

## **DISASTER 'SOFT' AND 'HARD' LAWS: BUILDING RESILIENCE FOR DISPLACED PEOPLE IN THE MIDDLE EAST AND NORTH AFRICA (MENA) REGION**

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### **ABSTRACT**

Evidence from the 2015 Global Assessment Report on DRR recognises that 'most resources continue to be invested in strengthening capacities for disaster management, and there has been limited success in applying policies, norms, standards and regulations to manage and reduce risk across development sectors' (UNISDR 2015). With a memorable and enduring history of conflicts, civil unrests, and refugee crisis, the impact of climate change and disaster forced displacement, undermine the cities adaptive capacities to deal with protracted displacement. Nowhere else is this most pronounced than in the Middle East and North Africa (MENA). Recognising the urgent need to shift from managing disasters to managing risks, we argue that the accountability of the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030 as a non-binding 'soft law', has to build upon the human rights 'hard laws' for disaster displaced people to build resilience in the (MENA) Region.). With the aim to support this argument, the study adopts the 'Sustainability Assessment' method, by integrating the displaced people rights for property, access to land and security of tenure into the (SFDRR) Scorecard cities Resilience Assessment (Essential 04: Pursue Resilient Urban Development). The study outcomes suggest combining the use of qualitative and quantitative indicators to shift DRR from emergency response to sustainable development, and strengthen the ratification of displaced people 'hard laws' with the endorsement of the 2030 Sustainable Development Goals.

Keywords: disaster, displacement, law, resilience, sustainability

### **INTRODUCTION**

There have been various attempts in the year 2015 to address the challenges related to disaster risk losses, climate change and development. The Sendai Framework for Disaster Risk Reduction (SFDRR) was endorsed by the United Nations (UN) General Assembly, and adopted by 187 countries as a 15-year, voluntary, non-binding agreement with four priorities and global seven targets. This was followed with the adoption of the 2030 Agenda of the Sustainable Development Goals (SDGs) with 17 Goals and 169 targets, and the Paris Climate Change Agreement (COP21). All aiming at reducing the impact of climate change CO2 emissions, and reduce disaster losses 'leaving no one behind' (UNISDR, 2015).

On first sight, it might seem plausible to argue that effective monitoring of hazards and reporting to the 2015-2030 Global targets indicators, however the lack of practical mechanisms to building coherence between the global agendas and mobilising resources for reporting at the local level, overlooks the cities underlying drivers of disasters risk (urbanisation, poverty and weak governance).

With a population over 355 million, 60 million people live in (MENA) coastal areas presenting about 17 percent of the region's total population (World Bank, 2015). Accompanied with increased urbanisation rates in countries with endured history of conflict and civil unrest, the lack of adequate housing and functional infrastructure services, increase the level of cities exposure and vulnerability to natural hazards, mostly affecting the urban poor.

Exacerbated by climate change severe environmental conditions, pastoral livelihoods are highly affected by desertification, that may lead into tensions over access to natural resources. According to IOM (2016), there are over 16.2 million IDPs in Arab countries, which constitute nearly one third of all internally displaced people in the world. Standing out as having one of the highest levels of human mobility, the MENA prolonged history of armed conflicts and civil wars generated a more complex trend of forced migration. Nevertheless, 'climate change induced displacement remains unidentified. Findings from the 2017 Global report on internal displacement indicate that 'by the end of 2016, there were 40.3 million people internally displaced by conflict and violence across the world. An unknown number remain displaced as a result of disasters' (Internal Displacement Monitoring Centre, Norwegian Refugee Council 2017) (Eltinay and Egbu, 2017).

With respect to the protection of displaced people human rights, the challenges of landownership in informal settlements and displaced people emergency shelters upsurge, and weakens the institutional systems coping mechanisms with disaster displaced populations needs. Here, complex land customary rights dominate land tenure security, associated with the deprived dispute resolution systems and the lack of legal recognitions for disaster displaced people. As noted by Zimmermann (2011), progress in urban planning is 'mainly technology driven (e.g. the geo-industry) and too often not accompanied by progress in reforming land policies, improving the normative framework, involving civil society, and reengineering institutional processes' (Zimmermann, 2011).

