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Preface

Prof. Dr. Resmiye Alpar Atun, Editor-In-Chief

As editor in chief, I am pleased to share with you the first issue of the first volume of the EMU Journal of the Faculty of Architecture. This issue has been realized after a long preparation period and I am ever grateful to my colleagues who helped advance the publication process. This issue came to fruition after inviting esteemed authors to participate, and we would like to extend our appreciation to our valued professors for providing all of us with the opportunity to learn together from the expert knowledge shared here.

At the dawn of this new year, 2024, the editorial committee extends our appreciation to all of the academics who inspired and supported the effort of bringing our first faculty periodical to life. For this initial production of the EMU Journal of the Faculty of Architecture, a total of 14 authors contributed five articles and one book review.

For the convenience of our readership and to reach a wider audience, this debut issue and all forthcoming releases will be published in a bilingual format. The writings are prepared in either Turkish or English and translated accordingly.

In this issue, all of the submissions relate to the role and significance of societal and environmental concerns, positioning the actions of living beings and sustainable interactions with nature at the forefront. The key points of the featured articles and book review are summarized in the following brief commentary.

- *Mahmoud Alsaeed, Prof. Karim Hadjri*, and *Dr. Krzysztof Nawratek* took this opportunity to argue "the development of successful sustainable social housing across Europe requires a theoretical basis that defines the concepts involved and establishes clear criteria for measuring housing sustainability." Readers will discover how human action and interacting with nature shape European housing.
- Where Alsaeed, Hadjri, and Nawratek leave off talking about the present and future of design, *Ruşen Keleş* affirms how new design depends on preservation of historic features in the built environment. When one is designing living spaces, Keleş asserts that it is crucial to take into account human factors and adhere to the principle of respecting natural and aesthetic values.
- In their article, *Gökçe Tuna Taygun and Ayşen Ciravoğlu* propose the implementation of an infrastructure of an acceptable evaluation system for the embodied energy of building materials. Building materials constitute the main energy usage of buildings when meeting human needs but they should be evaluated with respect to sustainability.
- Author and Professor *Charlie Hailey* stresses how design-build is a form of experiential learning in which students develop an intimate understanding of the materials by first designing and then actually building projects. The projects serve as intermediaries between the students, materials, environments, and people in design-build pedagogy, creating opportunities for humanitarian and sustainable actions.
- Following the earthquake disaster of February 2023, the responsibility of performing humanitarian service and sustainable design have been a region-wide center of attention *Elif Erkek, Alper Çabuk, Anıl Çakır, İlknur Küçükoğlu, Buse Bölek and Halil Duymuş* contend that Ian McHarg's nature-based planning approach offers opportunities for creating resilient, sustainable cities and should be applied to the reconstruction of the Kahramanmaraş region of Turkey.
- Where we can learn from past events and societies, we should; therefore, this issue concludes with a book review of *Feeding the Byzantine City*, edited by Joanita Vroom. According to *Luca Zavagno and Selman Oğuzcan Ünal,* the book is a compelling and well-structured account. Their review highlights how the book elaborates details of tangible remnants from the Mediterranean environs of Byzantine cities and their roles at the very heart of economic life of the Byzantine Empire. The reviewers express how the book further reveals insights into the society of the time and region – a topic that has occupied the minds of scholars for the past forty or more years.

We are honored to host the writings of these distinguished authors in our journal. Once again, I express sincere gratitude to each of the authors for greatly enriching the commencement of our journal.

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"ARTICLES"

A Proposal to Evaluate Embodied Energy in the Building Product Decision Process

Gökçe Tuna Taygun [1], Ayşen Ciravoğlu [2]

1 Department of Architecture, Yıldız Technical University, İstanbul, Turkey; gokcetunataygun@gmail.com
2 Department of Architecture, Yıldız Technical University, İstanbul, Turkey; aysenc@gmail.com

Abstract

Data and research on environmental behavior and production processes of building materials are extremely limited. Most of the time, in building product selection processes embodied energy is not considered. There are material databases produced for different geographies about embodied energy. However, as for Turkey, there is no known database except for some research based on comparing different materials or limited to presenting embodied energy of very few building materials. For this reason, actors of the building sector in Turkey are only able to use databases of other countries in building product selection processes. Unfortunately, using these data will not result in correct decisions. The need for a model to be used by actors of the building sector that will be easily understandable and integrated into the building process is urgently needed. By proposing a criteria based checklist to be used in building product decision stages, this article enables different actors of the building sector to include embodied energy criteria. This study targets the implementation of an infrastructure of an acceptable evaluation system on embodied energy of building materials, constituting the main energy usage of buildings.

Keywords

Embodied energy, LCA, building materials, product decision processes.

Yapı Ürün Seçim Sürecinde Gömülü Enerjinin Değerlendirilmesine Yönelik Bir Öneri

Gökçe Tuna Taygun [1], Ayşen Ciravoğlu [2]

1 Department of Architecture, Yıldız Technical University, İstanbul, Turkey; gokcetunataygun@gmail.com
2 Department of Architecture, Yıldız Technical University, İstanbul, Turkey; aysenc@gmail.com

Özet

Yapı malzemelerinin çevresel davranışları ve üretim süreçlerine ilişkin veriler ve araştırmalar son derece sınırlıdır. Çoğu zaman yapı ürünü seçim süreçlerinde gömülü enerji dikkate alınmaz. Gömülü enerji ile ilgili farklı coğrafyalara yönelik üretilmiş malzeme veritabanları mevcuttur. Ancak Türkiye için farklı malzemeleri karşılaştırmaya dayalı veya çok az yapı malzemesinin gömülü enerjisini sunmakla sınırlı bazı araştırmalar dışında bilinen bir veri tabanı yoktur. Bu nedenle Türkiye'de yapı sektörünün aktörleri yapı ürün seçim süreçlerinde yalnızca diğer ülkelerin veri tabanlarını kullanabilmektedir. Ne yazık ki bu verileri kullanmak doğru kararlarla sonuçlanmamaktadır. İnşaat sektörünün aktörlerinin kullanacağı, kolay anlaşılabilecek ve inşaat sürecine entegre edilebilecek bir modele acilen ihtiyaç duyulmaktadır. Bu makale, yapı ürünü karar aşamalarında kullanılacak bir kontrol listesi önererek, yapı sektörünün farklı aktörlerinin gömülü enerji kriterlerini projelerine dahil etmesine olanak sağlamaktadır. Bu çalışma, binaların ana enerji kullanımını oluşturan yapı malzemelerinin gömülü enerjisine ilişkin kabul edilebilir, kriter tabanlı bir değerlendirme sisteminin altyapısını oluşturmayı hedeflemiştir.

Anahtar Kelimeler

Gömülü enerji, YDD, yapı malzemesi, ürün seçim süreçleri.

1 Introduction

We are living in a century where earth resources are lessening and production and consumption processes inevitably result in soil, water and air pollution. It is a well known fact that buildings play an important role in this situation. The construction industry, along with its support industries, depletes two-fifths of global raw stone, gravel, and sand and one-fourth of virgin wood, and consumes 40 percent of total energy and 16 percent of water annually (Dixit et al., 2010). As resource consumption and environmental effects mainly result from the building sector, sustainability of buildings comes out as a vital subject. Even though sustainability has both social and economic aspects along with environmental ones, energy issues appear to be the most important element in an ecological building.

Energy is an important component of buildings both in construction, usage and demolition processes. Regarding the amounts of energy used, whether this energy is generated by using finite sources such as nonrenewable energy sources is an important issue. Despite many studies and works conducted, and an awareness about environment is shared by many nations, still most of the energy used by many nations is produced from nonrenewable sources. Besides this energy is not used efficiently. We know that a decrease of energy usage is very important as it plays a major role in the generation of environmental problems.

Studies on decreasing energy consumption in buildings mainly focus on operational energy from the usage stage of buildings. However Commonwealth Scientific and Industrial Research Organization (CSIRO) research (as cited in Dixit et al., 2010) has demonstrated that the embodied energy contents of an average household in Australia are nearly equivalent to fifteen years of operational energy. For this reason this article focuses on embodied energy and its evaluation in building product selection stages.

1.1 Aim and Method of the Research

Data and research on environmental behavior and production processes of building materials are very limited. The aim of this research is to implement the infrastructure of an acceptable evaluation system on embodied energy of building materials, which constitutes the main energy consumption of buildings. This will help for taking into account the embodied energy in buildings. Besides, paying attention to embodied energy in the decision stage will help achieve the issues below:

Efficient and effective consumption of natural and artificial resources

Efficient and effective consumption of energy and energy resources

Prevention and/or diminishing of environmental waste and pollution

Preserving the health of living-beings.

In order to achieve sustainable buildings a model is constructed in the scope of this study to help select from different products according to embodied energy of building materials. An easily applicable checklist is designed taking into account Life Cycle Assessment of building products.

1.2 Literature Review on Embodied Energy

From environmental point of view, an important element of a sustainable building material is its embodied energy. Embodied energy is defined as the total energy input consumed throughout a product's lifecycle. Initial embodied energy represents energy used for the extraction of raw materials, transportation to factory, processing and manufacturing, transportation to site, and construction. Once the material is installed, recurring embodied energy represents what is used to maintain, replace and recycle materials and components of a building throughout its life. However this feature is mostly ignored in building product decision processes because of the complexity of calculation methods. According to Langston and Langston (as cited in Dixit et al., 2010) while measuring operating energy is easy and less complicated, determining embodied energy is more complex and time consuming. Furthermore, there is currently no generally accepted method available to compute embodied energy accurately and consistently and as a result, wide variations in measurement figures are inevitable, owing to various factors (Dixit et al., 2010).

For the calculation of embodied energy, hybrid methods including process analysis and input-output analysis are used (Crawford, 2008; Lenzen and Dey, 2000; Lenzen and Treloar, 2002). Producers and/or researchers may use these methods. However current embodied energy data and databases exhibit inaccuracy and variability because of inconsistent methodologies that are used to determine the embodied energy of building materials. This leaves the industry with published embodied energy values that are not comparable. Parameters, such as system boundaries, primary or delivered energy and feedstock energy, define the input variables that are included in embodied energy calculations. Other parameters, such as age and source of data, data representativeness (temporal, spatial and technological), and methods of measurement, affect data quality. These parameters differ in current databases and influence the process of decision-making in the construction industry (Dixit et al., 2010). Therefore, designers and/or users who will make decisions as to which materials are going to be used, cannot be expected to make these calculations.

In many nations, despite all of the efforts to encourage Environmental Product Declarations, studies made according to European Standards on Sustainability of Construction Works, because of the fact that building material producers are still not willing to produce and/or share information about production processes, it is difficult to predict embodied energy. Therefore, the usage of this criterion in product selection processes becomes impossible. There are product information databases by different institutions for different countries. However, because of a lack of local data, using these international databases will not result in accurate decision processes. What is more problematic is that even there is a data to be used, we know that uncertain information about embodied energy is available to people involved in decision-making and their decisions are influenced by this uncertainty (Dixit et al., 2012).

For instance it can be stated that Ciravoğlu (2005), Esin (2007), Ciravoğlu and Tuna Taygun (2012) have researched embodied energy from a local perspective. However, these works which are done in the scope of Turkey, are either limited to a few building products or give information which will only help compare different building products. Therefore, the need for a model to be used by all actors of the building sector that will be easily understandable and integrated into the design process is urgently needed. By proposing a checklist, this article enables different actors of the building sector to include embodied energy criteria in material selection processes in buildings.

2 Building Product Decision in Buildings

In a traditional world, decision making between limited numbers of building products depended on experience and tradition (Balanlı, 1997). However social and economic transformation that occurred because of industrialization and negative effects of global environmental problems influenced production processes and the quality and quantity of building products. This situation increased and hardened responsibilities of the actors in charge of these decisions.

Decision making about product selection is important as neglect of this issue will result in negative effects to the natural and built environment, human health and a nation's economy. If an importance is given to the building product selection processes, this will obviously result in more healthy built environments. Appropriate product decision making requires adequate product information, which in turn requires an information database.

There are a variety of information sources such as professional publications, brochures of product firms, building catalogues, publications on the standards about building product selection processes. Most of these cover:

- Visual (form, size, color, etc.),
- Physical (features related to temperature, unit weight, moisture, water, etc.),
- Chemical (effects of water and moisture, gasses, corrosion, etc.),
- Mechanical (behavior against tension and compression, shear, shear stress, shear resistance, etc.),
- Technological (deformation, fracture, collision resistance, etc.),
- Economic (production, transportation and storage costs, etc.) features of building products or information on their usage in buildings (Balanlı, 1997; Arıoğlu, 1993; Tuna Taygun, 2005).
- However, as these resources are generated for different purposes, they are limited in number and are scattered; they also hinder the gathering of accurate information on products' environmental features and result in inaccurate product decisions.

Building products are in direct and indirect interaction with the environment in a lifecycle including the processes of extraction, transportation to factory, processing and manufacturing, transportation to site,
construction, usage, recycling and disposal. Appropriate energy usage and waste generation in these processes are very important as they lead to healthy and sustainable environments for both current and future generations.

2.1 Product Decision Criteria in Buildings

Product decision criteria in buildings can be stated as follows:

- Functional and structural needs,
- Building cost,
- Building design,
- User needs,
- Production methods of building materials,
- Lifespan of a product,
- Environmental impacts.

According to the criteria above, product features can be stated as follows:

- Economic,
- Usage:
  - Visual (form, size, color, etc.),
  - Physical (features related to temperature, unit weight, moisture, water, etc.),
  - Chemical (effect of water and moisture, gasses, corrosion, etc.),
  - Mechanical (behaviors against tension and compression, shear, shear stress, shearresistance, etc.),
  - Technological (deformation, fracture, collision resistance, etc.),
  - Economic(production, transportation and storage costs,etc.) features of building products.
- User requirements,
- Aesthetics (appropriateness to the decisions given in architectural design processes).

Environmental problems experienced over the years have brought out the importance of product decision in buildings. Considering the changes that the planet is experiencing, the criteria listed above has become inadequate. For this reason, this article proposes to add a sustainability criterion in building product decision processes.

2.2 Sustainability Criteria Building Product Decision in Buildings

Sustainable buildings use natural resources such as raw materials, energy and water effectively and produce waste and emissions that harm the environment less than the other buildings (Esin, 2006).

According to Ljungberg (2007) ecological design criteria can be stated as using products that have a low environmental impact, have clean product processes, avoid harmful and toxic products, increase efficiency of embodied energy, increase efficiency of operational energy, design waste management and are recyclable.

A sustainable product is a product, which effects the environment less during its total lifecycle. Features of a sustainable product are (Ljungberg, 2007):

- Diminishing material and energy usage in its total lifecycle,
- Diminishing formation, distribution, radiation of toxic materials in its total lifecycle,
- Increasing the amount of recyclable materials,
- Increasing sustainable usage of renewable resources,
- Increasing the lifespan of products,
- Evaluating and diminishing the environmental impacts in the lifecycle of products

According to the list above, sustainable product features can be detailed as follows:

- Usage of rapidly renewable natural and artificial resources,
- Usage of recyclable products,
- Usage of products that are produced from recycled materials and products,
- Usage of reusable products,
- Usage of products that are produced locally,
- Efficient usage of energy,
- Efficient usage of soil,
- Efficient usage of water,
- Not producing environmental wastes and pollution,
- Not effecting health of beings in a negative way.

As environmental problems are increasing day by day, it is possible to expect that the building sector will also be affected. Sustainability in the building sector can to a great extent be achieved by building product selection processes. Therefore, we suggest that a "sustainability" specialty of the product be added to product specialties which effect product decision processes such as economic, usage (physical, chemical, mechanical, technological), user needs, and aesthetics in order to be responsive to the vital environmental problems that we are now experiencing (Table 1).

According to the model proposed in this study, a sustainability specialty of a product can be outlined as folows:

- Resource usage:
  - Product:
    - Renewable resource usage,
    - Recyclable product usage,
    - Recycled product usage,
    - Reusable product usage,
    - Usage of products produced from local materials,
  - Efficient usage of energy,
  - Efficient usage of water,
  - Not producing environmental waste and pollution,
  - Not effecting health negatively.

As can be followed from Figure 1, the lifecycle of a product includes processes such as:

- Design of the product,
- Extraction of raw materials of the product, o Production of the product,
- Sales of the product,
- Installation of the product in the building, o Usage of the product in a building,

After completion of a product's service life;

- Recycle of the product or
- Disposal of the product

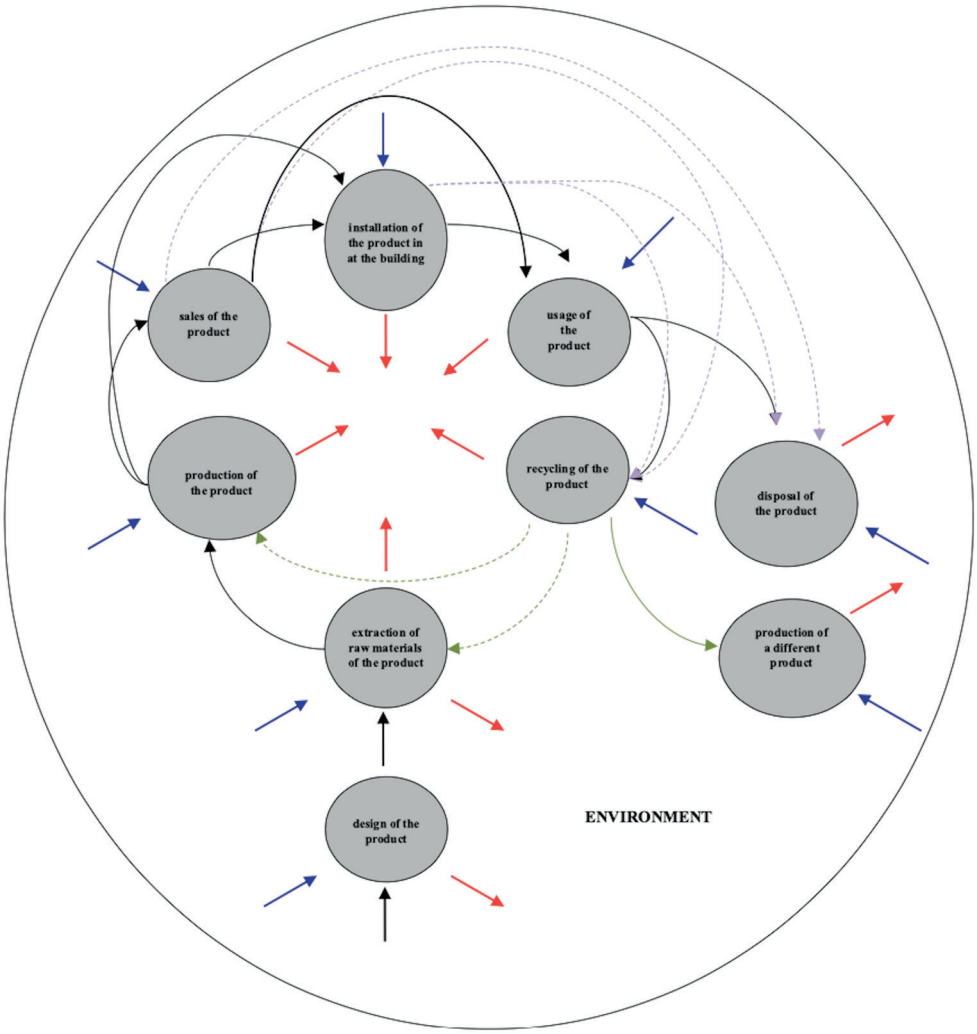

Figure 1. *Lifecycle processes of a building product*

Table 1. *Product decision criteria in a sustainable.*

SPECIALTIES OF THE PRODUCT				LIFECYCLE PROCESSES OF A BUILDING							
				Design of the product	**Extraction of the raw materials of the product**	**Production of the product**	**Sales of the product**	**Installation of the product to the building**	**Usage of the product in the building**	**Recycling of the product**	**Disposal of the product**
Sustainability	**Resource Usage**	**Product**	Usage of renewable resources								
			Usage of recyclable product								
			Usage of recyclable product								
			Usage of reusable product								
			Usage of products produced from local materials								
		Efficient usage of energy									
		Efficient usage of soil									
		Efficient usage of water									
	Not producing environmental wastes and pollution										
	Not effecting health of beings in a negative way										
Economic											
Usage	**Physical**	Specialties related to moisture and water									
		Specialties related to heat									
		Specialties related to noise									
		...									
	Chemical	Effect of water and moisture									
		Effect of gasses									
		Effect of corrosion									
		...									
	Mechanical	Behaviors against tension and compression									
		Shear, shear stress									
		Shear resistance									
		...									
	Technological	Deformation									
		Fracture									
		Collision resistance									
		...									
User requirements											
Aesthetics	Appropriateness to the decisions given in architectural design processes										

PRODUCT DESICION IN A SUSTAINABLE BUILDING

Evaluation of the lifecycle processes and sustainability specialties of a product together will result in accurate decisions in product selection processes. When specialties and lifecycles of a product are taken into account in a holistic perspective and while sustainability and economic dimensions in lifecycle processes vary, usage, user needs and aesthetic specialties can be evaluated independently.

According to the table where product decision criteria in a building are defined (Table 1), energy used in lifecycle processes of a product becomes an important design criterion.

3 A Proposal to Evaluate Embodied Energy Criteria in Building Product Decision

Embodied energy wasted in a product's lifecycle processes can be defined by a collaborative study of product producers, the public and academia. Information, certification or classification can be produced in order to guide designers. There are limited studies in which producers and academics are working together to achieve databases. As the processes are very slow and limited to a certain kind of product, in this article an easily understandable and applicable model that may be used by actors of the building sector to evaluate products is proposed.

According to the model, to evaluate embodied energy, a criteria list and a rating system has been created.
Criteria, which can be followed from Table 2, include a product's:

- Lifecycle processes,
- Energy evaluation criteria in lifecycle processes,
- Building product alternatives generated for product decision in the design process.

Lifecycle processes that are explained in detail in Figure 2 consist of processes that are directly and indirectly linked to each other. Energy evaluation criteria consist of the path that the product follows between processes and the type and quantity of the energy exploited there and those criteria that effect them. Quality and quantities in regard to product criteria are evaluated as in three forms. In terms of type of energy used in processes:

- Renewable energy (solar, wind, geothermal..) 1 point
- Renewable energy (hydro) 2 point
- Nonrenewable (natural gas, petroleum) 3 point
- Nonrenewable (coal) 4 point
- Nonrenewable (nuclear) 5 point

In terms of amount of energy used in processes:

- Very low 1 point
- Low 2 point
- Acceptable 3 point
- High 4 point
- Very high 5 point

In terms of specialty of the raw material used in the production process of the material and product:

- Recycled/Renewable/Recyclable raw material usage 1 point
- Non-Recycled/Renewable/Recyclable raw material usage 5 point

In terms of duration of the usage of the product in the building:

- 50-100 years 1 point
- 20-50 years 2 point
- 10-20 years 3 point
- 5-10 years 4 point
- 0-5 years 5 point

In terms of reusability of the product in the building:

- Reusable 1 point
- Non-Reusable 5 point

In the evaluation table, in columns, points of different building products which are defined related to their specialties can be written, and then by summing up those points the overall evaluation on embodied energy of a product can be generated. The table makes it possible to compare embodied energy points of different product alternatives and to select the optimum choice from a variety of products.

According to Table 2, there are 46 criteria in Lifecycle Assessment processes to evaluate embodied energy. However, considering different building products, not all products go through all processes. Here, in the model there are 8 criteria that can be bypassed. For instance, a product after its production goes to a building site and/or a building. Therefore 2 criteria are bypasses. Similarly, after completion of its life the product either goes to recycle or demolition. Therefore these 6 of them are obligatory bypasses. For this reason, the scale of the total points that a product can get is designed on 38 and 40 points and its multiples. Undoubtedly in product decision, it is more appropriate to select the product with the fewest total points considering its embodied energy according to the model proposed in this study. Nevertheless, when the total points are close to each other, it will be more appropriate with regard to sustainable product decisions to compare different product alternatives according to the points they get during different Lifecycle Assessment processes outlined in the model.

According to the processes that are outlined in the table, minimum and maximum points are between 0 and 132.

According to the total points, the following definitions can be made:

- 34-80 points sustainable product with regard to embodied energy
- 81-120 points acceptable product with regard to embodied energy
- 121-200 points unsustainable product with regard to embodied energy

According to the proposed model, a scale regarding boundaries of embodied energy consumption of different elements or components of a building can be generated. For instance a boundary value for flooring can be produced. This is left for further studies.

