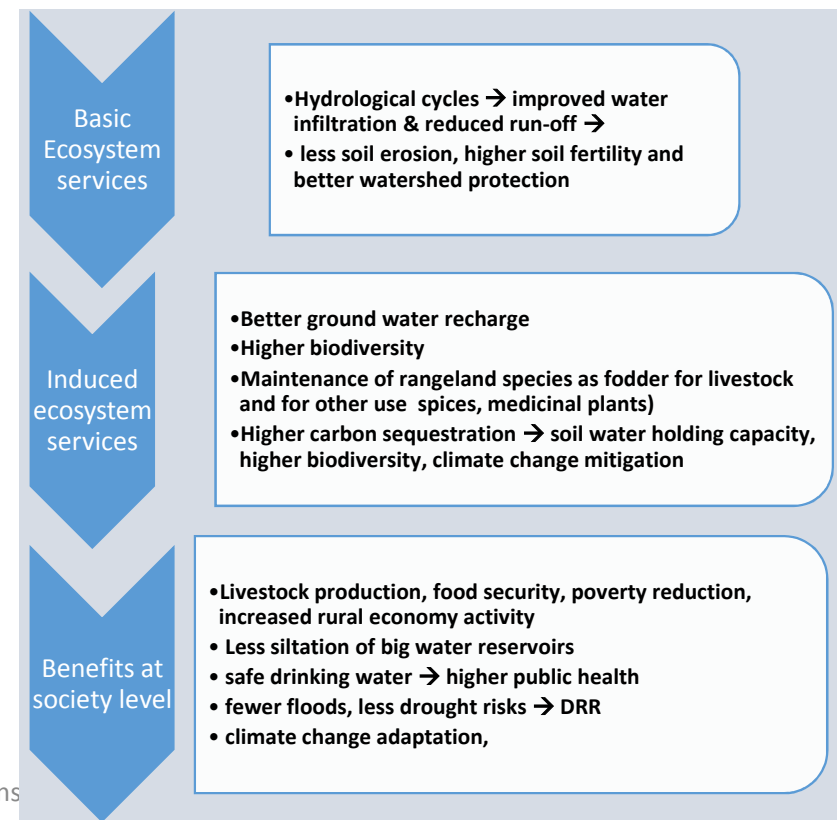
Source: MEA, 2005

# Ecosystem-based DRR in the Jordan Rangelands

## Multiple benefits of sustainably managed rangelands



## SRM and ecosystem service benefits; a possible hierarchy ?





# Ecosystem-based DRR in the Jordan Rangelands

## ***Core Elements of Ecosystem-based Disaster Risk Reduction***

1. Ecosystems provide multiple functions and services.
2. Ecosystems-based risk reduction is linked with sustainable livelihoods and development.
3. Sound environmental management is one element of DRR strategies.
4. Environmental management critical to addressing the risks associated with climate change and extreme events.
5. Integrating environmental approaches into disaster risk management requires multi-sectoral and multi-disciplinary collaboration.
6. It is essential to involve local stakeholders in decision-making.
7. Existing instruments and tools in ecosystems management provide an opportunity to integrate DRR considerations.

**From PEDRR training Course**



# Ecosystem-based DRR in the Jordan Rangelands

**Rangeland Ecosystem-based Measures  
(or Nature-based solutions)  
relevant for DRR  
In the Jordan rangelands**



# Ecosystem-based DRR in the Jordan Rangelands

## Rangeland Ecosystem/Nature-based Measures relevant for DRR

### From NAP Jordan to Combat Desertification (2014)

- ❑ S&W Conservation: Restoring soil fertility (by increasing organic matter content); Implementing soil conservation (terraces, stone walls) ; Improving water management (through water harvesting); Maintenance of stream flows and water springs
- Vegetation management: Re-vegetation of degraded range; Restoration of community rangeland governance and management; community-based protection of rangeland sites; community controlled pasture management
- ❑ Improving livestock production (veterinary services)
- ❑ Improving livelihoods through sustainable intensification of resource use

# Ecosystem-based DRR in the Jordan Rangelands

## Jordan Rangeland Site Studies

- 4 Rangeland study sites selected for detailed vegetation growth/dynamic measurements (2 in the steppes and 2 in the Badia - see map)
1. **Hima Bani Hasshim** site in Zarqa Watershed (Zarqa Basin)
  2. **Ayra Reserve** site in Ayra Watershed (Jordan Valley Basin)
  3. **Kharraneh-Fraisheen** site in Shaumari Watershed (Azraq Basin)
  4. **Husseiniyah** site in Al Hasa (al Khor) Watershed (Jafir Basin)



**Hima Bani Hashem**

## Ecosystem-based DRR in the Jordan Rangelands

### **Top-line summary of Jordan Rangeland Site Study**

Overview main characteristics rangeland sites (Prof Jawad Al Bakri, 2014)

