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Environmental Risks, Policy Decisions in Large Multinational Companies and Policy Makers in Tunisia

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Abstract:

In a world with local and global instability (economic, social and financial policies), an environmental disaster can have particularly devastating effects at the economic and human levels. We are also witnessing an increasing "legalization" of the causes and consequences of environmental degradation. The issue of prediction (anticipation and evaluation) of natural and anthropogenic risk is posed in terms of moral and sometimes criminal, political responsibility, as well as to the scientific community. In this context, researchers themselves might be tempted to "hedge" legal risks, by considering in their forecasts, the most "extreme" assumptions.

I- Introduction : The concept of sustainable development

Generally, we represent sustainable development at the intersection of three dimensions: ecological, economic, and social using the following diagram:

Figure 1: "Diagram of sustainable development"

The concept of sustainable development is still suffering from a lack of conceptual and analytical modeling tools that integrate the three dimensions. Therefore sustainable development is more normative than scientific. It is often easier to identify unsustainable practices over sustainable ones (Bossell, 1999).
From many debates on this issue of "sustainability", we note two positions:
The first position would assign to the State a political objective based on two types of decision rules: one for renewable energy and the other for non-renewable resources (Daly and Herman, 1994; Common and Perrings, 1992). Regarding renewable energy, the rule is to limit the consumption of resources at sustainable yield levels. For the second rule, we should reinvest the benefits of non-renewable resources in the renewable "natural capital". The combination of these two rules would maintain a constant stock of "natural capital".

The second position is a neo-classical perspective that posits that there is no reason, ethically or economically, to keep "natural capital" constant (Solow, RM, 1986; Hartwick, J.M, 1977).

The vast majority of economists today agree that free and unregulated markets can lead to ecological disasters and, therefore it is necessary to integrate the social dimension in order to reconcile economic and ecological dimensions. It is not a question of a symmetrical relationship between the economy and every other human and social sciences, but a unilateral integration of social phenomena by economic theory. This new socio-environmental perspective includes a significant inflection and even a vehement criticism (J. Stiglitz) of the traditional development policies designed after the famous "Washington Consensus". The Criticism of the neoliberal model and congenital market imperfections (information asymmetries, moral hazard, adverse selection ...) originates from an awareness of the importance of social institutions and norms in market performance. This justifies social and government action and returns to the foundation of the normative theory of development with a new understanding and focus towards environmental and social issues that were previously ignored. We can be relatively optimistic about the gradual emergence of a whole new paradigm of sustainable development that takes into account economic, ecological and social perspectives and develops new approaches of interdisciplinary research.

II- The consideration of ecological risk in environmental policy in Tunisia

Standard economic theory does not require a limit to the possible growth of the production of goods and services (this includes environmental goods, ‘‘public goods’’, and non-renewable natural resources "). The degradation of nature is taken into account in these theories only if it induces quantifiable negative externalities in terms of cost or decreasing welfare. The dominant economic theory, characterized by the belief in spontaneously self-regulating market, treats nature as “natural capital”, and its degradation is considered through the conventional theory of public goods and incentives.

Other authors, breaking with the liberal vision, prefer the context of "social choice" to suggest "operational" proposals for sustainable development that would preserve intergenerational equity without interrupting the process of economic growth. Like the environmentalist movement authors who are in line with previous recommendations of the club of Rome[1].

Some authors, although aware of the vague and often ideological concept of global public goods, admit that it can give meaning to the public debate on environmental issues (Constantine 2002) and re-legitimize the use of public aid in development (ODA). Not through ethics and solidarity (Gabas JJ and P. Hugon, 2001), but by putting pressure on policy makers of both national governments and international organizations that can impose responsible environmental management solutions worldwide. Achieving this goal would require not only better preparation policies to deal with inevitable environmental hazards, such as earthquakes, but also prevention mechanisms to avoid the damage caused by hazards such as flooding, storms and drought.

Countries in the Middle East and North African (MENA) region are facing profound changes in social, political and economic structures, since the beginning of the Arab Spring. Most of these countries are living into a politico-socio-economic crisis. At the international level, environmental risks, including climate change, are priority issues for international organizations. The summits on the environment and the agreement in Warsaw in 2013 to develop a new protocol at the 2015 summit in Paris involve a large number of countries. During these talks policy recommendations about sustainable development have become a key concept.

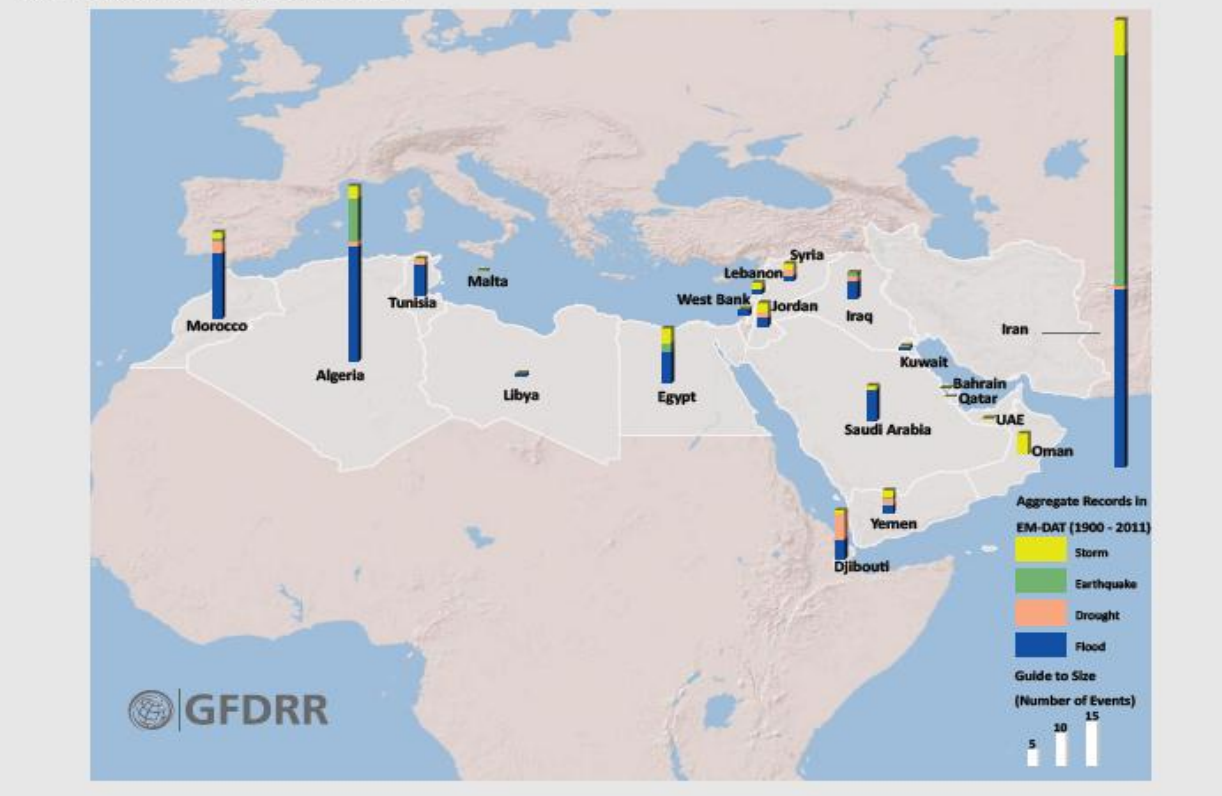
This section seeks to explore the integration of environmental policy in the context of transition economies, particularly in Tunisia. Can these economies help formulate new policies or would it be better to postpone environmental considerations at the moment? Environmental policies are seen as a way out of crises and towards sustainable development. Is it better now to resolve political and socio- economic crises prevailing in the MENA region first, or should the focus be on discussing issues related to the environment?