Hence, the key questions in this study are: How can the complimentary integration of human rights 'hard laws' support the enforcement of Disaster Risk Reduction 'soft laws' to protect disaster displaced people land and property rights in the MENA Region? With understanding that 'hard-law instruments allow states to commit themselves more credibly to international agreements' (Shaffer and Pollack, 2009), the Guiding Principles on Internal Displacement will be explored to develop operational mechanisms for reporting to the Sendai Framework for Disaster risk reduction (SFDRR), and take actionable measures to strengthen the legally binding nature and obligations of disaster risk reduction laws in pre-and-post disaster settings

Taking Climate Change adaptability as an opportunity, this could be 'the impetus needed to finally improve infrastructure...not only to reduce vulnerability, but also to contribute to greater long-term development' (Verner D, 2012). Accordingly, in this study will use the SFDRR Disaster Resilience Scorecard indicators for cities to assess the long-term impact on climate change adaptation in protecting displaced people rights, targeting five main challenges (Information generation and structuring, the interpretation of data collected, the social learning and operationalisation of indicators generated indexes demonstration of accountability and Identification of knowledge and data gaps) (Wass et al, 2014). The integration of human rights, disaster laws, urban politics and urban governance will be maintained in this study, to support the understanding of the methodological approaches to measure resilience in cities and building coherence mechanisms for reporting to the national governments, and support achieving the 2015-2030 Sustainable Development Goals at the local, national and regional levels.

## Method

This paper is part of an ongoing PhD, that aims to develop an Urban Resilience toolkit to support the implementation of SFDRR in the Middle East and North Africa (MENA) Region. To develop and validate the elements of this toolkit with a robust methodology, the method applied in this study integrates the sustainable development goals as a decision-making strategy, into the use of the SFDRR New Scorecard Ten Essentials for measuring city resilience (Waas et al, 2014). In an attempt to unravel the objectivist ontology of the 2015-2030 quantitative indicators ability to assess cities in crisis resilience, and help local governments in monitoring disaster resilience, this study suggests a shift towards measuring the qualitative variables of vulnerability, and better understand the needs of displaced people to prepare, respond and recover from disasters and build resilience.

Starting with a review of the MENA Region metrological hazards and underlying risks for disasters, a critical literature review of the region DRR complexity will apply in the nexus of urbanisation, poverty and displacement. Addressing the gaps in disaster law administration, this study will include data from secondary resources, refereed journals, the World Bank and UN policy reports, to undertake an inductive theoretical perspective towards filling the gaps in addressing the rights of disaster displaced people in pre-and-post disaster.

Using (Wass et al) 'Sustainability Assessment' set of five purposive challenges (information structuring – operationalisation – accountability - data gaps), the paper prioritizes investigating the integration of disaster displaced people rights (Land-use planning - Land Tenure security – Property Rights) into the (SFDRR) New Scorecard (Essential 04: Pursue Resilient Urban Development) indicators (Wass et al, 2011). Here the definitions and terminologies of taxonomies are considered to analyse the characteristics and normative nature of disaster displacement, and understand how risk-aware urban planning, design and implementation for sustainable development is essential for 'addressing the needs of informal settlements including basic infrastructure deficits such as water, drainage and sanitation' (UNISDR, 2017). The paper concludes with identifying the strengths and weaknesses in the quantitative methods applied for reporting to the SFDRR Scorecard for building resilience, highlighting future challenges and setting up recommendations for integrating qualitative bottom-up approaches to understand the human perspective of disaster vulnerability, the interpretation of 'sustainability' challenges into DRR in the built environment is explored to understand its impact on displaced people rights enforcement for achieving the 2030 agenda.

