

National Capacity Self Assessment for Non-Annex I Nations: The Case of Lebanon

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ABSTRACT: Countries, both developed and developing, are called on to identify, through self assessments, their priority environmental issues such as mitigating greenhouse gas emissions, combating deforestation, promoting sustainable land and water management, and minimizing their vulnerabilities to the impact of climate change. Root cause analysis is conducted to determine the major barriers and institutional capacities. This paper presents capacity constraints in national priority issues typically encountered in developing or non-annex one nations, with the national capacity self assessment of Lebanon taken as a case study. The analysis of the information has identified a number of achievements and difficulties related to the fulfillment of the commitments under the UN Framework Convention on Climate Change. The common priority issues are national action plan for GHG abatement, vulnerability and adaptation, research and systematic observation, technology transfer, and education and public awareness. Root cause analysis related to priority issues has been carried out during which the causes and impacts of the constraints have been identified. The corresponding assessment matrices are also presented. Lack of financial resources is found to be the constraint facing priority issues.

Keywords: Power sector; self assessment; capacity development; root cause analysis; market penetration.

JEL Classifications: O13; O53

1. Introduction

State governments, donors and practitioners on global scale, recognize that achieving environmentally sustainable development interventions would require a more targeted and in-depth assessment of countries' underlying capacities (Bellamy and Hill, 2010). In 2003, the Capacity Development Initiative (CDI) has set the stage for a global environment facility's strategic approach to enhance capacity building, with a focus on meeting and sustaining global environmental objectives, set by the Conventions on biodiversity, climate change, and desertification and drought. With the turn of the century, the CDI was a central part of the process to formulate and promote a conceptual framework for assessing capacities of both developed and developing country. The National Capacity Self-Assessment (NCSA) has been established as a country-driven tool for enabling activity that catalyzed a systematic and cross-cutting analysis of individual, organizational, or institutional, and systemic capacities (Bellamy and Hill, 2010, UNDP, 2003).

Common priority issues are national action plan for GHG abatement, vulnerability and adaptation, research and systematic observation, technology transfer, and education and public awareness. GHG abatement analysis is the major issue that comprises detailed considerations of the existing situation in various economic sectors in the nation, with predictions following the baseline scenario, along with possibilities for GHG emission reduction in the short, medium, and long term planning.

There are disparities between developing countries in energy consumption patterns depending on availability of fuel and hydrocarbon reserves, and also depending on climatic and socio-economic conditions. Those disparities include the levels of per-capita income, high energy consumption, and abundance of commercial energy services that reflects on high rates of electrification. In addition, several countries, including oil rich nations, experience very high rates of urbanization that are considered one of the highest worldwide. These disparities impose several challenges that should be addressed to achieve sustainable development. Among the major challenges facing the energy sector are improving accessibility to modern energy services to eradicate poverty and improve quality of life especially in rural areas, meeting the growing demand on energy resulting from population and economic growth, and urbanization and switching from fossil fuel based economies to sustainable energy systems.

The power sector is generally the biggest contributor to GHG emissions in developing countries, and therefore provides the highest GHG abatement potential (Gelil, 2011; Chaaban, 2005). In the GHG abatement analyses conducted within national communication reports, attention has been paid to this sector, in a way that some solutions for improvement of the national energy efficiency and reduction of environmental impacts are identified, accounting simultaneously for economic indicators and technological limitations. Attention has been paid to the importance and relevance of win-win opportunities that are good for the economy, as well as for local and global environment.

On the technical side, many articles have examined the transmission expansion strategies with several scenarios to cover the multi-conflicting objectives in highly uncertain environment, forming thus a tree of possible actions (Gorenstein et al., 1993; Yehia, 1995). Although several researchers have worked on resolving these uncertainty, some have developed transmission expansion planning methodology for uncertain environment (Al Nakhl et al., 1993), but as restructuring and deregulation concepts are introduced to the power industry, non-optimal decisions are leading to huge losses in a competitive environment. In the new era of restructuring, utilities are confronted with transition challenges, where management and operations concepts should be changed to adapt to the new environment.

