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Merit for the sustainability of the intervention in architecture at Cova do Vapor, Almada (Lisbon Metropolitan Area, Portugal)

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Abstract

The several editions of the local intervention lab in architecture in situ/ have fostered the creation of a community of practice in which different actors meet and work on a common project. In 2018, the common project was developed in the informal settlement of Cova do Vapor in the coastal area of Almada, in the Lisbon Metropolitan Area (Municipality of Setúbal). The project aimed to provide protection to the dunes through defining an access way to the beach and lead people to avoid walking over the dunes. This paper aims to, using sustainability indicators, focus on the merit of such initiatives such as the intervention lab in architecture in situ/ as far as their contribution to sustainability. The indicator used is called SUSTAIN and led us to conclude that the best result of the in situ/ Cova do Vapor was in the parameter Society, Social Fabric and Culture, which makes it a measurable and replicable tool in adaptive management of land and environment, promoting social well-being.

Keywords: Community of practice, urban regeneration; local intervention, erosion of dunes, informal settlement

Introduction

The coastal area is of major importance in environmental, economic, social, cultural and leisure terms. In the case of Portugal, there has been intense occupation of many coastal areas, which has increased in the 2nd half of the 20th century. According to Schmidt (2015), the population has doubled in the coastal districts since 1960, and the number of houses has also increased, in a process called 'costeirização*' (massive occupation of the coastal area)*. This process is closely linked to the development of three key elements in Portuguese economy in the past three decades - tourism, construction and real estate (Schmidt, 2015) in the Portuguese coastal area.

In this scenario, environment management and protection, and controlling the risks for the coastal area are crucial. This requires the participation of stakeholders from the beginning, in a bottom up perspective, as it may increase awareness and promote the integration of knowledge (Lopes; Videira, 2016). Therefore, environmental management and prevention and the management of risks in the coastal area of Portugal must be carried out from different perspectives and lead to conclusions and decisions, since Portugal is one of the European countries most vulnerable to the impact of climate change (Carvalho, 2011), and its coast line is especially vulnerable to environmental risks (Rocha, 2011).

The area of Almada has a long sandy coastal strip (Pereira Costa, 2015) that includes a wide system of sand dunes and urban areas such as Cova do Vapor, Fonte da Telha and Trafaria (Rocha, 2011). In this type of ecosystems which are prone to risks, the involvement of society is crucial for sea preservation (Jefferson et al., 2015) since its sand dune system has been changing since 1929. The stretch of white sand that was a barrier to the sediments along the coast has receded about 3 km and the natural barrier from the Tagus - "golada do Tejo" - cracked open (Rocha, 2011). Once that natural barrier opened, there was urgent need to find "heavier" solutions, i.e., construction that would serve as a defence to the coastal area (breakwaters and seawalls) at Cova do Vapor (Rocha, 2011), besides "lighter" ones, namely the protection of the sand dunes through participatory projects.

The project TransforMAR[1], the Biblioteca do Vapor[2] and *The Dune Project*[3] are examples of these "lighter" projects. They all started their dune protection activities at Cova do Vapor, an informal settlement. These urban settlements that result from informal occupation, as is the case of Cova do Vapor, have been an ideal scenario to bottom up initiatives, as was the intervention lab in architecture in the community in situ/. The in situ/ lab involves several stakeholders, including the inhabitants of these informal settlements, university students, architects, and public entities (Ramalhete; Silva, 2014).

The intervention lab in architecture in situ/ was created with the objective of solving actual issues in actual communities, involving local actors in construction in an urban context (Ramalhete; Silva, 2014). The 2018 edition was conducted at Cova do Vapor and included young architects, lecturers, students, and inhabitants and, aimed to limit the access to the beach, stop people from walking on the dunes and thus protect them.

In this area, the dunes have a crucial function as they protect against the wind, the waves, and the advance of the sea. Therefore, protecting the dunes as a natural barrier is a strategy used to manage coastal environment. To lessen the erosion of the dunes by limiting areas on the beach promotes the implementation of practical solutions to meet the local challenges through the use of innovative teaching/learning experiences.

