

# Contribution of Forests to a Green Economy in the Middle East and North Africa Region

by Lelia CROITORU and Ludwig LIAGRE

***Mediterranean woodlands provide many goods and services which are essential to the well-being of people and contribute to the local economy. It seems necessary that the value of ecosystem services is better understood and recognized by all stakeholders, especially policy makers, so that management orientations and resource allocation choices directed at greater durability. Assessing the value of those goods and services, even if it is not always monetized or even quantified, can help increase this recognition and enlighten decision-making. In this paper, the authors show how the forests of the Middle East and North Africa can make substantial contributions to a green economy.***

## How much are forests worth in the Middle East and North Africa?<sup>1</sup>

Forests in Middle East and North Africa are much more important than official statistics suggest. With less than 1 percent of the world's forests and only 3 percent of the countries' area, forests in Middle East and North Africa (MENA) are scarce. By official statistics, they appear to contribute little to national economies, generating less than 1 percent of the countries' gross domestic product (GDP) (FAO 2011). However, these figures are deeply misleading: they only capture a few tangible products (essentially timber) and omit the ecosystem services that forests provide, such as water purification, biodiversity, and recreation. A regional valuation study (CROITORU and MERLO 2005) and further updates estimated that timber accounts for only one third of the Total Economic Value (TEV) of forests in the Mediterranean countries<sup>2</sup>.

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1 - This article is based on Croitoru and Liagre (2013), who provide a comprehensive analysis of the issues discussed and an exhaustive list of references on which this analysis is based.

All estimations refer to the year 2010.

2 - See Daly-Hassen and Croitoru, 2013, this issue, for more discussion on the forests' TEV concept.

3 - CPMF partner countries are Algeria, Lebanon, Morocco, Syria, Tunisia and Turkey.

How much are forests worth in the member countries of Collaborative Partnership on Mediterranean Forests (CPMF <sup>3</sup>)? Conservative estimates indicate that forests generate US\$77/ha annually and can be much more valuable in specific locations. Forests' TEV varies from US\$63/ha per year in Turkey to US\$296/ha in Lebanon (Table 1). Because the estimates partially capture several non-market benefits, they underestimate the real forest value in these countries. In addition, as national averages, they do not reflect the true value of certain forest types. For example, benefits from cork oak in Tunisia are estimated at US\$214/ha (DALY-HASSEN *et al.* 2012a), compared to an estimated national average for all forests of US\$112/ha. They can reach up to US\$440/ha in Morocco's Maamora forests (HCEFLCD 2012), compared to an estimated national average of US\$94/ha.

Non-wood forest products (NWFPs) are the most important forest benefit in the CPMF countries and contribute significantly to the income of forest-dependent people. NWFPs, such as fodder for grazing, pine kernels, pine honey, mushrooms, and other minor products generate an average benefit of US\$31/ha/year and account for more than 40 percent of forests' TEV in the CPMF countries. These benefits are important safety

nets for many poor rural households, particularly in times of shortfalls, and also contribute to rural income throughout the year. In Morocco, for example, argan forests account for 7 percent of regional GDP (BENCHEKROUN 2012) and ensure subsistence of 14 percent of the rural population.

Watershed protection is one of the most important benefits in Maghreb countries (US\$30/ha/yr) and in Syria (US\$100/ha/yr). The role of forests in protecting water supplies, regulating water flows, and conserving soil is important. Watershed protection is the single most valuable benefit in Syria, for example, accounting for more than 50 percent of the TEV of forests. In the Maghreb countries, it is second in value only to grazing, varying within US\$25-32/ha per year. Estimates for watershed protection provided by forests would most likely have been high in the other countries as well, if data had been available.