In modern power system management, customers are the center of all activities and their satisfaction is the key factor for insuring the sector sustainability. The main issues for success include improved efficiency, reduced costs, enhanced reliability and improved customer services. The customer loyalty, linked directly to the services and supply reliability, should always be considered while determining the load forecasts. Yehia et al. (2001) have presented an integration mechanism of the Customer Information Systems (CIS) and the Power Engineering Planning Tools to reduce uncertainties related to load increase distribution forecasts in the overall transmission system expansion planning process. Their methodology overcomes uncertainties by allowing large number of simulations, each with a different set of variables to assess the uncertainty.

Barriers are also identified for other sectors. In the building sector, the two main barriers for the quick development of the mitigation options are the high prices of energy- efficient equipment on the local market, and the relatively low cost of electricity, due to subsidized tariffs. Norms for energy-saving building envelopes do exist in many countries, but are yet to be enforced. In agriculture, terms of capacity building, land suitability evaluation studies have been recommended for selected crops. Measures for the water sector include promoting demand management, increasing the efficiency of water use in irrigation, discouraging wasteful consumption, and incorporating environmental element in future water sector modernization. A number of measures have been reported in the forestry sector including forests inventory, forest management system, and modern effective methods for fighting forest fires (Lebanon SNC, 2010). Waste management measures that include recycling initiatives, adopting complete land filling of municipal solid waste, and separation at the source, are yet to be implemented on full scale in developing economies.

Lebanon, a small country located along the eastern Mediterranean coast, has ratified the Framework Convention on Climate Change (UNFCCC) in 1994, and thus became a party to the convention, a Non Annex I part. Lebanon's population density of around 400 persons/km² ranks amongst the highest in the world, while the per capita annual electricity consumption is around 4.75MWh. Population size is increasing at the rate of 1.65 percent yearly with an average life expectancy of around 71.3 years. The annual cost of environmental degradation in Lebanon for the past decade 2000 was estimated by the Mediterranean Environmental Technical Assistance Program (METAP) at around \$565 million, or around 3.4 percent of the annual GDP (METAP, 2003,

Djoundourian et al., 2007). Water constituted the highest cost of \$175 million, followed by air pollution close to \$170 million, coastal zone and cultural heritage \$110million, land and wildlife \$100million, and waste \$10million.

Lebanon has submitted to the secretariat of the UNFCCC its Initial National Communication (INC) report in 1999. In 2002, phase II of the climate change enabling activity was conducted, and in 2011, the Second national Communication (SNC) has been submitted. Both NC reports established national inventories of GHG, assessed Lebanon’s vulnerability to climate change, and proposed a mitigation strategy to reduce GHG emissions in the various sectors along with feasible adaptation measures (Lebanon’s SNC, 2010).

The GHG emissions as reported in the NCs indicated that Lebanon’s GHG emissions have increased by 27.6% during one decade, see Table 1. In 1994, the total emissions were approximately 15,901Gg of CO₂ compared to 18507Gg in 2000, and 20299Gg in 2004.

Table 1. GHG Emission Trends in Lebanon

	1994	2000	2004
Total emissions [Gg]	15901	18507	20299
Energy Sector emissions [Gg]	7743	9892	10979
Energy as % of the total	48.69	53.45	54.09

The power sector, with around 90% reliance on diesel and heavy fuel oil for its operation, has the highest contribution to GHG emissions that has increased from around 49% of total emissions in 1994 to 58% in 2004. This is due to the significant growth in demand for electricity, due in part to the changing socio-economic conditions and to the expansion of the national power grid.

2. Capacity Constraints in National Priority Issues

The current environmental management programs in most developing countries suffer from weak institutional infrastructures needed for facilitating a continuous process of undertaking such assessments and related activities. In most countries, there are no specific policies or legislation dealing with the effects or causes of climate change, issues addressing the causes and effects of climate change are still sparse and fragmented.

The NCs reports identified and highlighted a number of barriers and capacity requirements if Lebanon is engage effectively in implementing the provisions of the Convention. These included inadequate local technological capacity to expedite in an effective manner the tasks of undertaking the assessments, lack of comprehensive local data and country-specific information to support the studies, inadequate financial resources for making a meaningful intervention in the Convention’s implementation, lack of country-specific emissions factors and ratios, particularly in fuel combustion, agriculture, land-use change and forestry, and waste. The main constraints facing the priority issues are briefed as follows:

a. National Action Plan for GHG Abatement

The objectives of the national action plants (NAP) for GHG emissions abatement are generally identified as follows (Bellamy and Hill, 2010; Haselip et al., 2011):

- to generate positive effects on the national economy;
- to provide the economy with regional and international competitiveness;
- to minimize the costs of GHG emissions reduction;
- to maximize the benefit from available financial capacities;
- to exercise social fairness and acceptability;
- to achieve flexibility and viability of solutions, and;
- to develop medium and long-term solutions.