[1] The Club of Rome is a global think tank that deals with a variety of international political issues. Founded in 1968 at Accademia dei Lincei in Rome, Italy, the Club of Rome describes itself as "a group of world citizens, sharing a common concern for the future of humanity."

We first establish an assessment of the countries in the region to describe their attitude towards management of environmental risks, whether it occurs naturally or is caused by climate change. Second we look at the degree of involvement of Tunisia in this context. The culminating goal is to consider possible political action to eliminate the need for private action through the study of the strategy of international firms.

Human and material damage due to environmental events are becoming increasingly important in the world. Material losses in 2011 are estimated at 370 billion dollars, three times the amount of 2009. Human losses are estimated at nearly 304,000 deaths in 2010, and nearly 3.3 million in the 40 years from 1970 to2010.

Figure 2: Number of disasters stacked by type of disaster, 1980-2006:



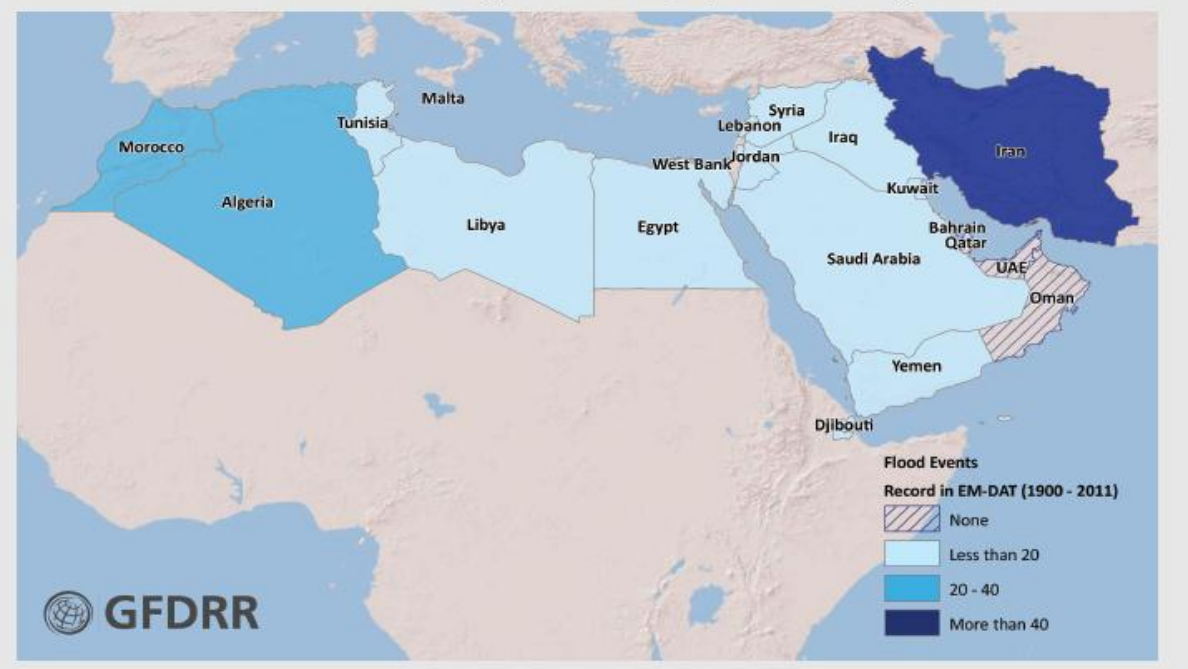
Source: World Bank: Adapting to climate change in the Arab countries.
Note: Floods (blue), drought (pink), earthquake (green), storms (yellow).

Figure 2 indicates the environmental risks of countries from the MENA region. Middle East and North Africa is considered a particularly risky area. The number of environmental disasters in this region has tripled since 1980, while it has only doubled worldwide. The large number of disasters is mainly due to rapid urbanization and water scarcity in the region, as well as climate change. Floods caused the most damage in terms of the decrease in the percentage of gross domestic product (GDP). In 2008 flooding in the governorates of Hadramout and Al-Mahara (Yemen) cost $ 1.6 billion, equivalent to 6 percent of GDP. Droughts were the second largest environmental disaster and hit vast areas recurrently. Economic losses and social consequences represent an increasingly important weight. Of the environmental disasters that occurred in the MENA region between 1980 and 2010, 81 % of disasters were concentrated in just six countries: Algeria, Djibouti, the Arab Republic of Egypt, the Islamic Republic of Iran, Morocco and the Republic of Yemen.

Rapid urbanization of the MENA region is among the most likely causes for the increase in exposure of persons and economic assets to environmental disasters. The urban population already makes up 62% of the total population and is expected to double in the next three decades. In addition, 92% of the population

lives in 3% of the area. There also exists alarming figures in terms of the efficiency of infrastructure such as drainage, and the amount of illegal and therefore unregulated construction.

Figure 3: Floods are the most frequent disasters occurring in the MENA region, 1900-2011.



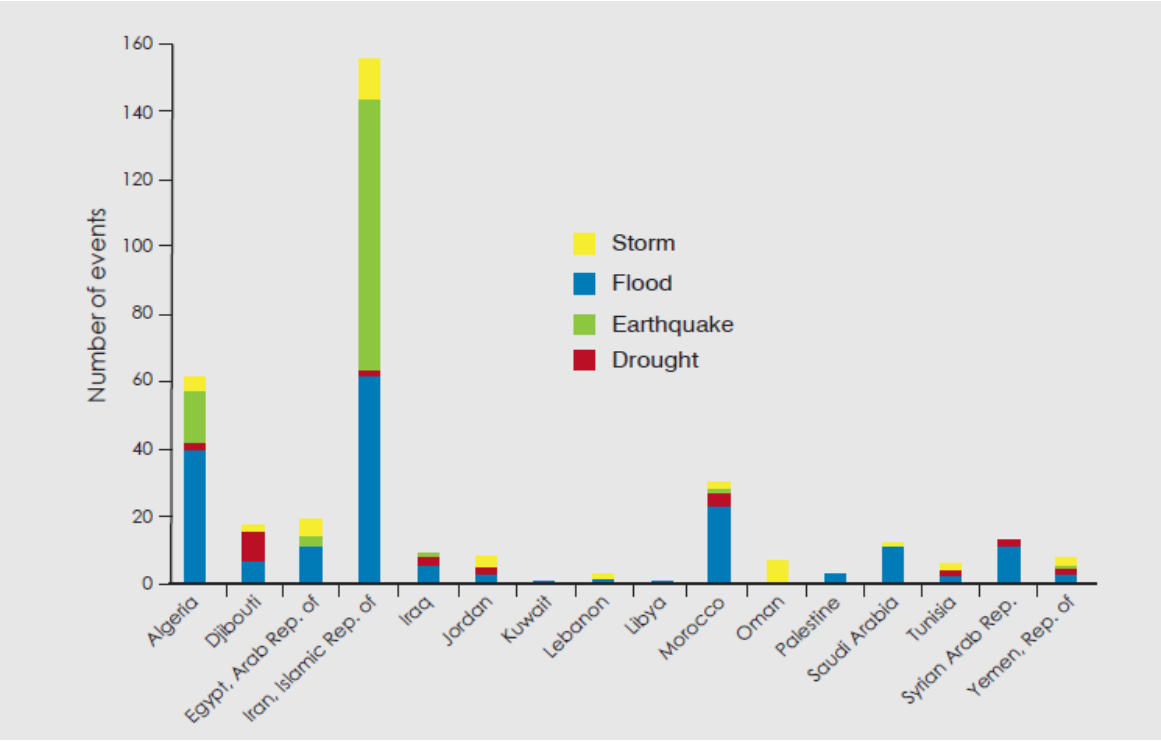
Source: World Bank: Adapting to climate change in the Arab countries.
Note: 213 floods affected 15 countries MENA, killing nearly 19,000 people while affecting 8.6 million others.