Embodied energy should be included in building codes. These codes should not only include an evaluation method of a building type or product, but should define criteria and boundaries which may be applicable to all of the materials. One option is to base these criteria on model buildings and real values of case studies of existing buildings.
In an overall evaluation it can be stated that international methods generated in order to calculate embodied energy of building products should result in a standard unit in order to compare different materials.

Table 2. *Evaluation of embodied energy.*

LIFECYCLE PROCESSES	ENERGY EVALUATION CRITERIA in LIFECYCLE PROCESSES	BUILDING PRODUCTS		
		Option 1	Option 2	Option 3
Extraction of raw materials of the product	Type of energy consumed in extraction of raw materials			
	Amount of energy consumed in extraction of raw materials			
Transportation	Type of energy consumed in transportation of raw materials to factory			
	Amount of energy consumed in transportation of raw materials to factory			
Production of the Product	Type of energy used in production of the material			
	Amount of energy used in production of the material			
	Recyclable raw material usage in production of the material			
	Recycled raw material usage in production of the material			
	Renewable raw material usage in production of the material			
	Type of energy consumed in production of the product			
	Amount of energy consumed in production of the product			
	Type of energy consumed in packaging of the product			
	Amount of energy consumed in packaging of the product			
	Recyclable material usage in production of the product			
	Recycled material usage in production of the product			
	Renewable material usage in production of the product			
Transportation	Type of energy consumed in transportation of the product from factory to sales unit			
	Amount of energy consumed in transportation of the product from factory to sales unit			
	Type of energy consumed in transportation of the product from factory to building site			
	Amount of energy consumed in transportation of the product from factory to building site			
Sales of the Product	Type of energy consumed in sales department of the product			
	Amount of energy consumed in sales department of the product			
Transportation	Type of energy consumed in transportation of the product from sales department to building site			
	Amount of energy consumed in transportation of the product from sales department to building site			
	Type of energy consumed in transportation of the product from sales department to building			
	Amount of energy consumed in transportation of the product from sales department to building			

Installation of the Product to the Building	Type of energy consumed by the product in the building installation process			
	Amount of energy consumed by the product in the building installation process			
Transportation	Type of energy consumed in transportation of the implementation wastes of the product to the recycle plant			
	Amount of energy consumed in transportation of the implementation wastes of the product to the recycle plant			
	Type of energy consumed in transportation of the implementation wastes of the product to the disposal plant			
	Amount of energy consumed in transportation of the implementation wastes of the product to the disposal plant			
Usage of the Product	Type of energy consumed in usage of the product in the building			
	Amount of energy consumed in usage of the product in the building			
	Products' easy maintenance and repair			
	Type of energy consumed during maintenance and repair of the product			
	Amount of energy consumed during maintenance and repair of the product			
	Long lasting usage of the product in the building			
	Reusability of the product in the building			
Transportation	Type of energy consumed in the transportation of the product which completed its life to the recycle plant			
	Amount of energy consumed in the transportation of the product which completed its life to the recycle plant			
	Type of energy consumed in the transportation of the product which completed its life to the disposal plant			
	Amount of energy consumed in the transportation of the product which completed its life to the disposal plant			
Recycling of the product	Products' easily separable specialty for recycle processes			
	Type of energy consumed during recycle processes of the product			
	Amount of energy consumed during recycle processes of the product			
Transportation	Type of energy used in transportation of the product which passed from recycle processes to place where raw materials of the new products are extracted			
	Amount of energy used in transportation of the product which passed from recycle processes to place where raw materials of the new products are extracted			
	Type of energy used in transportation of the product which passed from r ecycle processes to place where raw materials of the new products are produced			
	Amount of energy used in transportation of the product which passed from recycle processes to place where raw materials of the new products are produced			
Disposal of the Product	Type of energy consumed in disposal processes of a product			
	Amount of energy consumed in disposal processes of a product			
	TOTAL POINTS			

Data and criteria that are put forth in this chapter are expected to be a guiding source for evaluating embodied energy in product selection processes for actors of the building sector to achieve sustainable buildings.

4 Results and Discussion

Sustainability is an important entity in product decision processes in buildings. However, in which stage and how to benefit from sustainability in the product decision is vague. The model proposed in this study is aimed to ease this process by helping actors of the building sector compare different products and make accurate decisions.

Embodied energy becomes a determining entity in issues of sustainability of a building product.
For this reason, the model proposed in this study is to be a guiding method to evaluate embodied energy that will help professionals in the building product decision processes. The evaluation measures the type and amount of energy that a product consumes in its lifecycle processes. Instruments are provided to compare alternatives according to the embodied energy criteria in product decision processes.

This study proposes a model that will facilitate product decision processes. However in further research an easily used Lifecycle Assessment tool that will evaluate building products should be generated. With the use of such a model evaluation of the building products, announcement of those evaluations and constitution of specific certification systems will take place and these will help decision processes. Undoubtedly, to achieve an easily applicable Lifecycle Assessment tool, product producers, the public and academia should collaborate. This type of a multi-actor study can implement a valid, acceptable and usable method.

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A Review of European Assessment Criteria for Environmentally Sustainable Social Housing

Mahmoud Alsaeed [1], Karim Hadjri [2] and Krzysztof Nawratek [3]

1 Sheffield School of Architecture, The University of Sheffield, Sheffield, United Kingdom; m.alsaeed@sheffield.ac.uk
2 Sheffield School of Architecture, The University of Sheffield, Sheffield, United Kingdom; k.hadjri@sheffield.ac.uk
3 Sheffield School of Architecture, The University of Sheffield, Sheffield, United Kingdom; k.nawratek@sheffield.ac.uk

Abstract

In times of rising housing demand, measures to attain environmentally sustainable social housing are crucial and are attracting increasing attention from scholars, practitioners and policymakers in the European Union. However, developing environmentally sustainable social housing without a clear understanding and robust measurement criteria can be inefficient and counterproductive. This review argues that the development of successful sustainable social housing across Europe requires a theoretical basis that defines the concepts involved and establishes clear criteria for measuring housing sustainability. To achieve this, the study works to answer the following questions: What constitutes environmentally sustainable social housing? How can we measure the sustainability of housing? The answers are approached from a multidisciplinary perspective that demolishes the inherited silos around sustainability and housing. A literature-based review was used to define the concept of sustainable social housing and to identify the prominent methods for measuring its sustainability deployed by various European countries. Secondary data was collected by reviewing relevant materials, including peer-reviewed articles, dissertations, conference proceedings and other documents in the Scopus and Web of Science databases. The findings of this study offer insight into the existing literature on the environmental sustainability of social housing and provide critical insights for further empirical studies. Practically, it proposes a definition of environmentally sustainable social housing based on a trilogy of pillars, including housing, environment, and project impact monitoring. It also highlights the key criteria for assessing the sustainability of social housing in the EU.

Keywords

Social housing, EU sustainable housing, environmental sustainability.

Çevresel Açıdan Sürdürülebilir Sosyal Konut için Avrupa Değerlendirme Kriterlerinin Gözden Geçirilmesi

Mahmoud Alsaeed [1], Karim Hadjri [2] and Krzysztof Nawratek [3]

1 Sheffield School of Architecture, The University of Sheffield, Sheffield, United Kingdom; m.alsaeed@sheffield.ac.uk
2 Sheffield School of Architecture, The University of Sheffield, Sheffield, United Kingdom; k.hadjri@sheffield.ac.uk
3 Sheffield School of Architecture, The University of Sheffield, Sheffield, United Kingdom; k.nawratek@sheffield.ac.uk

Özet

Konut talebinin arttığı dönemlerde, çevresel açıdan sürdürülebilir sosyal konut elde etmeye yönelik tedbirler hayati önem taşımaktadır ve bu tedbirler Avrupa Birliği'ndeki (AB) akademisyenlerin, uygulayıcıların ve politika geliştiricilerin artan ilgisini çekmektedir. Ancak, net bir anlayış ve sağlam ölçüm kriterleri olmadan çevresel açıdan sürdürülebilir sosyal konutların geliştirilmesi verimsiz ve hatta zarar verici olabilir. Bu derleme, Avrupa genelinde başarılı sürdürülebilir sosyal konut gelişiminin, ilgili kavramları tanımlayan ve konut sürdürülebilirliğini ölçmek için açık kriterler oluşturan teorik bir temel gerektirdiğini ileri sürmektedir. Bunu başarmak için, çalışma şu sorulara cevap bulmaya çalışmaktadır: Çevresel açıdan sürdürülebilir sosyal konut nasıl oluşur? Konutun sürdürülebilirliğini nasıl ölçebiliriz? Cevaplara, sürdürülebilirlik ve konut kavramlarında süregelen bariyerleri yıkan çokdisiplinli bir bakış açısıyla yaklaşılmaktadır. Sürdürülebilir sosyal konut kavramını tanımlamak ve çeşitli Avrupa ülkeleri tarafından uygulanan sosyal konut sürdürülebilirliğini ölçmek için kullanılan yöntemleri belirlemek için, literatüre dayalı bir derleme yapıldı. İkincil veri, hakemli makaleler, tezler, konferans bildirileri, Scopus ve Web of Science veritabanlarındaki diğer belgeler dahil olmak üzere, ilgili materyallerin incelenmesiyle toplandı. Bu çalışmanın bulguları, sosyal konutların çevresel sürdürülebilirliğine ilişkin mevcut literatüre ışık tutmakta ve gelecekteki deneysel çalışmalar için kritik bilgiler sağlamaktadır. Pratikte, çevresel açıdan sürdürülebilir sosyal konutun tanımı, konut, çevre ve proje etkilerinin izlenmesi şeklinde, üç temel birleşene dayalı olarak önerilmiştir. Aynı zamanda, AB'de sosyal konutların sürdürülebilirliğinin değerlendirilmesine yönelik temel kriterler de vurgulanmıştır.

Anahtar Kelimeler

Sosyal konut, AB sürdürülebilir konut, çevresel sürdürülebilirlik.

1 Introduction

Sustainability and housing in Europe are inherently intertwined topics. Their connections and ramifications transcend the conventional boundaries of each and form what has recently been called "sustainable social housing". The idea of sustainable housing draws from various origins and is influenced by numerous initiatives and theories. However, the driving force behind housing sustainability is primarily rooted in the sustainable development agenda (Oyebanji, 2014). Environmental sustainability of housing, however, requires clear contextualisation based on the pillars of sustainability at local, regional and global levels (Salama, 2021). Europe possessed more than 235 million housing units in 2021, which is projected to surge in the upcoming decade (Statista, 2021). Concurrently, the residential sector produces around 17% of global annual CO2 emissions (IEA, 2022b) and consumes almost 21% of the world's energy (IEA, 2022a). Consequently, the imperative arises to create homes within the confines of available natural and energy resources (CECODHAS, 2023). While the impediments to sustainable housing construction are widely recognised, a comprehensive and operational understanding of the sustainability concept remains lacking (Mulliner & Maliene, 2015; Renukappa et al., 2012). Furthermore, sustainability misconceptions can engender negative perceptions that hinder the acceptance of this fundamental idea (Renukappa et al., 2012). This study, therefore, argues that developing environmentally sustainable social housing in Europe without a well-defined concept and robust measurement criteria can be ineffective and counterproductive.

The development of a sustainable and efficient social housing sector hinges upon the formulation of a coherent definition encompassing the relevant concepts and looking at the issues from a multidisciplinary perspective that considers the views of various stakeholders. Furthermore, the quantification of sustainability levels and their success factors is a crucial step in prioritising and identifying areas for improvement as an essential measure for sustainable social housing development. Therefore, two key inquiries emerge: What constitutes environmentally sustainable social housing? How can housing sustainability be measured?

Addressing these inquiries mandates an objective evaluation of existing knowledge. Secondary data was collected by reviewing relevant materials, including peer-reviewed articles, dissertations, conference presentations and other documents available in specialised databases. The identification of sources employed a combination of keyword and term searches related to topics such as sustainability definitions, housing theories, sustainability policies in the EU, environmental sustainability, sustainability assessment systems, sustainability in housing, and environmentally sustainable social housing. The search's temporal scope was limited to the 2000s onward, however, older material was considered if it garnered notable attention or influence in the studied areas. The process of material selection, as emphasised by Mensah (2019), and Browning & Rigolon (2019), is pivotal to qualitative studies. Therefore, at the outset of this study, inclusion and exclusion criteria were defined based on three core principles: (1) pertinence to the study's overarching discourse, (2) the authority and credibility of sources encompassing authors and publishers, and (3) material impact, gauged quantitatively through citation metrics (Browning & Rigolon, 2019; Mensah, 2019).

The outcome of this study identifies a triad of pillars to define environmentally sustainable social housing. The housing pillar clarifies and describes the conventional criteria associated with housing development, such as beneficiaries, financing and future goals. The environmental pillar represents the necessary balance between buildings, people and nature. In addition, the monitoring pillars define a set of qualitative criteria and quantitative indicators that guide the assessment of the environmental sustainability of the development. Furthermore, this study provides an essential insight into the existing literature on the environmental sustainability of social housing and provides valuable insights for further empirical studies.

2 State of the art in environmentally sustainable social housing

A precise and definitive characterisation of environmentally sustainable social housing remains elusive. Instead, it encompasses a bundle of interconnected expressions (e.g., low-impact buildings, sustainable buildings, and environmentally responsible buildings) and interwoven environmental assessment methods (e.g., Leadership in Energy and Environmental Design, Building Research Establishment Environmental Assessment Method, and Level(s)). To understand this term methodologically thoroughly, it was therefore essential to formulate an illustrative explanation for the narratives of sustainability and social housing and then explore the links to the most prominent methods of measuring the sustainability of housing. Thus, this section lays the ground for the necessary definitions and examines the global literature on the concepts studied.

2.1 Environmental sustainability narratives

"The term sustainability has become one of the most overused and all-too-frequently misused terms in the development literature."(Choguill, 2007, p. 144)

Murphy (2012) explained that defining sustainability is a "super-wicked" problem with multiple implications – among many, the scale, purpose and scope of interventions invariably emerge. Yearworth's (2016) work attributes the wickedness of defining sustainability to the fact that there is no definitive formulation, no stopping rule and no precise boundaries for the problem (Yearworth, 2016). Therefore, to understand the meaning and structure of sustainability, one should ask the questions: Sustainability of what? And which pillars constitute the structure of sustainability.

According to Moldan et al. (2012), citing earlier scholars such as Serageldin and Streeter (1993) and Goodland (1995), the term environmental sustainability was first coined by the World Bank and used to mean "environmentally responsible development" that protects the environment while supporting the capacity for economic growth (Goodland, 1995; Moldan et al., 2012; Serageldin & Streeter, 1993). Caradonna (2017) added that such growth aims to improve human well-being without depleting natural resource sources or exceeding waste management capacity. Moreover, supporting the planet's biophysical system is essential for maintaining and enhancing the integrity of systems associated with human well- being (Caradonna, 2017). Since then, the concept of sustainability has evolved rapidly, influencing foundational work such as the 1987 report Our Common Future", which has become an essential part of the European Union's long-term objectives as defined in Article 3(3) of the Treaty on European Union (Brundtland et al., 1987; Moldan et al., 2012; Sutton, 2004). Environmental sustainability has thus become a part of sustainable development. Additionally, it is often defined as the type of development that meets the needs of the present without compromising the ability of future generations to meet their own needs by striking a balance between economic growth and the protection of social and environmental equilibrium (EUR-Lex, 2001).

Although the literature does not point to an established definition of environmental sustainability in the EU for example, there are several scholars, such as Hey, C. (2005), Jabareen (2006), Portney (2015), Purvis et al., (2019) and Morelli (2011), who have defined environmental sustainability from a global perspective, which has influenced the perception of the term at the EU level. One of the most prominent definitions of the environmental pillar is often created by describing environmental protection goals and their relationships to other overarching concepts (Purvis et al., 2019). Environmental sustainability has become a dynamic and multidisciplinary concept linked to many other concepts, such as resilience, durability and renewability (Jabareen, 2006). Morelli (2011) add that, it can be applied at different levels and includes tangible and intangible aspects. Portney (2015), on the other hand, argues that the aims of environmental sustainability are to conserve natural resources, support human well-being and promote industrial efficiency without compromising society's ability to develop. Holistically, the current approach to implementing sustainability aims to reduce the resource consumption of buildings (water, energy) and waste production while improving the quality of the built environment. This goes beyond the boundaries of a single building and extends to the city's urban fabric (Berardi, 2012; McLennan, 2004).

Currently, the EU's approach to environmental sustainability is often exemplified by directives, policies, initiatives and guidelines (Hey, 2007). Most notable is the European Green Deal, which aims to make Europe carbon-neutral by 2050 while promoting sustainable economic growth (Fetting, 2020; Siddi, 2020). In addition, the EU emphasises the importance of integrating environmental concerns into all policies, including energy, transport, agriculture and industry. For example, the EU Action Plan for the Circular Economy aims to promote an economy that reduces waste and supports sustainable consumption and production patterns (Hermoso et al., 2022; Johansson, 2021). Overall, the EU approach to environmental sustainability emphasises the need for a comprehensive, integrated and long-term perspective that considers the economic, social and environmental dimensions of sustainability, as well as the importance of international cooperation in addressing global environmental challenges (Fetting, 2020; Hermoso et al., 2022; Siddi, 2020).

In summary, to answer the question "What is environmental sustainability?" this study suggests that sustainability is not a new science, paradigm or set of qualitative indicators. Instead, it is a set of wicked problems that holistically challenge the planet and its systems and impact on human existence and well- being in the present and future. From the definitions reviewed, it appears that sustainability is not presented or explained in terms of appropriate solutions to address the various challenges. Furthermore, the debate on the definition of sustainability is abstract if it is not clarified what is to be sustained and how can it be preserved? Therefore, it will remain a challenge to determine which definition has the better vision of sustainability and its pillars.

2.2 Social housing narratives

In academic discussions, establishing a single, universally applicable definition of social housing proves difficult due to its inherent dependence on specific countries and local contexts (Alsaeed & Hadjri, 2023; Braga & Palvarini, 2013). Braga & Palvarini (2013) explained that the division between definitions of social housing goes beyond the boundaries of semantics and affects the use of the term itself, with synonyms for social housing such as limited-profit housing, cooperative housing and protected housing have defined EU Member States' approach to social housing provision. Scholars, however, commonly approach the concept of social housing from two distinct angles: the legal and the academic perspectives. Within these two perspectives, the analysis of social housing often revolves around four main criteria: the provider, the tenure, the funding, and the target group or beneficiaries (Braga & Palvarini, 2013; Carswell, 2012; Granath Hansson & Lundgren, 2019).

In a legal context, scholars such as Braga & Palvarini (2013), Carswell (2012), and Granath Hansson & Lundgren (2019) have explained that the EU builds the social housing narrative on a tribology of pillars. First, the "mission of general interest" is to provide adequate, safe and accessible housing. The "objective", on the other hand, is to increase the supply of housing in the Member States. Meanwhile, the "target" is to provide affordable housing for specific groups defined by their socioeconomic status or the presence of vulnerabilities. Beyond these three foundational pillars, Braga & Palvarini (2013) have identified a fourth distinctive aspect, as the utilisation of "public support", whether in direct or indirect form, including public assistance, support or subsidies. *The Comité Europeen de Coordination de l'Habitat Social* – commonly known as Housing Europe, on the other hand, defined social housing by describing the nature of tenure and the beneficiaries. Social housing is thus rental housing or owner-occupied housing for which there are specific rules for access by households with housing difficulties such as affordability (Czischke, 2005).

From an academic perspective, Elsinga (2012) explains that social housing in the EU is broadly described as a set of initiatives to provide quality and affordable housing for vulnerable and middle-income groups, often managed by governmental entities (Elsinga, 2012). However, the UK and the Netherlands have majorly entrusted social housing to non-profit organisations. This is in contrast to Germany and Spain, where public subsidies are given to commercial landlords in return for a fixed social rent, thus constituting a form of social housing (Elsinga, 2012). Granath Hansson and Lundgren (2019) further argue that the historical development of social housing in the EU has involved a significant transfer of responsibility from local authorities to non-municipal providers, albeit under highly regulated practices (such as the UK managerialist approach). Priemus (2013) definition, on the other hand, focuses on explaining the regulatory framework and public intervention roles in governing social housing. In this definition, the target group is explicitly identified as households that cannot compete in the private housing market because of financial, physical or psychological challenges or because they belong to an ethnic minority or immigrant group. Furthermore, Priemus' description characterises the EU's primary typologies of social housing, including owner-occupied housing, commercially rented housing and public housing (Granath Hansson & Lundgren, 2019; Priemus, 2013). Bengtsson (2017) takes a target group perspective and characterises social housing as a "system" designed to provide housing to resource-limited households, but only after validating the necessity of their needs (Bengtsson, 2017, as cited in Granath Hansson & Lundgren, 2019).

Although there is no universally accepted definition of social housing, it is possible, however, to suggest that social housing is a housing "system" that aims to support households with limited financial resources by providing them with long-term housing, where tenure selection must have a test mechanism that considers the needs of the target groups. The system must provide housing as a form of subsidy rather than a self-sustaining form, and therefore rents or prices must be affordable and below market rates.

2.3 Sustainable social housing

As with the topics of sustainability and social housing in the literature examined, there is no clear and precise articulation of what constitutes sustainable social housing in the EU. Instead, there are several related terms and overlapping concepts. Therefore, in order to develop a comprehensive understanding of the term, other concepts such as green building, sustainable building, low-impact building and environmentally sustainable structures have been explored, primarily through the work of scholars such as Kruger & Seville (2012), Murphy (2003), Udomiaye et al. (2018), Attia (2016), Peters (2013) and others. The literature reviewed does not provide a classification methodology for the concepts involved, however, the concepts studied were classified based on (1) the definitional group defined by the authors with similar views, (2) the terminology used to describe the building system, which typically represents a

relationship between the building and the environment, and (3) the definition criteria that explain the mutual impacts between humans, the built environment and nature (see Figure 1).

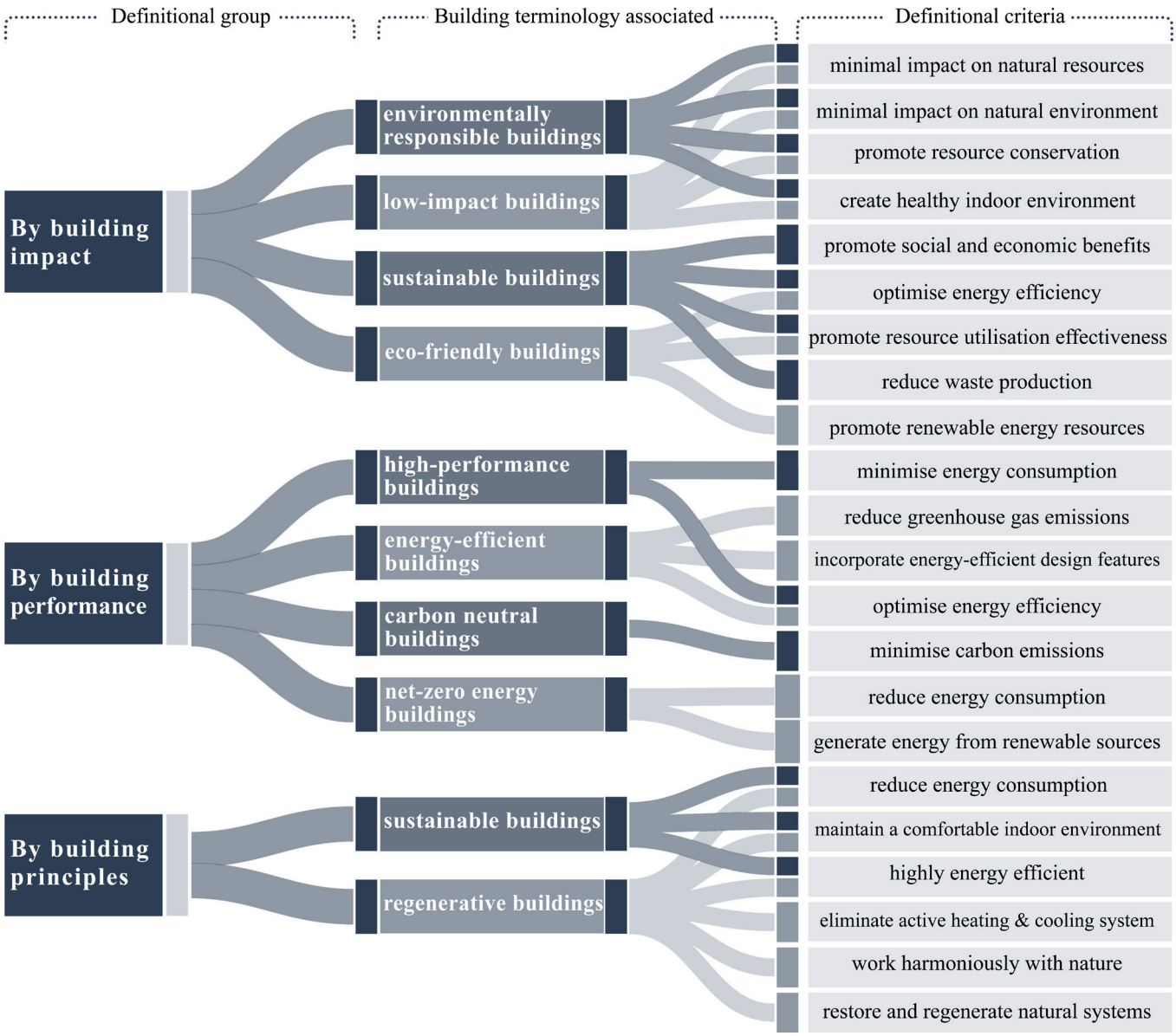

Figure 1. *Sustainable housing articulations. Source: the authors, 2023.*

Derived from Figure 1, it is notable that articulation of sustainable housing is often classified in three groups.

