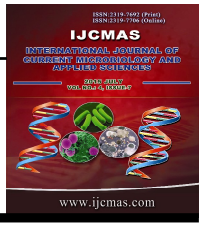
Int.J.Curr.Microbiol.App.Sci (2015) 4(7): 862-871

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 4 Number 7 (2015) pp. 862-871**
http://www.ijcmas.com



Review Article

Analysis of Environmental Health linkages in the EIA process in Jordan

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Keywords

Environmental Impact Assessment, Environment-Health linkage, Jordan

A B S T R A C T

Environmental Impact Assessment (EIA) is an environmental management tool aiming at identifying environmental problems and providing solutions to prevent or mitigate these problems to the acceptable levels and contribute to achieving sustainable development. EIA was first introduced in Jordan in 1995 as stipulated under the 1995 Environment Law. The EIA process was further strengthened and institutionalized under the Environmental Protection Law 2003 and 2006 which became operational under EIA Regulations No. 37 of 2005. This paper assesses the inclusion of health as a component in environmental impact assessment process in Jordan. It also identifies opportunities for strengthening Environmental Health Linkages in this process. The approach focused on an evaluation of the EIA system in the country based on an in depth analysis and review of 25 EIA reports representing different projects in various sectors as well as interviews with EIA approval authorities, consulting firms and experts. Results showed that Environmental Health linkages was not identified and considered explicitly within EIA process or have been shown to be limited. They were, however, included indirectly in the identification of traditional public health exposures associated with the physical environment and to a lesser extent the inclusion of social and economic impacts. The analysis revealed also that there is a sound legal basis and comprehensive guidelines, suggests that EIA has evolved satisfactorily in Jordan, but however there are still constraints to integrating health and identify linkages with "environment" explicitly in EIA process. Raising decision-maker and stakeholder awareness about environment and health linkages would help in overcoming such constraints. Identification environmental health linkages in the EIA studies would add value to the EIA process in the country as an explicit part of standard environmental, social and economic considerations.

Introduction

There is a growing appreciation of the linkages between environmental conditions and human health. Reports have shown that up to one quarter of the global burden of disease may be associated with environmental factors (Franssen *et al*., 2002; WHO/UNEP, 2004; Noble and Bronson, 2006). The link between environment and

health is complex and multidirectional. Environment can be seen in both a negative and positive senses; as a source of threats or hazards to human health as well as a source providing food, water and oxygen, and a range of other ecological functions and services that help sustain our lives.

Degradation of environmental resources and conditions in turn has consequences for human health. This may include respiratory diseases from poor housing; diarrheal diseases from poor water supply and sanitation; respiratory disease due to air pollution from transport, energy, and industry; contamination of the food chain from air and water pollution and poor storage of food; accidents; and injuries, illness, and deaths from extreme weather events, climate change and ozone depletion.

25-33% of the global burden of disease can be attributed to environmental risk factors (Smith *et al.,* 1999). Children under 5 years of age seem to bear the largest environmental burden, and the portion of disease due to environmental risks seems to decrease with economic development (Smith *et al.,* 1999; WHO, 1997). A summary of these estimates first appeared in the 1997 report, "Health and Environment in Sustainable Development," which was the World Health Organization's contribution to the 5-year anniversary of the Rio Earth Summit.

In a first attempt to assess the overall impact of the environment on child health in the WHO European Region: 100 000 deaths and 6 million years of healthy life lost (or DALYs[1]) ever year, in children and adolescents from birth to 19 years of age, are caused by outdoor and indoor air pollution, unsafe water, lead and injuries. This accounts for 34% of deaths from all causes and 25% of DALYs from all causes in this age group :(WHO, 2004). The need to avoid adverse impacts and to ensure long-term benefits led to the concept of "sustainability". This has become accepted as an essential feature of development if the aim of increased well-being and greater equity in fulfilling basic needs is to be met for this and future generations (WHO, 1997; Haines and Cassels, 2004). Therefore, and in order to predict environmental impacts of any development activity and to provide an opportunity to mitigate against negative impacts and enhance positive impacts, the environmental impact assessment (EIA) procedure was developed.