The parameters that measure the merit of the several aspects of sustainability in environmental and land management actions are essential to replicate successful experiences the integrate the environment, society, education, and land. The term sustainability is associated to the concept of sustainable development, in the sense that the latter is the process that allows attaining sustainability of a system in the long run. Therefore, sustainability is a complex concept based on the term sustainable, which means what can be maintained throughout time (HEINBERG, 2007) and can be measured using several indicators.

Sustainability indicators allow measuring and quantifying the four pillars that define it: governance, environment, economy, and society. Therefore, sustainability indicators need to be easily understood and applied in different contexts. In 2012, the SUSTAIN work group developed a common indicator as a simple tool to support self-assessment and coastal sustainability in any European coastal context. The indicator was named SUSTAIN. SUSTAIN indicators are based on a system of points that allows assessing the performance of actions in terms of sustainability, mainly in the coastal area (NUNES et al., 2012), such as that by the intervention lab in architecture in situ/ Cova do Vapor.

Therefore, we aim to measure the merit for sustainability of the intervention lab in architecture in situ/ Cova do Vapor in order to assess whether this is a replicable and measurable action in terms of sustainability.

Methodology

The 2018 edition of the intervention lab in architecture in situ/ was conducted at Cova do Vapor, in the coastal municipality of Almada, in the coast of Portugal. The lab was conducted at this location and its participants were young professionals with experience in this area, students, and lecturers. Through using teamwork and a bottom-up perspective, the action aimed to contribute to the decrease in erosion of sand dunes through stopping people living in the informal settlement Cova do Vapor from walking on the dunes. In its intervention, several wooden structures of different sizes were built in the coordinates: 38.662484,-9.258224. These interventions aimed to improve access to the beach and stop people from walking on the dunes (Figure 1).

The intervention lab in architecture in situ/ Cova do Vapor was conducted at the facilities of Universidade Autónoma de Lisboa and at Cova do Vapor, from 11 to 24 July 2018. It was coordinated by the research centre Centro de Estudos de Arquitetura, Cidade e Território, Universidade Autónoma de Lisboa (CEACT/UAL) and by the project TransforMAR, in partnership with and cofinanced by Câmara Municipal de Almada, with the support of Leroy Merlin in Almada and of Extruplas.

To assess the performance of the intervention lab in architecture in situ/ Cova do Vapor in terms of sustainability, nine structured interviews were made to key actors (to seven women and two men), active participants, inhabitants of the settlement, students, professionals and lecturers. The interviews were made in order to include a wide range of participants. The script used, in ANNEX I, was applied to participants and was based on the SUSTAIN indicator[4]. We used the SUSTAIN parameters, which are divided into four sustainability aspects: (I) Economy, (ii) Environment and Natural Resources, (iii) Society, Social Fabric and Culture, and (iv) Overall Responsibility.

In assessing performance using the SUSTAIN indicator, we allocated points (0-10) to each of the four sustainability components, zero being the lowest and ten the highest grade (ANNEX I). Participants answered each of the four questions and graded each of the four sustainability components during the interview. All the points allocated by the participants were collected and the punctuation was aggregated and divided into four overview scores for each sustainability component. Thus, all interviews were analysed as one answer only. The merit of the lab was synthesized and presented in a four axis chart, each axis representing a sustainability component.

Figure 1 – Construction during the intervention lab in architecture in situ/ Cova do Vapor.