At the same time, according to the Intergovernmental Panel on Climate Change (IPCC)[2], rising sea levels could affect millions of people in the MENA region. In Egypt, a rise of 1 meter of sea level will affect 12 percent of agricultural land and 3.2 percent of the population[3].

According to projections made by climate scientists and experts of the United Nations, the MENA region is the second most affected by climate change in the world. In 2050, the region will likely face a decrease of 50% decrease of the fresh water supply. Therefore, water must be imported or desalinated, at an estimated cost equivalent to 1% of total GDP in the region. As a result of the rising sea levels it will become one of the areas most exposed to water stress globally. Although this may become the most problematic environmental disaster the risk of flooding currently is the most frequent problem for countries in the region, as shown in Figure 4.

Figure 4: Comparison of the total, by country and type of natural hazards in the MENA region. From 1980 to 2010.

[2] IPCC, Special Report, The Regional Impacts of Climate Change, Chapter 7: Middle East and Arid Asia. http://www.ipcc.ch/ipccreports/sres/regional/index.php?idp=153
[3] Mostafa K. Tolba and Najib W. Saab, (*2009,) Report of the Arab Forum for Environment and Development*, VIII.



Source: World Bank: Adapting to climate change in the Arab countries.

Consequently, governments must take potential environmental disasters into consideration for their medium and long term planning policies. In fact, MENA governments are increasingly looking for better ways to manage and deal with the environmental risks. This new sensibility has contributed to the creation of a number of institutions and specific investments in regional programs. These programs include early warning and risk assessment systems at both national and local levels. They also aim to improve in key areas concerning: the availability of information on disaster risks, the development environmental policies to reduce risks, as well as the implementation of training at both national and local levels focused on adaptation and post-disaster reconstruction.

In 2012, the Arab part of the region launched a "10-year strategy" to reduce disaster risk. This entailed reducing the impacts of climate change and disaster losses through the identification of these strategic priorities:
- The strengthening of coordination mechanisms;
- Monitoring environmental risks at national, regional and local.

However, given the increasing exposure of the region to natural disasters, the challenges continue to grow. This strategy requires the implementation of immediate and coordinated action including the decentralization of environmental risks management and most actions continue to be taken at the national level. Initiatives in the direction of progressive decentralization, although slow, were undertaken in Algeria, Egypt, Morocco, and the Republic of Yemen. In Morocco, there is setting maps of communities, training on construction standards and early warning systems. The effectiveness of risk management strategies requires a decentralized approach, but also an appropriate allocation of resources (both human and financial). The involvement of civil society organizations at the local level can also contribute significantly to strengthening local resilience to environmental risks.

MENA countries are still among the most centralized in the world in terms of governmental management. The budget allocated to local governments varies from 3 percent in Jordan to 18 percent in Egypt, below the world average of about 22 percent. However, several countries in the region, including Morocco, Tunisia and Yemen, are moving towards greater delegation of authority to local governments.

The efforts between the countries of the MENA region are coordinated by the World Bank, which is involved in the establishment of a strategic framework and collaboration with international partners. They work with the United Nations Office for the Reduction of Disasters Risks (ONURRC) and the United Nations development Program (UNDP), but also with regional partners such as the Organization of Islamic Cooperation (OIC) and the Islamic development Bank (IDB). The objective is to support the efforts of countries to go beyond simple disaster response and establish a proactive risk management. The methods used may include the implementation of modeling risk assessment (in Djibouti, Morocco, Lebanon and Yemen) to sensitize the authorities and implement strategies to reduce vulnerability. Proposals are also made to use financial instruments to transfer catastrophe risk through risk pooling with international insurers.

A- The global climate change

Although the socio-economic impacts of climate change are uncertain, recent estimates are increasingly worrying.

According to these estimates, figures 5 and 6 below, we can observe the following in the MENA region:
- Significant areas of extreme and high risks of climate change shows that the Maghreb region is particularly exposed.
- The region as a whole will face a decrease in precipitation, and water stress. IPCC experts expect that global warming will cause more extreme weather events such as droughts, and torrential rains.
- Therefore, desertification will increase, especially in the Maghreb countries of Morocco, Algeria, Tunisia and Libya.
- Deterioration of agricultural systems mainly concerns Tunisia and Algeria on the eastern shore of the Mediterranean. According to the IPCC, the major crop yields could decrease an average of 2 % per decade if no real effort to adapt is implemented[4]. Meanwhile, in response to global demand, production will be required to increase by 14% per decade. Fisheries will also be affected by a loss of marine biodiversity. . This phenomenon is associated with water shortages and threatens food security and increases poverty.
- The threat of rising water levels particularly affects Egypt. Rising sea levels one of the major consequences of global warming, are now expected to be higher than past estimates. Scientists now expect an average increase of 26 cm to 98 cm by 2100 against 2007 report estimates of 18 cm to 59 cm[5]. Climatologists now better take into account the ice melting in Greenland and Antarctica. Between 1901 and 2010, the oceans already rose by 19 cm. throughout the century; the coastal communities will be impacted by more frequent flooding and increased coastal erosion, two phenomena aggravated by the massive urbanization of seashores

All these elements related to climate change reinforce the rise of environmental risks previously identified.

Figure 5: Map the impacts of global warming in the world.