## Context

### The Underlying Risks of Disaster Risk Management in the MENA Region

The 2016 World Bank Development Indicators reported an increase in MENA population up to 436,720 million (World Bank, 2017). In 1980, the urban areas of MENA region accounted for 48% of the total population, and by 2000 this had accelerated to 60%. With an estimation of rapid increase over the past 10 years, the UN 2020 projections expects the rise of MENA population to '430 million, of which 280 million are expected to be urban' (World Bank, 2008). In the context of the MENA Region, 'it is difficult to generalise urbanization trends because the region comprises a great diversity of socio-economic, human, natural resources and characteristics' between the different sub regions of Mashreq, Maghreb, Southern states and Arabian Peninsula. (Madbouly, 2009), as evidence from the 2017 Arab Cities Resilience to disaster and climate risks indicates that urbanisation rates differ between sub regions, with a norm of urbanisation increasing in countries with smaller populations, in compare to countries with larger populations such as Egypt, Iraq and Syria. (UNDP, 2017). It is worth noting that the sub regions referred to here are taking into accountability the Arab Region, not the entire MENA Region.

## Decentralisation and Urban Governance

As urban governance of land tenure includes 'traditional practices for making decisions on land transactions, inheritance, resettlement and the resolution of land disputes'(Mitchell, 2011). Decentralisation in the MENA region is confined to the political devolution of authority of central agencies at the local level, causing an increase in the autonomy of local governments in planning and decision-making, with limited accountability of monitoring and enforcing of Land use and policies, and lack of resources for urban services management and critical infrastructure delivery (World Bank, 2008). As stated by Madbouly M. (2005) 'the limited fiscal transfers and human resources at hand, and the limited financial and political autonomy severely impede local government capacity to finance, deliver and manage urban services'(Cited in Madbouly, 2009).

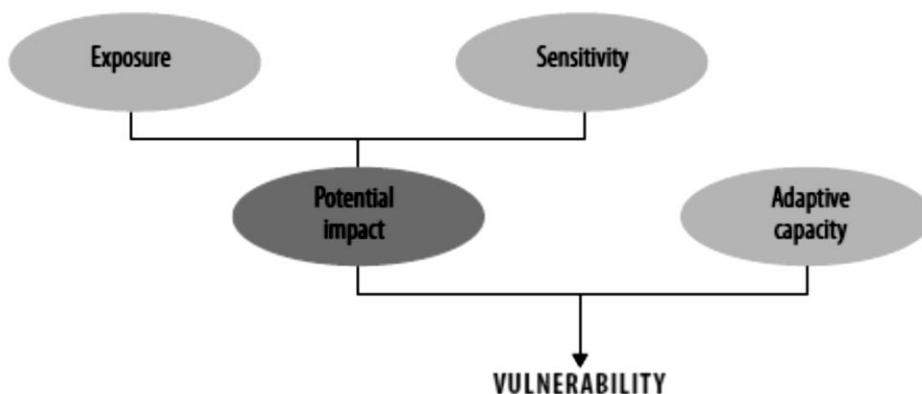
With the lack of transparency, the growing demands for infrastructure and affordable housing, the high cost of land in formal sector, and poor public land management all derived the proliferation of slums and informal settlements. 'In the Arab region, the proportion of sub-standard housing varies from country to country. In some countries, informal settlement and slum dwellings form isolated, marginalized pockets. While in others, 67 to 94% of urban residents live under one form or more of housing deprivations. In some Gulf countries, for instance, housing conditions of low-income migrant workers are often very poor compared to the rest of the urban population'(UN-Habitat (2012).