Building impact group: Scholars in this group rely on the essential role of minimising the impact of the built environment on nature. Kruger & Seville (2012) and Woolley (2013) have defined "environmentally responsible buildings" or "low-impact buildings" as the type of buildings that are designed, constructed and operated to have minimal negative impacts on the environment and natural resources, promote resource conservation and create a healthy and comfortable indoor environment for occupants (Kruger & Seville, 2012; Woolley, 2013). Tryggestad (2013) agrees but suggested that "sustainable buildings" are not just the built environment but any form of development that is designed, built and operated to minimise adverse environmental impacts while promoting social and economic benefits (Tryggestad, 2013). Later, in 2013, Peters emphasised optimising energy efficiency, resource utilisation effectiveness, reducing waste, improving indoor air quality and promoting environmental sustainability to achieve minimal impact on nature and its bio-systems (Peters, 2013). The concept of "eco- friendly buildings", as described by Udomiaye et al. (2018), highlights the same principles and conclusions but adds that promoting renewable energy resources and improving indoor and outdoor environmental quality are crucial aspects in minimising environmental impacts (Udomiaye et al., 2018).

Building performance group: In contrast to the previous group, the second group focuses on establishing and clarifying the crucial and superior roles of building systems such as electricity, water, heating and cooling. Scholars such as Erhorn et al., (2011) and Ionescu et al., (2015) refer to these buildings as "high- performance buildings" or "energy-efficient buildings" and define them as the type of buildings that are designed and constructed to minimise energy consumption and reduce greenhouse gas emissions. These buildings incorporate energy-efficient design features such as high-performance insulation, efficient lighting and HVAC systems, and renewable energy sources such as solar panels to optimise energy efficiency and reduce energy costs (Erhorn & Erhorn-Kluttig, 2011; Ionescu et al., 2015). Carruthers et al. (2013) highlight an emerging concept that is consistent with the emissions issue called "carbon neutral buildings", which are typically designed to achieve zero net greenhouse gas emissions over their lifetime by offsetting the same amount of CO2 they produce. These buildings are designed to minimise carbon emissions throughout their life cycle, including construction, operation and end-of-life disposal (Carruthers et al., 2013). Deng et al. (2014) extend and describe another concept known as "net-zero energy buildings"; these buildings are designed to produce as much energy as they consume over a year. Additionally, these buildings are highly energy efficient and focus on reducing energy consumption through various design strategies. They also generate energy from renewable sources such as solar or wind power (Deng et al., 2014).

Design principles group: Despite the numerous methods for designing "sustainable buildings", scholars of this group used existing, established design methods to describe the sustainability of buildings. For example, Chen et al. (2015) defined "Passivhaus" buildings as sustainable buildings that focus on reducing energy consumption and maintaining a comfortable indoor climate without relying on traditional heating and cooling systems. These buildings are highly energy efficient and aim to reduce or eliminate the need for active heating and cooling (Chen et al., 2015). However, Attia (2016) describes the status of "regenerative buildings" as a different type of sustainable building. This status goes beyond the meaning of green buildings and aims to improve the health and resilience of the ecosystems in which they are embedded. These buildings are designed to work harmoniously with nature to restore and regenerate natural systems (Attia, 2016).
It is worth noting that sustainable buildings share almost the same definitional criteria. They often call for a type of development that transcends the conventional role of shelter and security and seeks a balanced status between people, the built environment and nature, with a focus on protecting the latter from the impact of the former. However, sustainable housing requires precise and systematic methods to measure its sustainability. The following section discusses existing approaches used to measure the sustainability of housing.

2.4. Quantifying social housing sustainability

The concept of measuring the impact of human activities on the environment as the primary method of measuring sustainability dates back to the work of Barry Commoner, Paul Ehrlich and John Holdren in the early 1970s, known as the 'all-important equation' or the IPAT formula (Commoner, 1972; Ehrlich &
Emu Journal of Faculty of Architecture Vol 1, 2024 Alsaeed M, Hadjri K , Nawratek K. Holdren, 1971; Jerneck et al., 2011). At a practical level, Yates and Castro-Lacouture (2018) have stated that measuring such impacts requires an appropriate theoretical and practical framework that encompasses at least six areas of measurement, including the building's impact on the natural site, the building's water and energy use, the conditions and state of the indoor and outdoor environment, the building's economic value and impact on the economy, and approaches to protect local

culture and promote its preservation. It also requires comprehensive coordination between the architectural, structural, mechanical, electrical and environmental systems of buildings during the design, construction and operation phases (Yates & Castro- Lacouture, 2018). James (2014) and later Arjen (2015) clarified that measuring the level of sustainability has become a much more complex process that rely highly on quantitative methods, including (1) measurement indexes such as the energy efficiency rate, (2) assessment indicators, like carbon emissions rate and ratio to users, (3) performance benchmarks, such as the maximum level of consuming resources, and (4) audits that measures the compliance of building systems to planned efficiency rates (Arjen, 2015; Berardi, 2012; James, 2014; Kubba, 2012). In response to the complexity of measuring sustainability, several rating or certification systems and practice guides have been developed in the EU in recent decades. Albeit, the focus of this review is on the EU rating systems. Yet, systems from the UK and US have been included because of their fundamental role in influencing the European systems, in particular the role of the WELL Standards and ISO in the formation of level(s) and European Performance for Building Directives. Figure 2 was therefore created to list the most prominent methodologies discussed in the literature reviewed by looking at the area of assessment or measurement approach and the focus of interest of these assessment systems.

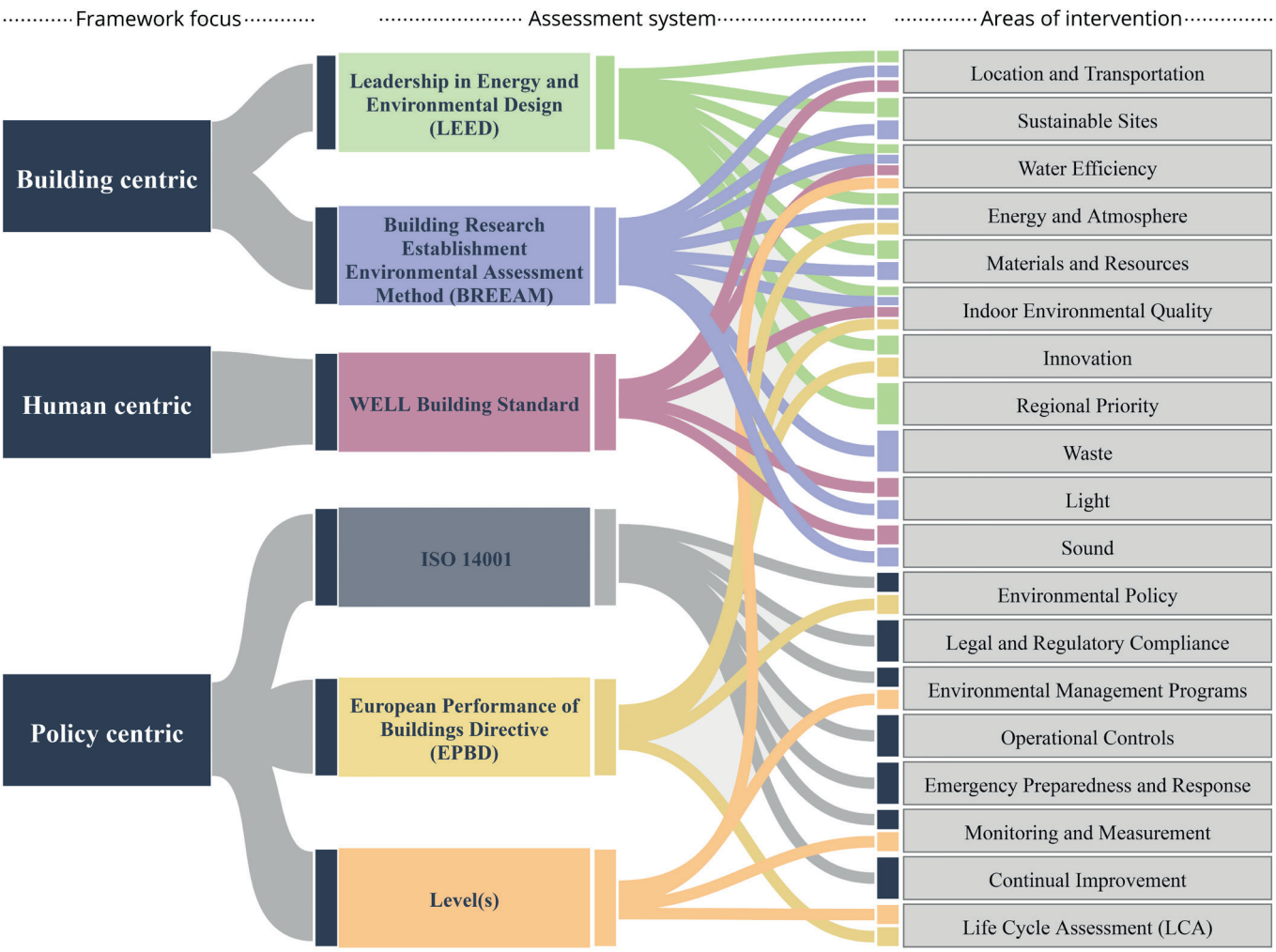

Figure 2. *Sustainability assessment system major indicators.*
Source: The authors as adopted from BRE (2016); Kubba (2012); Ferwati et al. (2019) and others.

The Building Research Establishment Environmental Assessment Method (BREEAM, UK) uses an assessment framework to evaluate the energy, water, materials, land use and ecology of the built environment (BRE, 2016; Ferwati et al., 2019; Kubba, 2012). The Leadership in Energy and Environmental Design (LEED, USA) provides a framework for assessing and certifying the environmental performance of buildings and communities, which has the same assessment scope as BREEAM (USGBC, 2018). The WELL Building Standard, on the other hand, focuses primarily on human health and well-being. It also includes some aspects of environmental sustainability (Knox, 2015). ISO 14001 is an internationally recognized environmental management system (EMS) standard. It provides organizations with a framework for establishing, implementing, maintaining and continuously improving their environmental performance. Although ISO 14001 is not a certification scheme, it is often used as a benchmark for assessing environmental sustainability (Psomas et al., 2011). The European Performance of Buildings Directive (EPBD) aims to promote energy efficiency and environmental sustainability of buildings. While the EPBD focuses primarily on energy performance, it also indirectly addresses environmental sustainability (Fokaides et al., 2017). The European Sustainable Buildings Framework, known as Level(s), is a voluntary assessment and reporting framework introduced by the European Commission in 2020. Level(s) aims to measure and improve the environmental sustainability performance of buildings throughout their life cycle (Sánchez Cordero et al., 2019). A trilogy of classifications is also notable in the systems examined. The first is building-centric such as LEED and BREEAM, which focus on improving building construction processes to support ecological systems and protect natural resources. The second is human-centric, such as the WELL Building Standards, created to put human well-being and health at the heart of building design and construction. The third class is more policy-focused and emphasizes policy's role in balancing building systems, natural systems and human well-being.

Having established the overarching understanding of sustainability and social housing as the main component of environmentally sustainable social housing, the next section presents a series of discussions that pave the way to answering this study's research questions.

3 Discussion

Environmental sustainability from an overarching perspective means using natural resources responsibly to meet the needs of the present generation without compromising the ability of future generations to meet their own needs (Hermoso et al., 2022; Portney, 2015; Siddi, 2020). This includes protecting and preserving the environment, minimising resource use, reducing pollution and waste, and promoting biodiversity and ecosystem health. As a result, the notion of environmental sustainability has evolved into a dynamic and all-encompassing concept, intertwined with various other principles such as resilience, durability, and renewability (Jabareen, 2006). It encompasses a broad range of factors and can be implemented at various levels, incorporating both tangible and intangible elements (Morelli, 2011). However, this is not without challenges. The complicated and interconnected nature of the environment makes it difficult to predict the long-term consequences of human actions. Limited resources, scalability issues and the need for global coordination present additional hurdles (Hermoso et al., 2022; Portney, 2015; Siddi, 2020). Addressing these challenges requires ongoing research, collaboration and innovative solutions to ensure that environmental sustainability goals are effectively pursued while addressing the complexity of social, economic and political factors.

Sustainable social housing is becoming increasingly important as it aims to meet the housing needs of vulnerable and low-income groups while promoting sustainable development and addressing social and environmental issues (Morgan & Talbot, 2001; Sunikka & Boon, 2003). Sustainable social housing represents both a possible future and an ambitious goal. It envisions an environmentally friendly, socially and economically responsible housing sector (Morgan & Talbot, 2001; Oyebanji, 2014). With the increasing awareness of the urgency to tackle climate change and social inequality, sustainable social housing offers a vision of a more equitable and sustainable future for communities worldwide (Dixon, 2019; Manoochehri, 2015; Shirazi & Keivani, 2019). The aim is to create housing that minimises its environmental footprint, promotes the well-being of its residents and provides affordable housing opportunities for all is needed (Udomiaye et al., 2018). Achieving large-scale sustainable social housing is fraught with challenges, such as the need for innovative design, adequate funding and community engagement, but it is an important goal worth pursuing. At the perception level, sustainable social housing has become too complex a concept that still lacks a clear boundaries and theorisation (Oyebanji, 2014). Meanwhile, at the practice level, there is a significant lack of a shared understanding of sustainable social housing and many misconceptions about what sustainability means to industrial sectors. These misconceptions have contributed significantly to stakeholders holding opposing views and consequently often rejecting the fundamental idea of sustainability (Renukappa et al., 2012).

The measurement of environmental sustainability has become a significant area of interest, leading to the development of numerous qualitative and quantitative assessment methods. These methods mainly focus on three main areas. The first area focuses on improving building systems based on and supporting natural systems to minimise environ-

mental impact. The second area places human well-being and health at the centre of building design and construction and aims to create spaces that promote occupant comfort and health. The third domain emphasises the role of policy in balancing building systems, natural systems and human well-being, ensuring that sustainable practises are implemented at both the individual and systemic levels. Through these approaches, a comprehensive understanding of environmental sustainability can be achieved, enabling effective decision-making and action. Measuring environmental sustainability is a complex task for several reasons. First, the environment comprises complicated systems and interconnected processes, making it difficult to isolate specific factors and measure their individual impacts (Arjen, 2015; Berardi, 2012; James, 2014). Furthermore, environmental problems often extend over long periods of time, making it difficult to capture and assess the full extent of change and its consequences. Furthermore, sustainability encompasses multiple dimensions, including environmental, social and economic aspects, which require a comprehensive and integrated assessment framework. Collecting accurate and reliable data on environmental indicators can also be a daunting task, as it often requires extensive research, monitoring and analysis (Poveda & Lipsett, 2011). In addition, different stakeholder perspectives and values complicate the measurement process, as sustainability itself is a subjective concept that is interpreted differently (Oyebanji, 2014). Therefore, capturing the complexity of environmental sustainability requires robust methodologies, interdisciplinary approaches and continuous refinement to ensure accurate and meaningful measurements.

In summary, an examination of environmental sustainability necessitates an exploration of its constituent principles, encompassing responsible use of resources, the protection of the environment and the promotion of biodiversity. The contemporary housing sector faces many challenges, mainly the intricate task of reconciling different interests and forecasting environmental ramifications. Although sustainable social housing remains committed to the fundamental goal of providing accommodation, yet it demands a heightened emphasis on promoting environmental, economic and social responsibility. The following section addresses the critical questions of defining the characteristics of environmentally sustainable social housing and the methods for assessing its sustainability.

4 Conclusion

The aim of this section is to elaborate on the fundamental criteria for environmentally sustainable social housing, and to answer the two research questions.

What constitutes environmentally sustainable social housing?

This study suggests that environmentally sustainable social housing is primarily constructed around a triad of defining pillars of housing, sustainability and impacts monitoring. Figure 3 was created to explain the pillars and their connections.

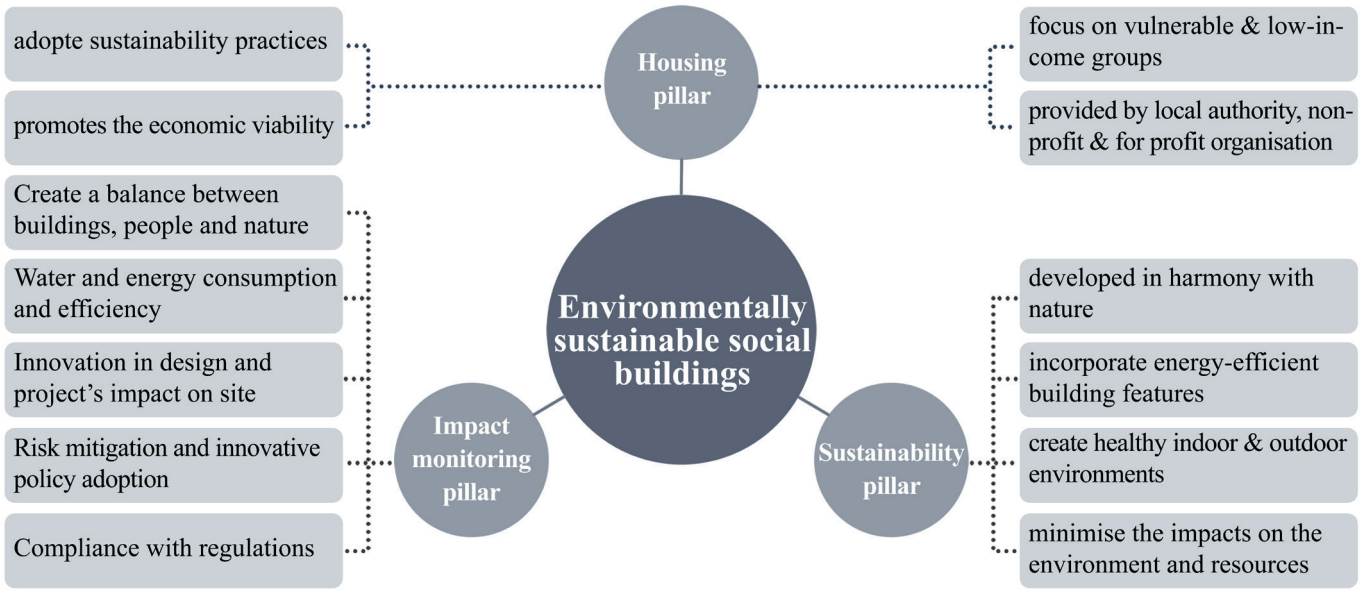

Figure 3. *Environmentally sustainable social housing proposed pillars. Source: The authors, 2023.*

First, the housing pillar, it is an emerging concept that positions its principles around the conventional perception of housing as a predominantly residual system. It is focused on meeting the housing needs of vulnerable and low-income populations, typically provided by local authorities, non-profit and for-profit organisations, and largely dependent on public funding. It also promotes the economic viability of development and applies sustainability practices to mitigate environmental ramifications, both existing and those created by development. Secondly, the provision of environmentally sustainable social housing is a multi-dimensional approach that incorporates several sustainable planning, design and construction principles. It emphasises the importance of creating a development that is in harmony with nature to minimise the impacts on the environment and natural resources. It also calls for incorporating energy- efficient building features and the promotion of alternative energy sources, as well as the creation of healthy and comfortable indoor and outdoor environments. Third, environmentally sustainable social housing must be designed to create a balance between buildings, people and nature. This balance is often measured by human-centred criteria, such as water and energy consumption, innovation in design, use of materials and indoor climate. This is in addition to building-centric criteria that consider resource efficiency, location and the project's impact on the site. Meanwhile, the policy-centric criteria are concerned with compliance with regulations and standards, risk mitigation and innovative policy adoption.

How to assess social housing sustainability?

The assessment of environmental sustainability in the context of social housing is undertaken through a multifaceted approach incorporating both qualitative criteria and quantitative indicators. This study, therefore, identifies the primary criteria and indicators rooted in the defining pillars of environmentally sustainable social housing.

The qualitative criteria predominantly revolve around the housing pillar, with an emphasis on assessing the project's impact concerning:

- The procedures involved in providing housing for the target demographic, particularly vulnerable or low-income groups.
- The roles and responsibilities assumed by the various organisations involved in housing provision encompass local authorities and public and private housing providers.
- The efficiency of funding utilisation and allocation to attain the envisioned outcomes.
- The economic viability of the development in advancing national housing objectives.

In contrast, the quantitative indicators are focused on assessing environmental aspects and employ methodologies similar to contemporary building rating systems. These indicators are instrumental in gauging the project's outcomes with regard to the intended equilibrium among human well-being, ecological preservation, and building considerations. They encompass:

- Resource consumption rates, including water and energy usage.
- The effectiveness of building systems in ensuring a healthy and comfortable indoor and outdoor environment, including electrification, lighting, acoustics, ventilation, heating, and cooling systems.
- Compliance with sustainability standards and regulations.
- Adoption of innovative design and sustainability strategies, such as integrating alternative energy sources and the life cycle assessment of building materials.
- The environmental impact of the building over both short and long timeframes.

In summary, this study underscores the intricate and multifaceted nature of the pursuit of environmentally sustainable social housing, a field faced with numerous challenges. In light of these challenges, it is imperative that housing developers, local authorities, and residents collaborate synergistically to enhance the existing housing paradigm, with the overarching objective of meeting human needs, safeguarding the environment, and fostering the creation of sustainable architectural structures for a harmonised and sustainable future.

Limitations and further development

The main focus of this study is on the environmental pillar of social housing, and the social, economic and human aspects have not been thoroughly investigated or incorporated. The authors, therefore, suggest that future research addressing these pillars is still needed.

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Design/build Instruments: Experiential Learning, Habit, and Living Understanding

Charlie Hailey[1]

1 School of Architecture, University of Florida, Gainesville, Florida, USA; clhailey@ufl.edu

Abstract

Design/build is a form of experiential learning in which students design and then actually build projects. Pedagogical precedents for design/build include philosophies of pragmatism, such as John Dewey's learning by doing and frameworks of architectural practice like Donald Schön's reflective practitioner such that design/build collapses distinctions between thinking and making in a process of reflective building. A recent design/build project at an elementary school in Gainesville, Florida, provides an opportunity to investigate how eight pedagogical tools (Cedar, Mappings, Bent, Rolled Drawing, Mock-up, Module, Staining pressure-treated wood, and Weathering cedar) link materials, environment, and people. This paper seeks to understand how these instruments connect the lived experience of design/build and its environmental context and serve as starting points to re-define architectural practice as a living project. How does design/build collapse the distance between the drawn, the built, and the lived? This paper argues that such instruments can serve as intermediaries between students, materials, environments, and people in design/build pedagogy. An intensive review of the instruments reveals how they are not only "things in the making" that form habits; but through habit, they are also actively engaged with what William James called the "living understanding of the movement of reality." Future research will draw further connections between design/build instruments and alternative forms of architectural
practice.

Keywords

Design pedagogy, experiential learning, pragmatism, living project, environmental design.

