

Deep Adaptive Reuse

A response to the 21st-century urban challenges

Ana Jayone Yarza Pérez

Delft University of Technology (Netherlands)

Bezalel Academy of Arts and Design (Israel)

Abstract

The world is undergoing dramatic change in its social and physical environments, resulting in cultural confrontation and conflict. Rapid urban growth, displacement, and gentrification increase urban pressure while jeopardising social cohesion, multicultural values, and local economies. In addition, environmental factors associated with climate change challenge how our cities respond and adapt, prompting the need for urban centre regeneration to confront the urban century challenges (Sassen, 2011). However, adaptation to these changes is also a source of conflict, as urban policies lack citizen engagement in the redefinition of public space, resulting in more disagreement and inefficient use of resources.

One way to respond to this ongoing crisis is adaptive reuse, repurposing an underused system for a new use. This process can enhance positive environmental impacts, encourage social and participatory processes, and promote economic dynamism through culture. However, the success of such an intervention will depend on the underlying approach.

The paper aims to explore how Jem Bendell's ambitious four-pronged Deep Adaptation strategy (Bendell, 2018) combined with the cultural resilience approach can result in adaptive reuse processes that act as development catalysers and peace-building mechanisms.

Keywords

Deep adaptation, Adaptive reuse, Urban heritage, Case study, Acre

DOI

<https://doi.org/10.47982/spool.2022.2.02>

Introduction

Background

The studies of the last decades show how we have moved into the Anthropocene (*Anthropocene*, 2021), a new Earth stage characterised by the human impact as the catalyser of changes to our planet (Crutzen, 2002; Zalasiewicz et al., 2008). The “hockey stick” trend visible in various studies from different disciplines showcases the acceleration of these dynamics and how they trigger climate change and disasters (United Nations Human Settlements Programme, 2012). These disruptive changes provoke economic crises, social instability, and ecosystem deterioration, resulting in other disasters such as the current COVID-19 pandemic, following a “snowball effect” (Roy Britt, 2005).

Governments and institutions such as the United Nations (UN) acknowledge the intricacies and consequences of not preparing for climate change and disasters and have proposed a series of frameworks to confront them. The Agenda 2030 includes climate change and disaster risk reduction and mitigation (DRRM) as part of its Sustainable Development Goals (SDG). Goal number 13 specifically addresses climate action, and the other goals include three themes transversally (United Nations, 2015a). The UN Agency for Disaster Risk Reduction (UNDRR, formerly known as UNISDR) published The Sendai Framework for Disaster Risk Reduction 2015-2030 in 2015, outlining targets and priorities for action to prevent and reduce existing disaster risks (UNDRR, 2015). Moreover, in December of 2015, during the COP21 Intergovernmental climate summit, leaders from 180 countries signed The Paris Climate Accord, agreeing to reduce greenhouse gas emissions and limit the global temperature increase to below 2 degrees Celsius (3.6 F) above pre-industrial levels by the year 2100 (United Nations, 2015b).

These measures have proven to be insufficient as they are being implemented too slowly to meet their aims (IOM, 2020). Therefore, alternative frameworks have been proposed by academics and other researchers. This is the case of Jem Bendell, who proposes the Deep Adaptation Agenda in response to the current situation, taking a more radical approach (Bendell, 2018). In his article “Deep Adaptation: A Map for Navigating Climate Tragedy”, Prof. Bendell advocates radical measures to address climate change and disasters as an ongoing emergency to be tackled now. Furthermore, he expresses great concern about the soft measures and the long timespan to be implemented due to systematic denial of the problem by governments, academics, and in public debate. In contrast to this superficial attitude, he proposes a four-pronged approach, the Deep Adaptation Agenda, as a mechanism to deal with profound disruption, accepting the hypotheses that “*climate-induced near-term societal collapse should now be a central concern for everyone*”.