## Disaster Risk vulnerability and building resilience

Disasters result from a combination of hazards with their respective to vulnerability. Vulnerability is defined by the United Nations International Strategy for Disaster Risk Reduction (UNISDR) - Open-Ended Intergovernmental Expert Working Group on the update of the 2009 UNISDR Terminology as 'the conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards'. Shaped by the type of hazards and degree of exposure, limited access to land and property rights for the urban poor pre-disaster increases the level of vulnerability to natural hazards post-disaster, causing the loss of human rights and economic assets (UNISDR, 2016). In relation to climate change, the Organisation for Economic Co-operation and Development's Development Assistance Committee (OECD-DAC) defines climate change adaptation projects as those that "reduce the vulnerability of human or natural systems to the impacts of climate change and climate-related risks, by maintaining or increasing adaptive capacity and resilience' as outlined in (Fig 1) below defining vulnerability as a function of exposure, sensitivity and adaptive or coping capacity Cited in (Verner D, 2012).

Figure 1: Conceptual Framework for Defining Vulnerability. Adaptation to a Changing Climate in the Arab Countries: A Case for Adaptation Governance and Leadership in Building Climate Resilience. Mena Development Report. World Bank

### Conceptual Framework for Defining Vulnerability

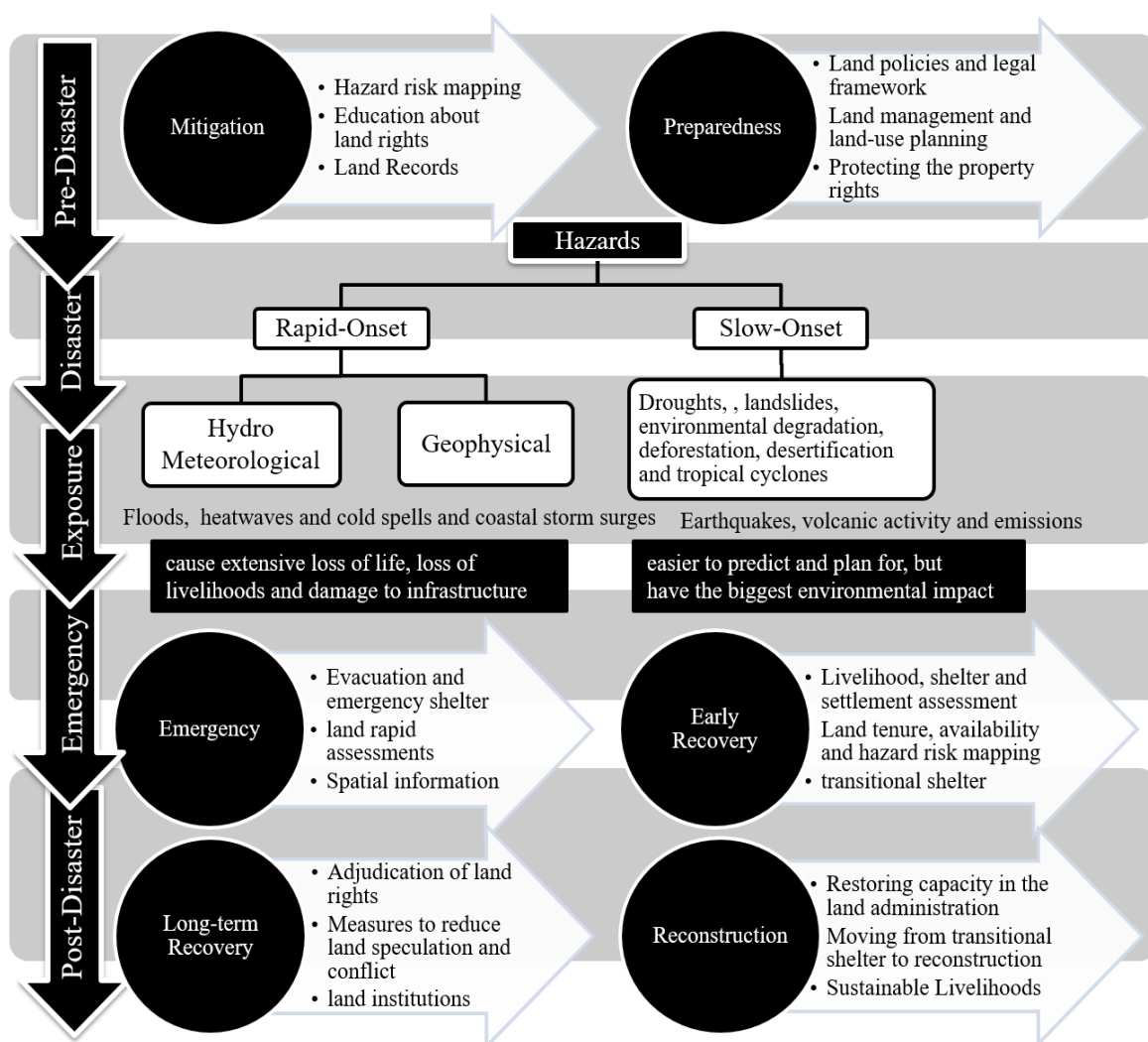


Source: IPCC 2001 (as presented in Fay, Block, and Ebinger 2010).

Defined as ‘the ability of a system, community or society exposed to hazards to resist, absorb, accommodate to and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions’ (UNISDR, 2016), building resilience for disaster displaced people rights in the stages of Preparedness, Early Recovery and Long-term Recovery is essential, with emphasis on land policies, land-use management as fundamentals to protect human rights to insure legal access to shelter and land pre-and-post disaster.

In the situation of protracted conflict and disaster forced displacement, the absence of rules and principles of humanitarian assistance may lead into focus on emergency response, and ignore the long-term demand for land tenure and property rights for displaced people. At the stages of early-recovery, the transition in DRR from emergency to reconstruction is associated with short term decisions on urgent assessment needs by first responders’, yet long-term plans for adjudication of land-rights, and reduce disaster displaced people land speculation and conflict remain overlooked. The conceptual framework (Fig 2) below outlines the relationship between hazard types, time-scale, types and the capacity of cities to build resilience in pre-and-post disaster management stages (USAID, 2011).