Results and discussion

The merit for sustainability of the intervention laboratory in architecture in situ/ Cova do Vapor was validated through a participatory approach at a local scale, using the nine interviews made to key actors in the action in situ/ Cova de Vapor. The results contributed to new intervention possibilities and strategies that focus on sustainable

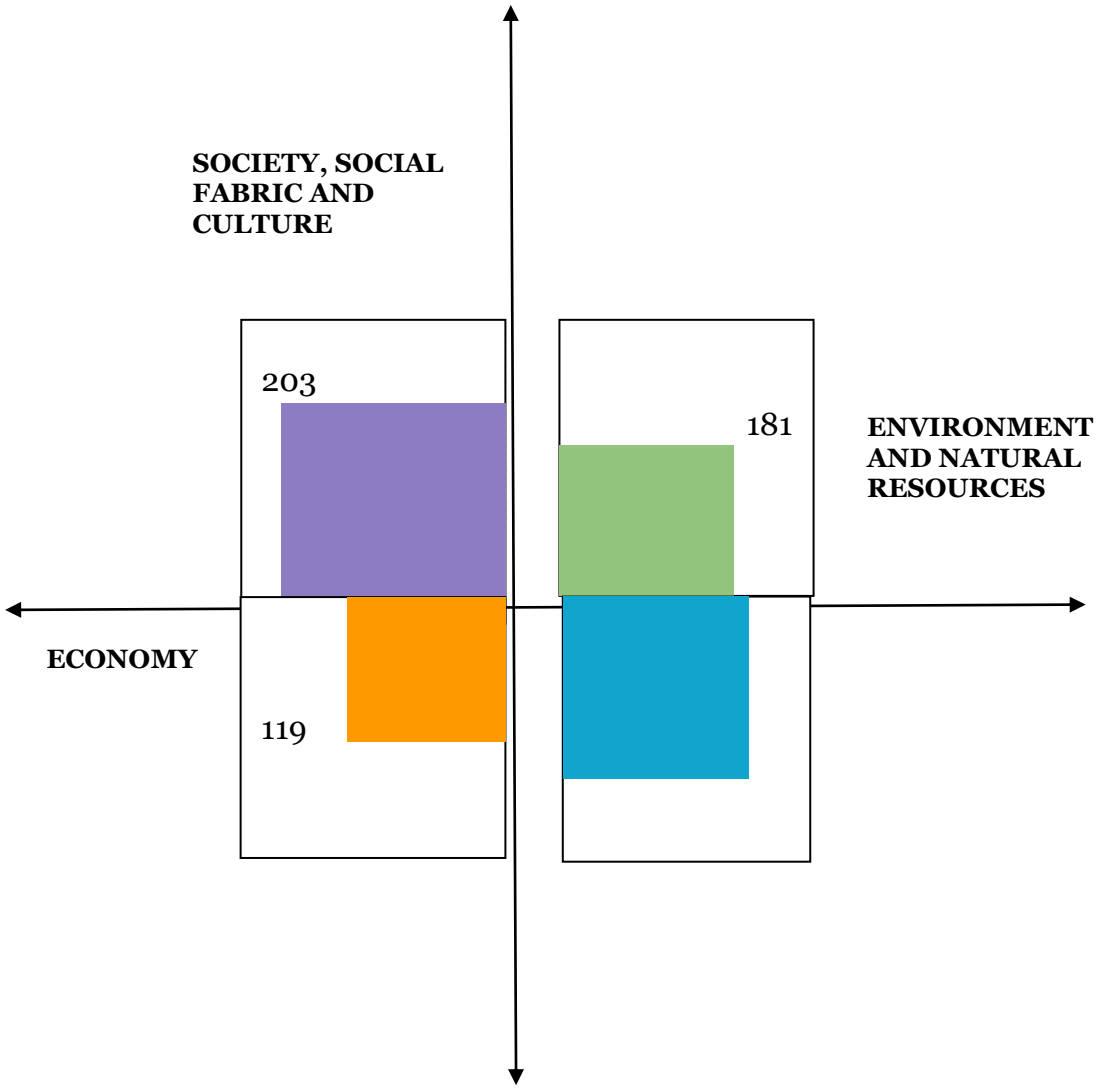
development and social well-being through implementing teaching/learning solutions and experiences.

