

Resilience in Lebanon: Getting ready for O&G activities

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Abstract

With the latest discovery of oil and gas (O&G) fields in the Eastern Mediterranean region, the concern about safety accidents and oil spills in this fragile social and natural ecosystem is continuously increasing, particularly after the 2006 Jiyeh oil spill in Lebanon resulting in an estimated socioeconomic cost of more than USD 200 Million. This stresses the role and need for well-designed prevention strategies, risk-based approaches that are fit for purpose for preparedness and response management in order to prevent and minimize risks and protect ecosystems. As well, it emphasizes the need to increase the communities' capability for resilience to strive through such catastrophes and maintain sustainable livelihoods. This paper discusses efforts of the Lebanese Petroleum Administration (LPA), as the upstream O&G regulator, towards improving resilience from potential safety risks and oil pollution through a framework of institutional, technical and management determinants in partnership with relevant authorities, albeit with multiple political and economic limitations.

Keywords: *oil and gas, resilience, management framework, Lebanon*

1. Introduction

An era of hydrocarbons exploration and production has begun in the Eastern Mediterranean with significant unexplored potential reserves in the Levantine Basin. Countries (Cyprus, Israel, Lebanon, Syria, and Turkey) are currently progressing at different paces among licensing, exploration, development and production. Consequently, the concern about potential adverse risks associated with oil development, particularly safety accidents and oil spills in this interconnected fragile social and natural ecosystem is equally growing. This

stresses the role and need for systematic risk assessment approaches, preparedness regulations and solid response management setups to prevent and minimize oil spills and protect ecosystems. In addition, such barriers need to be complimented with increased communities' capability for resilience to strive through such catastrophes and maintain sustainable livelihoods.

This paper explores resilience in Lebanon to oil and gas emergencies including oil spills particularly through re-visiting the Jiyeh 2006 oil spill, the largest oil spill along the Eastern Mediterranean shores, to assess the natural and social resilience, identify lessons learnt, and characterize future needs in view of planned hydrocarbons exploration in offshore Lebanon. It discusses the efforts of the Lebanese Petroleum Administration (LPA), as the upstream oil and gas regulator, towards improving resilience from oil and gas related emergencies including oil pollution through a framework of institutional, technical and management determinants, as well as, discuss the political and economic barriers and challenges.

2. Study Area

Lebanon is located in the Eastern Mediterranean Basin with about 220 km of shoreline along the Mediterranean. Analysis of 2D and 3D seismic surveys demonstrates the prospectively of Lebanon's offshore, about 22,000 km², for oil and gas production. Lebanon has put in place policy and legislation for the exploitation of offshore hydrocarbon resources including the Offshore Petroleum Resources Law No. 132 (2010) and the Petroleum Activities Regulations Decree No. 10289 (2013) provisioning legal, technical, commercial and quality, health, safety and environment (QHSE) regulations pursuant to conducting petroleum activities. LPA was established in 2012 as the regulatory body, under the tutelage of the Ministry of Energy and Water, in charge of managing the petroleum sector with the principal objective to ensure the greatest possible value for the economy and society while protecting the environment. In preparation for the upcoming licensing round, LPA is finalizing the governance structure of the sector with particular focus on QHSE matters including emergency preparedness, contingency plans and response and recovery systems.

3. Revisiting 2006 oil spill

The Jiyeh oil spill marked the largest oil spill along the Eastern Mediterranean when about 18,000 tons of heavy fuel oil were spilled into the sea during the hostility event of July 2006 and spread along more than 150 km of littoral and sub-littoral zones along the Eastern Mediterranean due to prevailing wind and current conditions reaching the shores of Syria and threatening Cyprus (El Fadel *et al.*, 2012; MOE 2006). Several studies examined the environmental and socio-economic impacts of the oil spill along the littoral including marine life and seawater quality (El-Fadel *et al.*, 2012; Barbour *et al.*, 2008; World Bank, 2008; Khalaf *et al.*, 2006). Adverse impacts on marine life and seawater quality due to sunken and dispersed oil were equally reported (AECID/MOE, 2009; UNDP, 2007; FAO, 2006). Concentrations of polyaromatic hydrocarbons and toxic compounds in fish muscles, higher than those measured after the Erika and Prestige oil spill accidents, were also reported (Khalaf *et al.*, 2006). At the socio-economic level, the World Bank (2008) estimated the total cost of environmental damages at more than \$200M USD including cost of oil clean-up, damages to biodiversity as well as lost income to fishermen, touristic establishments and ports; due to oiling of beaches, equipment, vessels and sites or indirectly due to halting of operations.