Figure (2): The relationship between hazard types, time-scale and the capacity of cities to build resilience in pre-and-post disaster (land-tenure) management stages





For city resilience assessments in the MENA, It is useful to consider the social structure and demographic profile of the inhabitants of Informal settlements, as this data plays a vital role in measuring the vulnerability and exposure of disaster displaced people pre- and post-disaster setting, while understanding the legislations and rights for land tenure at the local context. Defined by the Food and Agriculture Organization (FAO) Land tenure is 'the legal or customary relationship among people with respect to land and associated natural resources such as water, trees, minerals or wildlife'. Ruling how property rights are allocated and access to resources is regulated, land tenure normalises the relationship between people and land in the event of disasters, and provide the power structures for managing resources within a society (Mitchell, 2011).

As indicted by Adoko and Levine (2004) when 'displacement continues on beyond a short-term period, it is necessary to create measures to protect the people's rights to their land so that they have a level of security while waiting for restitution in the internally displaced people (IDPs) camps' (Cited in Mitchell, 2011). An overview of the international conventions for people who lose access and rights to land following a disaster will apply in the context of IDPs. 'The lack of secure property rights severely hinders the displaced people's ability to use land and real estate as collateral to access finance' for long term recovery and livelihoods development (Madbouly, 2009).

Bearing in mind the previous point, the MENA region is highly exposed to extreme weather events with variations in intensity and frequency, causing challenges in preparedness for and response to rapid and slow-onset disasters. The North Atlantic Oscillation (NAO) cause rapid flash floods and storm attacks with annual variations in rainfall in Western and Central North Africa (the Maghreb), and most of the Mashreq and the Arabian Peninsula. While for the MENA southern parts, the Inter-Tropical Convergence Zone (ITCZ) dominates causing the Indian monsoon system (Donat, M. G., et al. 2014). Slow-onset seismic activities are also hazardous in the region. For example, the Jordan rift valley system places a number of countries (Jordan, Lebanon, Palestine and Syria) at high risk from earthquakes. Similarly, some countries in the Maghreb region (Algeria, Morocco and Tunisia) have been exposed to seismic activity in the past, with devastating earthquakes that have occurred in Palestine (1927), Lebanon (1956), Morocco (1960), Egypt (1992) and Algeria (2003) (UNISDR, 2013).

