Planlama 2019;29(1):1-9 | doi: 10.14744/planlama.2019.27146

REVIEW / DERLEME

Green Settlement Planning and Design: The First National and Institutional Certification Attempt for Turkey

Yeşil Yerleşme Planlaması ve Tasarımı: Türkiye'nin İlk Ulusal ve Kurumsal Sertifikasyon Girişimi

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ABSTRACT

The concept of sustainability should be significantly integrated into practice as well as into contemporary urbanism principles as innovative technological approaches for designing the future cities of 21st century. A green certification can be accepted as an essential tool to provide the location-specific, measurable, monitorable, updatable components and parameters of sustainability. The aim of the study is to discuss the preparation of analysis and synthesis of green building and settlement certification that is carried out with the Ministry of Environment and Urbanism and to share the results of the significant experience which is dealing with global objectives at the national and local scale. This first experience will be evaluated under the indicators of land use, ecology and disaster management topics related to their contribution in sustainable urban development with a notion of providing social and economic sustainability of urban livelihoods. Alongside the evaluation this paper will provide a comparison of this national intervention with other widely used and world-known international green certifications. Having elaborated international green certificates to build the infrastructure for a national certificate on urban scale, the major land use decisions for the sustainable settlements prove to provide integrity between the green scales building and settlement. Thus, the researchers decided to emphasize the major subjects of ecological assets and land evaluation, sustainable site selection and energy efficient planning, sustainable urban development and land use, environmental management and infrastructure planning, disaster mitigation in conjunction with socio-cultural quality and socio-economic welfare to insure sustainability measures in Turkish settlements. The decisions on the parameters also help other components of sustainability to relate among whole dynamics of the city. Therefore, the suggestions for a national green certificate in this study are expected to contribute to the adoption of realistic and practical steps necessary to achieve sustainability goals.

Keywords: Green settlement certification; sustainability; sustainable urban development; Turkey.

ÖZ

Sürdürülebilirlik kavramı, 21. yüzyılın kentlerinin tasarımında yenilikçi teknolojiler ile birlikte hem pratiğe hem de güncel planlama prensiplerine entegre edilmelidir. Yeşil sertifika sistemleri ile sürdürülebilirlik için konum odaklı, ölçülebilir, izlenebilir, güncellenebilir gösterge ve bileşen setleri sağlanabilir. Bu çalışma, Çevre ve Şehircilik Bakanlığı ile yürütülmüş olan yeşil bina ve yeşil yerleşme sertifikasyonu için yapılan analiz ve sentez aşamalarını derlemekte ve küresel sürdürülebilirlik hedeflerini hem ulusal hem de yerel ölçekte çözümlemeye çalışan deneyimsel sürecin sonuçlarını derlemektedir. Bu ilk ulusal girişim için yapılan arazi kullanımı, ekoloji ve afet yönetimi göstergeleri kentsel yerleşimlerin sosyal ve ekonomik sürdürülebilirliklerine sağladıkları katkı üzerinden değerlendirilecektir. Bu çalışma, aynı zamanda, yaygın kullanılan uluslararası yeşil sertifika sistemlerinin karşılaştırmasını da yapmaktadır. Ulusal bir kılavuz hazırlama hedefiyle incelenen uluslararası yeşil sertifika sistemlerinin de gösterdiği üzere, sürdürülebilir yerleşmelerin ön koşutu bina ve yerleşme ölçeğinde verilen sürdürülebilirlik kararlarının birbirlerini pekiştirici nitelikte olması gerekmektedir. Bu sebeple, araştırmacılar ekoloji, sürdürülebilir arazi seçimi, enerji verimli planlama, sürdürülebilir kentsel gelişme ve arazi kullanımı, çevre yönetimi ve altyapı planlaması ile afet zarar azaltma politikalarını sosyo-kültürel kalite ve sosyo-ekonomik refahı artırma nosyonları ile bağdaştırarak Türkiye yerleşmeleri için sürdürülebilirlik kıstaslarını belirlemeye çalışmışlardır. Bu çalışmanın ulusal yeşil sertifikasyon önerisinin sürdürülebilirlik hedeflerini gerçekleştirmede gerçekçi ve pratik adımların geliştirilmesine katkıda bulunabileceği öngörülmektedir.

