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BARRIERS TO THE APPLICATION OF SUSTAINABLE CONSTRUCTION CONCEPTS IN PALESTINE

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Abstract

The state of the environment is a matter of growing current concern. It is a concern based on the observation that degradation of the environment is already affecting the quality of life of people throughout the world. The objective of sustainable development is to try to anticipate unfavorable changes and to moderate the project parameters to try to avoid unwanted consequences. Construction has to deliver its products with less environmental impact, i.e. it has to become more sustainable. The necessity of fostering economic and social development while preserving the environment has led to the redefinition of the traditional objectives of development through the concept of sustainable development, as a guide to design environmentally compatible economic development strategies. There is a pressure on the construction industry to deliver buildings with ever increasing standards of performance, constantly diminishing environmental impacts and steadily reducing costs of construction and operation. The environmental related problems in Palestine are acute. Palestine has fragile environment being faced with high levels of land degradation, acute shortage of fresh water, and rapid urbanization with its associated problems of air pollution and pressure on existing infrastructure such as waste management systems. The aim of this paper is to examine the concepts of sustainable development in construction sector, and to highlight the potential barriers to their application in Palestine. Recommendations are proposed to improve the sustainability of construction sector.

1. Introduction

The construction of buildings results in the extensive consumption of resources and materials, and substantial, often irreversible impacts upon landscape, amenity, and ecosystem, whilst meeting social and economic needs for shelter, investment, and the satisfaction of corporate operational objectives. The process of construction can be seen to pass through a recognizable life cycle form the original conceptualization of the project by the project sponsor, through construction and commissioning, to eventual occupation and operation up to the point of evacuation, demolition, or renewal and refurbishment. This cycle is largely the subject of project management, which seeks to achieve the realization of the built entity.

Sustainable construction practices are capable of being delivered in a project context where a condition of mutual benefit can be created. Where a sustainable approach can be recognized as coincident with sound business practice then a natural stimulus for this occur will be present but the mobilization of ethical behavior can receive further impetus from such drivers as state legislation, market incentives, and stakeholder pressure (Hutchinson, 1996). The implementation of the principles of sustainable construction can only be achieved where there is an active acceptance of the concept by all participants in the project process, primarily the project sponsor and key members of the design and production team, operating under the motivational and directional influence of a project manager.

Population expansion and the corresponding increase in consumption on one hand and the reduction in the carbon storage capacity through deforestation on the other pose the most critical threat. The construction industry is the major contributor to the environmental loading on the earth and needs to respond to by sustainability improving efficiency and effectiveness of in its entire production process. However, with an inevitable increase in population and demand for buildings and infrastructure services, even a dramatic improvement in environmental management of the construction industry is unlikely to offset an overall rise in the environmental loading caused by the increased level of building activity.

In 1992 The United Nations held a conference on Environment and Development (UN, 1992). Its objective was to address the concern both the natural environment and the social fabric of society appeared to be in a state of accelerated deterioration. The situation had reached a point at which the quality of life of people throughout the world was being degraded and threatened. The outcome was an agreement to try to balance environmental and social issues with the economic imperatives, in order to achieve a form of development that was more sustainable. This paper presents the issues of sustainability in the construction industry and the barriers to their application.

2. Sustainable Development Concept

The dynamic character of the concept of sustainable development requires in the construction industry a continuous improvement of the specific environmental performance. Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). According to this definition from the World Commission on Environment and Development, it is clear that the various activities of the construction sector have to be regarded and analyzed when considering sustainable development. The build environment constitutes one of the main support of the economic development, and its construction has significant impacts on resources and on the living and working environment. Hence, the construction industry has a lot of direct and indirect links with the various aspects of sustainable development.

The first International Conference on Sustainable Construction held in Tampa in 1994 introduced the following definition of sustainable construction, namely: the creation and responsible maintenance of a healthy built environment based on resource efficient and ecological principles (Kibert, 1994). A sustainable construction road map was presented by Kibert and Haovila, which indicates the relationship between sustainable development and the future of construction (Figure 1). However, these relationships need further investigations.

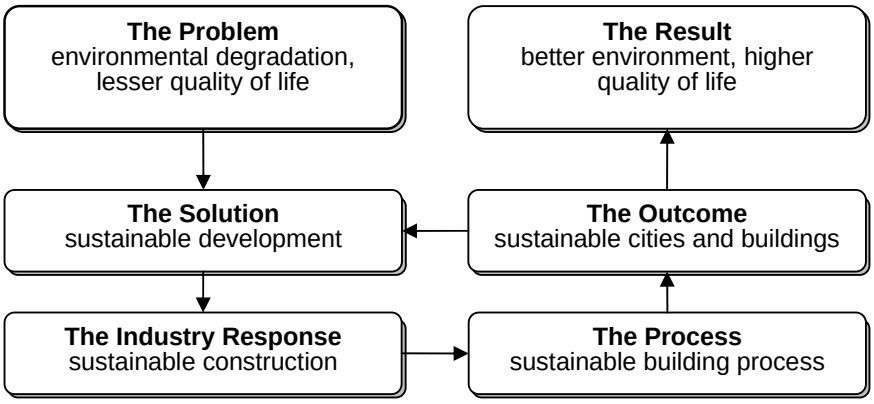

Figure 1 Sustainable Construction Road Map (by Kibert and Huovila)