### **International conventions for Disaster displaced people: Risk management and urban planning**

Evidence from previous literature indicates that 'a sizable gap between investments in disaster resilience and conventional crisis response spending. According to some estimates for every \$100 spent in development aid, just 40 cents has been invested in reducing the impact of disasters. At the same time, disaster losses in developing nations amount to \$862 billion (a considerably under-estimate) – equivalent in value to one-third of all international development aid' (IOM, 2012). The Guiding Principles on Internal Displacement- Principle 6 -Section 1 indicate that 'Every human being shall have the right to be protected against being arbitrarily displaced from his or her home or place of habitual residence' (UNHRC, 1998). Nevertheless, the lack of legal documents and ownership of land for displaced people cause the difficulty to apply the rule of 'his or her home or place'. This applies to Principle 21 which states that 'property and possessions left behind by internally displaced persons shall be protected against destruction and arbitrary and illegal appropriation, occupation or use'.

The contradiction between human rights 'hard laws' and Disaster Risk Reduction 'soft laws', requires developing the guiding principles of integration. Examining this contradiction between the two as alternatives, complements and antagonists, Shaffer G. and Pollack M. (2009) define hard law as 'legally binding obligations that are precise and that delegate authority for interpreting and implementing the law', while 'soft law is defined as the realm of 'soft' begins once legal arrangements are weakened along one or more of the dimensions of obligation, precision, and delegation'. On the other hand, Ferris, E. (2014) indicates that regional instruments such as the Kampala Convention (2009 African Union Convention on

Protection and Assistance of Internally Displaced Persons in Africa) offers an exciting entry point to ‘recognizing state obligations to protect and assist those displaced by disasters, yet much more needs to be done particularly at the national level, to ensure that national laws and policies on disaster management (prevention, response, and recovery) incorporate a human rights perspective’.

Considering the argument above, this study supports the need for taking action to incorporate human rights ‘hard law’ into disaster risk reduction soft law’ at the local level, taking into consideration the 1948 United Nations Universal Declaration of Human Rights, which shed the light on the right of the people affected by a disasters not to be arbitrarily deprived of their property (Article 17). This focuses on the city institutional governance, and role of national governments in providing the rights for displaced people according to the (Pinheiro Principles) ‘displaced people have the right to return to their lands when the emergency response is completed. Each person should have rights to land that are at least as good as the situation prior to the disaster. Principles 28-30 of the UN Guiding Principles on Internal Displacement state that ‘competent authorities’ have the responsibility to assist displaced persons to recover their property or, where this is not possible, to assist these people in gaining appropriate compensation or just reparation. The land policy framework should be consistent with these principles’ (Mitchell, 2011).

### **Sendai Framework for Disaster Risk Reduction– Enforce Natural Disaster Displacement Right**

As the successor instrument to the Hyogo Framework for Action (HFA) 2005-2015: Building the Resilience of Nations and Communities to Disasters, the study focuses on learning lessons from HFA, and the need for developing a strong method to best utilise the 2017 SFDRR New Scorecard Ten Essentials, taking into account that the 2005-2015 Hyogo Framework for Action (HFA) monitoring mechanism focused on reporting data losses from large scale intensive disaster, and overlooked the underlying risks of mortality, physical damage and economic losses from small scale extensive disasters. In relation to displaced people property rights, access to land and security of tenure, a detailed assessment of ‘Essential 04: Pursue Resilient Urban Development’ will apply to analyse the level of integration of human rights into disaster laws, and assess cities resilience policies and plans towards inclusion the implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030. This study offers main contribution to building coherence between ‘soft laws’ the 2015-2030 Sendai Framework for Disaster Risk Reduction (SFDRR) and ‘hard laws’ identifying the challenges to and priorities for disaster displaced population rights beyond temporary food and shelter, and achieving the 2030 global targets at the MENA Region local level.