Anahtar sözcükler: Sürdürülebilirlik; sürdürülebilir kentsel yerleşme; Türkiye; yeşil yerleşme sertifikasyonu.

Geliş tarihi: 26.12.2018 Kabul tarihi: 28.03.2019
Online yayımlanma tarihi: 06.04.2019
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TMMOB
Şehir Plancıları Odası

Introduction

The idea of sustainable development became a world-wide concern during the 1970s, while the first ever official document Bruntland Report only dates back to 1987. Since then, the ideal of "sustainable city" has turned into a "compulsory target" due to the unregulated consumption of natural resources. Many studies predict that 2030 will be the year in which the first major impacts will be seen, and 2050 will be the year of accelerating natural resource shortages (Steffen et al., 2015).

The inability to achieve sustainable development has prepared a ground for transnational struggle over global climate change, disaster planning, etc. Turkey first took part in a joint action with sanctions related to environmental protection in 1971 with RAMSAR Convention, aiming to protect wetlands (Union of Turkish Bar Associations, 2014). Over the years, Turkey has continued to be involved in many other agreements that serve sustainable development. Turkey became a party to one of the climate sensitive international initiatives firstly with United Nations Framework Convention on Climate Change at Rio Earth Summit in 1992 and continued to do so with Kyoto Protocol, which went in effect officially in 2005. Unfortunately, the could not be met through these agreements and conventions, the general objectives of which are a common understanding and programmed constructive steps for human-originated greenhouse gas emissions to be shared by countries. However, the search for solutions still continues as the impacts of global climate change has become more evident than ever.

Effective since January 2016, United Nations Sustainable Development Goals for 2030 to increase welfare while preserving the planet have been a milestone for global joint efforts against this change (United Nations Sustainable Goals, 2016). These goals have been an invitation to devote economic growth from climate change, poverty and inequality. Signed in April 2016, the Paris Treaty entered into force after reaching a sufficient majority by November 2016. To combat climate change, Turkey, as one of the parties, has made a commitment for the reduction of poisonous gas emissions creating greenhouse effect. According to Greenhouse Emission Statistics published by Turkey Statistical Institute in 2017, the main cause of the emissions are energy demand (fossil fuels), agricultural activities (fossil fuel use by agricultural machinery, agrochemicals, agricultural waste assessments), and industrial activities (TurkStat, 1990-2015). Particularly, energy use and thus buildings with more than 30% of greenhouse gas emissions remain to be outstanding problems for Turkey.

Businesses with clean technology approach, alternative renewable energy sources and green buildings are necessary for reducing emissions (Wamsler, Brink & Rivera, 2013). However, while a number of governments put various targets and legislations in place to reduce greenhouse gas emissions, they are experiencing difficulties in this rapidly emerging legal and business area. In most cases, "green policies" followed by the public and private sectors are neither integrating nor meeting on a common infrastructure.

Green building and settlement certificates are among the most important components of long-term energy efficiency-oriented cooperation policies of the European Union. Green certificates contribute to long-term sustainability goals, both with their ecological and economic efficiency effects (Ringel, 2006). It is a disadvantage that academic research and publications on green settlement certificates are in short supply (Sharifi & Murayama, 2014). However, even if they are limited in numbers, an analysis of empirical research results will help eliminate any future mistakes in the developing of a new certificate of such.

Development of a national green settlement certification for sustainable settlements in Turkey is of outmost importance. In order to achieve sustainability goals, to implement high-scale approaches, to contribute to national economic development, and to protect local values, integrated green building and settlement certification is an important tool.

Green Settlement Certification as a New Sustainability Agenda

Failure in the conversion from theory to practice of the work on sustainable cities is one of the major problems for Turkey. By individual or institutional efforts, it has not been possible to achieve an effective outcome about the commitments undertaken by agreements that Turkey has been a party of. Studies on various approaches such as ecological city, resilient city, green city, smart city, energy efficient city, eco-tech city, etc. could not be implemented due to lack of financial investments or of cultural, administrative and academic requisites.