The key aspects covered by the Deep Adaptation Agenda are resilience, relinquishment, restoration, and reconciliation. Each concept responds to the following questions, aiming to find viable, sustainable, and effective solutions to be implemented in the nearest future:

- Resilience (R1) asks us, “*how do we keep what we really want to keep?*”
- Relinquishment (R2) asks us, “*what do we need to let go of in order not to make matters worse?*”
- Restoration (R3) asks us, “*what can we bring back to help us with the coming difficulties and tragedies?*”
- Reconciliation (R4) asks, “*with what and whom can we make peace as we face our mutual mortality?*”

These actions cover a wide spectrum of topics, and are proposed as an umbrella approach to more specific themes. In my research, the Deep Adaptation Agenda is used to address adaptive reuse¹ of urban heritage², as a strategy to turn cities' elements in decline into development catalysts (Pereira Roders & van Oers, 2011). This strategy can positively influence the socio-economic, environmental, and cultural spheres of sustainable development (United Nations, 2015a). The latter, culture, is a focal point of this paper, with the role of culture as a brace for sustainable development (Bandarin et al., 2011; Bandarin & van Oers, 2012) being acknowledged by bringing urban heritage to the forefront. It is additionally addressed by the incorporation of cultural resilience³ as a cross-cutting element (Holtorf, 2013). It is a branch of resilience dealing not only with adaptation but also with continuity and change, both points aligned with the Deep Adaptation Agenda.

Aim of the paper

Altogether, this paper aims to explore how Jem Bendell's ambitious four-pronged Deep Adaptation strategy (Bendell, 2018) combined with the cultural resilience approach can result in adaptive reuse processes that act as development catalysts and peace-building mechanisms, intending to address the impacts of the climate crisis and disasters at the urban level. The proposed approach attempts to understand the potential of the Deep Adaptation Agenda and its actual implementation from an urban and cultural perspective by comparatively analysing two cases, the Marina of Acre and the Port of Jaffa, both in Israel.

Methodology

Hypotheses

One of the consequences of climate change agreed by most scientists is a global sea level rise of 0.3 metres up to 2.0 metres by 2100 (Parris et al., 2012; Sweet et al., 2017). It increases the risk of coastal flooding due to extreme sea levels or coastal erosion that would result in the exposure of coastal cities to these hazards (Reimann et al., 2018). This not only means the erasure of the actual urban fabric, but would also

-
- 1 Adaptive Reuse is the transformation of the function of an underused system into a new use (Apserou, 2013; Plevoets & Van Cleempoel, 2019, 2020; Stone, 2020; Wong, 2017). It can tackle urban issues holistically, as this process can enhance positive environmental impacts, encourage social and participatory processes, and promote economic dynamism through culture (Apserou, 2013; Mathey & Steinberg, 2018). However, the success of such an intervention will depend on the underlying approach.
 - 2 As a concept, urban heritage is global. Usually, it is defined as the historical and physical layers constituting the contemporary urban area. These include the built heritage, with architectural and historical value, the urban plan, and land utilization. However, the current views on heritage, like "The Historic Urban Landscape" approach, published by UNESCO in 2011 (UNESCO, 2011) go beyond the notion of historical centres and traditional layering to include the broader urban context and its geographical setting (UNESCO, 2011). This approach includes a wider range of elements, comprising not only tangible but also intangible components. The framework developed during the "Heritage in Urban Contexts" meeting held in Fukuoka in 2020 (UNESCO World Heritage Centre, 2020), classifies urban heritage into four categories: the wider context, the urban elements, the architectural elements, and the intangible cultural elements. All of these capture their local and regional identity. Therefore, this framework needs to be adapted to the context accordingly (Ibid.).
 - 3 Cornelius Holtorf defines cultural resilience as "the capability of a cultural system (consisting of cultural processes in relevant communities) to absorb adversity, deal with change and continue to develop" (Holtorf, 2013). Moreover, he adds that "Cultural resilience thus implies both continuity and change: disturbances that can be absorbed are not an enemy to be avoided but a partner in the dance of cultural sustainability (adapted from Thiele [2016, 36])." This perspective embraces disruption, transforming it into an opportunity for development, in which adaptation is key to prosperous societies (Gilbert & Bower, 2002).

have catastrophic consequences for the economy and social cohesion in these cities, as they depend on the activities linked to the port, like trade, fishing, tourism, and leisure (Marzeion & Levermann, 2014).