[4] IPCC, Climate Change 2007.
[5] ibid

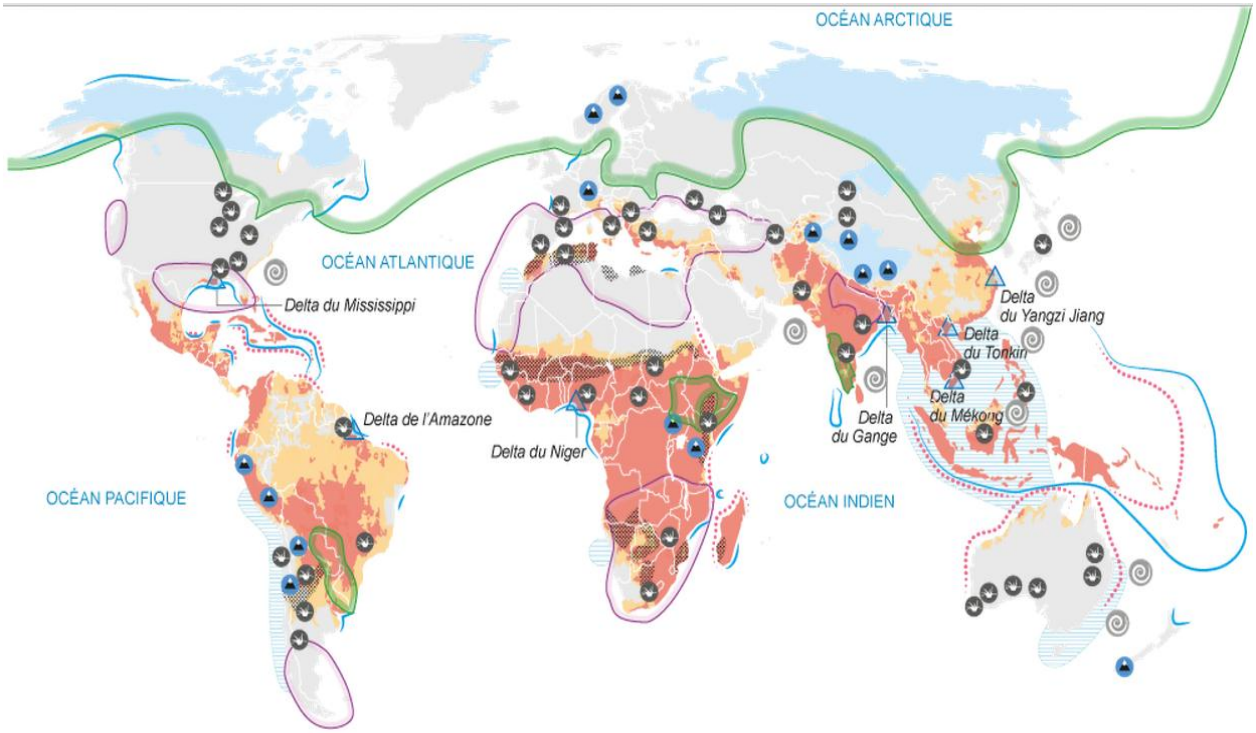
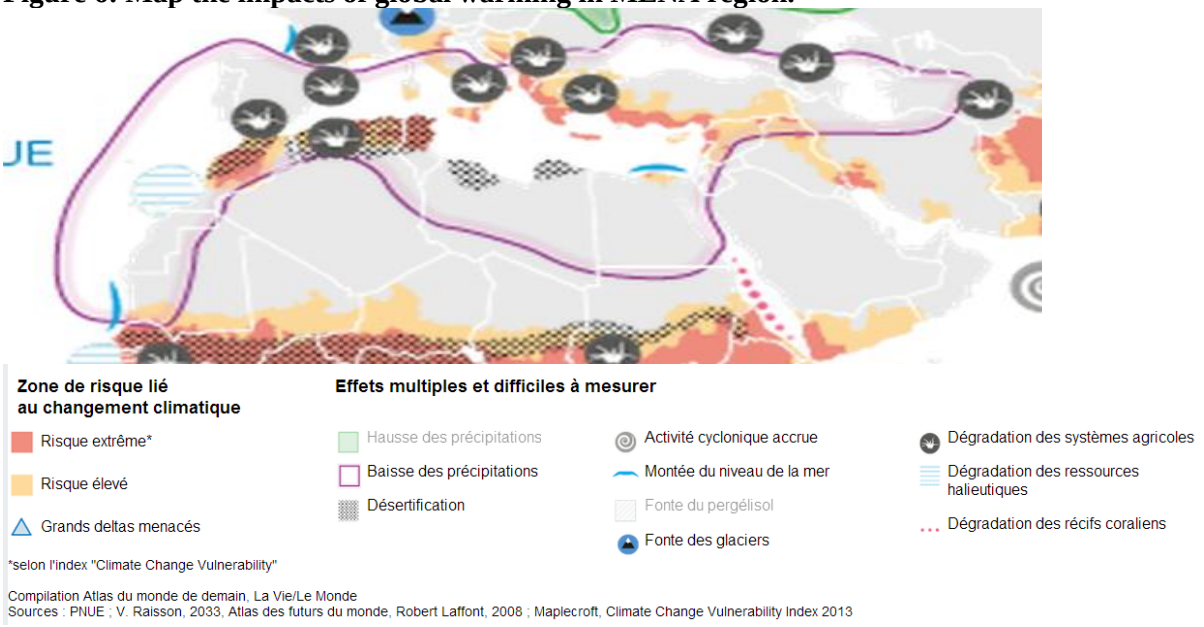


Figure 6: Map the impacts of global warming in MENA region.



As they did in 2007, experts warn against the economic costs of inaction. All studies confirm that the more governments delay, the heavier the cost will be for future generations. An increase in global temperature of 2 ° C could thus result in a loss of between 0.2 % and 2 % of global annual revenues. The IPCC has compiled modeling work of the last 7 years, but have not produced solid results of "costs and benefits" of the fight against climate change. The only cost figures put forward are on the third part of the 2014 report[6] and point to an economic loss of 0.06% on projected growth of 1.6 % to 3 % per year through 2100.

Studies by the World Bank show that long-term climate change is likely to lead to a cumulative decrease in household income in Tunisia of about $ 1.8 billion (6.8 percent of GDP) and $ 5.7 billion (23.9 percent of GDP) in the Republic of Yemen in the next 30 to 40 years.

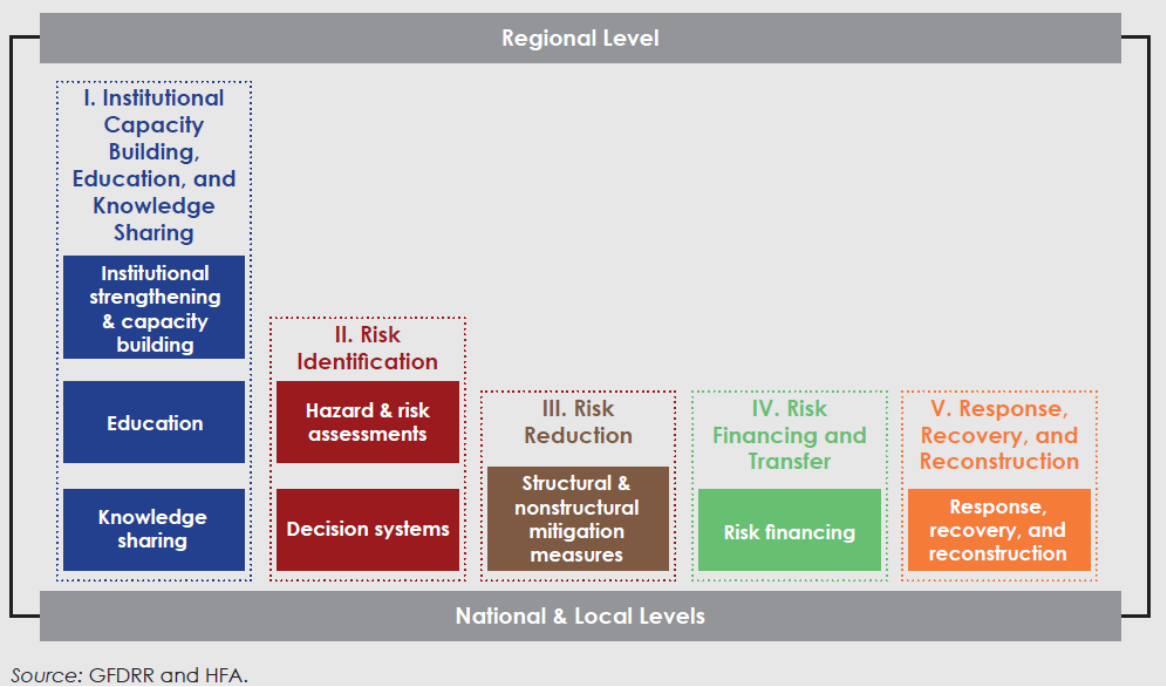
[6] IPCC (2014), Climate Change 2014: Mitigation of Climate Change.

Environmental risks require national and local action to mitigate, but also regional and international action as well. The international community seems to be moving more and more towards a commitment to limit greenhouse gas emissions, by the end of the century to 450 parts per million (ppm) for climate change. Estimates project this will lead to a warming of 2 ° C. This implies reducing global emissions between 40% and 70 % by 2050 and reduce them to a "near zero" level by 2100.

To achieve this changes are necessary in all areas including: the energy sector, which accounts for 35 % of emissions, agriculture and forestry (24%), industry (21%), transport (14%) and construction (6%). To do this, IPCC experts recommend the use of low-carbon energy sources (renewable, nuclear) that will need to triple or quadruple by 2050. As well, the energy efficiency of buildings should be improved, not to mention the development of techniques for capturing and storage of CO2. The introduction of more restrictive emission standards are important as well as the establishment of a tax based on emissions (carbon tax) and carbon markets.

Because of growing environmental risks, the involvement of all economic actors is no longer an option but a necessity, which is not in itself sufficient. We focus first on public sector involvement before considering the role of the private sector through the study of strategies of multinational firms.

Figure 7: The Hyogo pillars[7].



Source: GFDRR and HFA.

To better measure the efforts to tackle this issue, and given the high exposure of the region to natural disasters, there is a strong regional commitment to face the dangers in a more strategic and systematic way. The growing attention to environmental risk management is also the result commitments by the HFA group (Hyogo Framework for Action). It brings together international actors around a common and coordinated strategy in order to take action and monitor progress in reducing human, economic social and environmental losses by 2015. The pillars of this action are shown in Figure 6 above. Nevertheless, no country in the MENA region has been able to implement a comprehensive and coherent national policy.