In 1982, the World Health Assembly adopted a resolution which recommended that "environmental health and health impact studies" should be carried out and developed prior to the implementation of all major economic development projects,(WHO, 1987). One of the main purposed for such resolution was to strengthen health and safety considerations in EIA. The inclusion of health impacts in development assessment is receiving increased attention from EIA and health practitioners as well as international organizations including World Health Organizations (WHO) and United Nations environment Program (UNEP), (WHO, 1997; Banken ,1999; Noble and Bronson, 2006; Harris *et al.,* 2007c).

Environmental Health Linkages: the International Efforts

Although there are several relevant international environmental and health policy initiatives (e.g. The European Charter

[1] (Disability-adjusted life years (DALYs) are a comprehensive measure of health effects. For a given cause, DALYs are calculated to include both years of life lived with disability and years of life lost (deaths).

on Environment and Health, 1990) that have been adopted during the last 20 years, a few of them have discussed the role of health in EA (Davies and Sadler, 1997; Banken, 1999). However, considerable work in this area has been done recently by the WHO and United Nations Environment Program (UNEP). They jointly launched the Health and Environment Linkages Initiative (HELI) at the 2002 World Summit on Sustainable Development (WSSD), (WHO/UNEP, 2004).

HELI is a global effort to promote and facilitate action in developing countries to reduce environmental threats to human health, in support of sustainable development objectives. HELI supports a more coherent approach to valuing the services that ecosystems provide to human health as part of decision-making processes. In other words it identifies ways of integrating environment and health considerations into decision-making. According to HELI, environmental hazards are responsible for an estimated 25% of the total burden of disease worldwide, and nearly 35% in regions such as sub-Saharan Africa.

HELI encourages countries to address health and environment linkages as integral to economic development and supports valuation of ecosystem 'services' to human health and well-being, these services ranging from climate regulation to provision/replenishment of air, water, food and energy sources, and generally healthy living and working environments.

Environmental Impact Assessment (EIA)

Environmental impact assessment (EIA) is one method of safeguarding the environment from adverse impacts of development projects. An EIA can be defined as: "a process or set of activities designed to contribute pertinent environmental information to project or program decision-making. In doing so, it attempts to predict or measure the environmental effects of specific human activities or do both, and to investigate and propose means of ameliorating those effects." (Beanlands and Duinker 1983). World Bank (1991) has defined EIA as: “an instrument to identify and assess the potential environmental impacts of a proposed project, evaluate alternatives, and design appropriate mitigation, management, and monitoring measures”.

The EIA process formally emerged in the 1960s (Petts, 1999a), and currently there are many countries that are applying this assessment and management tool. EIAs are supposed to take into account impacts on a range of variables such as biodiversity, population, fauna, flora, soil, water, air, climatic factors, material assets, cultural, architectural and archaeological heritage, landscape and human health (El-Fadl and El Fadel, 2004). An EIA provides information that can be used by decision makers to determine whether or not a development or project conforms with statutory national and international requirements or is simply perceived as being environmentally acceptable.

The Environmental Impact Assessment (EIA) procedure is a management and planning tool designed to assist in the identification of the best development options, allowing for responsible consideration of the environment. Objectives of the EIA procedure can be summarized as:

- To examine development options available and select the most appropriate;
- To identify and predict the significance of any adverse environmental impact;

- To identify and incorporate into the project appropriate mitigation measures;
- To determine effective monitoring programs of compliance and environmental impact;
- To reveal positive and negative effects of the project that could have a significant impact on the environment, natural resources and society.

At international level, conventions place specific environmental impact management requirements and obligations on the parties (signatories) in complying with the aims and objectives of these conventions (Table 1).

EIA in Jordan

The Environment Protection Law No. 12 of 1995 (Article 15) was the first legal basis that introduced the EIA procedure in the country. Currently, EIA is being implemented through regulation No. 37/2006 and its five annexes, which were enacted in response to Environment Protection Law No.1 of 2003 and subsequently to law No. 52 of 2006. This regulation empowered the Ministry of Environment to develop procedures and measures for EIA. According to the same regulation, the ministry is responsible for administering the EIA system (to arrange for screening, control and follow up on the EIA process and its implementation), and for coordinating the licensing of development activities. Early EIA studies (prior 2003) were conducted on an ad hoc basis, primarily under the requirements of international donor agencies, and there were no guidelines, regulations and standards governing the EIA process. This situation was reversed with the enactment of subsequent environmental laws and there was a remarkable progress since 2003 in order to institutionalize the EIA system in Jordan and since then, Ministry of Environment in Jordan processes in average 1000 applications for screening and 15-20 EIA reports annually. The EIA procedure in Jordan (Table 3) is similar to the standard procedure usually followed in many other countries, where it routinely starts with screening and ending with the approval of the EIA study.