In the developing countries, the definition, implementation, and monitoring of such a plan are burdened with a wide range of constraints. The root cause analysis is conducted using the problem tree method that determines the major constraints for which capacity building does not proceed as planned, their causes and impacts. The following sections by no means present all the constraints, causes, and their impacts. Assessment is focused on the main issues.

Most reports, studies and document issued in several developing countries, including Lebanon, had consistently stressed the a lack of adequate funding as being one of the most significant factors in

preventing successful implementation and realization of the objectives of the Convention in mitigating GHG emissions from various sectors.

Moreover, the long time frames and uncertainty, and debates, associated with the effects of climate change had led to giving this issue low priority on the national agendas. With limited resources normally available, the focus of decision makers has been toward issues that are perceived to be more important and of greater urgency, such as poverty and regional conflicts that may be occurring, and their impacts on the country. In the absence of high recognition, any climate change programs will typically be supported only through sources of funding external to the national budget. Moreover, the current environmental management programs suffer from weak institutional infrastructures needed for facilitating a continuous process of undertaking such assessments and related activities. There are no specific policies or legislation dealing with the effects or causes of climate change.

The national communication reports have identified a number of barriers facing a full-scale implementation of the provisions of the Convention. These included inadequate local technological capacity to expedite in an effective manner the tasks of undertaking the assessments, lack of comprehensive local data and country-specific information to support the studies, inadequate financial resources for making a meaningful intervention in the Convention's implementation, lack of country-specific emissions factors and ratios. Moreover, there is a need for capacity building through local governmental units and institutions.

b. Vulnerability and Adaptation

The present status of the vulnerable sectors in the country varies according to the organizational establishment, management, public acceptance, and availability of funding. Most proposed mitigation options are faced with the financial constraint since big investments are needed in a sector that does not attract the private sector.

In the water sector, the main constraints are the current economic situation, demographic changes, lack of funding, lack of inter-ministerial and inter-institutional co-operation. In the biodiversity sector, the establishment of a decent scientific infrastructure for monitoring climate change impacts is hindered by the lack of financial resources, lack of sufficient personal knowledge, and lack of public awareness. A national strategy on biodiversity is yet to be implemented due to the lack of appreciation of biodiversity within the concerned governmental units. The constraints for the sector of land- use change and forestry are a lack of inter-ministerial and inter-institutional cooperation, that should be overcome on systemic, organizational, and individual levels. Measures such as reforestation and preventive actions against forest fires and trees cutting are yet to be maintained on permanent basis.

The implementation of a nation- wide wastewater treatment system has been hindered by various obstacles including the lack of finance, public acceptability, appropriate legislations, and sustainability measures.

c. Research and Systematic Observation

Only sparse and partial research and analysis have been carried out for various purposes and in different economic sectors, including meteorology, energy conservation measures, climate and environmental research, application of meteorological information and climate knowledge in the field of water management, agriculture, forestry, transportation, urbanism, tourism, protection of environment, and human health, and research on renewable energy resources.

The lack of public awareness around issues of climate change is one of the main barriers facing implementation of the UN conventions. The integration of climate change considerations into policy development and implementation provides further opportunities to increase the profile and awareness around the issue of climate change and how it may affect Lebanon.

Individual capacity is central to successful realization of the provisions of the UNFCCC. Capacity requirements therefore need to address career progression and security of employment tenure, providing opportunities for accessing training, networking opportunities and ensuring career progression. Security of tenure applies to government, academics, local consultants and practitioners. Measures are needed to ensure that specialized staff and employees are retained.

Lebanon still lacks any comprehensive national monitoring system for GHG emissions. The lack of specific emission factors undermines the accuracy of national efforts to determine contributions to greenhouse gases. In reporting levels of green house gas emissions the NC had to rely on UN default emission factors and ratios in the absence of any local specific values. The only permanent air quality monitoring station is allocated in the airport near Beirut. Other activities are restricted to sampling initiatives conducted by a number of academic institutions and municipalities.

d. Technology Transfer

The constraints facing technology transfer have been identified in the top- up enabling activity. They are divided into legislative (for capacity building initiatives), economic (availability of funding to acquire new technologies), social (public awareness), technological (maturity of new technologies), marketing (commerciality and competitiveness) and infrastructure (testing facilities).