Each of the four types of merit accounted for 400 points in total. The results of the interviews of the key actors were scored using the SUSTAIN methodology in order to obtain a result for each merit and calculate the highest from the perspective of the key actors (Table 1). The intervention laboratory in architecture in situ/ Cova do Vapor scored the highest score in the merit for *Society, Social Fabric and Culture*, As it develops cooperation among different actors, as well as promotes exchange of knowledge and social unity in the long run. In Table 4 you can see the merit analysed per sustainability component and our explanation regarding the impact of each merit in the action in situ/ Cova do Vapor. In Figure 4 you can see a chart which shows four axes, each representing a sustainability merit identified in the action; you can also see the different allocation levels identified in each sustainability merit.

SOCIETY, SOCIAL FABRIC AND CULTURE (203/400)	ENVIRONMENT AND NATURAL RESOURCES (181/400)
The project fosters refurbishing of urban space from the perspective of local needs and reinforces access to recreational activities because it creates innovative solutions to divide the different areas of the beach, as well as makes it easier for people to use a path to access the beach rather than walk on the dunes. It boosts long life learning of local actors. It promotes the cooperation between academia and local authorities, businesses, and local NGOs. It also fosters citizen and student integration in real-life context. On the other hand, it promotes rational and efficient use of natural and recycled resources through their direct use in the structures built in the project.	The project contributes to enhancing natural spaces and protecting the sand dune system and its diversity, which boosts the quality of natural habitats. The project encourages the use of recycled products and minimizes the carbon footprint. It also supports the coordination between the use of the dunes and private transportation because it separates the beach from the parking space and makes it easier for, for instance, children in strollers and persons with reduced mobility to access the beach.

ECONOMY 31/119/400	OVERALL RESPONSIBILITY (181/400)
The project enhances local business activities, since it improves space available to enter and use the beach; this space relates to local businesses. It encourages the participation of consumers, which improves the conditions of the beach bars and will eventually lead to the creation of new jobs.	The project supports refurbishing of the space for all those who live and visit Cova do Vapor, besides raising awareness to global justice. It minimizes the impact of climate change and increases people's awareness of risk through social and academic experience. It allows raising collective awareness between NGOs and other organizations, which can lead to joint commitment by municipalities and/or regions. It also encourages the community to keep itself up to date and be a model to other projects.

Table 1 - Merit of in situ/ Cova de Vapor using the SUSTAIN indicator, in regard to contributing to sustainable development



OVERALL RESPONSIBILITY

Figure 2 - Schematics of the results obtained from analysing the four components of sustainable development using the SUSTAIN indicator.

Considering the results obtained with the SUSTAIN indicator, the intervention laboratory in architecture in situ/ Cova do Vapor has an effect on society, social fabric and culture (Figure 2), namely in space justice - equity in distributing resources, services and access - considered a right for everyone.

Noteworthy is the fact that in situ/Cova do Vapor developed three interventions or wooden structures (Figure 3) involving partners and key actors, besides attaining its objectives in terms of participants' social, academic, and architectural experience. We confirmed the statement by Ramalhete et al (2014), which affirmed that the innovation in the in situ/ Cova do Vapor intervention lay in its designing and building solutions to local issues and contribute to improving the quality of life of populations, besides presenting merit for sustainability, according to SUSTAIN indicator.

We must emphasize that the interventions are closely linked with the origin of spaces (Hall, 1998), so in situ/ is an opportunity to propose innovative tools for adaptive management of the land and of the environment from a different perspective - one that is able to make plans more strategic and effective and less formal and defined.

Moreover, we must stress that the SUSTAIN parameters used to assess the merit for sustainability of in situ/ Cova do Vapor are also a means of communicating with and involving key actors in defining priorities within a time framework, thus reiterating what NUNES et al., (2012) have stated.

Figure 3 - Urban architecture interventions conducted during the intervention laboratory in architecture in situ/ Cova do Vapor to refurbish space and protect sand dunes.

Conclusions

○ The action in situ/ Cova do Vapor is in line with sustainable development in the sense of “stopping soil degradation and the loss of biodiversity”, specifically in the dunes, as one of the results of the intervention was to build footbridges and make it easier for people to access the beach, thus stopping them from walking on the dunes. We also observed that most key actors (80%) were women and girls, which is also in line with sustainable development: “To attain gender equality and empower all women and girls”.