This tragic future scenario serves as the basis for imagining alternative uses for these areas, addressing not only the environmental factors but also understanding the city from an integrated perspective with culture as the enabler of sustainable development (*Keeping the Promise: United to Achieve the Millennium Development Goals*, 2010; Unesco, 2016).

Cases: The Marina of Acre and the Port of Jaffa

The two selected areas, the Marina of Acre and the Port of Jaffa, being two ports in the Mediterranean Sea, serve as examples to test the hypotheses surrounding sea level rise. These ports have undergone multiple changes over time, so they have great potential for adaptation (Galili et al., 2010; Harari, 2012). Furthermore, while Acre and Jaffa are not extreme cases of rapid deterioration, as the historic areas of Dubrovnik or Venice, these port cities are on the edge of becoming mass tourism attractions. The ongoing gentrification process in the areas jeopardises the fragile balance between the traditional livelihoods of locals and new economic activities linked to tourism owned by outsider business people (Killebrew et al., 2017; Sherwood, 2012, 2012).

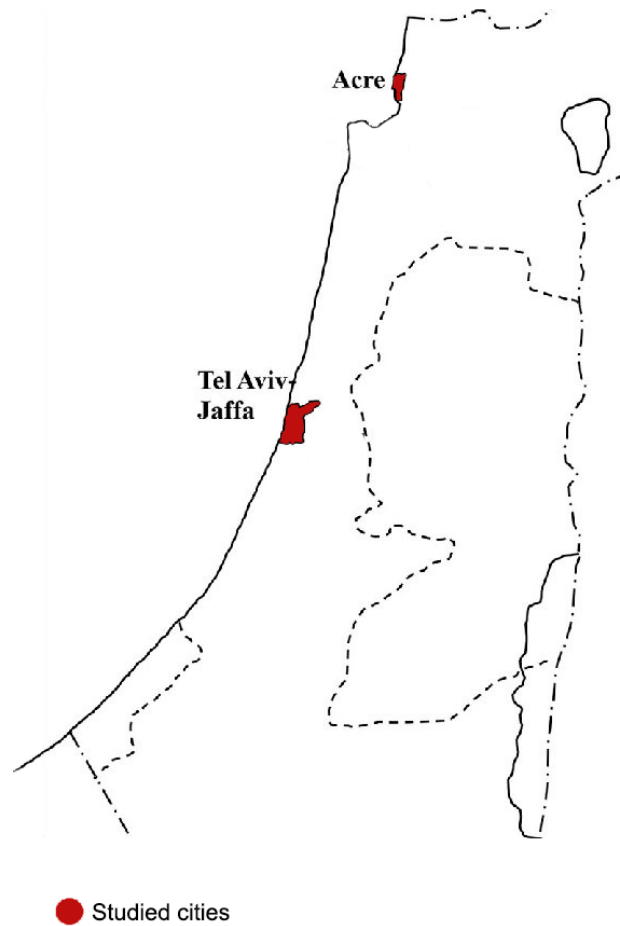


FIGURE 1 Orientation map of Israel locating Acre and Jaffa. Source: Izhak Schnell

Acre and the Marina

Being inscribed on the World Heritage List, the Old City of Acre preserves a historic town's urban and architectural elements. Its outstanding value relies on the Crusader remnants preserved under the Ottoman city (World Heritage Centre, 2013), showcasing Mediterranean port cities' dynamism and continuous change.

The Marina of Acre is one of the leading local and tourist assets in the city. This sea walk along the traditional fishing port brings together tangible and intangible cultural heritage elements in one place, a highly attractive space for leisure activities for tourists and locals.



FIGURE 2 Marina of Acre. Source: Flickr_Ray in Manila

Jaffa and the Port

Jaffa is situated on the south-western side of Tel Aviv, having been the initial settlement in the area until the foundation of Tel Aviv in May 1910. This city, now a district within Tel Aviv, has undergone renovations over the past few years to become a tourist attraction featuring restored buildings, art galleries, theatres, souvenir shops, restaurants, sidewalk cafes, and promenades. Unfortunately, this has triggered gentrification, amplifying the social inequalities in the area

Not listed as a World Heritage site, the Port of Jaffa is highly influenced by the proximity to the White City of Tel Aviv, a Modern WH Site (Rofe`, 2008). This cultural component boosts the attractiveness of the area for citizens and tourists, as its more organic configuration and liveliness contrast with the more orthogonal and less mixed-use urban pattern of the White City.