Health and EIA

Health is defined by WHO in 1947 as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity", (Saracci, 1997). Perspectives on and knowledge about health have improved during the last 25 years, it is now generally accepted that health is much more than the absence of disease and includes social and psychological well-being, as well as the capacity to respond to the changing circumstances and conditions of life. Interactions between environmental conditions and health impacts are characterized by multiple pathways of cause and effect. Environmental hazards and related illnesses kill millions globally every year, (Fig. 1), (WHO/UNEP 2004).

Much of the environmental disease burden is attributable to a few key risks. Those include unsafe water and sanitation, vector-borne disease, indoor smoke from solid fuels, toxic hazards and global environmental change as well as unsustainable patterns of development that contribute to air pollution, traffic injury and other forms of urban environmental degradation, (WHO, 2002; WHO/UNEP 2004). Over the last 25 years, environmental assessment (EA) has evolved into an institutionalized process for identifying, assessing and mitigating the potential environmental effects of development projects and for informing decision makers. Since the 1970s, the scope of EA has broadened considerably to include

related health and other social considerations. Often, however, health aspects are inconsistently or partly addressed in EA processes and the need for a more systematic approach has been well documented (e.g., Martin, 1986; Giroult, 1988; Ewan *et al.*, 1993).

Health in the EIA context is defined as a status of general physical, mental and social well-being and not merely a long lifetime or the absence of a disease or infirmity (WHO, 1992). The interest in integration health aspects into EIA is attributed to several reasons (Kemm, 2000; Steinemann, 2000; McCaig, 2005). EIAs potentially cover a wide range of negative and positive health impacts (Davies and Sadler, 1997; Bhatia and Wernham, 2008) and it is a regulatory requirement and provides a potentially powerful mechanism for addressing environmental/social/health impacts (Davies and Sadler, 1997; Harris *et al.*, 2007b; Bhatia and Wernham, 2008; Harris *et al.*, 2009).

Materials and Methods

Although EIA has evolved into a widely-used process for assessing the adverse environmental effects of development projects in many countries, recent as well as earlier studies identified health impact assessment as area that are insufficiently considered or inadequately treated in EIA (e.g. (Harris *et al*, 2009Franssen *et al.*, 2002, International Study of the Effectiveness of Environmental Assessment, 1996). It has been estimated that between 90 and 95% of all EAs lack appropriate health and safety assessments and do not involve health expertise (Steinemann, 2000).

The purpose of this paper is to examine and review the linkages between health and environment i.e. the inclusion of health as a component in environmental impact assessment process in Jordan. It also identifies and discusses opportunities for strengthening Environmental Health Linkages in this process. The present paper represents the first attempt to study and review the content of EIA reports in Jordan with regard to their comprehensive coverage of health and environment linkages. A mixed method was used to accomplish the present work. First, an in depth qualitative descriptive analysis and review of 25 EIA reports representing different projects and developments in various sectors (e.g. tourist projects and facilities, cement factories, road construction, mining projects, coastal development, fertilizer plants and other industrial facilities) was undertaken. The aim of this step is to evaluate the existing EIA system in Jordan, in addition to assess key perspectives and approaches to include health considerations as an integral part of the EA process. Second, interviews with EIA approval authorities, consulting firms and experts to get their feedback and comments on the on the state of practice of human health integration. This has been supplemented by a comprehensive review of the international literature on best practice in EIA and the integration of human health considerations into EIA (approaches and methods).

Results and Discussion

Currently, Jordan has no specific guidance that describes the country's regulatory framework for including health in EA, as well as procedures and methods for public participation. The outputs of the present work show that "health" is already addressed in all projects (EIAs) reviewed and was also recognized as an important element in the process, but however this was mainly prior to approval of the EIA and to a less extent during the monitoring stage (i.e. post-approval). Furthermore, results

indicated that the focus in these EIAs was mainly made on the physical components of health and health impacts due to physical environmental changes, and less focus was made on the other aspects of health e.g. social aspects.