Sustainable development is often considered to contain ecological and economical, social, and cultural aspects. Sustainable construction stands for ecologically sustainable construction, which means essentially management of biodiversity, tolerance of the nature, and economically sustainable construction enables socially and culturally sustainable construction. Sustainable construction in its own processes and products during their service life aims at minimizing the use of energy and emissions that are harmful for environment and health, and produces relevant information to customers for their decision making (Huovila, 1997). One of the concrete measures towards sustainable is the development and implementation of environmental management systems. There is a continuous environmental improvement of activities with the help of measurable targets. By means of an environmental management system, it is also possible to benchmark the environmental level of an enterprise to others (VTT, 1997).

The state of the environment is a matter of growing current concern. It is a concern based on the observation that degradation of the environment is already affecting the quality of life of people throughout the world. In developing world, there are very close links between economic growth and the environment, because a large percentage of development initiatives exploit natural resources. As a result, sustainable development increasingly means achieving economic growth without damaging the environment. Because of the limits on the levels of production and consumption that can be borne by the environment, the concept of sustainable development involves sensible limitation on the exploitation, of natural resources especially those that are non-renewable.

A discussion paper put out by the Canadian International Development Agency indicated that sustainable development should involve sustainability in five dimensions, the economic, environmental, social, cultural and political dimensions (CIDA, 1991). The concept of “equity” has become an issue in sustainability, as clearly, a social situation that is perceived to be inequitable will not be sustainable in the long term. The principal goal of social sustainability is improvement in the standard of living of all members of a society. In a developing country, this will be tempered by the need to bias the improvement towards the needs of the poorer members of the society. Political sustainability involves the absence of political conflict, democratic governance and a respect for human rights.

Institutional sustainability refers to the procedures that are established to determine and execute government policies. Institutional sustainability is analyzed on the basis of a capacity for policy making, for policy implementation, and for monitoring and enforcement. The challenge is to promote economic activity in such a way that the level of environmental quality remains intact or that there are appropriate compensations for its loss, and that any other negative impacts that the initiatives have on the socio-political-cultural complex are compensated for. An effective feasibility study for a major project must include a benefit-cost analysis and an environmental impact analysis. However, the emphasis of the feasibility study currently is more of insuring that the project is technically possible and economically justifiable, than that it is itself sustainable in the longer term, or contributes towards broader national sustainability.

3. The Impact of Construction Activities on the Environment

Sustainable construction is seen as a way for the construction industry to respond towards achieving sustainable development on the various environmental, socio-economic and cultural facets. The World Bank indicated that: any project proposal should be economically and financially sustainable in terms of growth, capital maintenance and efficient use of resources and investments. It must also be ecologically sustainable in maintaining ecosystem integrity and biodiversity. It must be socially sustainable in that it should promote equity, social mobility, social cohesion, participation, empowerment, cultural identity and institutional development (World Bank, 1995).

It is now acknowledged that construction activities can have a serious effect on the environment. Land-use, energy, materials, water and air pollution are the five main areas, which are concerned with the challenge for the construction industry. The first area is the impact of land-use. Every construction project on a green field site takes land away from other activities, notably agriculture (UNCHS, 1990). Construction invariably involves a modification of the land on which the item is located and in some cases, it environs. This can have an adverse effect on ecosystem (Ofori, 1992).

Second, construction leads to a high level of energy consumption (Lenssen and Roodman, 1995). Much of this is accounted for by the extraction and processing of materials. Some metals used in construction, such as aluminum, steel and zinc, as well as plastics are highly energy intensive. Smaller amounts used to the construction sites and in their installation during site processes. Energy saving measures, extensive retrofit program and transport needs constitute strong challenges linked to energy use.

Third, construction uses a large amount of natural resources, many of which are non-renewable (Lenssen and Roodman, 1995). Generally, construction materials are being used at unsustainable rates. Another issue relating to the use of construction materials is the amount of avoidable waste generated. Reduction in the use of mineral resources and conservation of the life support function of the environment require we of renewable or recycled materials, pertinent selection of materials and prediction of service life. Development of methodologies for saving and recycling construction materials, re-use and substitution by renewable materials are recommended.

