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Forests, Rangelands and Climate Change in the Near East region

Forests & climate change working paper n 9

Forests and Climate Change in the Near East Region FAO, 2010

Key Issues & Developments in the Region

Forests and Climate Change in the Near East Region

1. General Introduction

2. Forests and Climate Change in the Region

3. Responses to Climate Change

4. General Recommendations

1. General Introduction

24 countries covered by the analysis CC

Dominant desert conditions potential forestland is LOW

195 million ha (2005 FRA) 3% of wfa

60 million ha of additional wood/rangeland areas

Near East falls within 5 different bio-climate

Biodiversity Values: outstanding but endangered

Environmental Services: important grazing, fuelwood & charcoal, NWFP & roundwood

1. General Introduction
Continued

Important role in land stabilization, watershed protection, desertification control, air quality microclimate

Many forest areas: sources of carbon rather than sinks slow forest growth &human pressure

<u>Cultural Services</u>: recreation & landscape quality (population growth & high demand for tourism)

1. General Introduction
Continued

Socio-economic context: Main functions: protection, multipurpose and production. Subsistence provision for local communities. Woman heavily involved & still under-recognized.

Ownership patterns: mostly state owned. Communal & private on small scale

Trends in forest & land use: From critical/endangered to vulnerable ecoregions (WWP) Overgrazing, illegal logging, irrational fuelwood/forage/NWP collection, bad management practices, increase in fire frequency and severity, high population growth, poverty…

1. General Introduction
Continued

Legal framework: Government policies tend to favour agriculture over forestry & biodiversity. Marginalization of forestry sector low priority in national plans & financial allocations discourage investment.

2. Forests & Climate Change

<u>Past evidence & consequences of climate change</u>.
Studies concluded: ecosystems are dynamic systems with permanent adaptation to environmental changes. Expected that under climate change scenario, the great stability & genetic diversity of many relic tree species of the NE may play significant adaptation role become important target for in-situ conservation strategies. Due to sharp CC and human impacts there is evidence of extinction of trees species & forest types at local &regional scale .

High human impact in the NE forests will be sensitive to future environmental changes & their consequences.

2. Forests & Climate Change
continued

Climate change projections in the Near East:
IPCC (4th Assessment) 0.2 C worming/decade for next 2 decades. Most scenarios ↑more than 2 C/year by 2080.

Species migration and loss: By 2080 extinction of ≈ 60% of total flora in the Mountains of Mediterranean Basin.

2. Forests & Climate Change
continued

Climate change forest hotspots in the Near East: Main international conservation organizations

NE forest ecosystems are outstanding (biodiversity) but critically endangered. 04 forest types are most threatened:

(1) **Conifer & mixed relic forests in the upper forest belt of the Near East;**

(2) **Refugial areas for threatened relic tree & shrub species;**

(3) **Wetlands forests (including oasis systems) and**

(4) **Coastal forests (vulnerable to sea level rise and salinity changes).**

3. Responses to Climate Change

Defining climate change adaptation & mitigation:

2 fundamental concepts in the climate change debate:

1) **Adaptation: adjustments in ecological, social, and economic systems in response to the effects of changes in climate moderate harm or exploit beneficial opportunities. It tackles the effect of the phenomenon;**

2) **Mitigation: any anthropogenic intervention to reduce the sources or enhance the sinks greenhouse. It tackles the causes of climate change**

3. Responses to Climate Change
continued

<u>Adaptation of the NE forest ecosystems to CC:</u>

Biological changes of forest habitats/species as a response to CC:

- **Tolerance to environmental changes & in-situ persistence;**
- **In-situ adaptation with high phenotypic plasticity to evolve & genetically adapt to new conditions;**
- **+/- large-scale biome shifts of species ranges;**
- **Growth rate & regeneration success reduction extinction due to lack of ability to cope with abiotic changes.**

3. Responses to Climate Change
continued

Adaptation of the NE forest ecosystems to CC :

These changes certainly lead to:

- **new species assemblages in space & time;**
- **changes in the species competitiveness to favor expansion of invasive species.**

Forest ecosystems of NE will adapt to CC as done in the past,

BUT effects of intense alteration & CC prevent adaptation & lead to unwanted irreversible changes: - loss of species & habitat diversity, - areas transformation into scrublands.

3. Responses to Climate Change
continued

Adaptation of the NE forest ecosystems to CC:

- **NE societies historically produced highly resilient socio-ecosystems reducing likelihood of abrupt regional changes.**
- **Collapse of traditional & communal management systems of forest/rangelands root cause of intense forest/rangelands degradation trends.**
- **Urgent step in adaptation: stop/reverse existing maladaptive processes & practices need to enhance & restore resilience of/links between ecological & socio-cultural sub-systems of NE forest landscapes.**

3. Responses to Climate Change
continued

Adaptation of the NE forest ecosystems to CC:

For vulnerable socio-ecosystems, adaptation requires adoption of flexible policies, governance management systems:

- **New governance patterns allowing stakeholder participation & guarantee secure land tenure, forest users rights & sufficient financial incentives.**
- **Formulation & implementation of appropriate policy tools/instruments & development in a permanent open-ended & dynamic process.**
- **Decentralization: transfer authority/responsibilities to local institutions.**

3. Responses to Climate Change
continued

Adaptation of the NE forest ecosystems to CC:

Key adaption strategy in uncertainty context:

- **Maintain diversity, ecological structure/processes & reduce existing pressures on natural ecosystems;**
- **Incorporate compatible adaptation measures in ALL land use sectors & trade-offs to balance demands.**