In 1988, World Green Building Council (WGBC) was established to promote studies on ecological architecture and sustainable buildings in order to speed up such efforts on a global scale. Founded in 2007, Green Building Association in Turkey (ÇEDBİK) is the first initiative supported by WGBC.

Green buildings can be described as constructions that are sensitive to sustainable ecosystems, are produced from natural and non-waste materials, use renewable energy resources, are assessed within life cycle starting from land selection, are designed in accordance with social and environmental responsibilities, are suited to climate and local conditions and con-

sume minimum energy possible (Kibert, 2013). The first green building applications emerged as a result of engineering and software technologies working together on building scale.

The effort to define a framework for "European Sustainable Cities" includes common parameters and sustainability criteria on settlement scale. These parameters are based on urban development as well as urban renewal, which may correspond to residential, commercial, health or educational facilities on the building scale, whether existing or new.

Green certificates or guides are initiatives that promote cooperation for the improvement of construction and urban planning sectors in terms of environmental sustainability. What makes green certificates applicable and valuable is that they have a bottom-up approach rather than top-down (Hamedani & Huber, 2012). They intend to increase service and product quality by promoting green competitiveness and introducing new parameters and values about sustainability in the market.

All over the world, many green building and green settlement certifications as well as their implementations are already in use as tools for ecological and environmental policies. However, two extensively used certificates, LEED and BREEAM may document green building and green settlement performances more accurately than many others.

Canalizing towards green buildings corresponds to increasing either the life quality or the social responsibility for construction companies. However, the building scale, can only offer a segment of sustainable development in terms of efficiency. Therefore, many certifications now integrate the urban scale into existing certificate systems through taking settlements and neighborhoods into consideration.

In the context of Turkey, as international certificates cannot address local problems, they cannot become prevalent. Examining the constructions in Turkey, there are only 191 buildings with LEED certificate and 35 with BREEAM certificate (LEED Official Web Page, 2018), (BREEAM Official Web Page, 2018). As a matter of fact, Ministry of Environment and Urbanization in Turkey has given priority to "National Green Certification" project to ensure its vision of distinctive and quality sustainable development with the support of accessible recording and auditing systems.

General Characteristics of International Certification and Turkey's Former Initiatives

As of today, there are more than 30 local certification systems used in different countries. BREEAM (Building Research Establishment Environmental Assessment Method), LEED (Leadership in Energy and Environmental Design), CASBEE (Comprehensive Assessment System for Building Environmental Efficiency), DGNB (Deutsche Gesellschaft für Nachhaltiges Bauen-German Sustainable Building Council), GREENSTAR, HQE (Haute Qualité Environnementale-High Quality Environmental Standard) can be listed as the most commonly used certification systems. Turkey's first attempt for a local certification system have been ÇEDBİK Residential Certificate and ISO 14000 Systems, both of which could not be institutionalized.

BREEAM originates from UK and is developed in 1990. Some of the main categories of this certification system are land use, energy use, water use, construction materials, user health and welfare, transportation (location), pollution, ecological management. LEED originates from USA and it is developed in 1998. Some of the main categories of this certification system are spatial sustainability, water efficiency, energy, atmosphere, materials and resources, indoor quality, innovation and design process. CASBEE originates from Japan and is developed in 2001. Some of the main categories of this certification are energy consumption, materials and resources, air pollution, wind damage, use of sunlight, light pollution, acoustic and thermal comfort, lighting, indoor air quality, service opportunities, durability, safeness, flexibility and adaptation. DGNB originates from Germany and is developed in 2007. Some of the main categories of this certification system are environmental quality, economic quality, socio-cultural and functional quality, technical quality, process quality, and location quality. GREENSTAR originates from Australia and is developed in 2003. Some of the main categories of this certification system are management, transportation, emissions, water, waste, materials, indoor quality, land use, ecology, and innovation. HQE originates from France and is developed in 1996. Some of the main categories of this certification system are land, components, energy, working space, water, waste, management, hydrothermal comfort, acoustic comfort, visual comfort, smell comfort, spatial quality, air quality, and water quality.

