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SOCIAL AND ENVIRONMENTAL SUSTAINABILITY RATING SYSTEMS AND CERTIFICATION PROGRAMS

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The term sustainability has multidisciplinary use and meaning. Sustainability is typically described by many sources as development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. Sustainable construction projects are those that ensure the consideration of economic, environmental and social impacts that are created by their activities. It includes all the construction related tasks and the company's management. This research focuses mainly on the criteria of social and environmental sustainability. Social sustainability, whose criteria is based on the classification of company's stakeholders and the project's, and environmental sustainability, also called physical dimensions of sustainability, whose criteria are those related to resources and the environment. This paper aims to recognize the most known sustainability certification systems, how they classify their criteria and rate their metrics. After the research, we can conclude that the certification systems incorporate more metrics for criteria of environmental sustainability than for social sustainability.

Keywords: Certification systems, Construction project, Sustainability criteria.

1 INTRODUCTION

In the last couple of decades, the approach of responsible consumption, sustainable development and the inclusion of social and environmental aspects in construction projects have become increasingly important. The concept of sustainability refers, by definition, to the satisfaction of current needs without compromising the ability of future generations to satisfy their own needs, guaranteeing the balance between economic growth, care for the environment and social welfare (PNUD 2014).

Nowadays, sustainability must be considered a part of every decision we take, and the answer to each project should concern not only for the economic aspects but also for the social and environmental aspects of sustainability. It is said that construction is sustainable when it meets environmental challenges, responds to social and cultural demands and offers economic improvements (Bal *et al.* 2013).

The sustainability boom is having a positive impact on business certification and management systems. Organizations not only want to implement better management systems but also seek to certify them, in order to prove their stakeholders their commitment to the development of a sustainable project in a working environment adjusted to the objectives of the *triple bottom line* (economic, social and environment).

2 SOCIAL AND ENVIRONMENTAL SUSTAINABILITY METRICS AND CRITERIA

2.1 Social Sustainability Metrics

The social criteria result from the evaluation of the aspects that affect or may affect the stakeholders, each of them is benefited or harmed by the project in a different way, for that reason the social dimension includes specific criteria and metrics for each group of stakeholders. Within the construction projects, and the companies of the construction industry, we can differentiate four groups of stakeholders: the society, the local community, employees and users or customers (Bal *et al.* 2013; Benoît-Norris *et al.* 2013) (
Figure 1).

Figure 1. Social Sustainability Metrics by Stakeholders Categories.

2.2 Environmental Sustainability Metrics

Environmental indicators, also called physical dimensions of sustainability, are the traditional metrics of environmental sustainability (Cohen *et al.* 2014). The environmental sustainability metrics contemplate the impacts of the project or industry actions on the environment and human beings, any activity, that represents a change in the environment, must be identified, measured, mitigated and evaluated. The environmental metrics are classified into four categories (Figure 2), depending on the environment they affect; they can be related to human health, ecosystem, resources or water.

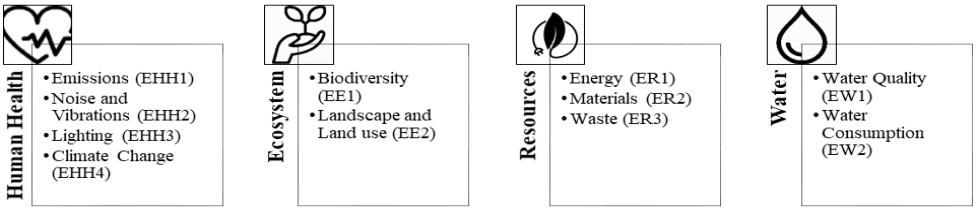

Figure 2. Environmental Sustainability Metrics by Categories.

3 RATING SYSTEMS AND CERTIFICATION PROGRAMS

The sustainability certification systems are a series of parameters or minimum standards in matters of social and environmental sustainability, carried out by specialized third parties, which are in charge of evaluating, classifying and certifying the organizations and/or their projects.

The construction industry has different certification systems (Table 1), ranging from evaluating the social management of employees within the organization, to standards to know if a building or infrastructure meets or does not meet the minimum requirements for energy performance. It means certification and rating systems that include the concept of sustainability in the management of the construction company and its projects.

Table 1. Rating Systems and Certification Programs.