The TNA/TT study has identified technology needs and most needed technological options in each of the relevant sectors of economy (Chaaban, 2002). The analysis revealed that the most important policy option is the development of suitable market based programs, followed by the engagement of the private sector, the need to update and enforce laws and regulations and, finally, benefit from the work programs of international donor agencies.

On the level of constraints, the analysis revealed that laws, policies and legislation concerned must be updated and enforced. The overcoming of this constraint was ranked first, followed by availability of funding, then by public awareness. Other constraints are commerciality and competitiveness, adequacy supporting infrastructure and immaturity of technology. On the level of decision criteria, the most important criteria were found to be the satisfaction of national economy efficiency, followed by the efficient use of local resources, and by insurance of environmental quality. The creation of market potential and insurance of social equity were of less concern.

e. Education and Public Awareness

One of the biggest challenges facing realization of the objectives of the UN FCCC is related to knowledge and awareness. The time over which the effects of climate change are likely to be felt along with the lack of certainty regarding these effects reduces the perceived importance in many developing countries that are faced with more pressing issues. Moreover, there is lack of recognition of the socio-economic gains that can be derived from implementation of the UNFCCC.

The lack of awareness also relates in part to a lack of political will, understanding and commitment at government level to implement the provisions contained within the Convention. The issues and implications as a result of climate change are long-term changes. The development of an enabling environment for engaging the UNFCCC requires political support that extends beyond the initial signing and ratification of the Convention, and the Kyoto Protocol.

There is currently no formal full-fledge education on climate change at the university or colleges, other than the general topics covered in geography and physical sciences. Specialized environment- related courses with topics including climate change issues have been designed and offered in a number of academic institutions.

3. Root Cause Analysis Regarding Priority Issues

The root cause analysis is conducted using the problem tree method that determines the major constraints for which capacity building does not proceed as planned, the causes and the impacts. Some example related to the root causes are also presented in the assessment. In order to realize the objectives of the Convention within the context of the Lebanon, these constraints will be addressed through the formulation of specific interventions, actions and strategies. The following sections by no means present all the constraints, causes, and their impacts. Problem trees related to all constraints have been developed, however, due to space limitation, only the problem tree relevant to market penetration constraint is presented.

a. Low Prioritization of Climate Change Issues on NAP

The reasons behind this constraint are:

- Low ranking of climate change issues on the national agenda.
- Insufficient level of awareness at some decision makers and policy planners on issues related to climate change.
- The Ministry of Environment is considered as a secondary ministry in comparison to other more powerful and more politically and economically influential ministries in the Cabinet.
- Lack of genuine collaboration amongst stakeholders.
- Political instability in the region is affecting the materialization of relevant projects such as the regional gas and electric networks.

The impacts of the low ranking of climate change issues on the national agenda include:

- Inadequate local technical capacity.
- Insufficient institutional arrangements.

- Policy issues being fragmented and sometimes difficult to implement.
- Inadequate financial resources.
- Weak and inconsistent law enforcement.

b. Difficult Socio- Economic Conditions

The biggest constraint facing the compliance with the Convention is the difficult social and economic conditions of the people in developing, as well as most developed countries. This is leading to a lack of local funding for relevant projects and initiatives, and to low potential for attracting foreign investments. The main causes are:

- Lack of internal funding
- Complexity of the process to access external funds.
- The corruption in the administration in various ministries and government- owned utilities.
- The civil disturbances and the regional political conflicts, coupled often with military activities.
- The current unfavorable economic conditions.

The direct impacts of these difficult socio- economic conditions are:

- Increased urbanization and internal immigration from rural areas to major cities.
- Inefficient use of resources.
- Further deterioration of the agriculture and forestry sectors.
- Deficit in the budgetary balance.
- The food chain in the country is damaged due to the lack of agricultural activities.
- Increased energy bill.

c. Lack of Information Exchange

In assessing climate change initiatives, time is often considered one of the most limiting factors. The collation of information needed for the assessment and the monitoring process of climate change are exhaustive and time demanding. Moreover, the collected information in the form of progress reports and newsletters is generally scattered among numerous government departments, as well as at smaller administrative levels and within the private sector and research units. Technical capacity and know-how to evaluate and implement climate change policies and measures to advise provisions of Convention are not sufficiently disseminated due to lack of appropriate channels for information dissemination and training measures, as stated in Article 6 of the Convention. The lack of information could be contributed to:

- Lack of funding and dedicated financial resources.
- Lack of systematic monitoring and observation networks and national GHG registry.
- Lack of collaboration amongst different stakeholders.
- Climate change issues not being integrated into the NAP.
- Ignorance of established Conventions mechanisms and protocols.