Tasarla/yap Araçları: Deneyimsel öğrenme, alışkanlık ve yaşama anlayışı

Charlie Hailey[1]

1 School of Architecture, University of Florida, Gainesville, Florida, USA; clhailey@ufl.edu

Özet

Tasarla-yap, öğrencilerin proje tasarlayıp daha sonra fiilen inşa ettiği bir deneyimsel öğrenme şeklidir. Tasarım/yap için pedagojik emsaller arasında, John Dewey'in yaparak öğrenmesi gibi pragmatizm felsefeleri ve Donald Schön'ün yansıtıcı uygulayıcısı gibi mimari uygulama çerçeveleri yer alır; öyle ki tasarım-inşa, yansıtıcı bir bina sürecinde düşünme ve yapma arasındaki ayrımları çökertir. Gainesville, Florida'daki bir ilkokulda yakın zamanda yapılan bir tasarım-inşa projesi, sekiz pedagojik aracın (Sedir, Haritalama, Bent, Haddelenmiş Çizim, Mock-up, Modül, Basınçla işlenmiş ahşabın boyanması ve yıpranmış sedirin boyanması) nasıl yapıldığını araştırma fırsatı sunarken malzemeleri, çevreyi ve insanları birbirine bağlamak için yaratılmıştır. Bu makale, bu araçların yaşanan tasarım/inşaat deneyimini çevresel bağlamla nasıl birleştirdiğini anlamayı ve mimarlık pratiğini yaşayan bir proje olarak yeniden tanımlamak için başlangıç noktası olarak hizmet etmeyi amaçlamaktadır. Tasarla-yap, çizilen, inşa edilen ve yaşanan arasındaki mesafeyi nasıl daraltıyor? Bu makale, bu tür araçların tasarım-yap pedagojisinde öğrenciler, materyaller, ortamlar ve insanlar arasında aracı görevi görebileceğini savunmaktadır. Araçların yoğun bir şekilde incelenmesi, bunların yalnızca alışkanlıkları oluşturan "yapılan şeyler" olmadığını; ancak alışkanlık yoluyla, aynı zamanda William James'in "gerçekliğin hareketinin canlı anlayışı" olarak adlandırdığı şeyle de aktif olarak meşgul oluyorlar. Gelecekteki araştırmalar, tasarla-inşa araçları ile alternatif mimari uygulama biçimleri arasında daha fazla bağlantı kuracaktır.

Anahtar Kelimeler

Tasarım pedagojisi, deneyimsel öğrenme, pragmatizm, yaşayan proje, çevresel tasarım

1 Design/Build: A brief introduction

Design/build is a form of experiential learning in which students design and then actually build projects. Typically, in architectural education, design/build occurs in a studio class so that students have a semester to carry out the project. In many cases, design/build entails service learning, and the project operates in what has been termed the "public interest."[1] So, not only is design/build an alternative pedagogical model, but it also forms links between a university and the community it serves. In this way, the design/build project participates in the social and environmental life in which the university resides.

The process of design/build in the architecture studio might begin with design but soon brings in activities of making at full scale, whether initially through the introduction of materials or techniques for cutting and joining. Design/build lets the process of designing run together with the process of building at the earliest stages of learning so that week-to-week activities might best be described as design/build/re-design/re- build. The slash between the two words "design" and "build" is indicative of this unified process, an approach that seeks full integration of thinking and making and, ultimately, living—through the project's lived experience of thinking and making (Hailey, 2016)

For fifteen years, we have carried out design/build projects in the School of Architecture at the University of Florida. The two most recent projects (Spring 2022 and 2023) were collaborations between my fourth- year undergraduate studio and the teachers and students at Rawlings Elementary, a local primary school in Gainesville, Florida, in the U.S. In each project, we designed and built outdoor classrooms on the elementary school's campus. These projects, while continuing the design/build work we had done in the past, also provided a context to re-examine the phases and tools of design/build pedagogy in terms of materials, environment, and people. This paper reviews those tools as what I have termed "design/build instruments."

2 Reflective Building: Pedagogical precedents and theoretical frameworks for design/build

Design/build's pedagogical origins can be traced to John Dewey's emphasis on learning by doing.[2] The American philosopher and educator advocated an approach to education based on direct experience and placed an emphasis on connecting education with the immediacy of living: "Cease conceiving of education as mere preparation for later life and make it the full meaning of the present life." (Dewey, 1969, p.50). More generally, design/build falls within the pragmatist tradition of collapsing distinctions between theory and practice. Pragmatism—and by extension its application in design/build work—is a form of praxis (theory plus practice) concerned with production (Hickman, 1994, p.15).[3]

For Dewey, experience includes both stability and precariousness, and it is thus a function of how any experience—and any learning endeavor—operates within a context over which we do not have control, as it also oscillates between the known and the unknown.[4] For Dewey, experience and learning also entail correspondences between doing and undergoing: "The series of doings in the rhythm of experience give variety and movement; they save the work from monotony and useless repetitions. The undergoings are the corresponding elements in the rhythm, and they supply unity; they save the work from the aimlessness of a mere succession of excitations. An object is peculiarly and dominantly esthetic, yielding the enjoyment characteristic of esthetic perception, when the factors that determine anything which can be called an experience are lifted high above the threshold of perception and are made manifest for their own sake." (1980, pp.56-57). Anthropologist Tim Ingold, defining the correspondence that occurs, notes that the "doing is inside the undergoing" (Ingold, 2018, p.32).[5] Consequently, the "doings" of design/build, which include designing and making, are active within the environment, just as the environment itself sometimes takes the lead in the experiences of students who engage with the site.

Along similar lines, urban planner Donald Schön discussed combinations of thinking and making in design work and related practices. Schön coined the term "reflective practitioner" to convey how practitioners undergo "reflective conversations" with situations as well as clients, and he demonstrated how "reflection- in-action" is a form of "tacit knowing-in-action" in which "knowing is inherent in intelligent action" (Schön, 2016, p.50).[6] From Schön's work, I have further defined what I call "reflective building" in which thinking and making occur simultaneously rather than sequentially (Hailey, 2016, p.122).[7]

Dewey's work also helps frame how experience works with and within nature: "It is not experience which is experienced, but nature—stones, plants, animals, diseases, health, temperature, electricity, and so on. Things interacting

in certain ways *are* experiences; they are what is experienced. Linked in certain other ways with another natural object—the human organism—they are how things are experienced as well. Experience thus reaches down into nature; it has depth. It also has breadth and to an indefinitely elastic extent. It stretches. That stretch constitutes inference." (Dewey, 1958, p.4) This attitude toward nature and its environmental forces and conditions also provides a framework for the multiple layers of pedagogy at work in the design/build studio as well as the outdoor classroom my class designed and built. The environment—its ecologies, its flora and its fauna—is the classroom where students drew, built, and inhabited. It is also the place where Rawlings elementary students learn about this environment through direct experience.

3 Questions and Objectives

This paper's primary question is: How does design/build collapse the distance between the drawn, the built, and the lived? The objective is to investigate a set of design/build instruments that might serve as foundations to foster a living understanding and as starting points to redefine architectural practice as a living project. This paper argues that a particular set of tools can serve as intermediaries between students, materials, environments, and people in design/build pedagogy. These tools are not tools in the traditional sense of hammers or saws. Instead, they are instruments that accommodate activities of making and learning. And my use of "instrument" contrasts with other uses of the term, which denote instrumental decision-making in which practice is considered the simple application of knowledge without direct experience.[8] I am defining instrument not as a simple means to an end, but as a tool that is equally concerned with the process of making and its outcome.

3.1 A Note about Site and Program

This paper focuses on the most recent design/build project at Rawlings Elementary completed in Spring 2023. The site for the project is a small grove of very tall pine trees. Each of the seven slash pines (*Pinus elliotti*) exceeds 60 feet (18 meters). Covered in a soft bed of pine needles, the ground is composed primarily of sand. The grove of pines stands in the middle of a large open field that extends 200 feet north toward a retention pond and 250 feet south to a neighborhood served by the school. To the west, at about 180 feet, is a motorcycle training facility; and to the east, the main part of Rawlings campus opens up with additional pine trees and a large, partially covered concrete slab for playing basketball and other sports. The main educational buildings are 400 feet further to the east.

Our clients for the project have been teachers and students at Rawlings. Discussions with them focused on providing a seating area for 20 to 25 students at a time. In addition to providing this outdoor classroom for a range of different classes, the project sought to address two focal points of education: birdwatching and playing music. One teacher at the school runs a successful program for birdwatching and has partnered with the Audubon Society, and another faculty member teaches music and planned to use the classroom for percussion performances and for playing chimes outdoors.

4 Instruments of Design/Build 4.1 Introduction

I have identified eight design/build instruments based on my observations and experiences on this project: *Cedar, Mappings, Bent, Rolled Drawing, Mock-up, Module, Staining pressure-treated wood, and Weathering cedar.* They are ways of working; but they are also things, objects, even materials (like cedar wood). Their arrangement here reflects the chronology of the project, although they also work recursively during the project. That is to say, each instrument might be deployed at various intervals during a project. For example, mappings occur throughout, and mock-ups are ongoing. The order of instruments presented and developed here alternates between two main contexts for the project: material/construction and site.

4.2 Cedar

Early in the studio process, we carry wood. Small pieces, long pieces, heavy pieces, wide pieces. With longer boards, the wood asks students to find its center so that they can balance its length in their hand. Soon, they also learn to rest this center point on their shoulders so that another part of the body—likely stronger than hand or arm—bears the load. Initially, carrying wood is a dance that makes students laugh. The simple act of lifting and carrying begins each student's process of acquaintance with material. It is through wood that students learn the weight of things.

By the time we used cedar in the second project at Rawlings Elementary, there were already multiple precedents for design/build projects built with cedar by School of Architecture students. In the town of Cedar Key between 2016 and 2018, graduate students had used cedar as the primary material in projects (Figure 1), which we could visit to study details, tectonic systems, finishes, and weathering. More recently, the previous year's (2022) studio had used cedar for parts of the outdoor classroom where Rawlings students would come into contact with the project's surfaces.[9]

Figure 1. *Design/build participants cut cedar wood and test its spans at University of Florida School of Architecture.*

Students also learned to cut wood with scraps of cedar from previous projects. In design/build, we try to cut as much by hand as possible (without power tools) in order to link eye, hand, and material. For most cutting, we introduce pull-stroke saws, which put the blade in tension and allow the maker to control the amount of force and exertion. Students practiced measuring and scribing lines and found that even precisely drawn cut lines have width, and consequently they needed to know which side of the line they were to cut.

Marking boards became a form of communication between students, and they learned to mark the side of the line to be cut to signal to someone else who would be making the cut. Their experience with wood also included specific sensory insights (the distinct smell of cedar), the necessity for care (cedar has a smooth texture but splinters easily), and the complexities of working with wood (it is as forgiving as it is demanding).

Consequently, cedar was introduced as a material with its own innate properties (weight, texture, grain, fiber), as a lumber component (with width and length, and different structural capacities depending on its orientation), and as an active agent within previous projects that have undergone use and weathering through time. In this way, cedar linked material with body, architecture with occupation, and installation with sites and their social and environmental ecologies.

4.3 Mappings

Mapping is a speculative and generative practice. Mapping in design/build studio begins the process of connecting body with site, while also exploring the environmental systems and ecologies inherent within the context. As a process that seeks to work between the objective and subjective, mapping matches analysis with narration, and essentially 'tells the story' of the site.

Mapping finds space and reveals forces, which are often hidden (like wind) or are at least not apparent until the site is visited and experienced on multiple occasions (like spider webs, bee colonies, and bird roosts). Landscape architect James Corner offers this definition of mapping: "Thus we can identify three essential operations in mapping: first the creation of a field, the setting of the rules and the establishment of system; second the extraction, isolation or 'de-territorialization' of parts and data; and third, the plotting, the drawing-out, the setting-up of relations, or the 're-territorialization' of the parts." (Corner, 1999, p.231)

In the design/build studio, students carried out a series of mappings. Their objectives included the following: analyzing and asking questions about existing vegetation, investigating edges between landscape and building, understanding objects and trees in relation to field, connecting the site's textures to human bodies, and discovering how site conditions (shadows, views, and environmental systems) overlay the body (Figure 2).

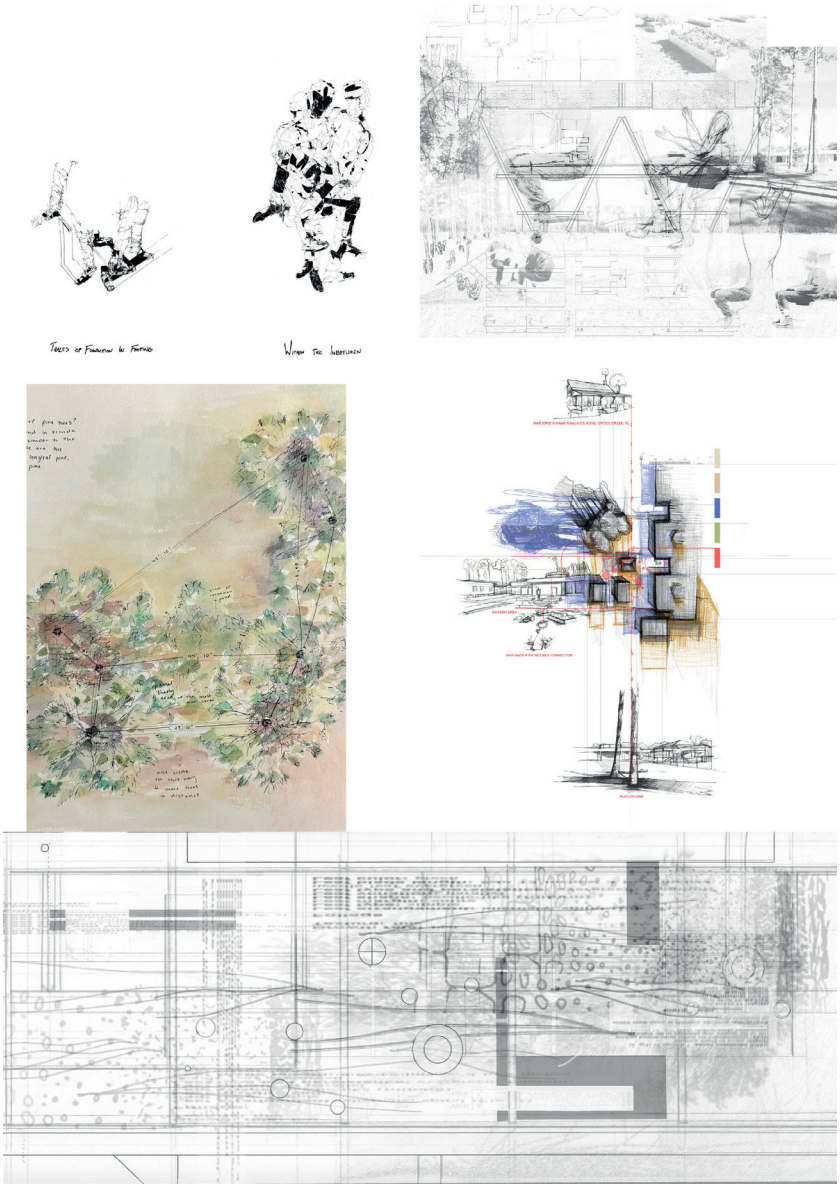

Figure 2. *Mapping the campus and modes of occupying the environmental context at Rawlings Elementary in Gainesville, Florida.*

4.4 Bent

A bent is one section of a building's frame.[10] In design/build projects, the bent typically includes "pass- by" construction—a system of framing in which paired components pass to either side of a central piece of the structure. Construction of bents is introduced early in the studio design process, but usually after preliminary site visits (and mappings) and also after initial meetings with clients and community members. Building bents allows opportunities for all students to be involved simultaneously in speculations about how to build this tectonic element that is fundamental to future phases of a developed design proposal. With sixteen students, the Spring 2023 studio class was relatively large for design studios, particularly when everyone in the class had to reach consensus on all decisions.[11]

In groups of four or five, students began laying out bents in a process we have called "sketching with wood" (Figure 3). As the process continued, students explored lines of force, connections, scale, proportions, overhead cantilevers, and dimensions relative to the body—both seated and standing (Figure 4). Discussions with students and faculty at Rawlings Elementary confirmed that each seating unit for the outdoor classroom would need to have multiple levels to accommodate the number of students (20 to 25) in a typical elementary school class. These discussions also pointed to the need for the seating units to be double-sided—to allow seating and, by extension, views on both sides (front as well as back). The complexity of different levels and seating resulted in non-pass-by joints and offered opportunities to explore let-in and oblique framing joints (Figure 5). As iterations and refinements of the bents progressed, questions of repetition and tolerance prepared students for later development of the jig that would guide the making of each finalized bent (Figure 6).

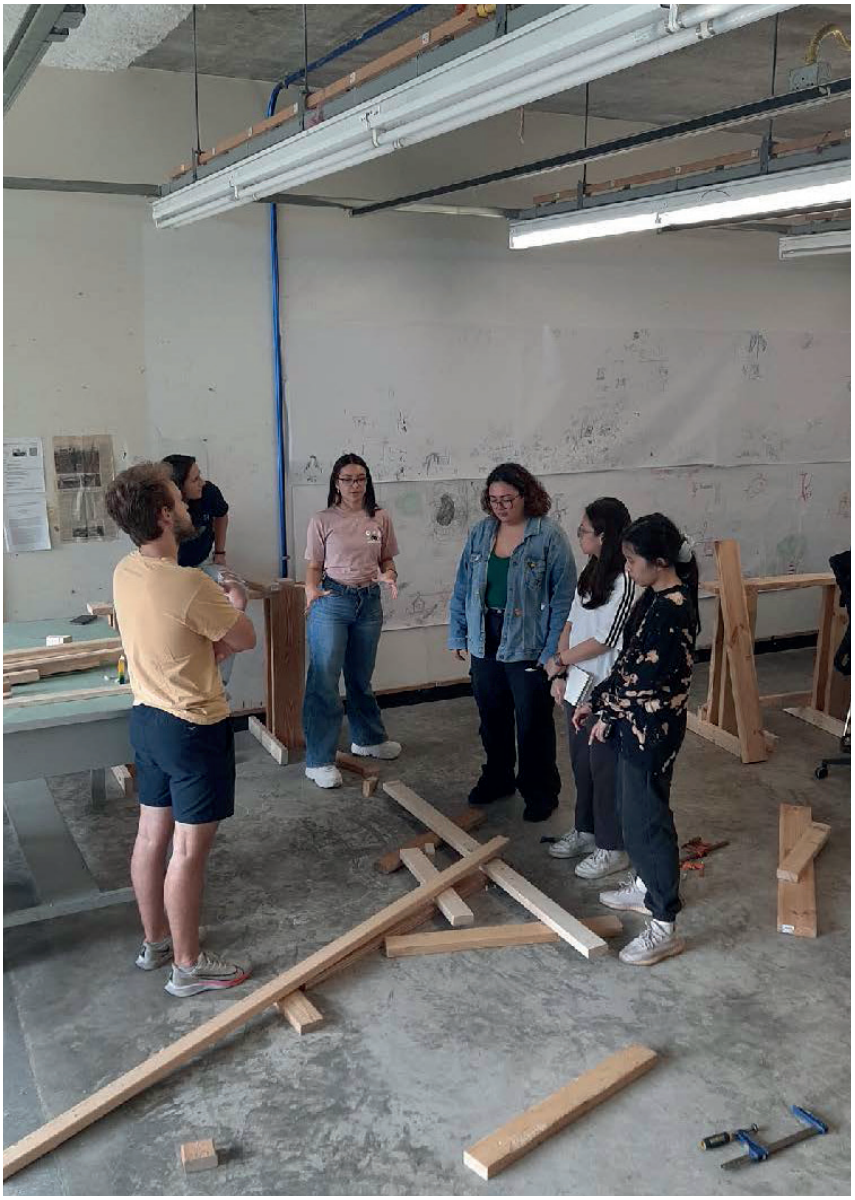

Figure 3. *Sketching with wood: Design/build students lay out wood for bents.*

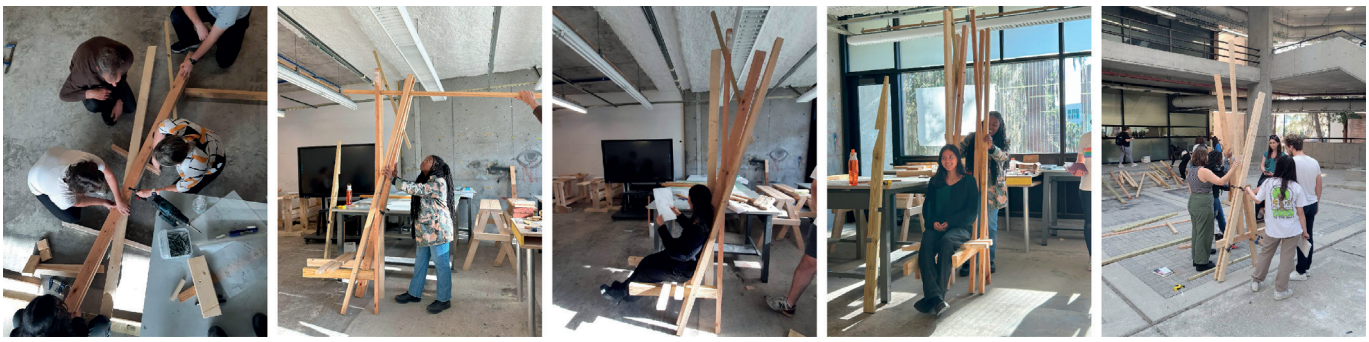

Figure 4. *Students explore lines of force, connections, scale, proportions, overhead cantilevers, and dimensions relative to the body.*

Figure 5 *Let-in framing joint in pressure-treated wood.*

Figure 6 *Laying out a finalized bent in the jig at School of Architecture.*

4.5 Rolled drawing

In design/build studios, we often lay out large sheets of drawing paper for brainstorming design sessions. In the studio setting, this paper covers the shared discussion area, which is typically made up of six drafting desks pushed together; and students and instructors sketch ideas on the part of the paper that is in front of them.[12] Often, after each round of sketching, we rotate seats so that participants sketch alongside—or, in some cases, add onto—their neighbor's previous sketch. This large communal table is not unlike a conference table, but in practice it is closer to a dining room table where conversations readily accompany not eating but equally social activities of sketching and drawing.

With the Rawlings project, we brought these activities to the schoolyard and invited primary school students to draw with crayons, pencils, and markers.[13] We rolled out a long sheet of bond paper on the outdoor basketball court near the project's site and asked them to draw their visions for the classroom (Figure 7). Many immediately began drawing tree-houses. My students and I sketched as well; and conversations emerged about the school day, food, and television shows, in addition to buildings they liked and what they enjoyed and disliked about the Rawlings campus. We talked about birds and grass and the day's cooler weather. As more students joined the activity, many continued

to sketch out plans for their own homes, complete with all the amenities they wished for: Jacuzzis, indoor pools, and waterslides. And we learned that this design/build project intersected with the dreams of the school kids.

Figure 7. *Rolled drawing: Rawlings Elementary students and design/build students drawing on a roll of paper on Rawlings campus.*

Later that same day, we used the rest of the drawing roll to approximate the location of the seating areas we were planning to mock-up the following week. It had rained the previous day, and these sheets of paper also served as veritable picnic blankets for us to sit on the damp ground (Figure 8). As a result, the sheets became inscribed with imprints of our bodies as well as markings from the site. The white paper carried sap that had fallen from the pines' limbs, moisture from the sand, textures of pine needles, bits of earth where the sand gave way to clay, creases and folds where students sought to reduce the size of the simulated seating area, handprints where we grasped edges of paper, and footprints where we stepped on them to hold them down against the vernal breezes that carried the promise of spring.

Back in studio, we unrolled the drawings made by the Rawlings students and pinned them to cover the studio wall. Their presence created a matrix of visions for the project (Figure 9).