While containment of oil was attempted at the time of 2006 spill, actual response and management had to be delayed for almost a month due to the war, and land and air embargo. This resulted in deepening the socio-economic, as well as, biophysical impacts of the oil spill where ten years after the spill, Lebanon still suffers from its repercussions i.e. weak recovery of fish stocks, oiled sand, unpaid compensation from the polluter...etc. While Lebanon showed relatively strong resilience after the 2006 Jiyeh oil spill, Lebanon's readiness for the additional challenges brought up by the upcoming O&G exploration activities is legitimately questioned. Lessons learnt emphasize the need for an updated national framework for oil spill contingency planning that encompasses risk-based assessment, best available management practices in the oil and gas sector, as well as, customized logistical and infrastructural basis for proper response. It also highlights the need to build a resilient system that can adapt to emergencies and recover from shocks.

4. LPA's Framework for Management of Quality, Health Safety and Environment (QHSE)

Acknowledging that resilience is a function of the capacity to absorb shocks, the LPA aims to enable this capacity through setting the policy and regulations for emergency preparedness and response. For this purpose, the LPA is investing in boosting preparedness on one side and establishing well-developed prevention and planning systems on the other side. The LPA has been incorporating strategies, policies and robust requirements into the sector's governance framework with a main objective to safeguard safety of people and the environment. The adoption of a production sharing model builds on the strong capabilities of international oil and gas operators to ensure a safer development of the nascent hydrocarbons sector in Lebanon, fostering partnerships between the public and private sectors and developing capacity through local content encouragement and transfer of technology.

In line with sound planning concepts, a strategic environmental assessment (SEA) of offshore petroleum activities was undertaken in 2012. The SEA aimed at identifying ways to integrate environmental, socio-cultural and socio-economic aspects in the exploration and development of offshore oil and gas resources and related industries in order to ensure a balanced and sustainable development. In addition, the SEA identified mitigation and monitoring requirements and objectives to establish best practices and ensure effective impact management for future oil and gas development.

Following best international practices, and based on benchmarking of success stories, the LPA is adopting a hybrid HSE governance system incorporating goal based/performance criteria supplemented by required or recommended specific prescriptive regulation for selected areas. The main advantages of such a system are: (1) flexibility as well as the ability to incorporate changes of insight rather quickly ensuring best practice operations; (2) a risk based system ensures that focus is on priority risks associated with a specific installation; (3) developing a goal-based system is a relatively simple process as focus is on output and less on content; and (4) it minimizes the authorities' own risk and liability as it's up to the operator to show evidence of good practices. Hence, LPA's HSE governance system will be based on the principle of risk management which means it is based on the identification,

assessments and mitigation of specific risks associated with a specific installation and activities. Operators will have to show that they are in control of their operations by regularly identifying, assessing, mitigating and monitoring all HSE risks and that the general risk level is in line with the set risk criteria. The concept of risk management gives the operator flexibility in applying their preferred solutions and ensures focus is prioritized on those risks that are most significant. Such a system promises high level of preparedness as well as early warning systems which allow effective response and management. The provisioned system consists of the following main blocks: (a) HSE management requirements and operational criteria which includes the applicable concepts and acceptance criteria in the field of HSE governance that operators will have to comply with; (b) compliance assurance; (c) social management which involves stakeholder and communities engagement, as well as social impact assessments; and (d) emergency preparedness and response and crisis management.

Emergency preparedness and response has been given high priority by the LPA where frameworks are being developed in line with the risk based approach for operators (Tier 1) as well as at the national level (Tier 3). The LPA is at the final stages of developing a National Oil Spill Contingency Plan in close cooperation with relevant stakeholders according to local requirements and in line with international standards and best practices. It addresses all potential oil spill sources while focusing on oil spill risk assessment, prevention, preparedness, response and management. It details the chain of command and institutional and organizational structures for Tier 3 response while providing guidelines for response at Tier 1 and Tier 2 levels. This plan consists the main building block for preparedness as it defines stakeholders of concern, sources of risk, and sensitive areas in need of protection, response capabilities including human and financial resources as well as equipment, response strategies and monitoring and recovery strategies.

5. Conclusion

At the dawn of oil and gas exploration in offshore Lebanon, the LPA aims to enhance the country's resilience to potential emergencies and crises by encouraging public-private partnerships in an emerging sector, boosting national capacities for preparedness and

response, and catalyzing the adoption of best international practices while building on the local peculiarities.

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