Range site	Bani Hasshim	Al Fraisheen	Husseiniyah	Ayra
<b>Watershed</b>	<b>Zarqa</b>	<b>Shaumari</b>	<b>Al Hasa</b>	<b>Ayra</b>
Watershed area	550 km <sup>2</sup>	1050 km <sup>2</sup>	270 km <sup>2</sup>	45 km <sup>2</sup>
Altitude	500 – 700 m	600-630 ,	940-1100 m	100 - 500 m
Geology	Dissected Limestone	Limestone Plateau	Gravel Plain on chalk/marl bedrock	Sandstone/lime stone colluvium
Soils	Clayloam ( ? ) Calcic Inceptisols	Silty Loam Calcic Aridisols	Silty clayloam Calcic Aridisols	Typic Torriorthent (Sandy Entisols)
Topography	Hilly with steep slopes (20-30%)	Flat (1-5% slopes)	Flat (1-2 % slopes)	JV Escarpment (12-27% slopes)
Rainfall	200 – 250 mm	80-100 mm	50-100 mm	150-400 mm
Poverty %	1.7--15.7 %	15.8 – 25.1 %	25.2 – 42.8 %	8.9 – 15.7 %
Ownership	MoA	Treasury Lands	Treasury Lands	MoA

## Ecosystem-based DRR in the Jordan Rangelands

### Top-line summary of Jordan Rangeland Site Study

Overview main characteristics rangeland sites (Dr Mahfouz , 2014)

Range site	Bani Hasshim	Al Fraisheen	Husseiniyah	Ayra
<b>Watershed</b>	<b>Zarqa</b>	<b>Shaumari</b>	<b>Al Hasa</b>	<b>Ayra</b>
Vegetation type	Batha Steppe	Chert Hammada	Chert Hammada	Mediterranean npn-forest
Vegetation structure	2 layers: shrubs and herbaceous	2 layers: shrubs and herbaceous	2 layers: shrubs and herbaceous	2 layers: shrubs and herbaceous
Coverage	Good	Fair	Fair	Good
Use	Controlled Grazing + medicinal plants	Uncontrolled Grazing + Barley	Uncontrolled Grazing + Barley	Uncontrolled Grazing + Barley + Olives
Threats	None	Land tenure conflicts +barley	Land tenure conflicts +barley	None
Investment potential	Limited area; moderate accessibility; fairly grazable	Sizable area; easy accessibility fairly grazable	Sizable area; easy accessibility fairly grazable	Sizable area; moderate accessibility; fairly grazable





## Ecosystem-based DRR in the Jordan Rangelands

***Hima, integrated community range management***

### **Community Based Protection of Rangeland Sites with Controlled Pasture Management**

In a number of rangeland sites IUCN, the MoA and other partners have engaged with local communities to come to social control and management systems in clearly earmarked areas that make better use of vegetation cover and increase biomass productivity for grazing animals (mainly sheep and goat, some camels)



# Ecosystem-based DRR in the Jordan Rangelands

## *Hima, integrated community range management*

### **Community Based Protection of Rangeland Sites with Controlled Pasture Management**

#### **Actions**

- Prepare and implement plans for improved rotational grazing management according to carrying capacity of land (50% allowed grazing) in areas varying from 200 to 1500 ha
- Setting-up participatory herder experimentation in rangelands management through **Herder-Field Schools** and enhancement of local knowledge;
- Lobby for better local governance and rangeland tenure rights



## Ecosystem-based DRR in the Jordan Rangelands

### **Results and impact of Hima community range management**

- Improved vegetation quality and density (biodiversity)
  - quite spectacular increase in forage production from 80 to 200 kg/ha in the Steppe areas and from 40 to 100 kg/ha in the Badia, as documented in the four rangeland sites
- Economic valuation indicates that such increased forage production has an economic value of 6,7 Million JD/yr when this Hima range management is applied in watersheds that have good potential for range management (30 % of the steppes and 28.5% of the Badia)



## Ecosystem-based DRR in the Jordan Rangelands

### **Results and impact of Hima community range management**

#### **Other related benefits:**

- Improved soil carbon sequestration
- Reduced soil erosion and increased soil moisture
- Improved groundwater recharge
- Enhanced local ownership for range management
- Increased economic activity in rural range areas
- Mitigate Drought incidence



## Ecosystem-based DRR in the Jordan Rangelands

### **Results and impact of Hima community range management**

**Economic valuation indicates that sustainable range management has an important economic value for the country**

- ☐ forage productivity: 6,7 million JD/year
- ☐ enhanced groundwater recharge: 7.8 million JD/year
- ☐ in total an added value to the economy of almost 15 million JD/year
- ☐ without counting the value of increased biodiversity and SOC





## Ecosystem-based DRR in the Jordan Rangelands

### **Results and impact of Hima community range management**

**A study on sustainably investing in the Jordan Rangelands (Laban, 2015) identifies the following actions that could be combined in different investment packages:**

- Hima integrated grazing management**
- Soil, Carbon & Water Conservation**
- Improved ecological livestock production**
- Ecological production of valuable medicinal and aromatic rangeland plants**
- Installing renewable energy (solar)**
- Developing eco-tourism**



## Ecosystem-based DRR in the Jordan Rangelands

**In another presentation more on**

- ☐ Economic valuation
- ☐ on-site benefits versus externalities; who pays ?
- ☐ Sustainably investing in the rangelands and reducing disaster risks
- ☐ Needed enhancing policy measures
- ☐ Financing flows and Payment for Ecosystem Services
- ☐ some process insights over time