Forests can play an important role in adaptation to climate change. The role of forests in social adaptation is significant, by providing local services that reduce the vulnerability of local communities to climate change ('forests for adaptation', forest ecosystem-based adaptation). Secondly, climate change is likely to cause important changes in forests, thus forests themselves need

Country	WFPs <sup>a</sup>	Grazing and NWFPs <sup>b</sup>	Recreation, hunting	Watershed protection <sup>c</sup>	Carbon <sup>d</sup>	Biodiversity	TEV
Algeria	-7	47	n.c.	32	-3	n.c.	69
Morocco	29	44	-6	29	-3	n.c.	94
Tunisia	6	73	1	26	3	9	112
Lebanon	-10	187	125	n.c.	-15	8	296
Syria	4	10	n.c.	101	8	n.c.	123
Turkey	32	21	1	-8	11	7	63
<b>Weighted average<sup>e</sup></b>	<b>25</b>	<b>31</b>	<b>n.c.</b>	<b>8</b>	<b>6</b>	<b>7</b>	<b>77</b>

Notes:

a - the aggregated value of WFP removals, net growth of standing timber and WFP losses to forest fires.

b - the aggregated value of NWFP use benefits and losses to forest fires.

c - the aggregated value of watershed protection benefits and the value of erosion, floods and landslides due to poor forest management.

d - the aggregated value of carbon sequestered in forest growth and carbon losses from deforestation and forest fires; the monetary estimates are based on carbon prices on international markets in the year of reference, updated to 2010.

e - Estimated by weighting the value of each individual benefit by the forest area in each country.

The negative values in the table mean that the estimated social costs due to poor forest management are higher than the estimated forest benefits.

n.c. = not calculated due to insufficient information. The valuations provided in the table are not necessarily comparable across countries due to differences in valuation methods and data availability for individual benefits.

**Table 1:**

Value of forest benefits in CPMF countries (US\$/ha, 2010 prices)

Sources: Daly-Hassen *et al.* (2012) for Tunisia. Croitoru and Merlo (2005) for the other countries, updated to 2010 prices.

adaptation ('adaptation for forests'). It was predicted that the Mediterranean region would experience a drop in rainfall of 10-20 percent and an increase in temperature around 2°-4°C by 2031-2060 (GIANNAKOPOULOS 2009). For the cork oak ecosystem in northwest Tunisia, it was predicted a decrease of rainfall by 10-11 percent and an increase of temperature by 1.4°-1.8°C in 2050 (DALY-HASSEN *et al.* 2012b).

Other forest benefits are particularly underestimated and need further analysis. Recreation is likely to be a significant forest benefit in the CPMF countries. However, available estimates are limited to certain areas, such as forest parks and reserves. Hunting benefits have been estimated only for a few countries and vary considerably from US\$1-99/ha, due to differences in site characteristics and valuation methods. As efforts to estimate non-use values of biodiversity are very scarce and site-specific, the estimated value of biodiversity remains almost negligible, at about 2 percent of the countries' forest TEV, or US\$7/ha on average.

Despite forests' importance, deforestation and forest degradation continue. Overuse, overgrazing, and competition from other forms of land use result in decreasing environmental services provided by the region's forests. Though net deforestation at global level seems to have slowed down since 2000, this is only a result of increasing area under plantations. Over the past two decades, Algeria lost more than 10 percent of its forest cover (VAN ACOLEYEN and KHELLADI 2011) and its deforestation rate was 0.6 percent per year during 2005-2010, according to FAO estimates. In many countries, forest degradation is likely to be a more important problem than deforestation itself (CIFOR 2009). Overall, the cost of deforestation and forest degradation can be high: 0.2 percent of the GDP in Morocco up to 0.7 percent of the GDP in Iran (CROITORU and SARRAF 2010).

Climate change is likely to exacerbate the impacts of deforestation and forest degradation. An analysis of climate change vulnerability in Tunisia showed that climate change could cause a loss of 1,200 - 18,500 ha of cork oak (1-20 percent of the total cork oak area), leading to an economic loss of US\$2-27 million for the period 2010-2050. This represents about 0.3-4.8 percent of the forests' TEV (DALY-HASSEN *et al.* 2012b).