FIGURE 3 Old Jaffa Port. Source: Noam Armonn

Method

The exercise combines the citizens' perceptions, current uses, and future visions of the areas as the starting point to imagine hypothetical future scenarios and propose alternative uses based on the Deep Adaptation Agenda and the cultural resilience approach.

The survey

The study includes a questionnaire created for and administered at the two sites.⁴ The survey is divided into three sections: the first considers the data to be disaggregated (sex, age, religion...) (See questions 1 - 10); the second addresses the use of the area and perceptions of it (See questions 11 - 18); the third is linked to future visions for the areas and proposes a hypothetical disaster in the area, sea level rise, to obtain the citizens' reactions (See question 19).

The questionnaire includes the Deep adaptation Agenda's four main points: resilience (R1), relinquishment (R2), restoration (R3), and reconciliation (R4). Points R1 and R2 (what to keep and what to let go of) are considered by collecting perceptions and future visions of the areas. The reactions to the hypothetical

4

See these links: [Survey in Acre](#) and [Survey in Jaffa](#)

sea level rise indirectly include R3, as the elements that should be brought back can be gleaned from the responses on how to respond to the crisis.

Moreover, reconciliation (R4) is directly linked to the multiplicity of dissonant voices. Their differences are included in the first part, in which traditional factors such as age and sex are integrated, along with native language (Hebrew, Arab, etc.), religion, place of birth, place of residence, and profession. Thus, we aim to understand perceptions from all viewpoints. With a similar intention, the survey is also carried out digitally, targeting workers from both public institutions and other societal sectors such as youth and students.

Time / Place considerations

Two similar questionnaires were prepared: one for the Marina of Acre, and another for the Port of Jaffa. The surveys were carried out on several days, at different times, and different days of the week to include as many different voices as possible. In addition, the spatial component is included by georeferencing each surveyed person, their place of birth, and residence.

The Sample

The sample for relevant results requires a statistical deviation of less than 5%. The standard deviation (σ) is inversely proportional to the square root of the sample size (n):

$$\sigma = \frac{1}{\sqrt{n}}$$

Children did not participate in the surveys due to extraordinary circumstances. The parents were reluctant to let their children participate, afraid of being exposed. Children constitute 36% and 38% of the population in Acre and Jaffa, respectively. Therefore, for this study, the planned sample for Acre and Jaffa is 380 people per city, assuming a deviation of 5% and a confidence of 95%.

So far, the number of surveys collected remains below the needed sample due to the COVID-19 global pandemic. The collected surveys currently have a 7% deviation, so the research remains open to ensure that enough surveys are collected to provide relevant findings.

COVID-19: challenges, pros, and cons

It should be noted that carrying out the physical survey during the first months of 2021 (January, February, and March) was highly challenging due to the ongoing COVID-19 health crisis. Some of the people approached during the survey were reluctant to engage in conversation, and the reduced number of foreign and national tourists due to mobility restrictions creates a “COVID-19 bias”. On the one hand, this provides an opportunity to get the locals’ understanding of their area. However, on the other hand, it reduces both the number of people surveyed and the diversity of views due to the lack of tourism. Therefore, considering that both sites are highly tourism dependant, we should analyse the survey results with a grain of salt while appreciating the benefit that the extraordinary times provide a “locals only” perspective.

Result Analysis

General and Disaggregated (See 5. Annexes)

The results obtained from the survey have been analysed.⁵ The aim is to first acquire a general understanding of perceptions and future visions of the areas, following the Deep Adaptation Agenda guidelines, aiming to respond to R1 and R2. Following that, the results have been disaggregated by sex, age, religion, and profession. The purpose of this step is to compile the multiplicity of voices in the area and map the points of consensus and conflict about point R4, reconciliation.