Internationally and commonly used certifications mentioned thus far has not prevailed in Turkey due to their evaluation parameters, applications, appraisal, and processes of monitoring, innovation, research and development. In this manner, accredited ISO 14000 Standards and ÇEDBİK Residential Certification are examined as national attempts.

IS0 14000 Environmental Management System fundamentally originates from Geneva and has been accredited to Turkey. Being used since 1996, ISO 14000 is a management model based on reduction of natural resource use, analysis of risks, and minimization of damages inflicted on earth, water and air. ISO 14000 offers a system standard than product standards, thus it is involved in how something is produced rather than what is produced. ISO 14000 is founded on constant monitoring and

improvement of environmental performance. It stipulates the following of conditions defined by law and legislations about environmental factors and makes monitoring and certification in concordance with these law and legislations.

Turkey's first green building-settlement certification is ÇEDBİK Residential Certification Guide, which had a pilot application in 2016. The main categories of this certification are integrated green project management, land use, water use, energy use, health and comfort, use of materials and resources, management, maintenance, and innovation. For such a certification to function, the central government has to provide necessary infrastructure as well as financial and administrative subsidies for sectoral initiatives for the certification to be prevalent. Moreover, a sustainable management of the certification system is also necessary. Green collar employment, planning of vocational services, innovative projection of technological necessities, cooperating with academia as well as provision of essential infrastructure for monitoring and auditing are basic factors for certification systems to function well. Otherwise, all attempts remain as initial efforts.

Evaluation of Global Compliance and Local Motivation for the National Green Settlement Certification

Seventeen sustainable development goals have been mentioned in the report "Transforming Our World: The 2030 Agenda for Sustainable Development" published by UN. The report touches on subjects such as sustainable production and consumption, fair resource allocation, increasing life quality and social justice with the aim of making "cities and human settlements inclusive, safe, resilient and sustainable" (United Nations Sustainable Goals, 2016). Within the report it is often stated that many of social problems in urban life stem from lack of sustainable planning of cities.

Major problems of 21st century are energy related including economic crisis. Matters such as consumption of natural resources, use of fossil fuel, and global climate change take place in the development agenda of Turkey (Özçevik et al., 2018). In both economic and social terms energy efficiency is of capital importance regarding its acquisition, consumption, and conservation. Concordantly, Turkey imports 70% of its energy (TurkStat, 2017); thus it can be easily argues that Turkey is dependent on external sources for energy acquisition. Scrutinizing the share of energy consumption causing the energy dependency, it is clear that 35% of Turkey's total energy consumption and 40% of Turkey's electricity consumption occurs in buildings, and that energy conservation cannot be maintained mainly in residential buildings (TurkStat, 2016; The Ministry of Energy and Natural Resources, 2018).

The call from the Ministry of Environment and Urbanism has been a concrete step for Turkey to reach the goals of sustainable development as set by the UN. Adaptations based on 2030 agenda has been set as national targets. Furthermore, with the aim of designing sustainable settlements Turkey's first national green building and green settlement certification has been prepared as a response to this call.

Besides shared decision making and solution provision, there are other national motivations exhilarating this certification process. Firstly, considering the climate, geography, culture and economic structure of Turkey, there has been a need to modify the international prevailing certificates. For Turkey the market covering certification processes for green buildings and green settlements are completely new (Erten et al., 2012). Another important national motivation is the urban renewal acts in Turkey. The movement started with the Law number 6303 on the Regeneration of Areas under Disaster Risk effective since 2012. The aim of this law and movement is taking precautions against disasters, specifically against earthquake (Official Journal, 2017).