## Capturing forest values

With a greater understanding of forests' potential to contribute to a green economy, it becomes critical for governments to conserve the most important forest benefits. Available efforts focus on mechanisms to capture forest benefits in general (UNEP 2011; WWF 2009), in protected areas (IUCN 2006), or in other regions of the world (EFIMED *et al.* 2008). No effort to date has reviewed comprehensively the existing efforts in MENA region. Table 2 provides a summary of instruments to capture different forest benefits. This section focuses on the use of three instruments: green accounting, payments for environmental services and establishment of protected areas, through illustration of successful case studies in the region. CROITORU and LIAGRE (2013) provide detailed insights on the use of a wider range of instruments, including NWFPs value chains, ethical bio-trade and carbon finance.

### Green accounting

In most countries, national accounting fails to reflect the real value of forests. While it captures the income from logging, it tends



**Picture 1:**  
Woman making corks in  
the national cork factory,  
Tabarka, Tunisia.  
Picture Pilar Valbuena

- 4 - Communication with F. Benchekroun, Haut Commissariat aux Eaux et Forêts et à la Lutte contre la Désertification du Royaume du Maroc.
- 5 - For more information, see RECAMAN: Application of green national accounting in Andalusia (by Pablo Campos and Alejandro Caparrós). In: Croitoru and Liagre, 2013. (www.recaman.es)

to exclude many social benefits and costs. In MENA, efforts to incorporate the value of ecosystem services in national accounting vary across countries. For example, in Tunisia, the system of national accounting captures only a few tangible forest benefits sold by the State, such as timber, fuelwood, NWFPs, hunting. Morocco is currently estimating the value of non-market forest benefits in two pilot eco-regions (Maamora forest, and the argan ecosystem) and incorporating them in national accounts<sup>4</sup>. Lebanon developed pilot accounts for water by using a conceptual framework (System of Environmental Economic Accounts for Water) for organizing the hydrological and economic information in a coherent and consistent manner (UN-ESCWA 2009).

The World Bank is leading the Wealth Accounting and the Valuation of Ecosystem Services (WAVES) program, a global part-

nership which aims to promote sustainable development by ensuring that the national accounts used to measure and plan for economic growth include the value of natural resources. As part of WAVES, Spain has prepared a system of green national accounts for forests in Andalusia<sup>5</sup>. What are the practical implications of this system?

- evaluating trade-offs for development: when building roads or bridges, these accounts show which parts of the forests store more carbon and are worth preserving or how much compensation is to be paid to local residents for commercial revenue lost as a result of the road,
- public buy-in for millions spent on fire protection in the region: the accounts help determine whether the money is being spent on the forest with the greatest value,
- setting entry prices for tourists: the accounts help determine the amount of

Environmental conservation target	Mechanism	Case study
All forest ecosystem'goods and services	Green accounting	<b>Morocco:</b> Maamora forest and the Argan tree ecosystem <b>Spain*:</b> cork oak forest in Andalusia
	Compensation mechanisms	<b>Morocco:</b> compensation for zoning degraded forests
	Incentives to reforestation	<b>Morocco:</b> subsidy to forest plantations on private lands
Water	PES	<b>Tunisia:</b> compensation for adopting sustainable land uses <b>Lebanon:</b> payments for environmental protection <b>France*:</b> compensation for adopting best practices in dairy farming <b>Italy*:</b> compensation for adopting certain forest management practices
Biodiversity	Protected areas	<b>Lebanon:</b> Shouf Biosphere Reserve <b>Tunisia:</b> forest concessions
	PES Access and Benefit-Sharing	<b>Spain*:</b> conserving forest biodiversity in Girona <b>Algeria, Morocco:</b> first experiences with ABS
NWFPs	Value chain development and organic certification Ethical bio-trade	<b>Lebanon, Morocco, Tunisia:</b> transforming aromatic and medicinal plants into essential oil and dried herbs <b>Turkey:</b> pine honey <b>Morocco:</b> case of argan ecosystem
Carbon	CDM, REDD+, LULUCF voluntary markets	<b>Morocco:</b> partner of UN-REDD <b>Algeria, Tunisia:</b> asked partnership in UN-REDD <b>Turkey:</b> LULUCF project in development (in partnership with UNDP) <b>Algeria, Tunisia, Morocco, Lebanon, Tunisia, Turkey:</b> REDD+ Fast-start project (in partnership with AFD/FFEM)

**Table 2:** Examples of instruments to capture forest benefits

Note: \* The examples from north Mediterranean countries aim at showing the application of mechanisms in ecosystems similar to those of MENA region.



money tourists would be willing to pay to visit a particular area of Andalusia (WAVES 2012).