Figure 8. *Sheets of paper used for layout of outdoor classroom in the pine grove at Rawlings Elementary.*

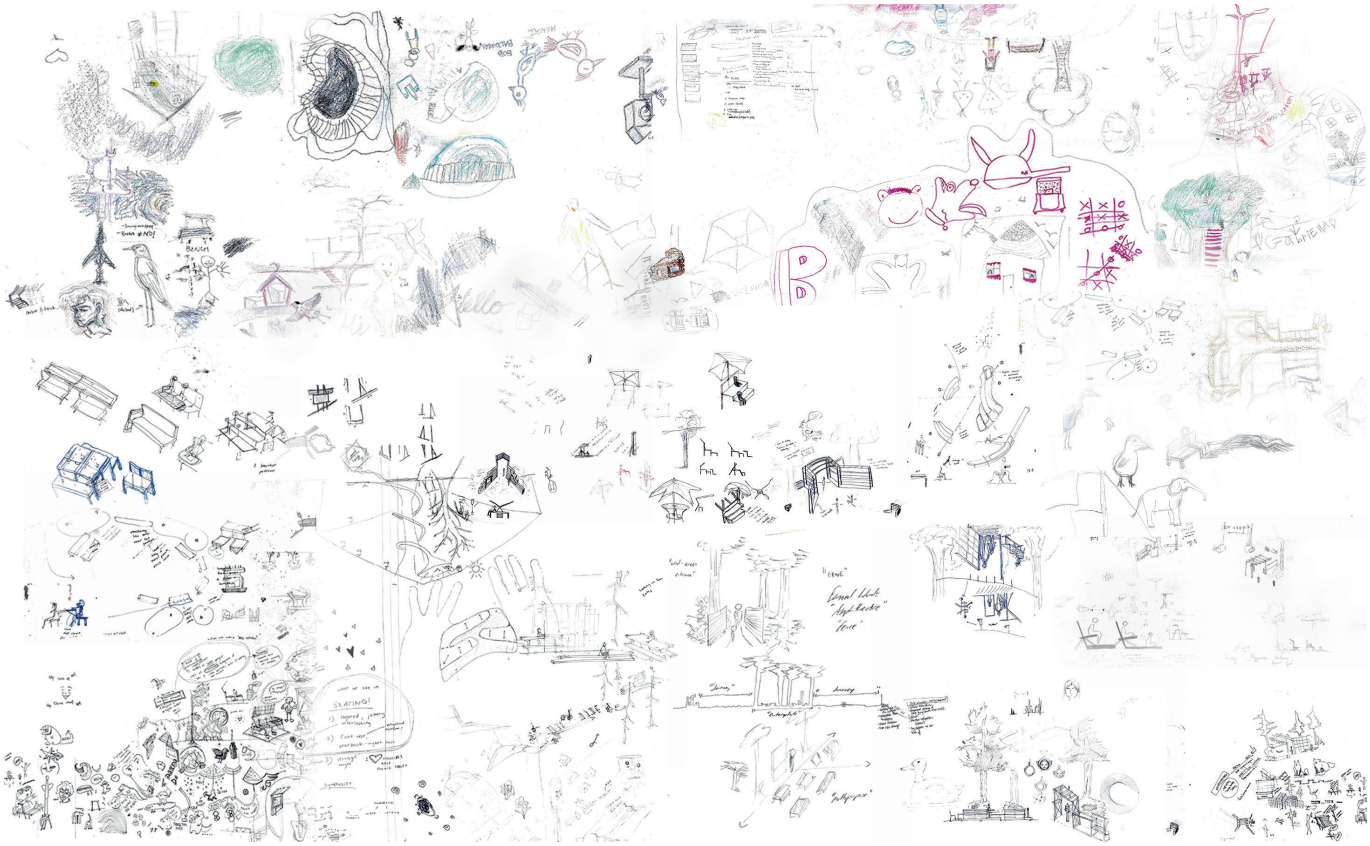

Figure 9. *Compilation of elementary school students' rolled paper drawings.*

4.6 Mock-up

A mock-up is a full-scale model that tests ideas, materials, and details. At this one-to-one scale, tectonic components take up actual space: "joints become architecture" and framing members carry their full weight and dimensions (Hailey, 2016, p.60). Pedagogically, mock-ups are didactic as well as experimental. They teach lessons about what can and cannot be done, about structure and support, about what works spatially and about how materials come together; and they also facilitate speculation, allowing students to make mistakes in the process of design development and refinement. Mock-ups facilitate group decision-making because of the visibility of systems and details at full scale. In this way, they provide context for visualization and execution.

Mock-ups can be messy and provisional; and as they become more complicated and larger in subsequent stages, they necessitate the active participation and engagement of the whole studio to assemble and then to deliberate about the steps of construction that should follow. During this process, they also allow for the re-use of scraps to approximate components like seating and roofing (Figure 10). The physical feedback from mock-ups brings students into close contact with material and each other. They also offer possibilities of play, an important part of the continuing design process, particularly when we are designing for children (Figure 11). These moments bring positive connotations of "mock" as laughter, but without the attendant meaning of derision. An additional implication is that it is sometimes necessary—or at least advisable—to interrupt the seriousness of design, and it is healthy to laugh at yourself.[14]

Figure 10. *Early stage mock-ups of outdoor classroom seating with re-used material.*

Figure 11. *Later stage mock-ups of outdoor classroom seating.*

4.7 Module

In the Rawlings design/build project, mock-ups led to finalized modules that formed the components for seating, display, and music in the outdoor classroom. These modules were assembled in the studio, then taken apart as a kit of parts that could be transported to the site. At the site, once re-assembled, each module could then be moved around the site to tune its location to a range of site features and ecologies: the context's environmental systems, its views out to the fields, the teachers' preferred distances between students and instructor, the proximity of the back of each module to the undergrowth below the trees, shaded areas at different times of the day, angles and orientations to breezes depending on time of day and season, acoustics within the site and sound from outside the site, and interactions between programmatic elements (Figure 12). Moving the larger seating modules was an exercise in teamwork that required half of the studio's participants to lift and a few additional students to direct the movement according to the desired outcome.

Figure 12. *Moving outdoor classroom modules around the site, including seating units and frames for chimes and white board easel.*

This process transformed students' assumptions about the site and asked them to reconsider some aspects of what their Mappings had recorded. This process of movement also combined legacies of the mock-ups (conducted back on the university campus) with actual site conditions. Moving the modules confirmed the flatness of the site—the

ground elevations varied only by two or three inches. Once positioned, students climbed on the modules, as they expected elementary students would, in order to test the potential overturning of the larger seating modules. While this tendency to overturn was less than it had been when modules were in studio, we decided that the back edge of the structure should be anchored in the ground for safety. Students designed a detail that connected the structure's grade beams (where the structures touched the ground) to shallow footings. To allow for future re-positioning, the connection between structural frame and concrete footing was a single anchor bolt. Students dug shallow holes for footings at every other grade beam. This process of digging, although it came near the end of the project, was a significant connection with the earth.

4.8 Staining pressure-treated wood and Weathering cedar

The project's instruments come full circle with a return to the material of wood; this return has two aspects: the staining of pressure-treated wood and the weathering of cedar. The studio used pressure-treated wood for components that came into close contact with the ground but did not come into contact with human use of the project. As a studio, we saw the green color left by the chemical treating process as a problematic feature of the material; the students noted its artificiality and inconsistency as negative properties of this wood. And yet it was necessary to use this material because it fit our limited budget and also resulted in less future maintenance by the custodial staff at Rawlings. An important aspect of the project was that we did not want to leave the school burdened with a project that required upkeep and repairs.

Consequently, we explored methods of staining the wood. Consultations with color theorists, paint store experts, and Rawlings faculty and students went through a series of color pallets and tests on campus and at the site, in the shade, in the full sun, on beds of pine needles, next to cedar samples (both newly milled and weathered over time), and at different times of the day. In this process, we had to account for the green of the wood treatment, which added a tint to wood's natural warmth and yellow hues. Students narrowed options down to five colors, and the pressure-treated wood components of the remaining mock-ups in studio were stained with each color before a final decision was made (Figure 13). Students chose a stain that echoed the purple hues of pine bark. And we all agreed that it was the color of shadow.

As they worked through these options, students also anticipated the future weathering of cedar. They studied the silvering of past design/build projects as precedents for different phases of this aging process. Based on Rawlings teachers' desire for longevity of the wood, students also investigated adding a sealant that would delay—but not prevent—that process of weathering. This added layer of polyurethane sealant offered further opportunities to study the futures of the project—both immediate as well as years from now. This aspect of near and distant time anchored discussions of weathering: the specific changes of wood and the broader concerns of how the project would gradually become an integral part of the ecological context it occupied. How might the natural systems, animals, and plants adopt their project? And how would the faculty and students of Rawlings make use of the project?

Figure 13*. Testing stain on pressure-treated wood.*

5 Conclusions

What really *exists* is not things made but things in the making. Once made, they are dead, and an infinite number of alternative conceptual decompositions can be used in defining them. But put yourself *in the making* by a stroke of intuitive sympathy with the thing and, the whole range of possible decompositions coming at once into your possession, you are no longer troubled with the question which of them is the more absolutely true. Reality *falls* in passing into conceptual analysis; it *mounts* in living its own undivided life—it buds and burgeons, changes and creates. Once [you] adopt the movement of this life in any given instance and you know what Bergson calls the *devenir réel* by which the thing evolves and grows. Philosophy should seek this kind of living understanding of the movement of reality, not follow science in vainly patching together fragments of its dead results (James, 1909, pp.263-64).

The eight design/build instruments are "things in the making." As methods of inquiring as well as of making, they are modes of reflection-in-action. Reflection-in-action and learning by doing connect "things" and "thoughts." In his definition of experience, Dewey draws from William James: "Experience...is...'double-barreled' in that it recognizes in its primary integrity no division between act and material, subject and object, but contains them both in an unanalyzed totality." (Dewey, 1958, p.8)[15] Each design/build instrument is an activity of making that binds maker, material, and context, just as it also connects the drawn, the built, and the lived. And each instrument operates by movement through time; as emergent tools, these instruments are constantly in a state of becoming (Lapoujade, 2000, pp.52-59). In this way, and as repeated activities, they are forms of habit.

According to Dewey, cumulative activities structure experience through time to form habit. Different from routine, habit "is an acquired disposition to *ways* and modes of response, not to particular acts." (Dewey, 1922, p.32) Habits structure experience in terms of order, which then allows for dynamic exchange and creative decision-making. James noted how habit's order sets up intentional activities, such as the making process that design/build instruments entail: "only when habits of order are formed can we advance to really interesting fields of action — and consequently accumulate grain on grain of willful choice like a very miser — never forgetting how one link dropped undoes an indefinite number." (James, 1920a, p.148) James also studied habit's place in what he called the "zone of insecurity" of human activity. Echoing Dewey's interplay between stable and precarious, James notes that the "plasticity" related to habit must have a "structure weak enough to yield to an influence, but strong enough not to yield all at once. Each relatively stable phase of equilibrium in such a structure is marked by what we may call a new set of habits." (James, 1920b, p.105) Habit bridges the stable and the precarious in making.

Consequently, the results of each instrument emphasize the importance of problem-setting rather than problem-solving. Within the frames of empirical method and pragmatist approaches, this focus on the setting of a problem acknowledges the interactions of stability and precarity that Dewey described. The instruments allow for mistakes and constant adjustments as a set of problems is defined and redefined. They are adaptive.[16] Each instrument also folds together the inquiry's source with its product. For example, the mock-up *becomes* the problem in its assemblage of materials, its relationship to the body, and its response to what its makers know about the client's desired program and the environmental context that will host it.

Dewey's understanding of instrument—similar to this paper's definition of design/build instruments—has its origins in Peirce's habit. As Hickman notes: "Dewey's instrumentalism is happily rooted in the soil of Peirce's account of the production of habits. Like Peirce's habits, Dewey's instruments are conditional, general, and final. They are conditional in the sense that that they are available for use if the proper situation presents itself." (Hickman, 1994, p.23) Such instruments keep the problem (whether it is material-based, site-specific, or related to human interaction) *in* the particular situation of the project. In this way, it combines process and product, much like a musical instrument, and also scientific instruments that record and measure phenomena.[17] In terms of music, I am also drawing from analogs Dewey uses to illustrate active experience: "We must summon energy and pitch it at a responsive key in order to *take* in." (Dewey, 1922, p.54) In that sense, these instruments are key parts in the process of reflective building, which is not unlike playing music—sometimes working improvisationally and other times according to an established composition.

Habits are directly tied to specific contexts and the situations they make.[18] And these instruments engage with situations—whether environmental, social, or material—through what Dewey called "transactions." In Dewey's terms: "The statement that individuals live in a world means, in the concrete, that they live in a series of situations. And when it is said that they live *in* these situations, the meaning of the word "in" is different from its meaning when

it is said that pennies are 'in' a pocket.... It means...that interaction is going on between an individual and objects and other persons. The conceptions of situation and of interaction are inseparable from each other. An experience is always what it is because of a transaction taking place between an individual and what...constitutes his environment." (Dewey,1938, pp.43) It is worth pointing out that, as John McDermott has noted, Dewey came to prefer "transaction" to "interaction" late in his research career. Dewey wanted to avoid the dualism that might be associated with the latter term and to reinforce how experience works *across* and *through* rather than *between* (McDermott, 1973, p.xxxiii).

Engendering transactions between people, material, and context, habit collapses distance between the drawn, the built, and the lived. If, as Tim Ingold contends, habits are principles of production "whereby a being that dwells in its own practices is recursively generated by them," then these instruments become habits for design/build in particular and architectural practice more broadly (2018, p.44) As habits, they demonstrate how the parts of a project with which instruments engage might help explain the whole. For James, habits, understood in this way, form the basis of a pluralistic world.[19] And for Dewey, the "form of the whole is therefore present in every member" when it is considered as an experiential process that includes both the doing and the undergoing (Dewey, 1934, p.56).[20]

A return to John Dewey's foundational understanding of experience further connects both habits and instruments not just to experiential learning but to living: "The process of living possesses continuity because it is an everlastingly renewed process of acting upon the environment and being acted upon by it, together with institution of relations between what is done and what is undergone. ... The world we have experienced becomes an integral part of the self that acts and is acted upon in further experience. In their physical occurrence, things and events experienced pass and are gone. But something of their meaning and value is retained as an integral part of the self. Through habits formed in intercourse with the world, we also in-habit the world. It becomes a home and the home is part of our every experience." (Dewey, 1934, p.109) As Ingold would say: we dwell in habit. Or, we inhabit habit.

Each design/build project is a process of lived experience. In this way, design/build instruments are not only "things in the making" that form habits; but *through* habit, they are also actively engaged with what James called the "living understanding of the movement of reality." Ingold has linked the sensitivity and attentiveness of habit—an attention to its past iterations and to its immediate context—directly to creativity: "Such a being is free, not in the illusory sense of a subjective free will that stands opposed to the objective necessity of predetermination, but in a real sense, founded in attention to others and responsive to the ways they are going. The freedom of habit, necessarily caught in the mesh of attention and response, is a condition for truly creative life." (Ingold, 2018, p.46) A living understanding is responsive and immediate, and each design/build instrument, through its combination of material, mode of engagement, and dynamic context serves pedagogically and productively in the creative process of making a project, one in which designing and building are inextricably linked.[21]

Renee Tursi has called James's particular approach "the poetry of habit" (Tursi,p.82).[22] Making inhabits a precarious world of complex interactions and, for students, a sometimes bewildering array of conditions and forces—whether from material, environment, or social contexts. And the habit of design/build instruments offers a mode of understanding that accounts for this precarity as it also offers a stabilizing context for coming to terms with the problems at hand. Habit also bridges the familiar with the new. Pedagogically, the habit of design/build instruments provides a working foundation for learning by doing generally and, more specifically, for carrying out a building project that can negotiate multivalent material, environmental, and social situations.

Figure 14. *Opening day for the outdoor classroom at Rawlings Elementary, a seating module, and an overall view of the pine grove site two months later.*

Future Research

Future Research will investigate these design/build instruments as a toolkit for architectural practice. A part of this study will reconsider architectural projects as living projects. Future research will also seek to understand how the design/build project itself (specifically the Rawlings project) becomes an instrument over time. Returns to the site every six months will study the project as a living document—one that experiences weathering, use (both intended and invented), repair, and additions (as well as subtractions).[23] A key question will be: how has the design/build project and its instruments gone through a process of transformation, including cycles of inscription and translation.[24] Specifically, research will also look closely at how translations of the project have continued with students and faculty at Rawlings. Preliminary site visits and conversations with Rawlings community members show that bird feeders and other teaching tools have been added, and the smaller modules have been moved around on the site. (Figure 14) Also, this Fall (2023), landscape architecture students are designing and planting a new context for the project in its pine grove, with bird-friendly plants and additional development of the outdoor spaces for instruction. One other research trajectory includes a study of how the design/build instruments include dynamic interactions of person, material, and context—what Tim Ingold has discussed as the "dance of agency."[25] How does this triadic dance relate to ecological approaches in design/build?

Acknowledgements

Thanks to Bahar Aktuna for her comments on an earlier version of this paper.

Endnotes

[1] See, for example, Bryan Bell et al, *Expanding Architecture: Design as Activism* (New York: Metropolitan Books, 2008), and Bryan Bell and Lisa Abendroth, *Public Interest Design Education Guidebook: Curricula, Strategies, and SEED Academic Case Studies* (London: Routledge, 2018).

[2] John Dewey discusses "learning by doing" as a fundamental part of his proposed "schools of tomorrow." See John Dewey and Evelyn Dewey, *Schools of Tomorrow* (New York: Dutton, 1915).

[3] The work of Dewey, Ingold, and Schon fits within a broader context of pragmatist philosophy.

[4] In my book *The Porch: Meditations on the Edge of Nature,* I discuss the "uncertainties of movement and changeable nature" of context and environment in connection to Dewey's pragmatist philosophy (pp.27-28). And for Dewey, the visible and the invisible provide an example of the known and the unknown as two sides of existence: "The visible is set within the invisible; and in the end what is unseen decides what happens in the seen;
the tangible rests precariously upon the untouched and ungrasped." ("Experience and Nature," *The Later Works,* 1925-1953, vol.I, ed. Jo Ann Boydston (Carbondale: Southern Illinois University Press, 1981), p.55). See also
Dewey, *Experience and Nature* (New York: Dover, 1958), pp.45-46.

[5] See also the discussion of the body intuitive in Castaño Urrea and Hailey, "Designing, Making and the Body Intuitive," *Journal of Undergraduate Research,* 2023.

[6] Although Schön did not focus on the education of the reflective practitioner, he did discuss "...implications of the idea of reflective practice—implications for the professional's relation to his clients, for the organizational settings of practice, for the future interaction of research and practice, and for the place of the professions in the larger society." (p.ix) Schon further develops "reflection in action" as an epistemology of practice (p.133).

[7] See also Bahar Aktuna, "Design Build Record," book manuscript submitted for publication, October 2023.

[8] Schön writes: "Once we put aside the model of Technical Rationality, which leads us to think of intelligent practice as an application of knowledge to instrumental decisions, there is nothing strange about the idea that a kind of knowing is inherent in intelligent action." (p.50)

[9] Pressure-treated wood was used primarily where the project's framework touched the ground, and cedar was used where those using the outdoor classroom would come into direct contact with the structure.

[10] This definition is derived from the *Oxford English Dictionary,* entry on "bent".

[11] Note that the design/build studios that I teach are based on consensus, in contrast to other studio models that are based on competition between groups within the studio. See Hailey, *Design/Build with Jersey* Devil, pp.65-67.

[12] Note that we have also used this technique in discussions with clients at the site.

[13] This event paralleled other activities with the Rawlings students, when we periodically engaged them in conversations about the project, games, and, later in the semester, small tasks of carrying, staining, and assembling the com ponents of the project.

[14] See Henri Bergson, *Laughter: An Essay on the Meaning of the Comic* (New York: Martino, 2014). Here, as in Bergson's work, laughter is a form of correspondence with others and is also related to "a stroke of intuitive sympathy," which William James discusses in *A Pluralistic Universe* (see this paper's conclusion).

[15] See also James, *Essays in Radical Empiricism,* p.10. Dewey's reference to James is the following: "'Thing' and 'thought,' as James says in the same connection, are single-barrelled; they refer to products discriminated by reflection out of primary experience." (p.8)

[16] Tim Ingold notes an approach to a kind of problem-setting in *A Thousand Plateaus:* "Every such way, according to Deleuze and Guattari, is a problem rather than a theorem. The theorem is rational, the problem affective. And the thing about real problems is that far from closing in on a solution, they afford an opening. False problems already contain their solutions, hidden inside them, and the challenge is to find them." (*Anthropology And/as Education,* p.41)

[17] Further, instrument has its etymological roots in "instruct," and this pedagogical role of an instrument points toward its agency.

[18] Dewey wrote: “Habits enter into the *constitution* of the situation; they are in and of it, not, so far as it is concerned, something outside of it.” (“Brief Studies in Realism”, The Middle Works, vol.6: 120).

[19] William James connects habit to pluralistic views in his definition of empiricism: “What do the terms empiricism and rationalism mean? Reduced to their most pregnant difference, empiricism means the habit of explaining wholes by parts, and rationalism means the habit of explaining parts by wholes. Rationalism thus preserves affinities with monism, since wholeness goes with union, while empiricism inclines to pluralistic views.” (1908, p.5.)

[20] The instruments also relate to C. S. Peirce’s quasi-habits, which are “ways of acting” and “conditional propositions.” Charles Sanders Peirce, *Collected Papers of Charles Sanders Peirce,* ed. C. Hartshorne, P. Weiss (Cambridge: Harvard University Press, 1931-1958), 5.510. See also Hickman, p.21.

[21] Note that Peirce connects habit to the “living definition”: “The deliberately formed, self-analyzing habit—self- analyzing because formed by the aid of analysis of the exercises that nourished it—is the living definition, the veritable and final logical interpretant.” Peirce, *Collected Works,* 5.491.

[22] Renee Tursi notes: “Thanks to the “poetry” of habit, we give birth to canny patterns in our process of banishing the uncanny bewilderment of the experiential world—we do not simply receive a pre-designed universe.... Here, then, lies the modernist paradox of James’s richly processive and canny narrative of habit. In order to make it new, we must first make it again.” (“William James’s Narrative of Habit,” Style 33, no. 1 (1999): 82.

[23] Related to living document and to ideas that language is an actor rather than merely a tool (Hickman, p.15), this study will also investigate how Peirce connects habit to “living definition.”

[24] Bruno Latour and Albena Yaneva have pointed out the seemingly obvious but nonetheless significant idea that buildings, unlike drawings and other documents, are not static: “You need only to think for one minute, before confessing that Euclidean space is the space in which buildings are *drawn* on paper but not the environment in which buildings are *built*—and even less the world in which they are *lived*.” (p.83). Latour and Yaneva describe the living document of a building as a “flow of tranformations” in which divisions of subjective and objective dimensions can be abandoned. (p.85)

[25] Ingold has provided a framework for these transactions in what he calls the “dance of agency.” This dance takes the form of a triadic interplay between people, material, and context. Ingold provides examples that include flying a kite and playing and instrument; in the former, the triad includes flyer, kite, and air; and the latter is made up of musician (player), cello, and sound. For Ingold, attentiveness guides this dance of agencies and the correspondences (his extension of Dewey’s idea of transaction) they engender. Each design/build instrument engages in this dance of agency.

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Understanding Ian McHarg: Planning strategies Based on the Design with nature Approach for Post-Earthquake Reconstruction in Antakya

Elif Erkek[1], Alper Çabuk [2], Anıl Çakır[3], İlknur Küçükoğlu[4], Buse Bölek[5] and Halil Duymuş[6]

1 Institute of Postgraduate Education Eskişehir Technical University, Eskişehir, Türkiye; elif_erkk@hotmail.com
2 Institute of Earth and Space Sciences Eskişehir Technical University, Eskişehir, Türkiye; acabuk@eeskisehir.edu.tr
3 Institute of Postgraduate Education Eskişehir Technical University, Eskişehir, Türkiye; cakirreal@gmail.com
4 Institute of Postgraduate Education Eskişehir Technical University, Eskişehir, Türkiye; ilknurkucukoglu@ogr.eskisehir.edu.tr
5 Institute of Postgraduate Education Eskişehir Technical University, Eskişehir, Türkiye; busebolek@ogr.eskisehir.edu.tr
6 Institute of Postgraduate Education Eskişehir Technical University, Eskişehir, Türkiye; halildyms@gmail.com, hduymus@cu.edu.tr

Abstract

This paper examines how Ian McHarg's nature-based planning approach can be applied to the reconstruction of the Kahramanmaraş region of Turkey following the earthquake disaster and how it can offer opportunities for creating resilient, sustainable cities. McHarg's "Design with Nature" approach aims at urban planning and design in harmony with natural processes and ecosystems. The article offers suggestions on how this approach can be used in the reconstruction works in Kahramanmaraş and highlights important issues to be considered in this process.

Through a bibliographic analysis of McHarg's Design with Nature, the article examines his ideas that nature-based planning should follow planning based on detailed field information. It also presents planning strategies on how this approach can be successfully applied in similar situations in Turkey and other countries through the Antakya case study.

Keywords

Ecological Planning, urban design and planning, post-earthquake Antakya reconstruction, sustainable and resilient cities, Ian McHarg.