Anticipated impacts are:

- Gaps in information and in knowledge.
- Uneven geographic registry of anthropogenic GHG emissions.
- Lack of public acceptability.
- Uncertainty and unreliability of the data obtained.
- Lack of expert/staff retention and poor working conditions.

d. Slow Market Penetration of Clean Technologies

The general trend in this concept is that efforts should be made to provide conditions for clean and energy- efficient technologies to penetrate the local market thus reducing energy consumption patterns and reducing GHG emissions. Since there are no specific policies for the management of demand in Lebanon, alternative technologies in the residential and commercial sectors are yet to be regarded as established and marketable. The recent introduction of loans supported by the central bank has slightly improved the situation. The relevant problem tree is presented in Table 2. The causes are detailed as follows:

- Lack of financial incentives for market penetration is one of the main causes of slow market penetration of clean and renewable technologies. The transfer of new technologies requires the existence of supporting infrastructure such as testing laboratories, skilled labor for regular operation and maintenance, and availability of local manufacturing facilities. Lack of Customs exemption and tax relief are affecting the cost- effectiveness of new technologies and make them less competitive

in the market to conventional technologies. Credit facilities are generally offered by the private sector, in addition to limited governmental initiatives carried out by the Lebanese Center for Energy Conservation (LCEC), at the Ministry of Energy and Water (LCEC, 2012).

- Commerciality and public acceptance of new technologies is another reason for the slow market penetration. Alternative and clean technologies cannot compete on cost basis with existing and well-established products. Commerciality and competitiveness is influenced to a great extent by the existing subsidies, mainly in the power and fuel sectors. Public acceptability is also an important factor for market penetration. Potential customers are ignorant of new technology possibilities and advantages it can offer economically and environmentally. They may also be faced with multiple and conflicting information and have limited ability/time to absorb it, and choose a known option in preference to new alternative.
- Low potential for foreign investment in new clean technologies since the small and limited share of the already small market in Lebanon is not attractive for foreign investors. Moreover, at the national level, the private sector is reluctant to invest in energy-related products mainly due to low public interest, and due to the current deteriorating status of the sector as a whole. Energy-efficient lighting systems and solar panels are indicative example of the limited market penetration due to lack of foreign investment that in turn has led to insufficient promotion and marketing campaigns.
- To encourage the participation of the private sector in the economy, the Government of Lebanon with support from the World Bank initiated the Power Sector Restructuring and Transmission Expansion Project which calls for a sector-wide structuring and reform aimed to introduce competition and private sector participation in utility operations. The legal framework for privatization, liberalization and unbundling of the sector, as stated in law 462, exists but is not applied yet. Changes have been suggested to ensure the proper and legal implementation of renewable energy technologies. However, the Cabinet of Ministry is still in the process of modifying these aspects of the 462 law that governs the whole power sector.
- Changing the cultural and societal behavior of the people for market penetration in any country requires stable political and economic conditions. The periodical conflicts in Lebanon are a major barrier facing technology transfer, and is maintaining the current inadequate enabling infrastructure.

Impacts

- Limited market size with no additional job opportunities. Development of local industries for clean technologies, especially solar domestic hot water and efficient refrigerators, is still hindered by slow market penetration.
- As a result of this constraint institutional and organizational barriers are currently facing an wide scale and effective international collaborative initiatives (WTO, EC,...). The majority of these global initiatives consider the adoption of energy efficient and clean technologies as a major prerequisite.
- Long-term health impacts and higher living expenses are the direct effects of the reliance on polluting and inefficient technologies in all economic sectors mainly in the energy, agriculture, and building sectors.
- Inadequate and inefficient technologies still in use. This would lead to the same consequences described above in addition to the higher production costs.
- Further increase in energy consumption and GHG emissions at the national level is the major environmental impact of slow market penetration. The top-up enabling activity and the second national communication of 2011 have clearly illustrated the substantial increase in CO₂ emissions in the energy sector of Lebanon between 1994 and 2004.