Disaster management requires an environment constructed with disaster resistant infra- and superstructure. Although the aim was to create a resilient environment with the transformation process, this attempt was a parcel-based building renewal, the sustainable goals could not be met. As social and economic targets could not be put clearly, institutional and organizational solutions could not last. Green building and green settlement certification plays a vital role in reconstruction processes since constructions are actively progressing depending on urban renewal legislations. Reaching international sustainability goals, increasing life quality, creating new employment in national economy, supporting local economy with the use of local materials and with energy efficiency are new doors to open with the key of national green building and green settlement certification system.

The Preparation of National Green Settlement Certification

The wide-ranging study as a first national and institutional intervention for preparing a green building and settlement certification started on 26.02.2016 based on the protocol between Istanbul Technical University and the Ministry of Environment and Urbanism, Directorate of Vocational Services, to be completed on 04.12.2017. On 23.12.2017, the legislation published on an official gazette was a step towards foundation of the legal basis of the certification process (Özçevik et al., 2018).

This two year-long process of preparation of a national green building and green settlement certification was led by Istanbul Technical University with 32 experts from six different

universities. Eleven scientific study groups carried out this preparation transparent process in cooperation with authorities from the ministry. All preparation, decision-making and implementation processes have been carried out with the understanding of co-production with face-to-face meetings and/or participation opportunities via communication technologies.

Initiated by the Ministry of Environment and Urbanism, this certification system has been approached in a holistic way with particular attention on connections between different scales of planning. On the settlement level, regional and immediate vicinity profiling, sustainable land use, ecology, and disaster management, transportation and mobility, settlement and neighborhood design, social and economic sustainability have been listed as sub-modules; whereas on building level integrated design, management and construction, indoor quality, construction material and life cycle, energy consumption and efficiency, water and waste management and innovation were the sub-modules of the certification. All these 11 modules are significant steps in taking action against climate change in the context of Turkey.

All modules of green settlement certification system are of capital importance in terms of urban planning. This study focuses on two of these modules, namely "Land Use, Ecology, and Disaster Management" (LUE) and "Social and Economic Sustainability" (SES). LUE deals with subtopics such as ecological assets and land valuation, sustainable area selection and energy efficient planning, sustainable urban development and land use, environmental management and infrastructure planning and disaster management. SES on the other hand deals with social and economic welfare, as well as socio-cultural quality.

Assessment of International Certifications

The first step of the national green certification system preparation was the analysis of existing international green certification systems. As mentioned in previous sections, the most prevalent certifications, namely BREEAM, LEED, DGNB, GREENSTAR, CASBEE, and ÇEDBİK Residential Certificate has been examined in this regard for LUE and SES modules (Table 1). For the analysis of LUE and SES, two parameters are important: their evaluation methods and national barriers they have faced, if there are any.

Formation Process of the National Certification

Having analyzed parameters of international certification systems, following steps have been taken for the formation of the national certification system.

- Formation of the technical manual of the national certification
- Formation of the training guide of the national certification
- Formation of exams for national certification evaluators
- Design of national certification logo and certificates
- Preparation of the infrastructure for national green big data management

The certification is divided into two groups: Green Building and Green Settlement. As mentioned above Green Settlement Certification consists of modules on (1) Regional and Immediate Vicinity Profiling, (2) Sustainable Land Use, Ecology, and Disaster Management (LUE), (3) Transportation and Mobility, (4) Settlement and Neighborhood Design, (5) Social and Economic Sustainability (SES). Below, parameters of two modules, LUE and SES, will be clarified. However, it is important to note that these parameters and modules are part of a holistic Green Settlement Certification and fully function together. Sub-categories of LUE and SES are briefly explained below:

a. LUE I - Ecological asset and land appraisal

This main theme is based on primary criteria for sustainable urban environment. It requires that the upper scale and sub-scale plans are established based on the notion of natural environmental protection. It draws attention to the relationship between built environment and the natural landscape. Thus, settlements are certified based on the following reports: (i) upper scale natural, historical and cultural environmental protection decisions report; (ii) ecological asset inventory report (iii) protection and development of biodiversity report

b. LUE II -Sustainable location selection and energy efficient planning

One of the most important components of sustainable development is the reduction of ecological footprints. This means that productive areas (forests, agricultural land, lakes, rivers, etc.) should be kept distant from urban structure and to convert towards compact settlements. Energy efficient planning approach presumes maximization of benefit from energy resources. Under this theme, following requirements need to be met: (i) suitability of settlement and evaluation; (ii) sustainable land analysis and evaluation; (iii) use of renewable energy; (iv) site selection according to insolation and wind.