Ian McHarg'ı Anlamak: Antakya'da Deprem Sonrası Yeniden Yapılandırma için Doğa ile Tasarım Temelli Planlama Stratejileri

Elif Erkek[1], Alper Çabuk[2], Anıl Çakır[3], İlknur Küçükoğlu[4], Buse Bölek[5] and Halil Duymuş[6]

1 Institute of Postgraduate Education Eskişehir Technical University, Eskişehir, Türkiye; elif_erkk@hotmail.com
2 Institute of Earth and Space Sciences Eskişehir Technical University, Eskişehir, Türkiye; acabuk@eeskisehir.edu.tr
3 Institute of Postgraduate Education Eskişehir Technical University, Eskişehir, Türkiye; cakirreal@gmail.com
4 Institute of Postgraduate Education Eskişehir Technical University, Eskişehir, Türkiye; ilknurkucukoglu@ogr.eskisehir.edu.tr
5 Institute of Postgraduate Education Eskişehir Technical University, Eskişehir, Türkiye; busebolek@ogr.eskisehir.edu.tr
6 Institute of Postgraduate Education Eskişehir Technical University, Eskişehir, Türkiye; halildyms@gmail.com, hduymus@cu.edu.tr

Abstract

Bu makale, Ian McHarg'ın doğa tabanlı planlama yaklaşımının depremden sonra Türkiye'nin Kahramanmaraş bölgesinin yeniden inşasına nasıl uygulanabileceğini ve bu yaklaşımın dayanıklı, sürdürülebilir şehirler yaratma fırsatlarını nasıl sunabileceğini inceliyor. McHarg'ın "Doğa ile Tasarım" yaklaşımı, doğal süreçler ve ekosistemlerle uyum içinde kentsel planlama ve tasarımı hedefliyor. Makale, bu yaklaşımın Kahramanmaraş'taki yeniden inşaat çalışmalarında nasıl kullanılabileceğine dair öneriler sunuyor ve bu süreçte dikkate alınması gereken önemli konuları vurguluyor.

Makale, McHarg'ın "Design with Nature" adlı kitabı ile doğa tabanlı planlamanın ayrıntılı alan bilgisi temelinde planlamayı izlemesi gerektiği fikrini inceliyor. Ayrıca, bu yaklaşımın Türkiye ve diğer ülkelerdeki benzer durumlarda Antakya vakası çalışması aracılığıyla nasıl başarılı bir şekilde uygulanabileceğine dair planlama stratejileri de sunuluyor.

Keywords

Ekolojik planlama, kentsel tasarım ve planlama, deprem sonrası Antakya yeniden yapımı, sürdürülebilir ve dayanıklı şehirler, Ian McHarg

1 Introduction

Earthquakes are natural disasters that cause great destruction and significant impacts on human life, especially in residential areas. Following the earthquake disaster in Kahramanmaraş region of Turkey, the reconstruction works in Antakya City Centre are of great importance. The aim of this paper is to examine how Ian McHarg's "Design with Nature" approach can be applied to the reconstruction of Antakya City Centre and how it can offer opportunities for creating resilient, sustainable cities.

The scope of the paper covers the basic principles of McHarg's nature-based planning approach and how this approach aims at urban planning and design in harmony with natural processes and ecosystems. It also offers suggestions on how this approach can be used in the reconstruction of Antakya City Centre and highlights important issues to be considered in this process.

In terms of methodology, this paper conducts a detailed bibliographic analysis of McHarg's Design with Nature and examines his ideas that ecological design should follow planning based on detailed site information. It also offers strategies on how this approach can be successfully applied in similar situations in Turkey and other countries.

This study fills a gap in the research field by emphasizing the importance of nature-based planning approaches in reconstruction processes. Specifically, it demonstrates the applicability and effectiveness of this approach by providing specific recommendations and strategies for the reconstruction of Antakya City Centre.

The article examines the origins of Ian McHarg's ecologically based theory and the basic principles of the planning and design approach based on this theory. In this context, the theoretical framework discussed in the article contributes to the development of an understanding of planning and design in harmony with nature and the dissemination of this understanding to various disciplines and application areas. Moreover, this theoretical framework helps to understand the nature-based planning approach in a broader context and to enrich the existing knowledge in this field.

As a result, this paper presents planning recommendations based on the Design with Nature approach for the reconstruction of Antakya City Centre after the Kahramanmaras earthquake and demonstrates how it can provide opportunities for creating resilient and sustainable cities. This study contributes to the body of knowledge in this field by drawing attention to the importance of nature-based planning in the research area.

2 Ian McHarg and Nature-based Planning

Nature-based planning has an important place as an interdisciplinary field that focuses on the harmony and sustainability of natural and man-made systems (Steiner, 2006). McHarg was a pioneering figure in the field of ecological design and planning. This literature summary and bibliographic analysis provides information about Mc Harg and his key concepts, approaches and practices in the field of nature-based planning.

2.1 Literature Review

Ian McHarg is a pioneering theorist and practitioner in the field of nature-based planning (Steiner, 2019). McHarg's (1969) "Design with Nature" emphasizes the basic principles of ecological planning and the importance of design in harmony with nature. By promoting the use of techniques such as geographic information systems (GIS) and suitability analysis, this book has contributed significantly to the development of urban and regional planning approaches that take into account natural processes and ecosystems (McHarg, 1996).

McHarg's (1996) autobiography "A Quest for Life" provides detailed information about his life and work in the field of nature-based planning. This book is an examination of McHarg's understanding of planning and design in harmony with nature and how this understanding has spread across various disciplines and fields of practice. 2 years later "To Heal the Earth: Selected Writings of Ian McHarg" is a compilation of McHarg's ideas and contributions to the area of nature-based planning, published by McHarg and Steiner (McHarg et al., 1998). It offers a thorough summary of the principles, applications, and policy ramifications of ecological planning.

"The Essential Ian McHarg: Writings on Design and Nature", edited by Steiner (2006), brings together McHarg's major writings on nature-based planning. This book contributes to the enrichment of knowledge in this field by

providing a comprehensive overview of the historical development, theoretical foundations and applications of nature-based planning.

Other studies in the field of nature-based planning have examined different planning and design approaches based on the integration of natural and man-made systems and the principle of sustainability (Berke and Conroy, 2000; Forman, 1995; Steinitz, 1990). These studies contribute to developing the theoretical and practical aspects of nature-based planning and enriching the knowledge in this field.

As a result, studies in the field of nature-based planning have the potential to create healthier and more livable spaces for the environment and society by focusing on the harmony and sustainability of natural and man-made systems. This literature review aims to contribute to the development of existing knowledge and understanding in the field by providing information on the main concepts, approaches and practices in the field of nature-based planning.

2.2 Ian McHarg and Design with Nature

Ian McHarg (1920-2001) was an important ecological theorist and practitioner in the second half of the 20th century (Steiner, 2019). Born in industrial Glasgow, Scotland, and fought as a young private during the Second World War. After the war he gained credibility as the commander of one of Britain's most elite fighting units (Steiner, 2006). Then, he studied modernism at Harvard University and returned to Scotland (McHarg, 1996). In here, he worked on housing and new town programmes, later he was persuaded to establish a new graduate programme in landscape architecture at the University of Pennsylvania (Steiner, 2006). He also worked on energy and ecological sustainability (Steiner, 1998). In the last decade of his life, he advocated for national ecological inventories for the United States and other nations and for the spread of this approach worldwide (Steiner, 2006).

In the early 1960s, Ian McHarg hosted a television show called "The House We Live In", which was broadcast on the CBS television channel in the USA. The show aimed to explain to viewers the importance of nature and how humans can live more harmoniously with nature by addressing the issues of the natural environment and human interaction. This show helped him to convey his ideas on ecological planning and sustainable development to a wider audience. In the show, McHarg emphasized the need to protect the natural environment and for people to live in harmony with nature. He also drew attention to sustainable development and ecological planning issues by addressing the effects of urbanization and industrial development on the natural environment. "The House We Live In" raised awareness of ecological planning and sustainable development and was one of the first television show to emphasize the importance of these issues and had a great impact on the fields of landscape architecture and urban planning (McHarg, 2023).

Ian McHarg provided a roadmap for the implementation of ecological sustainability, offering insights into how we interpret, plan and shape our environment. This was his major contribution in his lifetime and his ideas are still relevant today. His book Design with Nature is recognized as a landmark in the field, it emphasizes the importance of designing and planning in harmony with nature and was influential in areas such as environmental impact assessment, new community development, coastal zone management, brownfield restoration, river corridor planning, sustainability, and regenerative design (Steiner, 2006). The book addresses concerns about the growth of the world's population and its impact on the environment and proposes a new theory and public policy in fields such as town and regional planning, architecture and landscape architecture. This ecology-based theory stems from the idea that people and nature are interconnected this interconnection should be considered in design and planning. The book emphasizes the importance of the interaction of people and nature by addressing issues such as drivers of landscape change, population dynamics, consumption and use of natural resources. McHarg proposes a comprehensive environmental inventory at national, regional and local scales. This inventory covers areas such as oceanography, climate, geology, geomorphology, physical geography, hydrology, soils, vegetation, limnology, marine biology, wildlife and land use.

Moreover, in this book he introduced the "overlay" method for analyzing and using geographic data. This method allows different geographical features and data to be overlaid, analyzed, and evaluated. In this way, more informed and sustainable decisions can be made on natural resources, land use and urban planning. McHarg's pioneering work in the fields of ecological planning and sustainable development and the layering method have led him to be known as the "Father of GIS". These studies are important concepts that form the basis of GIS technology and have had a great impact on the field of geographic information systems.

Additionally, he has had a significant impact on the field of environmental impact assessment (EIA). EIA is a process

that assesses the potential impacts of large-scale projects on the environment and proposes measures to minimize these impacts. McHarg's sustainability approaches and ecological planning approaches have contributed significantly to the initiation and development of EIA studies. These studies are of great importance in assessing the impacts of projects on the environment and achieving sustainable development goals. McHarg's theoretical and practical contributions have been influential beyond this important book. In the decades after the first Earth Day, he worked on understanding energy and the ecology of our own species.

Below in Table 1, McHarg's Design with Nature book is analyzed in chapters and the spatial analyses in this article are shaped in line with the basic approaches of the following chapters.

Table 1. *Analysis of Design with Nature by Chapters*

Chapter Name	Basic Approach in the Chapters
Prospect	Ian McHarg emphasizes the importance of future approaches to design and planning in harmony with nature and explains how these approaches should be adopted and implemented
The City: Health And Pathology	Ian McHarg discusses the impact of cities on human health and natural processes and explains how these impacts should be assessed and managed.
The City: Process and Form	Ian McHarg emphasizes the importance of cities in terms of natural processes and ecosystems and explains how these processes need to be considered for a nature-compatible design and planning approach at the city level.
Process and Form	Ian McHarg emphasizes how an understanding and appreciation of natural processes and ecosystems is essential for a design and planning approach in harmony with nature.
The Metropolitan Region	Ian McHarg emphasizes the importance of metropolitan areas for natural processes and ecosystems and explains how these processes need to be considered for a nature-compatible design and planning approach at the metropolitan level.
The River Basin	Ian McHarg emphasizes the importance of river basins in terms of natural processes and ecosystems and explains how these processes need to be considered for a nature-compatible design and planning approach at the river basin level.
The Naturalist	Ian McHarg puts forward the idea that people and nature are interconnected and that ecological processes are an important factor to consider.
Processes as Values	Ian McHarg emphasizes the value of natural processes and ecosystems and explains how to use them in design and planning in harmony with nature.
The World is a Capsule	Ian McHarg emphasizes that the earth is a finite resource and therefore the importance of design and planning in harmony with nature.
A Response to Values	Ian McHarg considers how to respond to the core values of nature- compatible design and planning and how these values can be realized in practice.
On Values	Ian McHarg explains the core values of design and planning in harmony with nature and how these values can be applied.
Nature in the Metropolis	Ian McHarg proposes how to integrate and protect nature in urban environments. This chapter emphasizes the idea that cities can be sustainable and ecologically healthy
The Cast and the Capsule	Ian McHarg presents the key elements of nature compatible design and planning processes and the tools to implement them.
A Step Forward	Ian McHarg presents the steps that need to be taken to live and design in harmony with nature and the tools that need to be used in this process
The Plight	Ian McHarg emphasizes the impacts of humans on the natural environment and the consequences of these impacts on the world.
Sea and Survival	Ian McHarg discusses the ecological processes of the seas and coastal zones and the importance of a nature-compatible approach to the planning of these areas

3 Results and Conclusions

In this section, the study area is briefly introduced, the spatial data that should be used for planning studies that can be carried out in line with a nature-based approach are grouped according to McHarg's approach in Design with Nature, as well as information on spatial analyses in GIS, approach and strategy suggestions.

3.1 Study Area and Data Set to be Used for Nature-Based Planning

Antakya City Centre is a historic city and the capital of Hatay Province in Turkey. The city was founded on the banks of the Asi River and at the foot of Mount Silpius. Antakya has been home to many civilizations in history due to its geographical location, military and economic importance. It was an important cultural and commercial center during the Hellenistic, Roman, Byzantine, Seljuk, Crusader, Mamluk and Ottoman periods. Antakya is also one of the places where Christianity first emerged and spread (Dinç, 2015; Dinç and Hargel, 2017)

The 6 February 2023 earthquake in Kahramanmaraş has gone down in history as a major natural disaster affecting Turkey and Syria. Although the epicenter of the earthquake was in Pazarcık and Ekinözü districts of Kahramanmaraş, one of the most damaged places was Antakya, the city center of Hatay. The effects on Antakya are as follows:

- **Destroyed and damaged buildings:** At least 35,360 buildings in Antakya were destroyed or severely damaged because of the earthquakes. This situation threatened the lives and safety of people living in the city. It was determined that most of the collapsed buildings were old and neglected, ground surveys were not conducted, poor quality materials and workmanship were used, and they were built illegally or without license.

- **Formation of empty lands:** Hundreds of vacant plots of land were created in the area after the debris removal works initiated following the demolition and damage. This situation should be taken into consideration as an important factor in urban planning and reconstruction processes.

- **Population change:** While 377,793 people lived in Antakya before the earthquakes, after the earthquakes, the city had the appearance of a ghost city. This situation affects the socio-economic structure and quality of life of the city.

- **Increase in natural risks:** In addition to seismic risk, there are also natural risks such as landslides, floods and erosion in Antakya. After the earthquake, the destruction and damages that these risks may cause in the city have become more significant.

- **Reconstruction process:** The reconstruction works to be initiated in Antakya after the effects of the earthquake are of great importance. In this process, opportunities should be provided for the implementation of nature-based planning approaches and the creation of resilient, sustainable cities.

The effects of the Kahramanmaraş earthquake on Antakya have caused the city to experience significant changes in social, economic and environmental terms. Therefore, it is of great importance to implement appropriate planning and design strategies to create resilient and sustainable cities in harmony with nature in the post-earthquake reconstruction process.

Within the scope of the planning study, spatial data were determined in line with the main framework given in Chapter 2 of McHarg's Design with Nature book. The spatial data determined in this context are given in Table 2.

Table 2. *Spatial data which can be used for nature-based planning context. Frame Spatial Data Prospect Spatial Analysis Sheets*

Frame	Spatial Data
Prospect	Spatial Analysis Sheets
The City: Health And Pathology	**Air quality data:** Data providing information on air pollution levels, types and distribution of pollutants. **Water quality data:** Data providing information on the quality and pollution levels of surface and groundwater resources. **Noise levels:** Data providing information on levels and sources of noise pollution. **Green spaces and accessibility:** Data providing information on the location, size and accessibility of green spaces. **Public services and social infrastructure:** Data providing information on the location, capacity and accessibility of education, health, sports and cultural services. **Transportation network and traffic density:** Data providing information on transport lines, public transport stops, pedestrian and cycle routes, traffic density and accidents. **Waste management and recycling:** Data providing information on the location and capacity of garbage, recycling, sewerage and other infrastructure systems. **Disease and health problems:** Data providing information on the prevalence of communicable and non-communicable diseases, risk factors and access to health services. **Urban poverty and social exclusion:** Data on income inequality, poverty, homelessness and social exclusion and their geographical distribution.
The City: Process and Form	**Land use and urban morphology:** Data providing information on the location, intensity and distribution of different types of land use. **Natural and ecological features:** Data providing information on topography, hydrology, vegetation, habitat types and biodiversity. **Cultural and historical sites:** Data providing information on the location, significance and conservation status of cultural and historical buildings, sites and features. **Transportation network and accessibility:** Data providing information on transport lines, public transport stops, pedestrian and bicycle routes and accessibility analysis. **Public services and social infrastructure:** Data providing information on the location, capacity and accessibility of education, health, sports and cultural services. **Green spaces and recreation areas:** Data providing information on the location, size and accessibility of parks, gardens, forests and other green spaces. **Urban regeneration and reconstruction projects:** Data providing information on the location, scale and impacts of planned or ongoing urban regeneration and reconstruction projects. **Conservation areas and restrictions:** Data providing information on protection areas, restrictions and management policies determined for the protection of natural and cultural values.
Process and Form	**Topographic data:** Maps and data sets showing physical features such as elevation, slope, landforms and drainage characteristics. **Hydrological data:** Data that provide information on water characteristics and distribution, such as rivers, lakes, wetlands and groundwater resources. **Geological and geomorphological data:** Data showing rock types, structures, soil properties and the effects of natural processes (landslides, erosion, earthquakes, etc.). **Ecosystem and biodiversity data:** Information on natural habitats such as vegetation, habitat types, protected areas and wildlife corridors. **Land use and urban morphology data:** Maps and datasets that provide information on existing settlement patterns, urban density, vacant land and potential land uses. **Historical textures and local architectural data:** Data providing information on the location and value of historic sites, structures, archaeological sites and cultural heritage items. **Public space and transportation network data:** Data providing information on parks, squares, pedestrian and cycle routes, public transport lines and stops, roads and other infrastructure systems. **Air pollution, green spaces and accessibility data**: Data sets to be used for air quality, distribution of green spaces and accessibility analyses.

	Waste management analysis data: Data providing information on the location and capacity of waste, recycling, sewerage and other infrastructure systems.
The Metropolitan Region	**Population distribution and demographic characteristics:** Data providing information on demographic characteristics such as population density, age, gender, education and ethnicity. **Economic activities and employment:** Data providing information on economic sectors, employment rates and job opportunities. **Transportation network and regional connections:** Data providing information on regional transport networks and connections such as road, rail, air and maritime transport. **Infrastructure and services:** Data providing information on the location and capacity of infrastructure systems and services such as energy, water, waste management and telecommunications. **Land use and urban growth:** Data providing information on the location, intensity and distribution of different types of land use and urban growth trends. **Natural and ecological features:** Data providing information on topography, hydrology, vegetation, habitat types, biodiversity and ecological corridors. **Protected areas and restrictions:** Data providing information on protection areas, restrictions and management policies determined for the protection of natural and cultural values. **Urban and regional planning policies:** Data providing information on existing and planned urban and regional planning policies, projects and strategies.
The River Basin	**Hydrological data:** Data providing information on the location, flow rates and flow rates of rivers, lakes, dams and watersheds. **Water quality data:** Data providing information on the quality of surface and groundwater resources, pollution levels and types of pollutants. **Topography and landforms:** Data providing information on topographical features, slope, elevation and landforms of the river basin. **Geological and pedological data:** Data providing information on the geological structure of the river basin, soil types, erosion risk and soil properties. **Ecosystem and biodiversity:** Data providing information on plant and animal species, habitats and ecological values in the river basin. **Land use and urban development:** Data providing information on existing and planned land use types, urban development trends and utilization of natural resources in the river basin. **Water use and management:** Data providing information on water demand for agriculture, industry and domestic use, water use and water management policies. **Flood and flood risk:** Data providing information on flood and flood risk in the river basin, potential impacts and risk mitigation strategies. **Protection areas and restrictions:** Data providing information on protection areas, restrictions and management policies for the protection of water resources and ecosystems identified in the river basin.
The Naturalist	**Biodiversity and habitat data:** Data providing information on plant and animal species, location, size and quality of habitats, migration routes and ecological corridors. **Natural and ecological features:** Data providing information on topography, hydrology, vegetation, climate data and ecosystem services. **Protected areas and restrictions:** Data providing information on protected areas, restrictions and management policies determined for the protection of natural values. **Land use and utilization of natural resources:** Data providing information on the use of natural resources, their impacts on ecosystems and sustainable use of natural resources. **Threats and human impacts:** Data providing information on threats to natural areas, pollution, habitat loss, climate change and human impacts. **Environmental monitoring and surveillance:** Data to monitor the condition of natural areas and ecosystems, providing information on surveillance and monitoring programmes. **Ecotourism and recreation areas:** Data providing information on the location, size, accessibility and management of ecotourism and recreation areas. **Local ecological knowledge and traditional ecological practices:** Data providing information on local people's knowledge of natural areas and ecosystems and traditional ecological practices.

Processes as Values	**Natural processes and ecosystem services:** Data on natural processes such as topography, hydrology, climate, vegetation, erosion, water cycle and carbon cycle. **Land use and change:** Data providing information on current and historical land use, urban development, agricultural areas and transformation of natural areas. **Geological and geomorphological data:** Data providing information on landforms, soil types, underground water resources and natural disaster risks (earthquakes, landslides, floods). **Climate data and variables:** Data providing information on temperature, precipitation, humidity, wind and climate change effects. **Biodiversity and habitats:** Data providing information on plant and animal species, location and quality of habitats, ecological corridors and migration routes. **Water resources and quality:** Data providing information on the location, flow, quality and utilization of surface and groundwater resources. **Energy resources and utilization:** Data providing information on the location, capacity and utilization of renewable and fossil energy resources. **Pollution and environmental impacts:** Data providing information on air, water and soil pollution, waste management and impacts on natural processes.
The World is a Capsule	**Global and regional climate data:** Data providing information on temperature, precipitation, sea level change and climate change impacts. **Natural resources and their use:** Data providing information on the location, quantity and use of natural resources such as water, soil, energy and biodiversity. **Ecosystem services:** Data that provide information on the value and extent of services provided by ecosystems and strategies for their conservation. **Land use and change:** Data providing information on urban development, agricultural areas, transformation of natural areas and sustainability of land use. **Population and demographic data:** Data providing information on population density, distribution, growth rates and demographic structure. **Energy resources and utilization:** Data providing information on the location, capacity, utilization and energy efficiency of renewable and fossil energy sources. **Pollution and environmental impacts:** Data providing information on air, water and soil pollution, waste management and impacts on natural processes. **Sustainability and environmental policies:** Data providing information on sustainable development goals, environmental policies and strategies for design and planning in harmony with nature.
A Response to Values	**Socio-cultural values and structures:** Data providing information on the location and value of historical and cultural buildings, sites, monuments and cultural heritage. **Community values and expectations:** Data from surveys, focus groups and participatory planning processes that provide information on community values, expectations and priorities. Demographic data: Data providing information on demographic structure such as population density, distribution, age, gender, education and income level. **Local economy and employment:** Data providing information on economic activities, employment rates and sectors, income levels and economic development strategies. **Education and health services:** Data providing information on the location, capacity and accessibility of schools, hospitals, health centers and educational services. **Transportation and infrastructure:** Data providing information on the transport network, public transport, pedestrian and cycle routes, infrastructure services and accessibility. **Green spaces and recreation areas:** Data providing information on the location, size, accessibility and quality of parks, gardens, sports facilities and recreation areas. **Urban design and aesthetic values:** Data providing information on the quality of urban spaces, aesthetic values, squares, streets and public spaces.
On Values	**Socio-cultural values:** Data providing information on the location and value of historical and cultural buildings, sites, monuments, religious buildings and cultural heritage. **Community values and beliefs:** Data from surveys, focus groups and participatory planning processes that provide information on community values, beliefs and priorities. **Demographic and ethnic data:** Demographic data such as population density, distribution, ethnic and cultural composition, age, gender, education and income level. These data will help to develop strategies that are tailored to the needs and expectations of different demographic and ethnic groups. **Local economy and values:** Data providing information on economic activities, employment rates and sectors, income levels and local economic values.