### Payments for Environmental Services

Payments for Environmental Services (PES) are a popular incentive mechanism to conserve indirect benefits provided by ecosystems, such as water services. PES programs are based on two parallel principles: (1) those who provide environmental services should be compensated for doing so, and (2) those who benefit from environmental services should pay (PAGIOLA and PLATAIS 2007). These programs have been widely adopted in Latin America (e.g. Costa Rica, Ecuador, and Brazil) and to a lesser extent in Europe (France, Italy and Spain).

In the MENA region, applications of PES are relatively scarce. For example, in Morocco, the Government pays compensation for zoning degraded forest ecosystems so that they regenerate<sup>6</sup> (*compensation pour mise en défens*). Under the program, cooperatives or associations of farmers respecting the zoning receive 250 Dh/ha (or 350 Dh/ha for argan) for a minimum area of 300 ha (or 100 ha for argan). The funds are used for community projects and income-generating activities. The scheme has been successful in terms of forest regeneration and achievement of community projects. A study carried out in a Moroccan national park suggested opportunities for improving this scheme by adapting the amount of compensation to the real value of forgone benefits (CROITORU and JORIO 2011).

In Tunisia, a study analyzed the PES potential to improve conservation of a Tunisian watershed. The government subsidized 80 percent of investments for conservation measures, such as planting acacia in gullies, while farmers were expected to provide the remaining costs through in kind contributions and to undertake maintenance. However, observed survival rates were 40 percent, because of lack of maintenance and damages due to grazing by other farmers. The case study recommended: (a) paying for trees that survive instead of trees planted; (b) payments should be sufficient to make the practice attractive for farmers; (c) making repeated payments rather than a one-time ex ante payment (CROITORU and DALY-HASSEN 2010).

In Lebanon, a more indirect scheme of PES has been used. The Banque Libano-Française, in partnership with the United Nations Development Programme – Lebanon (UNDP) and MasterCard, launched in 2011 a unique card on the Lebanese market: the Earth Card. While using it to pay for purchases, a percentage of the profits generated through card payments is transferred for the funding of environmental projects in Lebanon under the supervision of the UNDP-Lebanon.

6 - by decree no. 1855-01 of March 21 2002.

### Protected areas

Creating protected areas has been the dominant approach of many governments to conserve forest ecosystem services. However, the traditional vision of protected areas as state initiatives on state-owned lands with state and international financing is fading. Many protected areas in the region have gradually introduced a broad spectrum of financing mechanisms. Among these, market-related initiatives include:

– **Use rights.** In the Mediterranean, entrance fees are charged in Jordan (in all protected areas), Egypt (for marine protected areas), Montenegro and Slovenia; other countries collect fees in some protected areas or are testing them at pilot sites (IUCN 2006). Generally, protected areas charge reduced rates for domestic visitors, and even lower for some groups (e.g. school groups). If the number of visitors is high, revenues can cover a significant portion of the protected area's costs. Other use rights are commonly

**Picture 2:** Man preparing plastic pots to receive seeds in a Tunisian nursery.  
Picture Pilar Valbuena



7 - Law n° 22-07 related to protected areas.

8 - See Sattout E. 2013. Ecotourism strategy in Shouf Biosphere Reserve.

In: Croitoru and Liagre (2013).

9 - [http://www.iucn.org/about/union/secretariat/offices/iucnmed/iucn\\_med\\_programme/terrestrial\\_ecosystems\\_livelihoods/protected\\_areas/](http://www.iucn.org/about/union/secretariat/offices/iucnmed/iucn_med_programme/terrestrial_ecosystems_livelihoods/protected_areas/)

10 - However, implementation of the above mechanisms does not immediately guarantee that protected areas will successfully conserve biodiversity and improve people's livelihoods. In many cases, the revenues generated by protected areas (admissions, concession sales, and services) are transferred to central government accounts and are not repaid to protected areas. It is therefore desirable to establish: (i)

financing mechanisms through tourism development, (ii) a policy of transferring at least a portion of revenues to the protected areas where they were generated; (iii) a policy of sharing a portion of revenues local people, or dedicated to community investments.