c. LUE III -Sustainable urban development and land use

The aim of this category is to direct urban growth towards green settlement by correct land use selection. Urban brown fields are incentivized to be selected to inhibit urban sprawl and ensure compact urban development. Rehabilitation, renewal and regeneration on urban areas in which legal and administrative incentives already exist are encouraged to apply for this certificate. Criteria for this theme has been determined as follows: (i) selection of urban brown fields for development; (ii) renewal and sanitization old building stock; (iii) selection of sites already declared as renewal/rehabilitation areas; (iv) selection of socially/physically/economically deteriorated areas; (v) increase in open and green area.

Table 1. Green Settlement Certifications and LUE/SES Parameters

Certificates	Land Use, Ecology, Disaster Management		Social and Economic Sustainability	
	Main Theme	Parameters	Main Theme	Parameters
Breeam-Communities	Land Use and Ecology	Ecological strategy	Local economy	Economic impact
		Land use		Education and skills
		Water pollution	Social welfare	Demographic needs and priorities
		Ecological value d		Housing supply
		Landscape		Service and facility supply
		Rainwater accumulation		Public space
				Green infrastructure
				Local park
				Local language
				Inclusive design
Leed Neighbour Development	Smart location and connections	Smart location	Smart location and connections	Smart location
		Endangered species and ecological assets		Locations of choice
		Protection of wetlands		Rehabilitation of abandoned industrial areas
		Protection of agricultural areas		Cycling opportunities
		Avoidance of flood plain		Proximity to residential and working areas
		Locations of choice	Settlement pattern and design	Connected and open society
		Rearrangement of brownfields		Housing types and affordability
		Location choice for less automobile dependency		Access to public spaces
		Cycling network and storage		Access to recreational areas
		Proximity to residential and working areas		Visitable and universal design
		Protection of sloppy areas		Social aid and intervention
		Design sensitive towards wetlands and habitats		
		Long-term wetland and habitat protection management plans		
DGNB	Environmental quality	Land use	Socio-cultural and functional quality	Outdoors quality
				Safety and Security
				Public accessibility
Hqe-Non Residential Building	Field	Consistency of selected project area with sustainable urban development	Urban Planning	Heritage, nature, identity
		Optimizing access, managing flows		Social function and diversity
		Incentivizing public transportation		Public spaces
		Minimizing environmental damage by controlling transportation modalities		Integration, education, and awareness
		Increasing green spaces		
		Protection and development of biodiversity		Attractiveness, economic dynamics, local branches
		Creation of climatic outdoors		

Table 1. CONT.

Certificates	Land Use, Ecology, Disaster Management		Social and Economic Sustainability	
	Main Theme	Parameters	Main Theme	Parameters
Greenstar Communities	Environment	Sustainable transportation and mobility	Governance	Engagement
				Adaptation and flexibility
				Corporate responsibility
				Participation and active living
				Sustainability awareness
		Sustainability fields	Livability	Healthy and active living
				Social development
				Culture, heritage, identity
				Facility access in walking distance
				Access to fresh food
				Safe places
		Ecological values	Economic welfare	Social investment
				Affordability
				Employment and economic flexibility
				Education and skill development
				Investment profitability
				Incentive programs
Casbee-City	Urban environmental quality	Environmental protection/ Green and wetland areas ratio	Society	Settlement profile
		Local environmental quality/air		Local community
				Governance
		Environmental policy	Economy	Settlement profile
	Urban social quality	Disaster preparedness		Local community
				Governance
ÇEDBİK	Settlement on land	Analysis	–	–
		Adaptation to land and topography		
		Direction of sun		
		Wind direction		
		Effects on water resources and stream beds		
		Protection of natural flora and fauna		
Yes_TR	Sustainable land use, ecology, and disaster management	Ecological asset and land appraisal	Social and economic sustainability	Social and economic welfare
		Sustainable location selection and energy efficient planning		
		Sustainable urban development and land use		
		Disaster resilience		Socio-economic quality
		Environment management and infrastructure planning		