Fourth, since lack of water resources, leakage from distribution systems and inefficient water use are problems that continue to grow, water management in buildings should be developed. To reduce the

maximum admissible concentration of lead in water due to domestic lead piping is also an objective. Development of water-saving devices/strategies and systems for capturing rain water in both new and existing buildings in view of fresh water shortage is recommended.

The fifth environmental consequence of construction activities is its contribution to air pollution. Particles of various sizes, some of which are harmful to humans, are released in the production and transportation of materials such as cement and quarry products.

4. Barriers to sustainable implementation in construction industry in Palestine

The construction industry is a powerful engine that contributes a significant force which drives the Palestinian economy. In terms of GDP in Palestine, construction output is in the range of 14 to 17%. The environment-related problems in Palestine are acute. It has fragile environments, being faced with high levels of land degradation, acute shortage of fresh water, and rapid urbanization with its associated problems of air pollution and pressure on existing infrastructure such as waste management systems. Palestine as a newly developing country lacks the managerial experience, the financial resources, and the legal and administrative systems for promoting activities, and formulating and enforcing regulations.

The attainment of sustainable development will need the active cooperation of international community in terms of both the capital and expertise of developing and applying systems for economic and environmental strategies which Palestine is seeking to implement. On the other hand, without the efforts of Palestine towards achieving sustainability, sustainable development cannot be attained either.

Sustainable construction should be an important component of creating a sustainable development. Much could be achieved by introducing the sustainable concept into the management of critical sectors including the planning and design, and the construction or modification of buildings. Action must include long-term structural change in policy frameworks, market incentives, technologies and land-use patterns. The main barriers to sustainable implementation in construction in Palestine include:

- Lack of knowledge about the concepts of sustainability.
- Lack of training among engineers and professionals who are involved in the construction process.
- Lack of legal aspects and regulations concerning sustainable development.
- The tendency to use traditional design and construction methods by local consultants and contractors.
- Lack of financial incentives due to the current financial constraints.
- Lack of environmental public awareness.
- The resistance to change the regulation for introducing the environmental aspects in contract documentation.
- The green labeled of some products are used for marketing reasons more than for environmental conditions of these products.
- Lack of culture on sustainable concepts.
- Inadequate institutional structures at the local level.
- Lack of responsibilities of managers and employees.
- Sustainability may lead to an increase in construction costs, in the short term.
- A reluctant by all parties involved in construction process to try new ideas owing to the risk factor.
- A lack of hard data in client organizations about capital and running costs associated with environmental improvements.
- A reluctant on the part of funders to adopt innovative technologies.

5. Conclusion

Sustainability is the ability to maintain a high quality of life for both present and future generation, while insuring the maintenance of ecological processes on which life depends and the continued availability of the natural resources needed. The built environment has an important role to play in achieving a sustainable environment as people depend on the use of constructed facilities such as buildings, roads, bridges, water treatment plants, etc. for improving living standards. Consequently, organizations involved in the design, delivery, and operations of constructed facilities need to incorporate issues of sustainability into their business activities if they are to improve their long-term performance and that of the built environment.

Sustainable construction is most likely to occur where there is a synergy arising between the aspirations, value systems, and sense of social responsibility of both project sponsor and project manager who have the most intimate relationship within the project process. It is recommended that environmental issues must become an integral part of the management systems of the organization involved. A clear strategic view of the relationship between construction activity, the built environment and society's goal is required in order to focus action in a beneficial direction. Environmental performance improvement requires strategic focus if it is to flourish, and add real value to organizational performance.

Social and economic aspects of sustainability need to be further developed. Environmental impacts of building construction and facility management need to be reduced. It is recommended that building owners should set concrete environmental demands to the parties involved in the design process during the initial design stage. Building users should develop their own activities to be more environmentally friendly in the occupied building. It is advisable that designers should consider the environmental qualities of construction materials as a starting point of the design and to develop design solutions from the point of view of environmental goals of the final product. Manufacturers of building products should see the life cycle consideration as the basis of product development. Contractors should see environmental consciousness as a factor of competitiveness and develop their own services to be environmentally sound.

The construction industry is actively involved in almost all development projects. As a result, the traditional construction industry feasibility study appears to be the appropriate contest for an assessment of sustainability in all various dimensions. Institutional sustainability should involve the creation and encouragement of inter-sectoral and cross-sectoral coordination among agencies whose policy/development actions interact. It should involve also the formulation or strengthening and enforcement of appropriate legislation, in addition to the provision of relevant training and skills in environmental issues for staff. Engineers are considered to be the appropriate professionals to be undertaking assessments of sustainability. Therefore, it is necessary to reconsider the content of the curricula for degree programmes. There is an urgent needs to promote the study of policies and practices towards attaining sustainability in Palestine. An active cooperation with international community is needed in order to realize the vision of sustainability.

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