	Education and health services: Data providing information on the location and capacity of schools, hospitals, health centers and educational services and their conformity with community values. **Environment and natural values:** Data providing information on the location and value of natural areas, ecosystem services, biodiversity and protected areas, and strategies for their protection. **Urban design and aesthetic values:** Data providing information on the quality of urban spaces, aesthetic values, squares, streets and public spaces. **Community participation and evaluations:** Data providing information about the participation of the community in planning and design processes, their evaluations and feedback. **Green spaces and recreation areas:** Data providing information on the location, size, accessibility and quality of parks, gardens, sports facilities and recreation areas. **Urban design and aesthetic values:** Data providing information on the quality of urban spaces, aesthetic values, squares, streets and public spaces.
Nature in the Metropolis	**Green spaces and natural areas:** Data providing information on the location, size and biodiversity of parks, gardens, forests, watersheds and natural areas. **Ecosystem services:** Data providing information on the value and extent of services provided by ecosystems and strategies for their conservation. **Land use and change:** Data providing information on urban development, agricultural areas, transformation of natural areas and sustainability of land use. **Urban biodiversity:** Data providing information on the distribution of flora and fauna species within the city, conservation areas and biodiversity strategies. **Water resources and watersheds:** Data providing information on the location, quality and conservation strategies for rivers, lakes, wetlands and watersheds. **Air quality and pollution:** Data providing information on air pollution levels, emission sources and strategies to improve air quality. **Transportation and infrastructure:** Data providing information on the transport network, public transport, pedestrian and cycling routes, infrastructure services and planning in harmony with nature. **Energy sources and utilization:** Data providing information on the location, capacity, utilization and energy efficiency of renewable energy sources.
The Cast and the Capsule	**Ecological assessments:** Data providing information on ecosystems, habitats, biodiversity and ecological processes. **Land use and planning:** Data providing information on land use types, changes and sustainable land use planning. **Natural environment protection areas:** Data providing information on the location, value and management of protected areas, protected areas, national parks and natural areas. **Protection of coastal zones:** Data providing information on the location of coastal areas, erosion, sea level change and coastal protection strategies. **Sustainable management of agricultural land:** Data providing information on agricultural areas, productivity, water use and sustainable agricultural practices. **Conservation of forests:** Data providing information on the location of forest areas, tree species, forestry activities and forest conservation strategies. **Water resources and management:** Data providing information on the location, quality and utilization of surface and groundwater resources and water management strategies. **Climate change and natural disasters:** Data providing information on climate change scenarios, natural disaster risks and adaptation strategies.
A Step Forward	**Geographical and geological features:** Data providing information on topography, geological structure, soil types and characteristics. **Ecological processes and evaluation:** Data to be used for the analysis and evaluation of ecosystems, habitats, biodiversity and ecological processes. **Hydrological and water resources:** Data providing information on surface and groundwater resources, water basins, wetlands and water quality. **Climate and air quality:** Data providing information on climate data, air pollution levels and scenarios related to climate change. **Land use and urban form:** Data providing information on existing and planned land use types, urban structure and density. **Natural disasters and risks:** Data providing information on earthquake, flood, landslide and other natural disaster risks and strategies and infrastructure to adapt to these risks. **Infrastructure and transportation:** Data providing information on the transport network, public transport, pedestrian and cycle routes, energy, water and waste management infrastructure. **Socio-economic and demographic data:** Data providing information on population density, distribution, age, gender, education, income level and economic activities.

The Plight	**Natural disaster risk areas:** Data providing information on the location and risk levels of areas subject to earthquakes, floods, landslides and other natural disasters. **Urban environmental problems:** Data providing information on the intensity and distribution of air and water pollution, noise, waste management and other environmental problems. **Urban poverty and social exclusion:** Data on income inequality, poverty, homelessness and social exclusion and their geographical distribution. **Vacant and abandoned buildings:** Data providing information on the location and number of vacant, abandoned or in danger of demolition buildings requiring urban regeneration and reconstruction. **Urban infrastructure deficiencies:** Data providing information on areas where urban infrastructure systems such as transport, energy, water and waste management are missing or inadequate. **Lack of green space and accessibility:** Data providing information on areas where green areas are scarce and access to these areas is limited. **Access to health and education services:** Data providing information on areas where health and education services are inadequate or inaccessible. **Unemployment and economic stagnation:** Data providing information on regions with high unemployment rates and declining economic activity.
Sea and Survival	**Coastal and marine areas:** Data providing information about the coastline, coastal zones, beaches, bays, islands and marine areas. **Coastal erosion and sea level change:** Data providing information on coastal erosion, sea level change and vulnerability of coastal areas. **Coastal and marine ecosystems:** Data providing information on coastal and marine ecosystems, biodiversity, habitats and protected areas. **Coastal and marine use:** Data providing information on types of coastal and marine use, economic activities such as tourism, fishing, ports and energy production. **Coastal and marine protection strategies:** Data to inform planning and strategies for the protection and management of coastal and marine areas. **Marine pollution and water quality:** Data providing information on marine pollution, water quality and the health of marine ecosystems. **Climate change and marine impacts:** Data providing information on climate change scenarios, sea level change and impacts on coastal areas. **Disaster and risk management:** Data providing information on natural disasters and risks in coastal and marine areas, events such as floods, storms and tsunamis, and strategies for adaptation.

3.2 Basic Approach and Strategies Determined for Creating a Sustainable and Resilient City

In this chapter, the basic approaches, strategies and related analyses made with GIS in order to create a sustainable and resilient city within the framework of nature-based planning approaches in Mc Harg's Design with Nature book, which are proposed to be implemented in the post-earthquake reconstruction process of Antakya City Centre, are discussed. In this context, in the light of the data and analyses obtained during the research process, it is evaluated how the proposed strategies will contribute to the social, economic and environmental sustainability of the city (Table3).

4 Conclusions

In this section, the results of nature-based planning approaches applied in line with Mac Harg's Design with Nature in the post-earthquake reconstruction process of Antakya City Centre will be discussed. In this context, the effects of the implementation of the results on the sustainability and resilience of the city will be evaluated and recommendations will be presented. This chapter aims to present the gains achieved in the post-earthquake transformation of Antakya and important lessons for other cities that may face similar situations in the future.

In the process of reconstruction of Antakya City Centre, we need to follow the following steps to create a sustainable and resilient city by using Ian McHarg's nature-based planning approaches:

- Analyzing natural and ecological processes: We need to study the geographical, geological and ecological characteristics of Antakya in detail and integrate this information into the planning process. This should include assessing earthquake risks, landslide and flood hazards, erosion and the condition of natural resources.

- Conduct comprehensive surveys: We need to analyze Antakya's historical, cultural and archaeological assets, existing building stock and infrastructure systems. This information should be considered in the planning process and appropriate strategies for the protection and development of the city should be identified.

- Sustainable and resilient urban planning: During the reconstruction process, we should develop an urban plan that is compatible with natural processes, energy and water efficient, with waste management and recycling systems, and with an abundance of green and open spaces. This plan should optimize urban regeneration and new construction areas in terms of the protection of natural and cultural values and the resilience of the city.

- Ensuring the participation of local people: It is important to ensure that the people of Antakya are actively involved in the restructuring process and participate in decision-making processes. This will both increase the feasibility of the plans and help to create a city that considers the needs and expectations of the local people.

Table 3. *Suggested Planning Approaches and Strategies for Antakya.*

Frame	Approach	Strategy	Spatial Analysis
Prospect	Providing a perspective on how the living spaces of the future Antakya could look like	For the post-earthquake reconstruction of Antakya City Center, a sustainable and resilient city vision for the future should be created.	Overlap sheet
The City: Health And Pathology	Investigation and evaluation of Antakya in terms of health and pathology	The reconstruction process should aim to provide the city with a healthy and livable environment and minimize structural pathologies. Ensuring health and decent living conditions Identifying health problems in the city center and making health- oriented planning to improve them. It is stated that there is a pest and fly problem in the city center of Antakya, determining the factors that occur after such disasters and affect human health. Identifying the areas where the rubble of demolished buildings is dumped/stored and the place of these areas in the ecosystem.	Building stock analysis, disaster and urban risk assessments to analyze the health status of the city and existing risks. Collection and analysis of data on access to health services, air and water quality, green spaces and physical activity opportunities. Marking and risk analysis of areas that will affect the health status of the city and are prone to environmental degradation (where activities such as green areas, pastures, animal husbandry are carried out). Analysis of rubble waste management
The City: Process and Form	Analyzing the processes and forms of Antakya	In the reconstruction of Antakya; Creating a city form in harmony with natural and cultural processes Managing the construction processes of the city and creating an environmentally sensitive urban form by considering the principles of sustainability Organizing the urban form with a sustainable approach that constructs the public spaces formed before and after the earthquake together in the urban memory of the people.	Land use and urban morphology analyses for the compatibility of city form with natural and cultural processes Analysis of the city's existing settlement patterns, urban growth projections and inventory of urban gaps Use of analytical tools including urban density maps, potential use of urban gaps and urban growth scenarios Public space analysis based on pre- earthquake focal points and post- earthquake focal points

Process and Form	The importance of natural processes and patterns and their impact on human life	Taking natural processes and forms into account in the post- earthquake reconstruction of Antakya, Creating a city plan in harmony with ecosystems Determination of the potential of openings formed after the earthquake to become green spaces	Habitat quality and ecological corridor analysis to protect natural and ecological processes. Analysis of wildlife and migration routes. Reconstructing transportation maps or the location of industrial facilities according to wildlife and migration routes
Process and Form The Metropolitan Region	To put forward ideas on the planning and management of Antakya and its surrounding areas	Antakya and the surrounding areas should be integrated into the post- earthquake reconstruction process by adopting a holistic planning and management approach. Ensuring regional integration and connectivity Promote regional cooperation and coordination by adopting an integrated planning approach with the surrounding metropolitan area of Antakya. To identify the industrial and production facilities in Antakya that are available and can be developed.	Regional planning and urban growth analysis and evaluation of settlements, infrastructure and transportation systems in the region Determination of urban and intercity transportation axes Collection and analysis of regional data such as regional population, economic activities, transportation networks and distribution of natural resources Consideration of industrial and production centers in the planning of transportation networks
The River Basin	Examination of ecosystems and management of river basins	The protection and management of the Asi River basin should play an important role in the post- earthquake reconstruction of Antakya. Identifying approaches for river basin management and sustainable water use Promote sustainable management of water resources to protect and restore the Asi River basin. Identification of disaster risk arising from the water basin	Flood risk analyses and water quality assessments for river basin management and protection of water resources Analysis of hydrological characteristics of the Asi River basin, collection of data on water quality and water resources utilization Determination of the impact of wastewater on rivers and water resources and water quality
The Naturalist	Ensuring the contribution of natural scientists and people who study nature to the planning process	In the post-earthquake reconstruction of Antakya, the protection and sustainability of natural processes and ecosystems should be consulted and prioritized for reconstruction. Protecting natural areas, strengthening green infrastructure and promoting biodiversity in the city center. Maintaining the sustainable effects of the consultancy received by conducting trainings at the local level.	Analyses for areas with high ecological sensitivity (forest, pasture, agriculture) Inventory of natural areas, evaluation of ecosystem services, analysis of the creation of biodiversity maps Planning of green space networks, habitat conservation strategies and analysis of biodiversity corridors Analysis of potential for the development of green infrastructure system proposals

Processes as Values	The values of natural processes and their impact on human life and the environment.	The values of natural processes should be the basis for sustainable and ecological urban planning in the post- earthquake reconstruction of Antakya. Encouraging participatory planning and decision-making processes based on the views of stakeholders in urban development processes. Collecting data through workshops planned with participatory methods where the public has a say.	Analyzing ecosystem services and natural resource assessment, considering the values of natural processes Collecting and analyzing stakeholders' views in participatory planning processes Use of analytical tools such as participatory mapping, public opinion surveys, stakeholder analysis and spatial awareness maps
The World is a Capsule	Shaping the idea that the city has limited resources and that these resources should be managed sustainably in the restructuring process	In the reconstruction of Antakya, sustainability measures such as energy and water conservation should be taken, recognizing that the world's resources are finite. Ensuring that the city is compatible with sustainability goals in a global context. Conducting studies on energy efficiency and circular economy	Conduct plant and animal species distribution and habitat assessments to assess and conserve biodiversity. Comparison of global sustainability goals and city data Analysis of global development trends Energy efficiency and retrofit-oriented analysis of the existing building stock
A Response to Values	Identifying human responses to values and natural processes and how they affect their lives	The values of the people of Antakya and their reactions to natural processes should be taken into account in the post- earthquake reconstruction process and the needs and expectations of the community should be met. The city should adopt a values- based management approach and make planning and design decisions that respond to the values of society. Identifying needs according to the demographics of the population affected by the disaster.	Participatory planning and demographic analysis, taking into account different values and perceptions. Collection of data reflecting the values of the society, inventory of cultural heritage
On Values	Identifying the effects of people's values and beliefs on nature and the environment	In the post-earthquake reconstruction of Antakya, historical and cultural sites should be protected and developed in line with people's values and beliefs. Promote the preservation of the city's existing identity through the protection and enhancement of its values. Identification of urban memory	Geographical analysis of archaeological and historical sites for the protection of cultural and historical values Collection and analysis of data on the historical, cultural and social values of the city Analyzing social values through urban memory
Nature in the Metropolis	The importance of nature in Antakya and the values that need to be protected	In the post-earthquake reconstruction of Antakya City Center, the protection and development of green and natural areas should be an important goal. Preserving natural areas in the city center, strengthening the green infrastructure, and creating urban living spaces in harmony with nature Resilient and sustainable infrastructure planning	Microclimate analysis and air quality assessments for urban nature and green spaces Inventory of natural areas, protection of ecosystem services and analysis of the green infrastructure network

The Cast and the Capsule	Conceptualizing the human relationship with nature and the importance of living in harmony with it	Considering the importance of living in harmony with nature, ecosystem-based planning and design approaches should be adopted in the post-earthquake reconstruction of Antakya. Sustainable integration of cultural and historical heritage by preserving and renewing the urban morphology.	Microclimate analysis and air quality assessments for urban nature and green spaces Inventory of natural areas, protection of ecosystem services and analysis of the green infrastructure network
A Step Forward	Identifying the importance of nature- based approaches and how they can advance in the future	Recognizing the importance of ecologically based planning and design in the post-earthquake reconstruction of Antakya and taking steps towards a sustainable and resilient city Adoption of innovative and sustainable technologies and practices and forward planning to determine the future direction of the city.	Analysis of innovative technologies and sustainable practices, future projections. Analysis of analytical tools such as innovative energy systems, smart transportation solutions and digital infrastructures Analyzing the protection of natural resources
The Plight	Identifying environmental problems and how people can cope with them.	In the post-earthquake reconstruction of Antakya, efforts should be made to improve the quality of urban life by providing proactive and innovative solutions to environmental problems. Risk management and emergency planning to make the city resilient to harsh conditions and natural disasters. Reorganization of gathering areas determined within the scope of disaster management plans.	Climate change analysis, carbon emissions and energy use modeling Analysis of natural disaster risks, Disaster risk maps, emergency response scenarios and urban resilience analysis.
Sea and Survival	The importance of marine and surface water ecosystems and their role in human survival	In the post-earthquake reconstruction of Antakya, the protection and management of marine and water resources should play an important role for the sustainability and quality of life of the city. Determining the coastal and marine interactions of the city and adopting a sustainable planning and management approach on coastal areas. Structuring coastal areas used for tourism with a focus on sustainable tourism. Designing maritime transportation trade networks with a focus on sustainability	Coastal land use analysis and seawater quality assessments for coastal zone management NDWI (Normalized Difference Water Index) analysis Management and conservation of water resources and marine ecosystems Analysis of coastal zones, assessment of marine ecosystems, analysis of climate change impacts Coastal erosion models, sea level rise scenarios, conservation and sustainability of marine ecosystems Analysis of maritime transportation networks Tourism focal points analysis

- Integrated and interdisciplinary approach: Experts from different disciplines need to come together and work towards a common vision and goals in the process of restructuring Antakya. This will support a planning process that considers ecological, social and economic dimensions and will ensure that the city is sustainable and resilient.

- Continuous monitoring and evaluation: We need to establish continuous monitoring and evaluation mechanisms to assess the effectiveness and sustainability of decisions taken and projects implemented in the reconstruction process. This will allow plans and projects to be revised and improved over time, enabling Antakya to achieve its goal of becoming a sustainable and resilient city.

In the post-earthquake reconstruction of Antakya City Centre, short- and medium-term strategies for creating a sustainable and resilient city using Ian McHarg's nature-based planning approaches should be as follows:

Short term:

- Meeting urgent needs: Temporary solutions should be developed to meet the shelter, health, education and social service needs of earthquake victims.

- Damage assessment and risk analysis: Identify and risk analyze the damaged structures and infrastructure after the earthquake and plan emergency response and repair works.

- Cleaning of destroyed and damaged areas: The areas destroyed and damaged in the earthquake should be safely cleaned and debris removal works should be completed.

- Reconstruction plans: Reconstruction plans should be prepared to make Antakya a sustainable and resilient city.

Medium term:

- Urban transformation plans: In order to make Antakya a sustainable and resilient city, it is necessary to identify the areas and structural areas that were not damaged in the earthquake but are risky and prepare urban transformation plans in this context.

- Improvement of infrastructure and transport systems: The city's infrastructure and transport systems should be strengthened and made earthquake resistant.

- Protection of green areas and natural resources: Protecting Antakya's green spaces and natural resources should contribute to the goal of creating a sustainable and resilient city.

- Sustainable development strategies: Development strategies should be developed to ensure the economic, social and environmental sustainability of Antakya.

- Training and awareness-raising: Training and awareness-raising activities should be organized to enable the people of Antakya to contribute to sustainable and resilient urban life.

- Adaptation to climate change and disaster risks: Planning and design practices should be implemented to adapt Antakya to climate change and disaster risks.

Implementation of these strategies will contribute to the creation of a sustainable and resilient city by using nature-based planning approaches in the post-earthquake reconstruction process of Antakya.

5 Discussions

This paper discusses how Ian McHarg's nature-based planning approaches can be used in the post- earthquake reconstruction of Antakya City Centre and what the short-, medium- and long-term strategies should be to create a sustainable and resilient city. The main topics on which the discussions are focused are as follows:

Analysis of natural and ecological processes: The analysis of natural and ecological processes plays an important role in the post-earthquake reconstruction of Antakya. These analyses will help planners to identify risks and potential hazards in the city and to improve its resilience by taking appropriate measures.

Urban regeneration and reconstruction plans: Urban regeneration and reconstruction plans are of great importance for Antakya to become a sustainable and resilient city. These plans should be prepared to ensure the ecological, social and economic sustainability of the city and to build earthquake-resistant structures.

Local community participation and training: The active participation of the people of Antakya in the reconstruction process and their inclusion in decision-making processes will contribute to the sustainability and resilience of the

city. In addition, educating and raising awareness of the public on sustainable urban living plays an important role in this process.

Adaptation to climate change and disaster risks: Planning and designing Antakya to adapt to climate change and disaster risks will ensure that the city is sustainable and resilient. To this end, planners and designers should develop strategies to ensure that the city is prepared for future climate and disaster risks.

In conclusion, in the post-earthquake reconstruction process of Antakya, it is of great importance to implement short-, medium- and long-term strategies to create a sustainable and resilient city using Ian McHarg's nature-based planning approaches. These strategies will ensure that the city becomes a city that is compatible with its natural and ecological processes, energy and water efficient, has waste management and recycling systems, and has plenty of green and open spaces.

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Human Factors in the Creation and Conservation of the Built Environment

Ruşen Keleş[1]

1 Faculty of Architecture, Design and Fine Arts. Cappadocia University, Nevşehir, Turkey; keles@politics.ankara.edu.tr

Abstract

We live in a context that is very rich in terms of cultural and architectural assets. It is not appropriate to say that we properly conserve the assets that have been brought to our country over the centuries. The insufficient development of conservation awareness among both central and local government officials, as well as the public, may lead to the conservation laws remaining mere words on paper. Consequently, there exists an ethical imperative to safeguard cultural heritage recognized not only by the state but also by the global community. It is crucial to secure cultural heritage through legal frameworks, incorporating aspects of conservation awareness, urban culture, responsible citizenship, and civic consciousness. These, coupled with ethical obligations, should be cultivated through all available means.

Keywords

Conservation, cultural heritage, international regulations, citizenship awareness, laws.

Yapılı Çevrenin Oluşmasında ve Korunmasında Beşeri Faktörler

Ruşen Keleş[1]

1 Mimarlık, Tasarım ve Güzel Sanatlar Fakültesi, Kapadokya Üniversitesi, Nevşehir, Türkiye keles@politics.ankara.edu.tr

Özet

Kültür ve mimarlık varlıkları açısından çok zengin bir bağlamda yaşamaktayız. Yüzyılların ülkemize kazandırmış olduğu bu zenginlikleri gereği gibi koruduğumuzu söylemek kolay değildir. Hem merkezi ve yerel yönetimlerde görev üstlenmiş olan yöneticilerin, hem de halkın kendisinde koruma bilincinin yeterli düzeyde gelişmemiş olması, korumaya ilişkin hukuk kurallarının sonuç olarak kâğıt üzerinde kalmasına yol açabilmektedir. Bu nedenle yalnız devlet olarak bizim değil, bütün insanlık aleminin de üzerinde hak sahibi olduğu bilinen ve hukuk kurallarının güvencesi altına alınmış olan kültür mirasının, her çareye başvurularak geliştirilecek olan koruma bilinci, kent kültürü, sorumlu yurttaşlık ve kenttaşlık bilinci bağlamında güvence altına alınmasında etik zorunluluk vardır.

Anahtar Kelimeler

Koruma, kültürel miras, uluslararası tüzükler, yurttaşlık bilinci, yasalar

1 Conceptual Introduction

The built environment, sometimes referred to as the man-made environment, falls directly within the scope of the architecture profession. In the social sciences volume of the Turkish Science Terms Dictionary by the Turkish Academy of Sciences (TÜBA), architecture is defined as follows: "The necessary structures, environments, functional requirements, economic and technical structures to facilitate people's living and to enable them to carry out their activities such as sheltering, resting, working, and entertaining." It is the art, profession, and related branches of science for designing and constructing the necessary structures with aesthetic creativity, environment, functional requirements, and economic and technical possibilities in order to facilitate people's living and enable them to continue their activities such as sheltering, resting, working, and entertaining. In addition to this definition, in the same dictionary, also mentions architecture as "the special method or style used in the construction of buildings." It is clear that the field of interest of architecture is not limited to buildings alone, but also living environments.

In my *Kentbilim Terimleri Sözlüğü* [Urbanology Terms Dictionary], I have provided the following definitions within the framework of the concepts of natural areas and natural protected sites: "A natural area, in urban sociology and human ecology, constitutes a whole with its unique features, a special location, conditions, and natural or human-made features"." A natural protected area is defined as: "A place that should be preserved and assessed in terms of its homogeneity, natural and artificial beauties, features, and importance. Therefore, it holds a significant position in city development plans and regional designs, either as a collaborative creation of nature and humans or as a place formed solely by natural beauties". The common feature emphasized in all these definitions is the necessity of designing people's living environments without deviating from the principle of respecting natural and aesthetic values.

2 Historical Development Process

Architects who examine the relationship between architecture and the environment have carefully distinguished three stages in the development process of the architectural profession. The first is the era of traditional architecture, where an emphasis is placed on harmony and unity with nature. The second is the period of contemporary architecture, symbolizing the architecture of the 20th century, during which it is not observed that special importance is given to natural values. The third period is known as the era of ecological architecture. Ensuring sustainability by improving harmony with nature, conducting construction

in line with the principles of ecology, and creating designs that take artistic and spiritual dimensions into account are the main features of the ecological architecture period. During this period, architects need to consider fundamental elements in their design work, including energy, climate, building materials, holistic approaches to urban spaces, rational land use, green areas, identity, scale, construction, and education. In this era, while architects are influenced by environmental values and ecological data, they also shape the environment with their own designs (İncedayı, 2007).

In traditional Turkish architecture, there was no distinct concept of urbanism. That is, the idea of creating a planned city, a concept observed in European countries since the Renaissance, was not separate from architecture. The cities that the Turks encountered upon their arrival in Anatolia, which they Turkified by settling first around them and then within them, were the product of a settlement structure based on Turkish-Islamic culture and the agricultural economy (Alsaç,1976). The period from 1923 to 1950, known as the Early Republican Period, can be considered synonymous with the efforts to establish, institutionalize, and elevate the Republic to the level of modern civilization. Extensive green area arrangements, cultural parks, and municipal nurseries, as well as contemporary environmental arrangements, are examples of the steps envisaged to create contemporary cities, elevate the country to the level of contemporary civilization, and transition from Islamic and Eastern culture to the Western cultural order. It is impossible to separate these from Kemalist Turkey's Westernization ideology. These attitudes also had evident effects on the first and second architectural movements. According to my esteemed friend, Prof. Dr. Metin Sözen, the first national architecture movement drew inspiration from Seljuk and Ottoman architectural values, while the second national architecture movement sought inspiration from
traditional houses rather than Ottoman monumental structures (Keleş,1993).