d. LUE IV - Disaster resilience

Definition of disaster history, analysis of risks, establishment of disaster management plans are of outmost importance for resilience against urban disasters. It is also very crucial to take precautions for protection and intervention during disasters and avoidance from their destructive effects. Therefore, settlements applying for a certificate should declare (i) a disaster risk report and a settlement plan regarding disaster management; (ii) a plan for assembly areas and of necessary equipment.

e. LUE V - Environment management and infrastructure planning

Water management is not only important on building scale,

but also on urban scale. Saving of clean water, refinement and reuse of waste water are significant for sustainable urban environment management. Urban waste collection and reuse methods are valuable for sustainable consumption habits. Thus, settlements should have (i) a system for rainwater collection; (ii) waste water management and reuse of refined water; (iii) waste collection and reuse).

f. SES I – Social and Economic Development
The aim of the certification is to improve social inclusion, to provide efficient and sufficient services for various demographic groups, to allow social actualization and to reach a social welfare level with high social acceptability in an existing or a developing area. To ensure and incentivize this, the certification grades settlements in regard to (i) adaptability to demographic needs and priorities; (ii) accessibility of public services; (iii) increase in vocational education and skills; (iv) supporting social development; (v) increase in employment opportunities; (vi) increase in investment profitability; (vii) increase in land values; and (viii) use of incentive programs.

g. SES II - Socio-cultural quality
A green settlement should advocate understanding between different cultures, preserving traditional and cultural identities; it should include organization of social and touristic events, as well as necessary strategies for increasing the life quality of local inhabitants to urban plans and design decisions. The measures to grade this in a settlement are (i) the increase in local mobility, (ii) improvement in healthy and active living; (iii) increase in efforts to support local production and use of local products.

For sustainable urban development it is possible to generate many more indicators. These indicators of the Green Certificate and all its modules are based on an initial analysis of its global examples. While creating the certification it has been considered that the indicators can be updated and serve as a first guide and draft to be worked on further. Turkey has seven geographical sub-regions and four different climate typologies which hold many cultural and ethnic groups. Therefore, researchers having generated the Green Certificate Turkey strongly believe that this certification is adaptable for other countries and their settlements.

Conclusion

To achieve sustainable development, countries need to act with shared wisdom acceding to treaties and following sanctions. A concrete step from Turkey has been nationalization and institutionalization of green building and certification system, which has been a research and development project in nature and was prepared in cooperation with academia, administration and private sector. In this paper, only two of the modules of the whole certification system, LUE and SES have been examined in detail.

For Turkey this concrete step is expected to contribute to the national economy with its multiplier effect and provide a physical transformation of individual buildings or settlements. Hence, it can be claimed that the outcoming certification is directed towards economic, social and physical welfare.

From the perspective of urban planning, with this certification, specifically the two modules examined in this paper, the researchers hope to ensure sustainable land use, energy efficient planning, bottom-up transformation of unplanned building stock, performance of a planned disaster management, development of resilient physical and social systems. The confidence of the researchers lies within a future, when local communities embrace the criteria of green certification and thus even without legal procedures sustainable urban development will be supported in an internalized way.

Acknowledgements

General outputs of the project "A Basic Assessment Guide for Sustainable Green Building-Sustainable Settlement Certification and Preparation of National Data Management Plan for National Green Building Information System Software Development" are used for this study. This project is collaborated between Istanbul Technical University and Ministry of Environment and Urbanization of Turkey. As the authors of this paper and as members of the project team, we would like to thank Murat Bayram, Murat Kantemir, Namık Sandıkçı, Samet Yılancı, Ömer Eroğlu, Esra Tombak, Yıldız Agaya, Çağlar Özdemir, the experts of Directorate General of Vocational Services of the Ministry for their dedication and valuable contributions.

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