Tunisia, in the heart of the MENA region, faces several challenges. As we have seen in the previous graphs, Tunisia faces the risk of drought and flooding (6 cases between 1980 and 2010). Given the high rate of urbanization of the population, nearly 67%, the concentration of its cities on the Mediterranean

[7] World Bank (2014), "Natural Disasters in the Middle East and North Africa: A Regional Overview", P.35.

coast, and the water stress that characterize its water needs, it is directly facing the environmental risks linked with climate change. These risks come in addition to many other issues, which are feared because of their resurgence and their impact on development.

Three stages can be distinguished in the approach that has been followed to deal with environmental risks:
- First, from 1990 to the independence, the Tunisian government reduced environmental risk by building capacity, fighting against ignorance and poverty, and creating protection against floods.
- Then, from 1991 to 2010, the state introduced the environment and sustainable development into its national policy. A full-fledged ministry was created with a variety of institutions and specialized committees, which functions by enacting laws, decrees and specific codes. But if this policy integrated the concept of sustainable development, it has placed prevention functions in the background. In 1991, a national disaster management system was established. This system consisted of a national commission aimed at fighting against disasters by focusing on their prevention, a relief organization, and a regional commission installed in each governorate. The Interior Minister chairs the National Commission and the governor, the regional commission.
- The current stage, called transition, developed after the revolution of January 2011 The civil society strongly objected to the system, which is considered inefficient to cope with the increase in disasters, floods and recurrent drought. In response to a strong social demand, the new government has promised to make Disaster Risk Reduction (DRR), an essential element in the development and planning of future national policies. But in the current context captured by Tunisia's democratic transition and socio-economic recovery, the system created in 1991 remains the head of national disaster management. The new policy being developed is virtually at the project stage.

Only a few actions have been taken so far in the regional and international framework. Tunisia is formally involved in implementing the strategy HFA (Hyogo Framework for Action), however, until December 2013, it has only submitted a report of 6 pages, dated from March 2004, entitled « Strategy for civil protection in the prevention of disasters ». It is the only document published (seewww.preventionweb.net). Formally, Tunisia thus starts the chemical analysis of the process (CaH) with a report published by the Ministry of Environment. This action plan takes place under the current Ministry of the Environment, with the international support of the UNISDR and UNDP Office in Tunis.

This strategy focuses on the countries priorities in the region that are taking place under the auspices of the World Bank, which coordinates the activities at international, regional, national and local levels. While describing this strategy, we discuss the achievements and shortcomings of the Tunisian government. These priorities are based on the following five pillars:

Pillar I. Institutional capacity building, education and knowledge sharing:

The objective is to better manage training and share knowledge about risk, policy and legislative development. For example, following devastating urban floods in 2009 and 2010, Saudi Arabia, in partnership with the World Bank, has developed a comprehensive national assessment of risks to reduce the future effects of natural disasters. In Morocco and Tunisia, the public sector develops and uses tools at the forefront of technology to better measure, manage, and finance efforts to address major risks likely to arise. However, no country in the MENA region has been able to develop a comprehensive and coherent national policy.

Institutional arrangements: Many countries in the MENA region have established national bodies to coordinate the management of natural hazards between departments and communities. Most of the time, these organizations are rooted in the environment and interior ministries, as they are responsible for issues of sustainable development.
Coordination mechanisms: National coordination mechanisms exist as national committees and are operating in several countries in the region. The aim of these organizations is to establish contacts nationally and conduct multilateral actions while serving as an advisory board in the priority areas requiring concerted action.

Integration of environmental risks in development plans: Integration into development plans of MENA countries remains in its infancy stage and much progress still needs to be done in this area.

According to Official report produced and published by the Government of 'Tunisia[8], in Tunisia, early warning systems, when they exist, are sectoral, pretty tight and do not cover all the territory nor all the risks to which the country is exposed. They usually belong to a strongly hierarchical management, characterized by a strong institutional dispersion, with overlap and duplication. The lack of coordination between all stakeholders, including civil society, weighed on the performance and efficiency of the current institutional framework. In the future, it is announced that a new institutional framework to coordinate and implement the state policy on DRR would be implemented.

It is in this perspective that was introduced or initiated, in 2012 the following actions:

It initiates the development of a national strategy for DRR in the context of an informal committee.
- The creation of a multi-sectoral National Platform for DRR.
- The establishment of a database "DESINVENTAR " data archive with disaster loss assessment and damage.
- The development of an action plan as a result of the study on reducing disaster risk in Greater Tunis until 2030.

Pillar II. Hazards Identification:

It is important to understand the system of evaluation designed to identify hazards. Specifically the focus is on understanding the intensity, frequency, and of decision systems.

Risk Information: This is a crucial component and a prerequisite for effective risk identification and hence appropriate interventions. Appropriate levels of understanding of risk assessment in the MENA region are generally weak and should be strengthened. The basic elements of the risk assessment include historical events, hazard maps and information on the characteristics of the infrastructure. This data is often difficult to collect.

Integration of environmental risk management and the climate change agenda: While both are very closely related, they have not often been treated in a joint and coherent manner. However, efforts encouraging their integration have been undertaken in North Africa (Egypt, Morocco and Tunisia) through the GFDRR (Global Facility for Disaster Reduction and Recovery) project. This program funds the study aiming at improving the capacity to adapt to climate change and natural disasters in coastal cities of North Africa. This action, funded by the European Union and in coordination with some African countries, identifies investments that combine these two objectives in coastal cities, especially in Egypt and aims to enable the national system of climate data to make predictions of weather, organize data management, and provide appropriate warnings.

Hazard and climate data: The coverage of weather stations is not uniform in the MENA countries, so their ability to anticipate and effectively communicate hydro-meteorological events is reduced. Many meteorological stations exist along the Nile and the coast of the Mediterranean Sea, but in less populated areas, meaning the coverage is very limited. In some countries, including Algeria, Tunisia, Egypt and Iraq, the data is probably available but not easily accessible. Therefore, the establishment and/or replacement of some observation and automatic weather monitoring station sites will be necessary to build more rigorous forecasting and meteorological modeling.

According to Official report produced and published by the Government of 'Tunisia[9], In Tunisia, several initiatives have been undertaken to establish specific monitoring systems. The National Meteorological Institute, under the Ministry of Transport, has a network, which quadrille throughout the country. It is

[8] Rapport national de suivi sur la mise en oeuvre du Cadre d'action de Hyogo (2011-2013).
[9] Rapport national de suivi sur la mise en oeuvre du Cadre d'action de Hyogo (2011-2013).

equipped to provide the information to different operators (air and maritime navigation, fisheries, agriculture, tourism ...) as well as to all citizens, on many risks:
- Hydro meteorological hazards: height and intensity of rainfall, storms, snow and hail.
- Risks of sea storms and sandstorms.
- Thermal hazards: heat waves and the waves of cold.
- Telluric vibrations.
- The tide gauge to monitor the change in sea level
- The announcement of the locust,
- Epidemiological prevention under the Ministry of Health.

The Ministry of National Defense mobilizes, during periods of high risk of forest fires, about 2000 soldiers equipped with the necessary resources.

However, the data obtained at the level of observation and warning systems are not stored in a centralized database and set up for sharing. This separation does not encourage the development of unified format for risk assessment. In Tunisia, it is therefore not necessarily a matter of logistics and equipment to mobilize resources. It is also a mentality to acquire. A considerable effort is undertaken to pass the "culture of reaction "where the citizen reacts in times of disaster to a "proactive culture" that makes him anticipate the event before it becomes a disaster.

Pillar III: Risk Reduction

From disaster response to risk reduction: Several MENA countries have made a lot of progress in this area. This progress varies from country to country depending on each country's governance capacity of each country and the socio-economic parameters. For example, in Morocco, the government plans to invest in the infrastructure of risk reduction in the construction of dams in floodplains and the modernization of schools and public buildings in high-risk areas.