Alternative proposal

Aiming to test the limits of acceptability in relation to the hypothetical catastrophic future of sea level rise and the Marina of Acre and the Port of Jaffa disappearing, adaptive reuse alternatives are proposed. The criteria extracted from the analysis are considered in addition to the “Cultural Resilience Approach”. Together they were used to evaluate the level of acceptability of these alternatives. The “Cultural Resilience Approach” addresses restoration (R3), “what can we bring back to help us with the coming difficulties and tragedies?” by recovering the notion of cultural resilience as “the capability of a cultural system to absorb adversity, deal with change and continue to develop” (Holtorf, 2013).

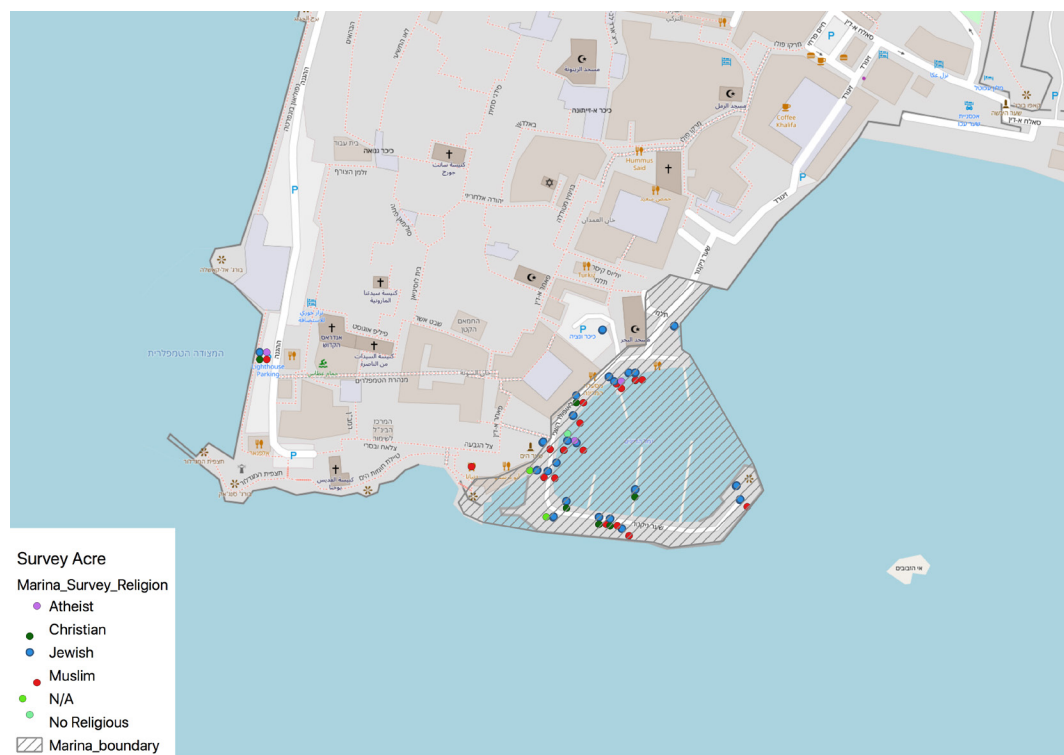


FIGURE 4 Map of Acre with respondents' religion

5

See table with results at the following link.

Marina of Acre

The general results of the survey show the majority perception, which in this case can be expressed as the following profile. For the Marina of Acre: a Jewish man, between 19 and 34 years old, employed, working in the business sector. He was born and currently lives in Israel, but outside of Acre. This person visits the area once or twice a month, and he usually walks, engages in tourism, and spends time with friends. The elements of the port that he likes the most are the views, the food, and the buildings. However, he finds the area not nice, difficult to access, and he does not like the location. He would like the port to be a fishing port in the mornings and a local market in the evening, yet boat tours would be undesirable. In the hypothetical case of sea level rise that would flood the marina, the most common reaction is to believe it would be a high disruption requiring a new port nearby, and the least common reaction is to call for the port's reconstruction.