e. Ignorance and Lack of Awareness

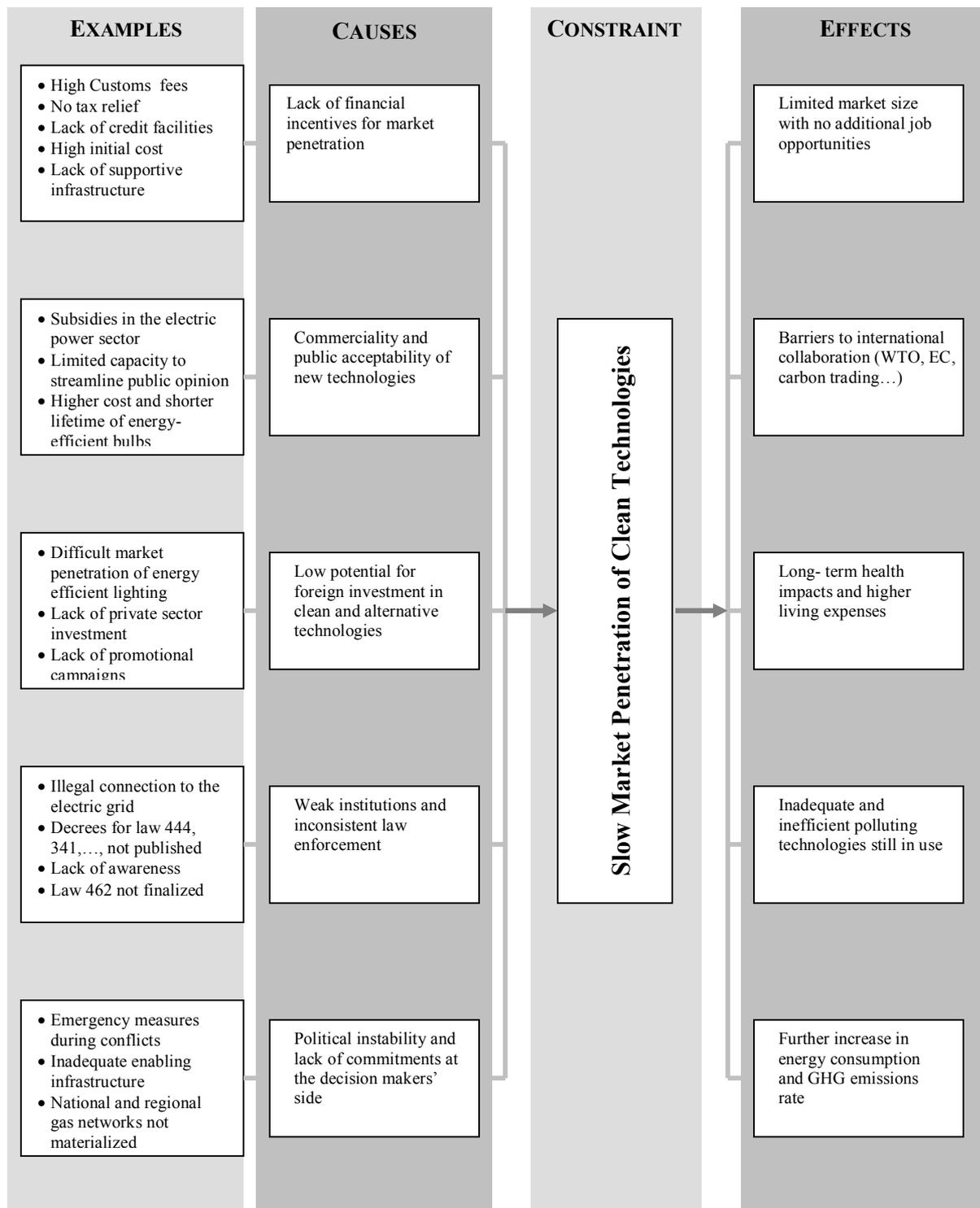
There is a lack of appreciation for the consequences and impacts of climate change on the society in general. Main causes include:

- Political instability and inappropriate prioritization.
- Lack of recognition of win-win opportunities.
- Deterioration of social conditions in rural areas.
- Lack of strategic planning.
- Lack of promotional campaigns.