○ The intervention laboratory in architecture in situ/ Cova do Vapor is an example of how environment, land and development are inseparable and issues that influence one another. The project opens the possibility of building in challenging spaces with specific needs and confirms what Ramalhete et al (2012) state in regard to the need for solutions to be discussed with the different stakeholders and that they meet the needs of people.

○ Analysing the merit for sustainability of the intervention laboratory in architecture in situ/ Cova do Vapor has shown that this reinforced the resilience of the community, since it is able to maintain its identity while adjusting to new environmental and social challenges.

○ From a bottom up perspective, it would be essential that this action would have a longer implementation period in order to generate an active participation of the local population, both in terms of construction and in the activities related with the in situ/ action.

○ We identified the need for more partnerships for developing this project, for example, with the Portuguese Environment Agency (Agência Portuguesa do Ambiente - APA), with the commission for development of the Lisbon area (Comissão de Coordenação e Desenvolvimento Regional de Lisboa e Vale do Tejo - CCDR-LVT), among others.

○ The project should be further assessed to know and identify the strategies and benefits, whether direct or indirect, that each in situ/ edition has had on its key actors.

○ The use of the SUSTAIN indicator in the in situ/ Cova do Vapor action allows us to apply assessment mechanisms, which can be applied to similar actions because it allows qualitative and quantitative validation of the impact of any multidisciplinary action, in this case, the in situ/ action.

○ Finally, the self-assessment tool SUSTAIN must be applied in land, development and environment management projects, since it will make it possible to identify aspects that need to be improved and study the issues with strategies adjusted to specific needs, including the components of sustainability. Self-assessment would allow for each project to constantly review its processes, identify its strengths and weaknesses, and implement improvement measures.

Recommendations

○ In situ/ is a project that can lead to social and land innovation at a local scale. However, an improvement would be to better integrate the local population, both at the construction stage and at the implementation of the constructions made by the architecture students, because the local population could contribute with knowledge that would enhance continuous learning and integration of all stakeholders. This way, the number of participants would increase, which would also increase the number of interviews for analysis. Integrating more local inhabitants might also increase the involvement of the local community in the construction and installation of elements and might lead to a sense of belonging and a sense of personal relation, which would also make it easier for all those elements to be maintained.

○ Considering the type of material that the elements were made of, it would be important that a visit be made to the location to assess their state of conservation. This way, we would be able to analyse how the materials behaved and how that can be improved.

○ The communication strategies and publicity used to disseminate the project could be improved in order to increase their visibility for the general public and thus increase the level of participation and include more participants.

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Photos: All the photos included in this text were taken by Lina Arroyave.

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Biography:

Lina Arroyave is a Master student in Environmental Sciences and Policies, Faculty of Sciences and Technology - NOVA After having worked in nature conservation and water ecosystems, Lina is now focused on finding new tools that enhance human well-being and the sustainable use of natural resources. Lina has worked on projects on the use of nature and conservation at the Smithsonian Institute in Panama, at Instituto de Pesquisa em Recursos Biológicos Alexander von Humboldt in Colombia, at several NGOs in Colombia, and was also a volunteer at Centro de Pesquisa da Mata Atlântica in Argentina. She has also organized scientific conferences and has experience in treasury management of scientific associations.