11 - This could include joining existing international initiatives on the economic valuation of ecosystems goods and services, such as The Economics of Ecosystems and Biodiversity (TEEB), the International Platform on Biodiversity and Ecosystem Services (IPBES) and WAVES.

charged in protected areas at points with educational or tourist interest (e.g. caves, museums, etc.) or for the use of facilities (e.g. parking places).

– **Concession rights.** This practice has been used often for to the right to operate accommodations, souvenir shops, and guided tours. For example, in Morocco, the ability to delegate management agreement for protected areas is provided by law<sup>7</sup> based on specification of the management conditions, charges, etc.

– **Ecotourism.** It has been successfully promoted in protected areas in Jordan and Lebanon<sup>8</sup>. Other initiatives are being undertaken in the Maghreb, such as an IUCN project promoting ecotourism in two pilot areas of Morocco and Tunisia<sup>9</sup>.

– **PES.** In many cases worldwide, PES contributes to the protection of protected areas or their buffer zones. For example, in Ecuador, payments by Quito's water company contribute to the conservation of the Cayambe Coca and Antisana ecological reserves.

Though such approaches have already been developed in several MENA countries, they remain largely one-off exceptions from the conventional dependence on domestic

government budgets and foreign donors, rather than systematic approaches. Perhaps the most promising are the entrance fees and the PES for water<sup>10</sup>.

## Conclusions

The magnitude of forest benefits and the application of market-based mechanisms to enhance these values have important policy implications. Using these examples and building on the Strategic Framework on Mediterranean Forests (2012), the decision makers in MENA region are invited to:

1. Support the **economic valuation of forest benefits:**

- improve data collection and valuation of non-market forest benefits (e.g. watershed protection, biodiversity, etc.) at local and regional levels<sup>11</sup>,
- improve valuation of the impacts of climate change on forests,
- disseminate the results of existing valuation studies through on-line, user-friendly databases.

2. Integrate the value of forest benefits in **decision making:**

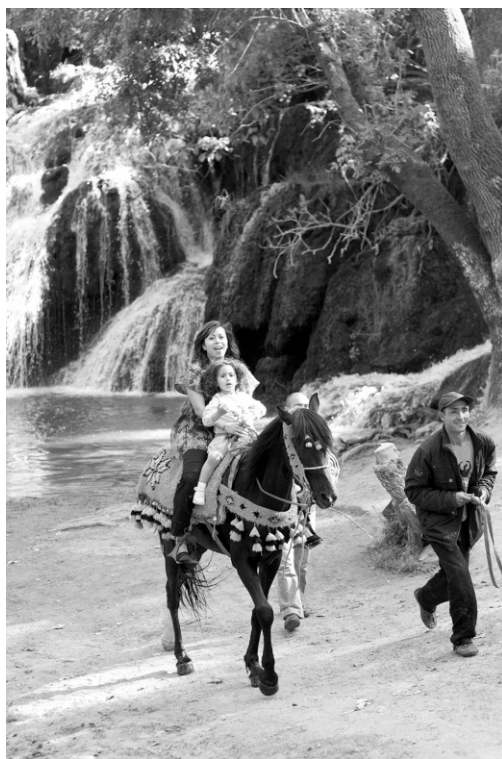
- incorporate the value of fodder, water services and biodiversity in national accounting,
- invest in green infrastructure to increase resilience to climate change, reduce risk of disasters, etc.
- increase budget allocations to the forestry sector.

3. **NWFPs:** support the development of value chains and ethical bio-trade:

- support decentralized financing streams (micro-finance, local investment banking) for SMEs,
- develop legislations to guarantee the equitable sharing of the benefits from endemic genetic resources,
- promote the use of certification schemes (fair-trade, etc.).

4. **Protected Areas:** conserve forest benefits and attract revenues:

- promote use and concession rights,
- develop ecotourism strategies,
- establish mechanisms to finance Protected Areas from the revenues they generate and share a portion with local people.