### **Disaster Resilience Scorecard for Cities New Ten Essentials: MENA Region**

The Disaster Resilience Scorecard for Cities New Ten Essentials is a set of measures, developed in 2017 by the United Nations Office for Disaster Risk Reduction (UNISDR), with the support of USAID, European Commission, IBM and AECOM. Structured around the Hyogo Framework for Action (HAF) 2010 campaign “Ten Essentials for Making Cities Resilient”, the NEW essentials are now updated to support implementation of the Sendai Framework for Disaster Risk Reduction: 2015-2030 at the cities local level.

Classified under three main themes, the first three essentials target the assessment of city governance and financial capacity. This is followed with essentials four to eight with focus on integrated planning for disaster management and preparation. The last two essentials assess the city disaster response and recovery processes for ‘building back better’ (UNISDR, 2017). Aimed at assisting countries and local governments in monitoring and reviewing progress and challenges in the implementation of the SFDRR, the New Ten Essentials provide two levels of preliminary and detailed assessments. While both levels suggest responding to key questions in a multi-stakeholder exercise, the detailed assessment includes 117 quantitative indicators, that can set up the basis for a detailed city resilience action plan. Considering that the Scorecard indicators are developing based on a “scientifically rigorous” top down methodology, it is difficult to justify the inclusion of citizen based participatory approach in city planning.

In Table (1) below, the shared principles for Essential 4 indicators ‘Pursue Resilient Urban Development’ will be investigated, against the integration of the elements (Displacement - Informal Settlements - Land-use planning - land Tenure security – Property Rights). Using Sustainability Assessment approach, the evaluation of Essential 4 Indicators is applied using (Waas et al, 2014) ‘Sustainability Indicators’ method, to address the long-term sustainable development ‘needs of the most vulnerable people and ‘taking into consideration of how low-income groups can access suitable land’ (UNISDR, 2017).

From a theoretical perspective, the definitions of the evaluation terminologies are clarified, considering the selection criteria and the indicators assessment method applied. Land use planning stands for the ‘The process undertaken by public authorities to identify, evaluate and decide on different options for the use of land, including consideration of long-term economic, social and environmental objectives and the implications for different communities and interest groups, and the subsequent formulation and promulgation of plans that describe the permitted or acceptable uses’ (Mitchell, 2011).

Considering that the definition of ‘Informal settlements’ varies considerably from ‘Slums’, (Madbouly, 2009) states ‘Informal’ as ‘the housing stock which is not in compliance with current regulations’, where ‘Slums’ refer to ‘deteriorated living conditions and low levels of access to basic services’. The Food and Agriculture Organization (FAO) guidance is used for defining ‘Land Tenure security’ and ‘Property Rights’. For the former, three definitions are outlined, yet alignment with disasters situation consider ‘the certainty that an individual’s rights to land will be recognized by others and protected in cases of specific challenges’, while the latter is defined as ‘recognized interests in land or property vested in an individual or group’ including ‘customary, statutory or informal social practices which enjoy social legitimacy at a given time and place’ (Mitchell, 2011). Accordingly, the selection of the terminologies above is framed according to the ‘Sustainability Indicators’ evaluation which sets five purposive challenges for ‘the decision-making strategy in sustainable development’. The first challenge is ‘information structuring’, where socio-economic vulnerability of ‘Informal Settlements’ is difficult to measure, verify and communicate to meaningful information for the decision-making process. The second challenge is the operationalisation of the indicators, where Land-use Planning’ pulls ‘the discussion of sustainable development away from disaster emergency response abstract formulations’ (Waas et al, 2014). Changing the mindset of decision-makers is a priority for challenge three to ratify displaced people rights for ‘Land Tenue Security’. Challenge four demonstrate the accountability to ‘Property rights’, and paves the ground for the fifth challenge of data gaps in disaster losses.