ATTACHMENT I

Table 1 Total score awarded by the nine key actors during the structured interviews to obtain the merit considering the four components of sustainability.

	in situ// Cova do Vapor U. Autónoma July 24, 2018
	COMPONENTS OF SUSTANABILITY Parameters of analysis Score 0 to 10

1	ECONOMY	Score
1.1	Does the project support local economy and promote local and regional economic products?	19
1.2	Does the project generate jobs?	10
1.3	Does the project encourage the participation of workers and improve social benefits?	4
1.4	Does the project provide leverage to increase entrepreneurship and the development of new products and production processes?	27
1.5	Does the project enhance the relevance and attractiveness of a place?	33
1.6	Does the project simultaneously increase economic benefits and reduce the consumption of resources?	18
1.7	Does the project improve the financial situation of state institutions or families?	0
1.8	Does the project reduce the need for transportation of goods and people?	8
	SUM (No Merit = 0; Excellent Merit = 10)	119

2	ENVIRONMENT AND NATURAL RESOURCES	Score
2.1	Does the project contribute to the improvement of natural areas close to urban areas to support environment-friendly rural activities?	40
2.2	Does the project minimize the use of space, avoid use of soil and the expansion towards the city?	16
2.3	Does the project prevent environmental hazards and reduce air, water and soil pollution?	28
2.4	Does the project reduce noise levels and exposure of population to noise?	0

2.5	Does the project reduce non-renewable energy consumption?	2
2.6	Does the project reduce non-renewable resource consumption? Does it encourage recycling of materials?	34
2.7	Does the project support biodiversity and the quality of natural habitats?	43
2.8	Does the project support sustainable mobility, reduce unnecessary mobility and coordinate use of soil and transportation systems?	18
	SUM (No Merit = 0; Excellent Merit = 10)	181

3	SOCIETY, SOCIAL FABRIC AND CULTURE	Score
3.1	Does the project contribute to meet the population's basic needs and decrease poverty?	4
3.2	Does the project promote communication and cooperation among citizens and between citizens and the local authorities or other institutions?	37
3.3	Does the project improve the population's quality of life, regenerate urban space and reinforce access to collective equipment and basic services?	40
3.4	Does the project support qualification of human resources, long life education and training?	29
3.5	Does the project promote the participation of local actors in the planning and implementation process, create synergy among actors and increase social capital?	29
3.6	Does the project foster the integration of disadvantaged citizens and social groups, is it family-friendly and integrate generations?	24
3.7	Does the project support the well-being of citizens, their health, sports, responsible consumption, and citizenship?	28
3.8	Does the project decrease the risks to humanity, contribute to the prevention of crime and increase the population's awareness of safety?	12
	SUM (No Merit = 0; Excellent Merit = 10)	203

4	OVERALL RESPONSIBILITY	Score
4.1	Does the project foster social justice and equal opportunities for all members of society?	40
4.2	Does the project support justice and inter-territorial equity and promote ecological products and fair trade?	16

4.3	Does the project consider the supralocal impact on other places and regions, even if distant?	28
4.4	Does the project apply best practices and technology, serve as a model to other projects and promote the exchange of knowledge?	0
4.5	Does the project support the development of disadvantaged regions?	2
4.6	Does the project increase the awareness to global justice and the sense of single destination?	34
4.7	Does the project reduce climate change?	43
4.8	Does the project support cooperation and exchange of information among municipalities and regions?	18
	SUM (No Merit = 0; Excellent Merit = 10)	181

[1] Project TransforMar launches its crowdfunding campaign to support the protection and ecological regeneration of Cova do Vapor beaches. See website http://www.m-almada.pt/portal/page/portal/AMBIENTE/AGENDA/DETALHE/?ambiente_agenda_detalhe=557453285&cboui=557453285 and https://www.dunafilms.co.uk/cova

[2] Biblioteca do Vapor has a website where information and events promoted by the Biblioteca are shared. See website https://www.facebook.com/bibliotecadovapor/

[3] Community project for the regeneration of the dunes at Cova do Vapor. See website http://theduneproject.com

[4] The SUSTAIN methodology was used, which allows decision-makers to assess the merit of best practices, actions and/or projects by applying a checklist to the main actors. See on the website: Contribuir para o desenvolvimento sustentável das zonas costeiras. Lisbon, November. https://www.apambiente.pt/_zdata/DESTAQUES/2012/ProjetoSUSTAIN/GuiaLicoes_ParceriaSUSTAIN/contribuirparadesenvolvimento_lq.pdf