**Picture 3:**

Ecotourism in Ifrane, Morocco.

Picture Pilar Valbuena



5. Adopt innovative financing mechanisms such as **PES** schemes and REDD+

- investigate the potential for their application at the local level,
- learn and apply good practices from other regions,
- start designing initiatives at pilot sites.

6. Develop the use of **National Forest Funds** as key institutional and financial instruments for implementing PES schemes and supporting sustainable forest management through collection of new taxes, public and private financial resources, and international financing opportunities.

7. Offer “green solutions” to the **private sector** to offset emissions of greenhouse gases, compensate biodiversity losses, etc.

8. Promote **forest-based adaptation** solutions to adapt economic sectors and people to climate change.

9. Explore and seize the financing opportunities of the three **Rio conventions** (UNCBD, UNCCD, UNFCCC), including the REDD+ mechanism, the Adaptation Fund, the Green Climate Fund, the ABS, the opportunities presented by the Global Mechanism of the UNCCD, and the synergies between Rio conventions (financed by GEF).

Although these policy recommendations are potentially applicable to all MENA region, they need to be tailored to the specific contexts at country and local levels.

**L.C., L.L.**

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**Picture 4:**  
Ecotourism in Yalova,  
Turkey.  
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## Summary

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### Contribution of Forests to a Green Economy in the Middle East and North Africa Region

Although there is broad agreement that forests can make substantial contributions to a green economy, their precise role has not yet been investigated comprehensively. This paper addresses this gap for forests in the Middle East and North Africa and makes concrete recommendations to decision-makers. Overall, non-timber forest products are the most important forest benefit, contributing up to 40 percent of household income. Watershed protection is very significant, particularly in Syria and the Maghreb countries. Specific ecosystems can reach particularly high values, such as cork oak in Tunisia (US\$214/ha/year) and Maamora forests in Morocco (US\$440/ha/year). Despite these high values, the social damage caused by deforestation and forest degradation can be as high as 0.7 percent of countries' gross domestic product. A wide range of instruments has been developed to help capture forest benefits in ways that promote a green economy. In the Middle East and North Africa, some countries have already created value chains for non-wood forest products, established protected areas, and promoted green accounting. However, only a few countries have introduced innovative mechanisms such as payments for environmental services and carbon finance. The paper recommends improving valuation of non-market benefits at the local level and tailoring specific mechanisms that conserve the most important forest benefits.

## Résumé

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### Contribution des forêts à une économie verte dans la région MENA

Bien qu'il soit admis que les forêts contribuent significativement à une économie verte, leur rôle précis n'a pas encore été complètement étudié. Cet article vise à combler ce besoin concernant les forêts de l'Afrique du Nord et du Moyen Orient et propose des recommandations concrètes aux décideurs. En général, les produits forestiers non-ligneux constituent le principal bénéfice issu des forêts d'Afrique du Nord et du Moyen Orient, et représentent jusqu'à 40 % du revenu des ménages. La protection des bassins versants est également un bénéfice significatif, en particulier en Syrie et dans les pays du Maghreb. Certains écosystèmes spécifiques peuvent atteindre des valeurs particulièrement importantes, à l'image de l'écosystème chêne-liège en Tunisie (US\$214/ha/an) et de la forêt de la Maamora au Maroc (US\$440/ha/an). Malgré ces valeurs importantes, le montant des dommages sociaux causés par la déforestation et la dégradation des forêts peut atteindre jusqu'à 0,7 pourcent du produit intérieur brut des pays concernés. Un large éventail d'instruments a été élaboré en vue de tirer profit des biens et services fournis par les forêts pour le développement d'une économie verte. Dans la région MENA, plusieurs pays ont déjà développé des filières de produits forestiers non-ligneux, établi des aires protégées et certains sont engagés dans la comptabilité verte. Cependant, rares sont les pays à avoir conçu des mécanismes innovants tels que les paiements pour services environnementaux et la finance carbone. L'article recommande l'amélioration de l'évaluation des bénéfices non-marchands au niveau local et la conception de mécanismes spécifiques pour la conservation des principaux bénéfices issus des forêts.