Table 1: Sustainability Assessment for Essential 4 indicators ‘Pursue Resilient Urban Development’

<b>Essential 04: Pursue Resilient Urban Development</b>			
<b>Evaluation: Land-use planning - Land Tenure security – Property Rights</b>			
Indicators	Question / assessment area	Considerations	Evaluation
Land use zoning	Is the city appropriately zoned considering, for example, the impact from key risk scenarios on economic activity, agricultural production, and population centers?	Displacement for 3 months or longer as a consequence of housing being destroyed or rendered uninhabitable, or the area in which it is located being rendered uninhabitable.  This assessment also needs to cover informal and unplanned settlements.	Land-use planning
New urban development	Are approaches promoted through the design and development of new urban development to promote resilience?	Is there policy promoting physical measures in new development that can enhance resilience to one or multiple hazards. For example, appropriate locations for new development, water sensitive urban design, proper integration of disaster refuge areas, proper access and egress routes	Land-use planning



Building codes and standards	Do building codes or standards exist, and do they address specific known hazards and risks for the city? Are these standards regularly updated?	Standards will include those for the supply of basic infrastructure services to informal settlements, without which the ability of those settlements to recover from disasters will be severely compromised.	land Tenure security
Application of zoning, building codes and standards	Are zoning rules, building codes and standards widely applied, properly enforced and verified?	Cities with informal settlements are unlikely to score highly on this assessment, unless the occupants of those settlements have been engaged and helped in making themselves more resilient.	Property Rights

## Conclusions

Moving forward from disaster management to disaster risk reduction, the question of risk transfer shall be investigated with the integration of sustainability assessments into the decision-making process. This will allow the rights of disaster induced displaced people in pre-and post-disaster to be protected. Taking into account the complexity of climate change, conflict and displacement nexus in the Middle East and North Africa (MENA) Region, improving the decentralization of urban planning strategies and services delivery will help 'improving the overall regulatory environment for urban and housing development' (Madbouly, 2009). On the other hand, the monitoring progress against the 2015-2030 global indicators will help raise awareness and understanding of existing challenges and opportunities, while developing a culture of social learning, as argued by Pintér et al, 'the way society measures progress represents a key leverage point in tackling the root causes of unsustainable development' (Cited in Wass at al, 2014).

Ratifying internationally signed agreement and 'hard laws' will help secure land and property rights for displaced people. Nevertheless, the role of 'soft laws' and legal frameworks for disaster risk reduction should not be ignored. According to the UK Government office for Science report, 'at the international level, the governance systems for climate change, for migration and for displacement are characterised by overlapping legal agreements; distinct fora within which they are discussed; participation by different sets of institutions; rules that can overlap because there is no agreed hierarchy for resolving conflicts; and disaggregated decision making, with agreements made in one forum not necessarily extending to others. This can lead to fragmentation and incoherence. Yet there are also potential advantages, related to flexibility and adaptability' (Migration and Global Environmental Change Future Challenges and Opportunities, 2011). An important contribution to the study is applying the 'Sustainability Assessment' principles to the SFDRR Disaster Resilience Scorecard Indicators – Essential 4: Pursue Resilient Urban Development. This approach demonstrated that the indicators covers the potential variables required to address sustainability challenges: data structuring (Informal Settlements), opretaionalisation (Land-use planning), accountability (Land Tenure security), interpretation (Property Rights) and gaps in disaster data losses (Displacement).

A further study worthy consideration is the integration of qualitative methods to measure human experiences, and create opportunity of citizen engagement and ownership of sustainability practices. This is to consider that data generated from both quantitative and qualitative methods will present indexes in numerical manners and remain as 'reductionist tools'. Thus, the environmental, social and economic complexities of disaster risk hazards, exposure and vulnerability cannot only be captured with indicators, and wider interpretation of sustainability in the decision-making process in essential for building resilience.

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