It was noted also that approaches and procedures used for that are to some extent not appropriate and consistent. Interviews with EIA practitioners and officials from the concerned authorities indicated that requirements and key challenges to a well-developed integration include:

- Lack of common understanding of the scope of health;
- Lack of an appropriate/or limited coordination with the health concerned institutions;
- Lack of the necessary legislative framework and guidance for health integration;
- No common and specific scope of the health issues that should be considered in the EIA process.

Another observation based on the EIAs reviewed is that consideration of health issues in EIA, when it does occur, has usually been limited to the level of baseline studies and impact prediction.

However, reviews of EIAs in several countries show that coverage of human health aspects in EIAs still tends to be limited and there is a lack of a systematic approach or methodology (Franssen *et al.*, 2002, McCaig, 2005, Harris *et al*, 2007c, Bhatia and Wernham, 2008, Harris *et al*, 2009). But however several studies and reports on the status of health in EA, suggested that health concerns started at least to receive international attention in EA practice (Steinemann, 2000, Mahoney and Potte, 2004, Noble and Bronson, 2006; Bhatia and Wernham, 2008). On the other hand and to date, few countries have prepared guidance on the health component of EA e.g. Canada and Belgium, (Noble and BRONSON, 2005). A few international agencies also, including the World Health Organization, the World Bank and the European Union have requirements or framework for the potential health effects of projects to be considered as part of EA, (UNECE, 2007). However, if Jordan is to develop such a framework, several issues should be taken into considerations, *inter alia.;* agree upon an explicit definitions of "health" , "impact" as well as to agree upon the scope of health effects to be assessed as part of the EIA process

Identification of the environment-health linkages in development projects and programs in Jordan does not necessarily mean –in case it is been considered appropriately-the need of a separate and independent health impact assessment (HIA) process, because this is in turns require specific legislative and institutional framework. Furthermore, the effective integration of health in EIA process will ensure environmental and health protection through a "cost effectiveness" process (i.e. by minimizing the cost and efforts of conducting a separate HIA for both the project proponent and the authority).

It should be mentioned here that since the Jordanian EIA system has been recognized as al leader in applying EIA in the region and compatible-with some moderate gaps-with the World Bank and the European EU requirements, (World Bank, 2009), the quality of effective integration will not be affected by the existing features and requirements of the EIA practices..

Table.1 Example on the key international developments in EIA during the last 15 years

Key Instrument/Event	**Requirements/Outcome**
Rio Declaration on Environment and Development	Calls for use of EIA as an instrument of national decision-making (Principle 17); other principles also relevant to EIA practice (e.g. Principle 15 on the application of the precautionary approach).
UN Conventions on Climate Change and Biological Diversity (1992)	Cite EIA as an implementing mechanism (Articles 4 and 14 respectively refer)
UNECE (or Espoo) Convention on EIA in a Transboundary Context (1991)	Entered into force in 1997 as the first EIA-specific international treaty.
Doha Ministerial Declaration	Encourages countries to share expertise and experience with Members wishing to perform environmental reviews at the national level (November 2001).
UNECE (or Aarhus) Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters (1998)	Covers the decisions at the level of projects and plans, programs and policies and, by extension, applies to EIA and SEA (Articles 6 and 7 respectively refer).

Fig.1 Estimated proportion of total disease burden caused by environmental risk factors, by region of the world (WHO and UNEP, 2004)