#	SYSTEM - REFERENCE	SUBJECT - MATTER
01	Be^2st-in-highways (Recycled Materials Resource Center and University of Wisconsin-Madison 2010)	Social Requirements including regulation and Local Ordinances, Emissions, Energy, Waste, Water.
02	CEEQUAL (Beckwith *et al.* 2011)	Project Management, Land Use, Landscape, Biodiversity, Historic Environment, Water, Energy, Material, Waste.
03	ENVISION (ISI 2015)	Quality of Life, Leadership, Resource Allocation, Natural World, Climate and Risk.
04	GreenLITES (New York State Department of Transportation 2008)	Sustainable Sites, Water Quality, Material Resources, Atmosphere, Innovation.
05	Greenroads Manual (Muench *et al*. 2011)	Basic Project Requirements, Environment and Water, Access and Equity, Construction Activities, Materials and Resources, Pavement Technologies, Custom Credits.
06	ISO 26000 (Kritkausky and Schmidt 2011)	Organizational Governance, Human Rights, Labor Practices, Environment, Consumer Issues, Community Involvement and Development.
07	I-LAST (Illinois Department of Transportation 2012)	Planning, Design, Environmental Water Quality, Transportation, Lighting, Materials, Innovation.
08	INVEST (Bevan *et al.* 2012)	System Planning and Processes, Project Development, Operations and Maintenance.
09	LEED (U.S. Green Building Council 2002)	Sustainable Sites, Water, Energy and Atmosphere, Resources, Indoor Environmental Quality, Innovation, Regional Priority.
10	SA8000® (Social Accountability Internacional 2014)	Child Labor, Health and Safety, Freedom of Association and Right to Collective Bargaining, Discrimination, Working Hours, Salary, Management System.
11	STARS (North American Sustainable Transportation Council 2012)	Integrated Process, Access, Climate and Energy Ecological Function, Cost, Innovation.

4 SUSTAINABLE METRICS ANALYSIS

Once sustainability certification systems related to the construction industry and its projects are identified, we can determine which criteria is included by each one, and which are more representative according to each certification system. In
Table 2, those criteria that have been included in each system are marked down with an "X".

The social sustainability criteria that stand out above others, within the considerations of the certification systems analyzed, are Safe and Healthy Living Conditions (SCL6), Worker's Health and Safety (SW3) and Customer Satisfaction (SC1). ISO 26000 (06) and SA8000 (10) are, as

expected, the certification systems that include the largest number of criteria in social sustainability terms.

Table 2. Consideration of criteria classified by certification system.

CRITERIA/SYSTEM	01	02	03	04	05	06	07	08	09	10	11
SOCIAL SUSTAINABILITY											
SS1	-	-	-	-	-	X	X	-	-	-	-
SS2	-	-	-	-	-	X	-	-	-	-	-
SS3	-	-	-	X	-	X	X	X	X	-	-
SLC1	-	-	X	-	X	-	X	X	-	-	-
SLC2	-	-	-	-	-	-	-	-	-	-	X
SLC3	-	X	X	-	X	X	X	-	-	-	-
SLC4	-	X	X	-	X	X	-	-	-	-	-
SLC5	-	-	-	X	X	X	X	-	X	-	-
SLC6	X	X	X	X	X	X	X	X	X	-	X
SLC7	-	X	-	-	-	X	X	-	-	-	-
SW1	-	-	-	-	-	X	-	-	-	X	-
SW2	-	-	-	-	-	X	-	-	-	X	-
SW3	-	X	-	-	X	X	-	X	X	X	-
SW4	-	-	-	-	-	X	-	-	-	X	-
SW5	-	-	-	-	-	X	-	-	-	X	-
SW6	-	-	-	-	-	X	-	-	-	X	-
SW7	-	-	-	-	X	X	-	-	-	-	-
SW8	-	-	-	-	-	-	-	-	-	X	-
SC1	-	-	X	-	-	-	X	-	X	-	X
ENVIRONMENTAL SUSTAINABILITY											
EHH1	-	X	X	-	X	X	X	X	X	-	X
EHH2	X	-	X	X	X	-	X	X	-	-	-
EHH3	-	-	X	X	X	-	X	-	X	-	-
EHH4	-	-	X	X	X	X	X	X	X	-	X
EE1	X	X	X	X	X	X	X	X	X	-	X
EE2	X	X	X	-	X	-	X	X	X	-	-
ER1	X	X	X	X	X	X	X	X	X	-	-
ER2	-	X	X	X	X	X	X	X	X	-	-
ER3	X	X	X	-	X	-	X	X	X	-	-
EW1	X	-	X	X	X	-	X	X	X	-	X
EW2	-	X	X	-	X	X	X	-	X	-	-

On the other hand, the environmental criteria related to material resources (ER2) and water quality (EW1) are the most important in the certification systems, and ILAST (07), ENVISION (03), INVEST (08) and LEED (09) are the systems that include the greatest number of environmental sustainability metrics. It is important to note that the two certification systems with the most metric criteria are ILAST, for infrastructure and transport, and LEED, for buildings. In general, it is possible to affirm that ISO26000 (06) is the most complete sustainability certification system, including most of the social and environmental criteria, and that could be applied in the construction industry despite of being focuses on social responsibility system.

We can specify there are some criteria that should be included in several certification systems, or that must receive more importance. For example, the social criteria related to

corruption (SS2), employee training (SW7) and respect for indigenous rights (SLC8); and the environmental criteria that include lighting (EHH3), noise and vibration (EHH2) issues. Criteria directly or indirectly related to construction projects and their stakeholders.

5 CONCLUSIONS

The main functions of a sustainability rating system are to promote engineering awareness and integration into the construction process and at the project level, serve as a management tool for accountability and project evaluation, work for internal and external recognition for sustainable actions and to track sustainability program progress. Although the list of social sustainability criteria is greater than the environmental one, we can verify that the criteria of environmental sustainability are more incorporated in the certification systems. The certification systems ISO 26000 (06) and SA8000 are the most completed systems in terms of social sustainability, and ILAST (07) and LEED (09) includes a greater number of environmental sustainability metrics.

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