Building codes: Several MENA countries, including the most vulnerable to earthquakes, Algeria, Iran and the Republic of Yemen, integrated structural safety measures in their buildings, including the establishment of zones buffers in coastal belts. However, the greatest difficulty lies in the application of codes and regulations. The lack of authority and inability to impose sanctions are clearly identified. Another challenge lies in monitoring the quality of construction and ensuring compliance with the prescribed standards.

According to Official report produced and published by the Government of 'Tunisia[10], the country does not have a national platform for disaster risk reduction yet. However, such a project is under design .In this perspective DESINVENTAR application, the database on disaster losses that has been established, in cooperation with UNISDR and UNDP Tunisia. Indeed, there is not so far any evaluation report about socio-economic impacts directly or indirectly related to recurrent disasters events such as droughts and floods. The principle of creating a national platform for DRR is already accepted (Ministerial Council, November 2012), but does not have appropriate legal framework yet. It is expected that this multi-sectoral platform stands as a platform or forum for interaction between the key actors in DRR.
In this respect, the sectoral administrations should accept to share the information they have and the public should participate in the animation of this platform

Pillar IV: Risk Financing and Transfer

Most countries in the region do not spend regular budgets for the management of environmental risks. These funding mechanisms are established only after a disaster, and tend to disappear soon after.
Given the multisectoral nature of these risks, an innovative concept to create a unique mechanism for risk management and emergency funding was put in place in Yemen. A mechanism of a "single window" for

[10] Rapport national de suivi sur la mise en oeuvre du Cadre d'action de Hyogo (2011-2013).

supervision, receiving donations and execution of emergency related to natural hazards, climate change, food security, or the scarcity of water was designed.

Risk financing: Many countries in the MENA region raise emergency funding after a disaster occurs. Budgetary expenditures, following such an event, cause reallocations or increased debt. A system of alternative funding becomes necessary. In Morocco, for example, the government is considering a law to impose the obligation of an insurance guarantee thus reducing the demand for public funds in case of emergency.
Many other areas, such as members of the Association of Southeast Asian Nations (ASEAN), South Eastern Europe and the Caucasus, and the Caribbean islands increase their economic integration by focusing on regional solidarity to better manage environmental risks. This is a form of pooling of resources through insurance in order to cover the financing of disaster risk.

According to Official report produced and published by the Government of 'Tunisia[11], the RRC is coordinated at the regional level. Each committee is responsible for developing the regional governorate and monitors its implementation. Chaired by the governor, it is composed of representatives of all the ministers involved in the National Commission. It also combines the head of the regional sector of the national guard, the head of regional sector of the national police, the head of the regional civil protection unit, a regional representative of the national electricity and gas company (STEG), a regional representative of the national society of exploitation and distribution of water (SONEDE) and a regional representative of the national sanitation (ONAS).
These regional committees meet at least twice a year. On the ground, local volunteer committees are sometimes created to assist the regional commission for the fight against calamity, their prevention and organization of relief.

However, at the regional level, governorates have not enough equipment for action. Paradoxically, the most vulnerable areas are sometimes the most deprived in terms of human resources, equipment and appropriate transport.

Both at national and regional level, DRR suffers from a lack of:
- Cartographic support risk areas and reliable and timely databases.
- normalized information to educate and alert local populations on the frequency and severity of hazards.
- Administrative procedures, adapted to the management of the budget in case of crisis.
- Appropriate finance to establish specific programs DRR.

It is essential that this framework has its own legal basis, financial autonomy, and administrative, technical, and scientific structures. It will ensure the institutionalization of the participation of the civil society as well as that of local populations potentially exposed to disaster risks.

Pillar V. Response, Recovery and Reconstruction

Institutional Arrangements: The institutional planning management of natural hazards is always driven by the urgency to respond. Most MENA countries use an autonomous coordination body which is responsible for the coordination of the risk profiling, mapping, policy and legislation, and the establishment of an action plan. These organizations do not normally have the expertise to carry out all these tasks effectively, and have no political authority to influence decision makers. Loss can be considerably reduced if authorities, individuals and communities designate specific areas, teams ready to act with better knowledge of effective disaster management.

Exchange of South-South knowledge: To share best practices in the management of environmental risks. Discussions deals with the identified challenges and opportunities, and lessons learned in terms of management in urban areas with high concentration of population.

[11] Rapport national de suivi sur la mise en oeuvre du Cadre d'action de Hyogo (2011-2013.

According to Official report produced and published by the Government of 'Tunisia[12], in the country many actions are carried out with the support of international cooperation. As examples, the Ministry of Defense participates in operations such as:
- Simulation of a natural disaster due to earthquake (operation under 5+5 Defense / SOLIDARIDAD Grenada in Spain in 2006)
- Medical emergency exercises (Midlite) organized annually by the Directorate of Military Health in cooperation with the U.S.
- The organization in 2012/2013, as part of the agreement « l'amitié 12 » of a simulation of a chemical disaster in cooperation with the National Office of Civil Protection (NOCP), the Tunisian army and its counterpart, the French army.
- Operational cooperation (in the field) is established between executives of the NOCP and Forestry Department and their Algerian colleagues. This cooperation is important for forest fires.
- Cooperation becomes broader, involving other countries in the Maghreb and Sahel, when it concerns the locust.

These collaborations are not generalized and do not cover all contingencies. Sustainable management of droughts and floods requires action beyond national borders and therefore the implementation of cross-border protocols for sharing information on DRR. In this perspective, an early warning system for drought was initiated by the Observatory of the Sahara and Sahel (OSS) within the MWSD project (Maghreb Warning System for Drought).Lack of human and financial resources prevents the widespread use of early warning systems. International solidarity could play an important role in strengthening national capacities. Indeed, international aid to DRR remained almost negligible with respect to the needs of naturally vulnerable countries like Tunisia. According to OCHA (United Nations Office for the Coordination of Humanitarian Affairs), support for DRR in Africa amounted to 3% of the total amount provided to humanitarian assistance, or 1% of the ODA .A significant investment in DRR will probably result in an improvement in the resilience of populations exposed to disaster risks and will result also in a consequent saving of the funds that go directly to humanitarian emergencies.

Through this section, we identified the nature of environmental risks in the MENA region in general and the Maghreb in particular. We found that the risks are significant, growing and can harm the growth and the well-being of populations. We have developed in this part the expected role of the public sector in the establishment of a coherent plan adapted to face identified threats. The action plan must be established at not only the regional and national, but also at local levels. The Hyogo Framework for Action seemed most appropriate to explain what is expected from the public sector from an international point of view. Especially when it takes place under the supervision of the World Bank and in coordination with other regional and international organizations. The example of Tunisia illustrates the gap between what is desired and what is feasible in a political and socio-cultural transition period that is taking place in the MENA countries. We have seen that despite the difficulties inherent to this transitional stage, Tunisia intends to make the adaptation to environmental risks a driver of its future strategy. Actions multiply, although still largely insufficient.

This action by the public authority should not hide the role of the private sector, which is essential. That is why we will analyze how the strategies of Multinational enterprises (MNEs) in Tunisia, take into account the ecological risks.

III-The consideration of ecological risk in the strategies of MNEs.

In addition to international organizations and policymakers, MNEs are major players on the global scene. An MNE may decide to adopt sustainable development strategies to respond to pressures from stakeholders, to gain a competitive advantage, or to satisfy ethical concerns. To adopt these strategies in competitive pressures, environmental, and social investment "Sustainable Development Innovation" (SDI) may be an appropriate strategy for these companies.

[12] Rapport national de suivi sur la mise en oeuvre du Cadre d'action de Hyogo (2011-2013.