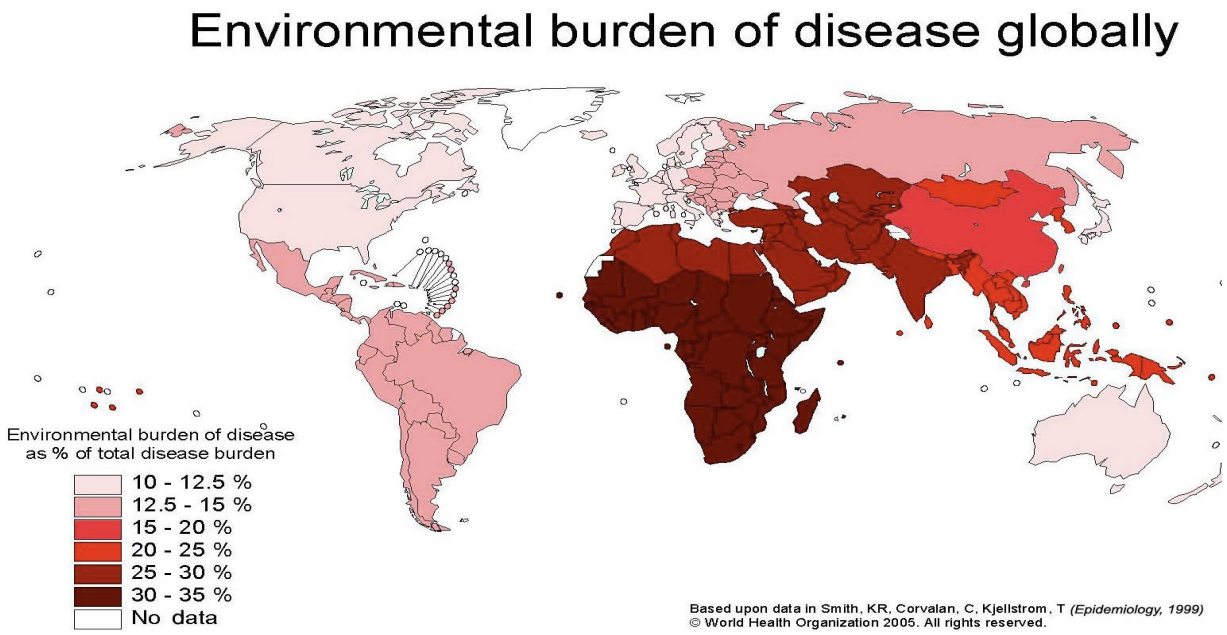

Table.2 Summary of the Jordan EIA Procedures

Stage	Activity
Screening	1. Submission of Project Information Form (PIF). 2. Reviewing the PIF by an Inter-ministerial Central Licensing Committee (TRC) and classify the project as: • Category I -EIA is required • Category II -initial EIA is only required • Category III -no EIA is required
Scoping	• Preparing Terms of Reference (ToR), after consultation with all stakeholders (determining the issues and parameters to be addressed in the EIA) • Reviewing and approving the ToR by TRC.
Conducting the EIA/ Assessment	• EIA study is conducted by a qualified team • EIA study is submitted to the Technical Evaluation Committee (TEC) to evaluate it against: ✓ Conformity to the ToR; The methodologies used, the scientific validity and legal value of the evidence presented; ✓ The soundness and compatibility of the impacts with respect to environmental protection, the content of the environment management plan (EMP), standards, and other references. • The TEC submits the findings to the Minister of Environment to make a decision.
Setting the Mitigation Measures/Management	• Designing strategies to avoid or mitigate potential negative impacts and enhance potentially positive ones.
Decision and Approval	• Approval/disapproval is notified to the proponent within 45 days. • EIA is deemed to be accepted in case no decision was made within the 45 days after the submission of the EIA report.
Licensing	• Issuing the license- upon the approval of the EIA report.
Monitoring	• Follow up on the implementation of the Environment Management Plan and reporting the results of monitoring.

EIA has a potential and important function in enhancing positive effects of the development in jordan; therefore, the inclusion of health in this process would consolidate and support such function via providing an opportunity to demonstrate ways in which both the environment and the health may be improved as part of the development process (i.e. plans, programs and projects). However, the present work suggests that there are some improvements in the integration of human health in EIA practice in Jordan if we compare the EIAs conducted five years ago and those recently

performed. However, the existing institutional and legal framework of EIA and the EIA process itself are not sufficient at present to promote the incorporation of human health in the EIA practices.

In conclusion, the existing environmental management system and in particular the EIA practices in Jordan, both provide a framework for improving the inclusion of health into EIA. However, it is necessary to establish an explicit a guidelines that describes the country's regulatory framework as well as a methodology/approach (combination qualitative quantitative) to ensure an effective inclusion of health in EIA.

Also, a special consideration should be made to improve the capacities of EIA practitioners on the identification of health and environment linkages. The present work has concluded that the priority of health considerations (and the scope of the health effects) and the extent to which it could be integrated in EIA is usually determined by EIA practitioners themselves as well as by type and size of the project and its potential effects in addition to the public concerns about that project.

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