While today's administrations almost consider the ideology of selling and disposing of all kinds of natural and cultural values of the country, in those days, quite the opposite was true. It was an indispensable element of the Republican ideology to ensure that all natural values were kept in state hands. Atatürk and his associates, who perceived modernization as always adhering to the requirements of science and rationality, aimed to exert control over the planned,

orderly, and healthy development of cities, especially Ankara. This is why they began recommending changes for people's clothing, liberating them from primitive appearances, and emphasizing the cleanliness and beauty of their living environments. There have been those who found these steps strange or who could not digest them. This remains true even today. For instance, by replacing the fez with a hat, they realized a prerequisite for initiating a revolution in thought and worldview, shifting away from religiosity towards rationalism. The revolutionaries considered the modernization of cities and the built environment as the starting point for modernizing society as a whole. Therefore, some of their efforts, which may initially seem to be mere formalities, were directly linked to the essence of the revolution they aimed to achieve (Keleş,1993). Some architects, like Ernesto Rogers, observing the Republic's founders' efforts to modernize the country from abroad, started to searching for similarities between the fascist practices of the 1930s in Italy, Germany, and other European countries, and the practices of Turkey's early Republic and single-party period. Unfortunately, it appears that some architects are influenced by such analogies (Bozdoğan, 2015). However, even at a time when democracy was not yet known, the founders of the Republic, aside from other potentially fascist actions, placed great importance to expertise and consultation. After the law was passed by the Grand National Assembly of Turkey to designate Ankara the capital, other potential capital cities underwent examination by a scientific advisory board under the supervision of the general staff. The "I did it; it worked" method was not followed.

While the consulting architect, Robert Oerley, permitted the construction of a house with a shop underneath it in Yenişehir, Ankara, for Atatürk's adopted daughter, Rukiye, the true statesman Atatürk ordered the construction to be halted, and the house was instead built on Mithatpaşa Street. Conversely, in the present day, despite all the warnings of Turkey's professional chambers, there have been fluctuations in judicial decisions during the process of transforming the Atatürk Forest Farm into a concrete monolith. In fields of practice inherently closely related to political decision-making processes, such as urban planning and architecture, giving importance to science, expertise, and consultation is vital (Keleş,1998). Without a doubt, the Presidential Government system, which is highly conducive to "one- man rule" and "doing what one knows" carries significant risks for architecture and every field, as well as for the future of our Republic Architecture (in Turkey).

There have been significant achievements in the architecture of the Republican era, thanks to the efforts of foreign architects and planners. However, it must be acknowledged that we have not been successful in adequately preserving either the cultural assets we inherited from the past or the new ones. The lack of developed conservation awareness administrators at all levels, and within the public, has likely played a significant role in this. One example of the misguided steps taken is the demolition of the İller Bank building in Ankara, one of the buildings of the Early Republic period, and its replacement with a mosque that struggled to find users.

3 The Importance of Conservation Awareness

In Turkey, it can be easily stated that those who shape the practices exhibit a level of indifference, best described as 'neutral,' when it comes to the preservation of architectural and cultural assets. While it is exceptional for some of our architects (of Turkey), as seen in examples such as the Presidential Complex in Ankara and the Mosque placed on Çamlıca Hill in Istanbul, to be the architects of misguided practices, they cannot be entirely dismissed.
Among professional chambers, the Chamber of Architects of Turkey is at the forefront in terms of its sensitivity to conservation issues, a quality that I have always admired. The Chamber's not-so-recent positive attitude and behavior are closely linked to its steadfast commitment to the Republic and its fundamental principles. This is the primary reason for the occasional backlash the Chamber of Architects receives from those who have yet to fully embrace the Republic and its foundational values. Therefore, we can confidently look towards the future of Republic Architecture (in Turkey).

About 60 years ago, my esteemed friend Maruf Önal, who served as the President of the Chamber of Architects of Turkey, delivered a speech at the 1968 General Assembly meeting. His speech clearly highlighted that members of the profession could be trusted in matters of sensitivity and awakening: "The architecture profession and its members are deeply committed to the problems of Turkish society and our country. This perspective prevails in our Chamber. In recent years, Turkey has experienced an environment of cohesion created by the masses' efforts to awaken and assert their rights. Our Chamber is responsible for accelerating this awakening". Nevertheless, the real responsibility for properly conserving our historical, cultural, and architectural assets falls on the masses. As important as the knowledge, equipment, and awareness of administrators are on these issues, even more critical is the urban awareness and cultural level of the people (Keleş,2011).

One of the primary quantitative challenges in the conservation of the historical and cultural environment is the sheer number of buildings that need preservation, along with issues of insufficient resources and technical equipment. Yet, equally, if not more importantly, our cultural assets have suffered significant destruction due to qualitative reasons. The main problem areas include the pressure of construction on historical structures, the absence of a persistent political will in conservation efforts, and governments disregarding conservation priorities by emphasizing construction, tourism, dam construction, and similar justifications. Undoubtedly, the insufficient interest and awareness at the central and local government levels regarding the conservation of cultural assets and architectural values are fundamental reasons why cultural assets are left to their own fate. The role of the public, and especially property owners, in the formation of this negative landscape, stemming from unawareness and selfishness, should not be underestimated.

4 Characteristics of Conservation Responsibility

Based on their characteristics, historical, architectural, cultural, and natural assets are regarded as public trusts, and any actions that compromise their original qualities are deemed a betrayal of this trust. Such values cannot be passed on to future generations in a deteriorated or damaged state compared to the form in which they inherited from past generations because these values are not as a 'legacy' from the past but borrowed as 'borrowed' values from future generations. Even if, for a moment, they are considered a form of 'individual inheritance', this does not justify their irresponsible use. A conservation approach that neglects the principle of intergenerational equity, some referred to by scientists as 'non- conservation planning', is incompatible with the rules of both environmental law and environmental ethics.

Since such values belong to no one and all of humanity holds rights over them, those who destroy the original quality of cultural, historical, and architectural works are acting disrespectfully toward the rights of others. They violate these rights and, in a sense, commit a "crime against the city and the environment" (Karasu, 2009). Unfortunately, contemporary capitalism, globalization, limitless liberalization, and the consumer culture underpinning industrial capitalism alienate individuals from their natural and cultural values, transforming their sensitivity to beauty into insensitivity. As a result, material values, interests, and rent concerns take the place of non-material values (Keleş, 2014).

5 Some International Conservation Measures

In European countries, the growing interest in the values left by the civilizations of Aleppo and Roman can be traced back to the 18th century. The initiation of the transition from the scale of individual structures to the scale of areas and cities in conservation can be attributed to the Athens Charter (Le Charte d'Athenes), which was adopted in 1931. However, in international relations, architectural and cultural assets have suffered significantly from radical, intolerant, rigidly nationalist, religious, racist, and separatist practices and policies. In this context, wars have been the tipping point. In the recent past, the Mostar Bridge in Bosnia and Herzegovina and the Palmyra Temple between Aleppo and Damascus in Syria became targets of aggressive forces. UNESCO brought attention to the Mostar massacre, likening it to genocide, through an exhibition named Urbancide. UNESCO gives careful consideration to these issues. It is noteworthy that the Council of Europe is also taking constructive and positive steps regarding conservation issues. The aim of the European Council is to support measures for the preservation of values considered as one of the riches of Europe's cultural identity and to raise public awareness in this direction.

The European Cultural Convention (1954), the Venice Charter (1966), and the World Heritage Convention (1972) are important steps taken in this field. In the Final Declaration of the World Conference on Environment and Development, convened by the United Nations in Rio de Janeiro in 1972, emphasis was placed on addressing environment, peace, and development issues. The same issue was also noted in the Final Declarations of the HABITAT II (Istanbul, 1996) and HABITAT III (Quito, 2016) meetings, also organized by the United Nations. Both the United Nations and the Council of Europe consider cultural values as enriching elements that contribute value to the cultural identity of human settlements.

6 Rules that Can Create Assurance in our Countries (Turkey & Cyprus) Laws

Both the constitution of the Republic of Turkey dated 1982, and the constitution of the Turkish Republic of Northern Cyprus (TRNC), dated 1985, contain important rules that can provide sufficient assurance for the proper conservation of natural and cultural assets. The rules of the constitution of the Republic of Turkey regarding the Protection of Coasts (Article 43), the Right to the Environment (Article 56), the Protection of Cultural and Natural Assets (Article

63), and the Protection of Forests (Article 169) are among these. In the Constitution of the TRNC, dated 1985, there are rules that can provide assurance for the conservation of the Soil (Art. 37), Coasts (Art. 38), Historical, Cultural and Natural Assets (39), and the Environment (Art. 30). The rules in both constitutions are so similar that they almost overlap each other. Another tool that is as important as these constitutional rules is the law of the TRNC, dated 1989 and numbered 55/89, bearing the traces of the British period. According to this law, "a national physical plan is prepared in order to encourage and control orderly development and to determine the settlement and distribution of the population". It is known that the national physical plan, which is a general framework for plans to be prepared with the aim of ensuring the orderly development of cities, came into force with the approval of the Council of Ministers of TRNC. Although it has been included in the legislation for a long time, it was necessary to wait until the early 2000s for the national physical plan to be prepared and put into effect in the TRNC.

Rights and obligations in laws must complement each other according to Immanuel Kant's categorical imperative rule. In other words, rights also impose certain duties and responsibilities on right holders, especially among the rights reviewed here. Our cultural, historical, and architectural values are greatly damaged by the abuse of the broad powers that the right to property provides to individuals. Seeking profit from property can lead to the destruction of the most valuable cultural assets. For this reason, it is necessary to set limits on property rights for social and cultural purposes and to apply the relevant rule meticulously. Just as the saying in political science, "Power corrupts; absolute power corrupts absolutely", is an argument that highlights moderation, proportionality, and taking responsibility. In parallel, considering that the seductive effects of individual ownership and especially of the ownership of immovable property have devastating consequences on natural, historical, and cultural values, it can be assumed that it would not be an exaggeration to say, "Property corrupts; absolute property corrupts absolutely."

7 Urban Identity and Urban Culture

It is not possible to isolate cities from the whole of society. Independent variables are more macro in nature. The same dialectical relationship exists between urban values and the understandings and practices that dominate society as a whole. In other words, a society can be underdeveloped not only with its economy but also with all its institutions. The most reliable way to get rid of underdevelopment is modern education, which has no other guide than science.

Culture and identity are often intertwined concepts. Both concepts are related to settlements and cities as well as people. It is possible to talk about the identity and culture of a city as well as the identity and culture of a person and society. For this reason, Oktay Ekinci, one of the former presidents of the Chamber of Architects of Turkey, suggested that cities be given Republic of Turkey identification numbers like individuals, with the idea that this would help to conserve properly the cultural and architectural values of cities. Many economic, social, historical, and environmental factors contribute to the formation of both identities and culture as a whole.
While there are those who define culture as "the humanization of nature and the related process, production, and efficiency", there are also those who define it as "the cumulative civilization of a society or societies". Bronislav Malinowski was more interested in the biological foundations of culture and spoke of culture as "a product formed as a result of human nature and needs". Malinowski regarded culture as "the aggregate and degree of material objects, knowledge, art, skills, habits, beliefs, and values acquired by people through various means, shared both within their communities and across generations". This encompasses both material and non-material values created by people throughout the process of social and historical development. This definition by Malinowski largely overlaps with the definition of culture by Emile Henriot, a member of the French Academy. According to Henriot, "Culture is the name given to what is left after everything is forgotten and lost." (Keleş,2018). In addition, there are sociologists who state that culture is a class phenomenon and they focus on its role within the framework of production relations (Ergün,2004).

On the other hand, identity is perceived as a concept that carries individual, institutional, national, and cultural characteristics and helps distinguish us from others. While the concept of urban culture includes the causes and consequences of the interactions that occur throughout the city, the concept of urban identity focuses on the specificity of the causes and consequences of this interaction. It is evident that urban identity encompasses specific characteristics unique to a city, aiding in its distinction from others.

Cities acquire their identities through the culmination of a historical accumulation process, turning identity into one of the fundamental elements of social memory. Nature, history, culture and architecture, which have become inseparable elements of the identities of cities such as İstanbul, Paris, New York, Rome, Venice and Madrid, as well as

Nicosia, Lefke, and Famagusta, belong to these and similar cities. It can only survive if the people of the countries they live in embrace these values as a whole and with a sense of urbanity, as well as those who are bound by their feelings. In fact, the view that not only the people of those countries but all humanity has rights on some of these values has even been included in international law documents.

The survival of all kinds of cultural values of a city can be ensured by the people living in the city, reaching a level of consciousness that will conserve these values. This is what is called urban consciousness. In his assessment of urban awareness, Aristotle made a distinction between two types of people or citizens: passive and active. Aristotle pointed out that being able to conserve the values that constitute the basic elements of urban identity necessitates being an active citizen. This situation is a prerequisite for the healthy functioning of democracy. Today, it is certain that Aristotle is in agreement with those who argue that those who live in cities should not be mere residents of the city, but real owners.

8 Conclusion

Several brief observations can be made about keeping cultural heritage alive and ensuring its continuity. The first relates to sustainability. As stated in the Brundtland Report of 1987 and the Rio Declaration of 1992, sustainable development is an approach that envisages using today's natural and cultural values without losing sight of the fact that future generations also have the right to benefit from them. For this reason, we should be careful in the use of these values and assets, and it is essential not to overlook the rights of future generations. Such an understanding of development undoubtedly and especially necessitates a balance between the purposes of using and conserving cultural assets. This is called the conservation-use balance. We observe that this balance is not well-maintained in our country (Turkey) and is consistently tilted towards favoring use. However, 70 years before the publication of the United Nations' Brundtland Report, dated 1987, the Real Leader Mustafa Kemal Atatürk, who was not only a statesman but also a man, drew attention to this need with the following words:

"People do not live only as owners of property rights on the land they live on. While using these lands, they should not forget that future generations also have the right to benefit from them."

Second, our people, from the citizens on the street to the managers and bureaucrats at all levels, unfortunately, are generally not aware that conservation is a social duty. Therefore, if the societal benefits of conservation cannot be effectively introduced and communicated to the public in all its dimensions, there will be no possibility of developing a healthy awareness of conservation. Radio, television, newspapers, magazines, and other media outlets are obliged to prepare educational programs and publications about conservation. With an amendment made to the Environmental Law No. 2872 in 2006 via Law No. 5491 (Art. 9/1), television channels were required to broadcast programs aimed at raising the public's environmental awareness during the hours when the programs were most likely to be observed. It is important that the value system adopted by professionals can also be adopted by a large segment of society, including individuals who own antiquities. Therefore, it seems necessary to make formal and non- formal education much more effective. In this context, it can be said that the Union of Historical Towns (Turkey) of which nearly 1000 municipalities are members, has effectively discharged its responsibilities in this field over the past two decades.

Third, in the preservation of cultural assets, the anticipation of creating and distributing profit should not be allowed to take precedence over the goal of safeguarding cultural values.

Fourth, what steps should be taken to determine the functions old buildings need to assume in order to ensure their cultural continuity? Some experts argue that there is a gap in the Law No. 2863 on the Protection of Cultural and Natural Assets regarding this issue. While this view is not entirely unfounded, it is essential to recognize that preserving a cultural asset is contingent upon its utilization. Without such use, the survival of the cultural asset becomes untenable. The most natural approach involves maintaining a structure through its original function. However, if the original function of the building has lost its former societal importance and economic value, consideration of another suitable function becomes necessary.

Finally, all gaps in conservation laws should be filled, and resources allocated for conservation should be increased by exploring every possible means.

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"BOOK REVIEW"

Joanita Vroom (ed.), Feeding the Byzantine City: The Archaeology of Consumption in the Eastern Mediterranean

(Medieval and Post-Medieval Mediterranean Archaeology, vol. 5) **Turnhout: Brepols, 2023, Pp 350, 37 b/w, 107 col., 14 tables b/w., 4 maps b/w, 35 maps color. ISBN 978-2503605661**

Luca Zavagno[1], Selman Oğuzcan Ünal[2]

1 Department of History and Department of Archeology, Bilkent University, Ankara, Turkey; luca.zavagno@bilkent.edu.tr
2 Department of History, Bilkent University, Ankara, Turkey; scanunal6@gmail.com

The Byzantine city and the role it played at the very heart of the economic life of the empire has often occupied the minds of scholars in the past forty years. We can only mention a few here: from Michael Hendy's study on Byzantine monetary economy as partially centered on a diachronic distributive pattern of cities in the Balkans and Anatolia as contrasted with those of land-based thematic magnates to Alan Harvey's research on the so-called urban expansion starting in the tenth-century; from the chapter on the urban economy as written by Gilbert Dagron in the pivotal *Economic History of Byzantium* pointing to the two great breaks of the seventh and eleventh century, to the attention Chris Wickham (and partially John Haldon) dedicated to the relationship between Byzantine cities and the fragmentation of the imperial fiscal structures in the course of the seventh century and the expansion of urban life from the tenth century on as centered on the commercial fortunes of centers like Thebes, Corinth, and Monemvasia (Hendy, 1985 cited in Laiou, 2002; Harvey, 2003; Wickham, 2005). Finally, it is important to mention the attention Angeliki Laiou and Cecile Morrisson dedicated to the development of the structures of the Byzantine city in their book entitled Byzantine Economy, for they stress the role of cities as centers of secondary production (the archaeologically documented large-scale production of ceramics, glass, and textiles) (Laiou and Morrisson, 2007)."The cities of the seventh, eighth, and ninth century had functioned primarily as administrative and military centers, refuges, and centers of ecclesiastical administration. It is clear, however, that they soon acquired the usual role of urban agglomeration, as places where both production and exchange of commodities took place" (Laiou and Morrisson, 2007, p.131).

Ideally, *Feeding the Byzantine City: The Archaeology of Consumption in the Eastern Mediterranean (ca. 500-1500)*, edited by Joanita Vroom, tries to reassess such a statement as it moves beyond the production side of the Byzantine urban economy and addresses issues of consumptive demands of cities and their hinterland. The volume also has the merit of encompassing a wide array of disciplines and methodologies, and it includes ten contributions combining archaeological, literary, documentary, and artistic sources from a diachronic and regional perspective. On the one hand, the volume resists the temptation of giving Constantinople the pride of place, for it encompasses several provincial and well-excavated centers like Corinth, Thebes, Chalcis, Cariçin Grad, as well as Eleutherna and Gortyn in Crete; on the other hand, "special attention is paid to the developments and changes of urban consumption behavior over time during the rise and fall of the Byzantine Empire." (12) This by comparing the Early Byzantine centralized and state-oriented economy with the growing commercial networks and long-distance trading in the Middle and Late Byzantine era.

The array of essays collected in the volume stems from a round table organized by the editor and some of the contributors at the 2016 International Congress of Byzantine Studies held in Belgrade, and it is divided into three parts following a chronological order: the first (including four chapters) covers the Early Byzantine period (and the so-called

Dark Age); the second (also composed by four chapters) dwells upon the Middle and Late Byzantine period. Finally, an overview by the editor presents the reader with a cogent overview of the production, consumption, and exchange of ceramics from the early to the Late Byzantine era.

However, the volume opens with a real prolegomenon to the three abovementioned sections: an introductory chapter written by Archibald Dunn, focusing on the actors (suppliers) and goods (supply) available in Byzantine and Ottoman provincial town markets. In particular, as he examined the existing literary records for three southern-Macedonian sites (a city like Thessaloniki, a harbour like Krysopoulis, and the delta of the Strimon River) between the Mid-Byzantine and late Ottoman periods, he helps us to tip the historiographic balance by encouraging us to reassess the "'default' assumed characteristic of urban (and rural) markets as a dominated by big landowners and (increasingly) foreign merchants (15). Rather, he stresses the role of the "silent majority" of non-elite producers (peasants and pastoralists alike) as main suppliers; this allows him to conclude that the features currently discernible at particular sites encompass minimal sets of locally sourced goods and minimal sets of extra-regional goods imported during the Medieval Byzantine period and beyond.

If Dunn's contribution delves mainly into literary sources, all the following chapters mainly incorporate and discuss material culture and archaeological evidence. The first section opens with a contribution by Vesna Bikič, who uses Caričin Grad (Justiniana Prima) as a key study to examine models of pottery production and consumption behavior in an Early Byzantine city. Founded by Emperor Justinian, Caričin Grad has been cogently regarded as a model for a new idea and ideal of the Byzantine city; (Zanini) in this light, the various types and forms of pottery yielded in singular "zones" of the city lend credence to the idea that the assemblages are reflective of different functions and socio-economic background (for instance, distinctive dietary and dining habits in these parts of the city).

The following chapter by Myrto Veikou discusses the meaning and "spatialities of consumption" using Middle Byzantine Epirus as an example. As archaeological evidence reveals multifaceted practices of consumption based on a diversity of goods, Veikou cogently shows that the city does not seem to have played a central role as consumption practices varied from place to place (86).

In a similar vein, in the third chapter of the section, Natalia Poulou examines the production and consumption of pottery at a regional level by focusing on the island of Crete. Here, patterns of importation and local commercial activities seem to have remained unchanged even after the conquest by Andalusian Muslims. Indeed, amphorae and painted wares produced and circulating in different Cretan urban sites point to a strong link with the Byzantine network of exchange (based upon local agricultural production); a link that archaeology and written sources proved intensified after the return of the island under Byzantine control. In the last chapter of the first section, Evelina Todorova maps spots of seventh-to-fifteenth-century amphorae and their quantities as yielded in different sites of Bulgaria and the Black Sea region. This allows the author to identify consumption centers and distributive networks as stamps and graffiti on the vessels and also gives valuable insights into the Byzantine system of government control over trade and, in particular, food supplies.

The second section starts with Philipp Niewöhner's essay, in which he stated that looking at the marble carvings makes it possible to detect the complexity of the so-called urban revival in the Middle Byzantine Period. In Asia Minor, for instance, archeological findings illustrated a "dual process" of urban decline and rural revitalization with local marble production hubs and region-specific techniques that follow a similar pattern of technique and style that also gives a hint of an existing web of communication between the Middle Byzantine workshops (176). In the following piece, Stefania S. Skartsis and Nikos D. Kontogiannis focus on Thebes and Chalcis, and by investigating ceramic findings and luxury goods like jewelry, accessories, silk textiles, and objects of exceptional value, they try to understand the evolution in consumption and production patterns between the ninth and fifteenth centuries. This article managed to observe that during the six centuries-long period, there was continuous material production and trade within both local and, to some extent, global contexts.

In the third chapter of the section, Joanita Vroom, Elli Tzavella, and Giannis Vaxevanis analyze the results of the Orionos Street rescue excavation in Chalkida (Chalcis). The functional change of buildings like a bath (used in the tenth and eleventh centuries) to a dumping spot for industrial waste (in the twelfth and thirteenth centuries), as well as the wide range of material findings, including potteries, metalware, and glass, show an existence of a multilayered commercial system that ranges from local to long-distance distribution. This preliminary work offers an opportunity for further research to understand the trade and consumption dynamics of the Aegean region during the Middle and

Late Byzantine periods. The last article of the chapter by Elli Tzavella examines consumption in two sites, Athens and Corinth, and their rural hinterlands. This allows her to conclude that the local elites resided in the countryside, underpinning a good level of consumption as demand remained substantial even in the urban sites as provisioning and transportation to feed urban lower classes.

In the concluding chapter, Joanita Vroom proposes a diachronic overview of the changes in pottery types, productive techniques, and development of new forms and decorations as mainly owing to changing consumer demands potters were adapting to. In particular, she examines the introduction of lead-glazed wares (initially centrally produced in Constantinople but later spreading across the Byzantine Mediterranean with provincial imitations), slowly turning from functional products to high-level and richly decorated commodities produced in several local workshops (in particular from the thirteenth century onwards); this paired with a dramatic increase in production (and imports from the Islamic world) and commercialization of amphorae as well as (from a consumptive perspective) a gradual evolution towards smaller and taller open vessels with reduced volume capacity over time.

In summary, “Feeding the Byzantine City” is a compelling and well-structured volume. It makes a coherent contribution to the debate on the changing economic facies of Byzantine cities during the transition from Late Antiquity to the Middle Ages. The array of interdisciplinary and methodologically varied contributions provides readers with a geographically diverse and chronologically open-ended analysis of the transformation of socio-economic and cultural consumption patterns, as reflected by material culture, archaeology, and literary and documentary sources.

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