Higher diversity at all levels implies wider range of opportunities/options to cope with any environmental, social & economic change

3. Responses to Climate Change
continued

Adaptation of the NE forest ecosystems to CC:

Adaptation measures need innovative solutions to fit into modern life conditions & face higher environmental constraints due to CC:

- **Higher certainty about temperature/precipitation changes;**
- **More precise scenarios on how CC will affect species, ecological process & ecosystem services;**
- **Plans for resilient landscapes with stakeholders participation;**

3. Responses to Climate Change
continued

Adaptation of the NE forest ecosystems to CC:

- **Innovative approaches/new technologies in adaptive conservation & land use management practices**
  maintain/restore resilient landscapes & socio-ecosystems;

- **Enabling conditions to gain support & enable land managers/users to swift to resilient uses & management practices.**

These conditions rural economies self-sufficient & less dependent from subsidies.

3. Responses to Climate Change
continued

Landscape adaptation measures:

People and wildlife depend on their "functional landscape" in space & time (upland-lowland seasonal movement to overcome seasonal resources scarcity & fulfill the needs)

influence structure, composition, distribution & natural habitat dynamics in large territories (unique eco-cultural landscape).

Large-scale landscape connectivity is fundamental for ecosystems/species to respond to CC.

Landscape resilience helps reduce risk of large-scale harmful fires.

3. Responses to Climate Change
continued

Landscape adaptation measures:

CC adaptation strategies need to address rural development as a whole – not only forest ecosystems.

Building fire-smart forest landscapes: need to use the "Integrated Fire Management" concept that employs social, economical, cultural & ecological evaluation to:
-minimize damage and – maximize benefits of fire.

3. Responses to Climate Change
continued

Landscape adaptation measures:

Post-fire restoration: Post-fire restoration and management reduce future risk & increase ecosystem & landscape resilience to harmful fires in considering:

- **Changes in the vegetation structure & species composition;**
- **Smart post-fire snags & woody debris management;**
- **Combination of species with different life strategies**

3. Responses to Climate Change
continued

Landscape adaptation measures:

Integrating CC adaptation in watershed management:

Watershed management: ideal framework for integrated & sustainable use of natural resources and protection of soil and water:

Uses of river basins as functional landscape units that obey to nature & not to political boundaries;

Addresses unbalanced flows between mountain areas & lowlands;

Provides important policy tool to balance human development needs & natural resource use.

3. Responses to Climate Change
continued

Adaptive management practices

<u>Adaptive forest management.</u>

Sustainability needed to ensure provision of ecosystem services.

Studies recommend:

Changes in silvicultural practices to include:

- **Adaptive thinning practices (reduce water competition & improve water balance, reduce risk of fire, better-structured & more mature stands to store higher quantities of carbon).**

3. Responses to Climate Change
continued

Adaptive management practices

Changes in silvicultural practices to include:

- **Shrub cleaning operations to reduce & control shrub growth);**
- **Pruning of dead tree branches to reduce risk of fire spreading;**
- **Changes in rotation intervals period to compensate for growth rate reduction due to water constraints & increased carbon sequestered in tree biomass, forest, soil & vegetation;**

3. Responses to Climate Change
continued

Adaptive management practices

Changes in silvicultural practices to include:

- **Changes in harvesting periods (collection of NWFP, cork stripping…)**

- **Increase species richness & close-to-nature forest management multifunctional forest management approach**

3. Responses to Climate Change
continued

Adaptive management practices

Enhancing forest resilience through restoration.

Key restoration measures include:

- **Diversification of tree & shrub species with different life strategies**
- **Use of runoff & fog water produced upslope to restore degraded areas;**
- **Natural regeneration & spreading of forest species into secondary forest is often facilitated by nurse plants favourable soil conditions & improve microclimate;**

3. Responses to Climate Change
continued

Adaptive management practices

Enhancing forest resilience through restoration.

Key restoration measures include:

- **Healthy organic soil conditions play important role in building the resilience forest ecosystems in the NE.**
- **Priority to forest restoration in the NE coastal mountains; and**
- **Facilitate species migration needs in the landscape.**

3. Responses to Climate Change
continued

Adaptation measures in forest conservation

- **Forests in most NE have direct/indirect primary function.**
- **In watersheds, forest protection to be strengthened to take into account future CC.**
- **Undisturbed forests are efficient land cover type in mountain watersheds.**
- **Temporal/permanent elimination of forest cover leads to - important reduction of water quality, - increase of pollutants (nitrates), flash-floods & erosion.**

4. General Recommendations

- **Effect of CC & socio-economic changes/needs**
  Alarming increase in forest loss & degradation;

- **Government, intergovernmental organizations and aid agencies to give priority for implementing participatory regional research programmes aimed at:**
  - **filling major information gaps;**
  - **exchanging know-how;**
  - **Monitoring global change effects.**

4. General Recommendations

- **Governments to seek assistance of intergovernmental organization and aid agencies to develop/implement effective monitoring programmes based on modern methodologies.**
- **Governments to develop flexible policies & legal frameworks that provide means to restore & adapt communal management systems and property regimes of forest/rangelands to current socio-economic & politic contexts.**
- **Local community groups to take the lead in developing locally adapted solutions.**

4. General Recommendations

- **Intergovernmental organization & aid agencies to foster establishment of regional network of pilot projects on forest adaptation measures, representing all forest ecosystem types and prioritizing sensitive areas that are mostly hit by CC.**
- **Governments of the region to seek regional cooperation in:**
  - **Capacity building & training programmes**
  - **Exchange of experiences in the field of local knowledge**

THANK YOU