Major impacts are

- The lack of awareness.
- Lack of appropriate legislative or strategic framework.
- Slow integration of climate change issues in national academic programs.
- Little funds allocated at the national level to support research and adaptation measures.

Table 2. Problem Tree Analysis for Slow Market Penetration



4. Assessment Matrices

The root cause analysis is concluded by the matrix of Table 3 that presents a quantification process for the effects of the main constraints on priority issues. Ranking from high (H), medium (M) and low (L) effects is presented. According to this matrix, lack of awareness is the predominant constraint for 4 out of 5 of the major constraints, followed by hard socio-economic conditions, low ranking, lack of information exchange, and slow market penetration.

Table 3. Effects of Major Constraints on Priority Issues of Lebanon

	Low ranking	Socio-econ. conditions	Lack of info. exchange	Slow market penetration	Lack of awareness
National action plan	H	H	L	L	H
Vulnerability and adaptation	M	H	L	L	H
Research and sys. observation	M	M	H	M	M
Technology transfer	L	M	M	H	H
Education and public awareness	M	H	H	M	H

Table 4 links the root causes to the major identified constraints. From this Table it is evident that lack of financial resources is linked to each of the major constraints. Other issues such as lack of appropriate legislations, low environment- related awareness, and ignorance of economic benefits, political instability, and lack of promotional initiatives are linked to 4 out of the 5 constraints.

Table 4. Constraints and Causes Linkages

	Low ranking	Socio-econ. conditions	Lack of info. exchange	Slow market penetration	Lack of awareness
Insufficient education	x		x	x	x
Political instability	x	x		x	x
MOE being a secondary ministry	x				
Lack of collaboration amongst stakeholders	x		x		x
Scarcity of funding resources	x	x	x	x	x
Political interference	x	x			x
Increased oil prices	x	x			
Lack of systemic observation		x		x	
Ignorance of globally established mechanisms			x	x	x
Commerciality and public acceptability		x		x	x
Scarcity of foreign investment		x		x	
Ignorance of economic benefits			x	x	x
Unstable economy		x		x	x
Outdated legislations	x		x	x	x
Lack of promotional activities	x		x	x	x
Uncertainty about climate changes impacts	x			x	

5. Capacity Building Opportunities

Tasks for the proper implementation of the Conventions recommendations include securing of funding for climate-change related activities and studies in various units, regulating the rights and obligations of all stakeholders in climate-change related activities, improving the stakeholder coordination and agreement among the various agencies, and building of a system for exchange of information on climate change activities in Lebanon. Three levels of capacity development are generally recognized. These are individual, organizational or institutional, and systemic levels. Table 5 presents an assessment for the capacity development levels for each of the root causes. It is evident that, for typical developing nations, capacity building at the systemic level is most needed, followed by the organizational, and the individual levels.

Table 5. Capacity Development Levels for the Root Causes

	Individual (I)	Organizational (O)	Systemic (S)
Insufficient environment-related education	x	x	x
Political instability			x
MOE being a secondary ministry		x	x
Lack of collaboration amongst stakeholders	x		x
Lack of funding	x	x	x
Political interference	x		x
Increased oil prices		x	x
Lack of systemic observation		x	
Ignorance of globally established mechanisms			x
Commerciality and public acceptability	x	x	
Lack of foreign investment		x	x
Ignorance of economic benefits	x		x
Bad economic situation		x	x
Outdated legislations			x
Shortage of promotional activities	x	x	
Uncertainty about climate changes impacts		x	

6. Concluding Remarks

The main constraints and priorities have been identified. There is a need to work towards improving the political scene in the country, improve availability of financial resources, enhance and engage local capacity more effectively with view to strengthening motivation through improved working conditions and incentives, harmonization of institutional responsibilities, increase awareness among politicians, local communities and all stakeholders concerning the impacts of climate change and existing abatement opportunities, increase the exchange of information, and develop and support the deployment of alternative energy sources of energy.

There is also a need for further demand side management and energy efficiency initiatives to curb the load growth and improve the load factor. These initiatives include energy efficient compact fluorescent lamps, solar water heater distribution, and funding for private renewable power generation. New policies for the adoption of standards and labels to promote cleaner technologies are also required. Also, the restructuring of the tariff, leading to a gradual balance in the fiscal budget of EDL, has to be forced to generate revenues for both public and private generation units, and to unload the financial burden on the economy. Collaboration and partnership with the private sector is also needed.

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