As it has been shown in previous research, the establishment and management of SDI are extremely difficult for an MNE because they can cause its success and failure. In fact, employees often don't understand the benefit of the implementation of SDI projects, which could lead to resistance on their part, and therefore considerable complications within the multinational company (Ketata et al, 2014. Ketata and McIntyre, 2010; Climb et al 2009). The purpose of this exploratory section is to help understand the difficulty of managing the implementation of an SDI project by a multinational company operating in a developing country that still lives a political revolution and does not classify sustainable development at the top of its priorities. This section seeks to understand the environmental influence on the management of such projects.

To complete this objective, it is necessary to start by explaining the concept of SDI. Then, we will study the case of Air Liquide to focus on the contextual influence and management of SDI.

A- The concept of SDI and Multinational Enterprises:

Before explaining the concept of SDI, it is important to define the concept of sustainable development. As it was noted in previous research (e.g., Dixon and Fallon, 1989; Mebratu, 1998. Schiederig et al, 2012), the term sustainable development was provided by the Brundtland report under the commission of the United Nations, and it was defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs.

As it was mentioned by Ketata et al. (2014), the review of the literature related to SDI showed that there are several concepts used in relation to innovation for sustainable development. Schiederig et al. (2012) showed that green or eco-innovation concepts are widely used as synonyms while the concept of sustainable innovation extends to include the social dimension. They identified six aspects associated with the SDI which are shown in the following table:

Table 1: Criteria to define sustainable innovation

Aspects in different definitions	**Interpretations based on Schiederig, Tietze and Herstatt (2011)**
1. Innovation object: Product, process, service, method 2. Market orientation: Satisfy needs/ be competitive on the market	Almost all definitions studied agree on the first two aspects.
3. Environmental aspect: Reduce negative impact (optimum = zero impact)	All definitions believe that sustainable innovation "should reduce the negative impact".
4. Phase: Full life cycle must be considered (for material flow reduction)	This aspect appears only in two of the definitions by Kemp and Pearson (2007) and Reid and Miedzinski (2008). In these studies they call for an analysis based on the "full life cycle" and on the input and output involved in the whole process. The main goal is to reduce the consumption of resources.
5. Impulse: Intention for reduction may be economical or ecological 6. Level: Setting a new innovation/ green standard to the firm	For example different causes could explain the decrease in the consumption of resources for a new product. The authors believe that aspects 5 and 6 are "relative and have no absolute value".

Source : Ketata, I. Sofka, W. and Gimpe, S. (2014).

In this research, we follow Tseng et al. and Schiederig et al. (2012) and we adopt a broad definition of SDI because we believe that it should also include social aspects and the needs of future generations. In this

context, SDI can be seen as the ecological and social dimension of innovation activities. Our definition includes all types of innovation: product process, service or method.

B- Research Methodology:

The case study method is justified by a desire to deepen the understanding of the problem and possibly find some aspects, dimensions or variables that can not be seen or studied by statistical methods such as contextual specificities that characterize the management of SDI in a subsidiary of a multinational company. Thus, this research conducted by a qualitative method focuses on the case of Air Liquide in Tunisia. For the sake of triangulation, a diversification of information sources has been followed. According to Wacheux (1996), it is necessary to multiply the empirical evidence to allow triangulation. In this sense, three data sources are mobilized for this study: semi-structured interviews, passive observation and documentary analysis. An interview guide was addressed to the subsidiary Air Liquide in order to collect data. The guide was organized around two main themes. The first seeks to identify the subsidiary from its culture of innovation and some examples of innovation led by the company. The second theme is to determine the management of SDI in the subsidiary, including its method of communication and motivation and the impact of context on the company's management of SDI. The questions concerned the projects of innovation and the company's strategies and objectives.

The multiplication of interviews with the same company is a powerful form of data collection. Indeed, the reproduction of interviews facilitates mutual trust, triangulation, and the evolution and customization of the interview guide. This explains the reason for repeated interviews with the same company, which was conducted as part of this research. Because some previous studies (Ketata & McIntyres, 2010; Ketata and McIntyre, 2006) were interested on the headquarters, we chose to focus, in this study, on the Tunisian subsidiary to understand the impact of context on the management of SDI.

In addition, this research has used external sources to the organization (documents provided by specialized technical centers, Internet, etc...). This investigative work complements other collection devices provided (Yin, 1994) to clarify the direct contacts and to triangulate information.

Concerning the sample, the method of case study is not representative of a statistical population, but only the object and scope of the research. What was sought in this exploratory study is to understand the effect of context on the management of SDI. This is why this study focuses on the Air Liquide subsidiary in Tunisia.

C- The case of Air Liquide:

Air Liquide is an excellent example for the management of SDI. The company, which is multinational, specializes in the production and distribution of industrial and medical gases, and has several activities oriented to the preservation of the environment.

After focusing on the headquarter in a previous study, we focus in this research on Air Liquide Tunisia which serves 15,000 customers and offers products and services that meet the most demanding needs in industry and health.

Air Liquide has been operating in Tunisia since 1917. Today it uses two hundred people and has a turnover of 43 million dinars. The performance recorded recently in safety was rewarded by obtaining the special price of EIGA (http://www.tn.airliquide.com/).

For the analysis of the case of Air Liquide in Tunisia, we conducted an interview with Mr. Campa who took the time to explain the daily management of the company for sustainable development and the impact of the context on the SDI strategy.

3.1. Identification of the subsidiary Air Liquide through its daily strategy and examples of SDI projects conducted by the company:

In our analysis of the case of Air Liquide, we will focus initially on the daily strategy of managing the employees citing some examples of SDI projects that have taken place in the company. Then we will analyze the impact of the context on the management of the company. Adopting the corporate's culture, the subsidiary Air Liquide continues to promote innovation. In fact, the corporate culture encourages the subsidiaries to be innovative. Innovation in Air Liquide covers two aspects: an invention or research aspect and an innovation aspect that is often in contact with customers and their needs. Therefore, the role of the subsidiary is not limited to implementing the innovation of the MNE, but to be innovative itself in trying to establish innovative solutions.

The subsidiary has implemented several actions to help the employees build awareness about the concept of sustainable development. For example, it has established an electricity saving system, a water saving system and a draft mastery of paper used by the company. Two years ago, the subsidiary used 70 printers, but it recently installed network copiers that are shared by all employees and work as scanners and fax. This action allowed the company to reduce its consumption of printer cartridges. Employees are also encouraged to print two-sided documents to reduce the consumption of papers. In addition, the company has installed a motion detector on the stairs that lights up when there is a person who arrives and turns off automatically afterward. These kinds of daily strategies allow the company to avoid waste and save resources. The company uses these strategies to educate and train the employees to be more aware of the issue of sustainable development.

In addition, the subsidiary has established a management system to reduce water consumption. In the past, the company wasted large quantities of drinking water for the cooling system. This water was rejected in networks afterward, so it could not be drunk or reused later and could only serve to cool. The employees thought that the water must be collected and treated. Therefore, they set up water treatment facilities. In fact, the subsidiary has managed to develop a quite sophisticated system that reduced water consumption by four to ten percent.

Air Liquide has also established an action to encourage employees to renew their refrigerator by replacing them with more energy efficient models. However, as these models are expensive, the subsidiary has negotiated a collective purchase contract with a Tunisian distributor for the most efficient models in terms of energy consumption, choosing the newest refrigerator on the market. The subsidiary chose to cover a percentage of the purchase price of these refrigerators to encourage employees to renew their refrigerator. Since the refrigerator is a device that works day and night, it is considered the second largest electricity consumer at home after the heater. This action is supposed to reduce electricity consumption at home for all employees.

The subsidiary also organizes days of car pool where employees are encouraged to share their vehicle to get to work. Rather than coming to work on his/her own, each employee is encouraged to share his/ her car with two or three colleagues to save energy consumption and reduce emissions of carbon dioxide.

There is another project on which the subsidiary is currently working with the STEG (Société Tunisienne d'Electricité et Gaz). This is a project that the STEG wanted to launch and that already exists in other countries. In terms of electricity consumption, the STEG observed annual spikes, where the total amount of installed plants fails to follow. In such situations, all electricity suppliers or manufacturer wish to have partners who are willing to shut down their unit for an hour or two while this spike passes. This strategy allows the STEG to avoid a power outage without requiring it to invest in new equipment.

The interviewee also cited the example of the toilet taps. In fact, the subsidiary has installed taps with a presence detector so that the water does not run unless you put your hands under the taps and water stops flowing as soon as you remove your hands. Hand dryers were also installed to prevent the use of paper or tissue and to be more environmentally friendly.

The company has also launched vaccination campaigns. These campaigns help prevent epidemics and makes it more difficult for diseases to be transmitted. Therefore, the subsidiary provides free vaccination

to a certain number of staff. Initially, there was some kind of resistance from employees, but the company has overcome this problem by communication. The subsidiary worked on explaining the impact this action may have on the employees in particular and the civil society in general. In this regard the company has released a number of articles and has held several meetings.

The way the subsidiary communicates these innovations to the employees depends on the project itself. If this were a project that affects the employees' health, it would be demonstrated through the impact this kind of project may have on the employees. Otherwise, if it is a project connected to energy or other resources, it would be explained through the effects of this project on the subsidiary and the civil society in general. The newsletter also appears as a very important means of communication as it was mentioned in our previous research (Ketata & McIntyre, 2010). In fact, the newsletter appears monthly and includes a whole section on sustainable development.

This strategy of awareness that the company followed helped prepare the employees. The examples cited above show that sustainable development is part of Air Liquide's daily strategy. It affects the employees at all levels such as printing documents or using the restrooms. Such a strategy seems to have prepared employees for a greater implementation of projects such as the water treatment system or the project that Air Liquide led with the STEG. In fact, Mr. Campa confirmed that the subsidiary has not encountered major resistance or significant difficulty in the implementation of innovative projects related to the field of sustainable development.

D- Discussion and analysis of the impact of context on the SDI in Tunisia:

When we sought to understand the impact and influence of the media on employees, Mr. Campa explained: "Some of the employees are aware of the issue so they get committed, but unfortunately most of them listen, but I do not think their level of commitment is the same level that can be found in other countries." So the perception of SDI projects differs among employees with some employees less motivated to work on SDI projects than others. This can be explained by the country's culture, in which sustainable development does not appear at the top of people's priorities.

Mr. Campa considers that the level of understanding of the concept of sustainable development among the employees of Air Liquide Tunisia is significantly better than that of the employees in other companies in Tunisia. This can be explained by the continuous strategy of developing awareness that is pursued by the subsidiary. However, Mr. Campa considers that the employees' understanding is much less than those at Air Liquide France, the USA, or Canada where sustainable development is an important part of the culture and people's priorities.

He then explained that the concept of sustainable development is part of the MNE's strategy and priorities. The subsidiary pursued a strategy based on the communication of the concept of sustainable development, and the development of awareness at all levels. But as these actions are relatively recent, they are perceived as less important in Tunisia compared to the country's politics, revolution, labor union or other issues that are among the civil society priorities. The concept of sustainable development has a larger impact in other countries like France or Germany where it is a subject that is discussed daily in the newspapers.

To describe the environment post-revolution in Tunisia, the interviewee mentioned a lack of enforcement of the legal system. He talked about pollution, water shortages and electricity, and unauthorized building without a permit. These kinds of actions were observed during our repeated visits to Tunisia for the past two years. To explain this behavior after the revolution the interviewee mentioned that there was less control from the authorities and a lack of enforcement of the rules. Tunisians believed they were free to disregard the law after the revolution. There were those who were taking the wrong way while driving and those who were not stopping at red lights. "I would say that in terms of the environment and sustainable development, I fear that Tunisia has not progressed, but instead regressed since the revolution."

The revolution did not have a direct impact on the management of sustainable development at Air Liquide. The subsidiary continued to pursue its long-term strategy. The strategy of sustainable development in Air Liquide is a strategy that is at the heart of what the company does and was implemented a long time ago. "Even if the country is going in the wrong direction, Air Liquide must continue to have the same civic and responsible behavior to engage in the strategy of the MNE regardless of what's happening in the country."

IV- Conclusion, implications and limitations of the research:

Air Liquide has successfully put in place a number of projects, innovative actions and strategies in everyday life that helped educate and train the employees to understand the priority of the MNE focused on sustainable development. Daily strategies such as "carpooling", the installation of network printers, and lamps or taps with motion sensors serves as examples that can be easily adopted by other companies in Tunisia or elsewhere.

This study showed that the environment, in which the company operated, has not had a great influence on the overall business strategy. In fact, Mr. Campa made it clear that the subsidiary did not encounter difficulties or particular resistance from its employees during the implementation of SDI actions. Even the post revolution period did not have a direct impact on the group's strategy. Several questions may be raised at this level. Did the company follow the right strategy that allowed it to avoid the kinds of problems that seem to be quite common in other companies, or is the interviewee avoided talking about resistance to avoid giving a negative image about the company?

If we support the first hypothesis, it is likely that the daily strategy to educate, and build awareness among the employees about the concept of sustainable development has been successful. This confirms previous studies (Ketata & McIntyre, 2006, 2010) that suggested such daily strategies to preparing and educate the employees about the concept of sustainable development.

Despite the complexity of the post- revolution environment characterized by a huge instability and disorder, Air Liquide was able in some cases to cooperate with the government and public enterprises as it was shown in the example of treatment water treatment and in the example of the STEG cited in the case study. This kind of cooperation reflects the importance of the firm in the Tunisian society and the good relationship the company has with the government. Companies operating in Tunisia should give much importance towards networking, developing relationships, and especially to the influence of the government. In the case of Air Liquide, the relationship that the company has with the Tunisian government dates back a long time. Moreover, the subsidiary employs a large number of employees, which has a strong impact on the country's economy. This kind of relationship is highly recommended for businesses that want to operate in emerging countries such as Tunisia. Companies who want to have easy access to this kind of relationship and avoid going through the complication of the Tunisian business environment may choose to partner with a Tunisian company that knows how to overcome the difficulties related to the functioning of the Tunisian environment.

The STEC and water treatment examples show that the subsidiary is in the process of developing SDI projects and does not just follow the projects that come through headquarters. Moreover, encouraging local employees to take more initiative and be creative in the SDI project is the subsidiary's priority as mentioned in the interview by Mr. Campa. In fact, the implementation of SDI projects becomes easier when the employees themselves suggest these projects.

This research may be supplemented by the study of other subsidiaries operating in Tunisia to understand the impact of co-text on the management of SDI.

For general conclusions, all the countries of the MENA region in general and Tunisia in particular are at the heart of the issue of sustainable development. The prospects for economic growth must integrate social and environmental dimensions. Environmental risks are natural or due to human activities and economic actors have an incentive to avoid them or adapt to them. First, they will have to develop their ability to

limit the social cost for unavoidable scenarios, and then they must boost their efforts to adapt their behavior and work towards a less risky environment.

These attitudes toward resilience and/or increased adaptation are very important. The international community is looking for a definitive agreement in 2015 in Paris about GHG emissions (greenhouse gases). The Kyoto Protocol will be extended and strengthened. The divergence of "environmental" awareness between North and South will be bridged thanks to the establishment of an international fund filled by countries with historical responsibility for carbon dioxide emission. This fund of 75 billion dollars promised at the Warsaw Summit in November 2013, will fund the developing countries' efforts after 2020.

Tunisia is interested in being eligible to receive this international funding. Lack of environmental policies outlined in the second part could be overcome if the decision makers establish the necessary structures as recommended by international organizations, which will play a key role in determining the criteria for funding and over sighting the international efforts. The efforts of other actors, like companies and households, are required too. The development of this "environmental culture" is the responsibility of the most influential companies in terms of weight and impact. MNEs should not play on the divergence of environmental constraints to move their polluting units, but rather work for a wide dissemination of pro-environmental cultures for the well-being of mankind.

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