The general analysis of the results also shows the values linked to the marina and the city of Acre, represented in these two tag clouds. In the first, the three most repeated words are place, sea, and beautiful. In the second, these are dust, culture/s, and city. It shows how the Marina of Acre is mostly valued for its aesthetic value and location near the sea. Regarding Acre, while its cultural value is acknowledged, it is seen as a dusty city. We find these values back in response to the most (R1 – Resilience) and least (R2 - Relinquishment) valued elements.

Port of Jaffa

In the case of the port of Jaffa, the most common respondent is a Jewish man, between 19 and 34 years old, unemployed. His sector is not specified. He was not born in Jaffa, but somewhere in Israel or a foreign country, and he currently lives in another city in Israel. This person visits the area 3 to 4 times a month, and he usually walks and spends time with friends and family. The port's preferred elements are the views, the space being nice, and the buildings. He finds it difficult to access the site and to park. The food is one of the least preferred elements. The morning and evening preferred uses for the area are a green park and a local market, respectively. Boat tours would be undesirable.

At both ports

The results extracted from the survey offer a wide range of perspectives on the two ports. We can understand the multiplicity of perceptions the citizens and visitors have about these two similar public areas, the cultural values linked to them, and the vision for a hypothetical disastrous scenario.



FIGURE 5 Acre's Tag Clouds – Marina (on the left) and City of Acre (on the right) _Generated With Wordclouds.Com



FIGURE 6 Jaffa's Tag clouds - Port (on the left) and City of Jaffa (on the right) _Generated with Wordclouds.com

Decisions on urban resilience could benefit from these general results, though they are shallow. At first glance, the preferred option is to be prepared for or respond to sea level rise by relocating the marina to a safer area of the city so that the economic activities are not jeopardised. This also aligns with the importance of economic activities for the respondents and with the fact that reconstruction is the least-selected alternative.

In the hypothetical case of sea level rise that would flood the port, the most common reaction was to believe it would be a considerable disruption and to construct a new port, while the least common option was to reconstruct it. The values linked to the port are sea, food, and promenade, whereas Jaffa's values are related to community, market, and history. Altogether, the tag clouds show that the sea and the community are the most valued assets. Consequently, if the sea level were to rise and flood Jaffa's port, the generally preferred option would be to build a new port. Similar to Acre, reconstructing the area is not a priority.

Management of the port if the sea level rises

Fixed answers were provided as responses to the hypothetical question about what would happen if the sea level rose and the port flooded, with the results nearly the same for both ports. The most common answer is that it would be an enormous disruption that would affect the economy, the second answer was to build a new port close to the original one, and the third option was that no port would be needed. That the responses remain so similar shows an apparent consensus on how the citizenship understands city management and their level of trust in the authorities.

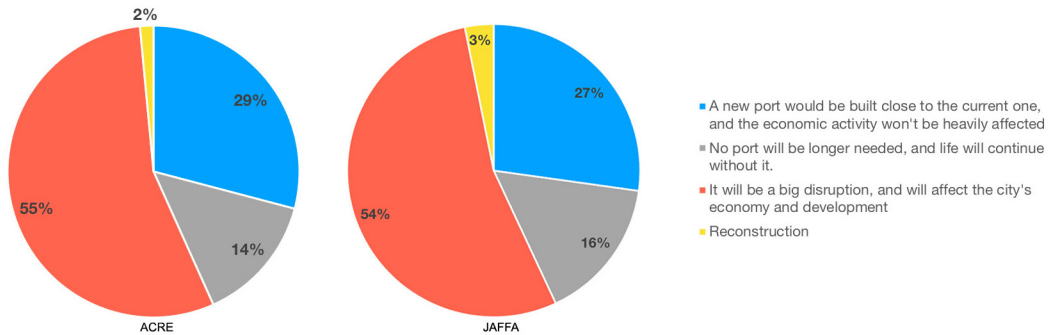


FIGURE 7 Survey results on the question: If the sea level rises and the Marina of Acre/ Port of Jaffa disappears, how will the city manage?

Deep Adaptive Reuse and Cultural Approach and Alternatives

Disaggregating the data shows a complex and varied range of perceptions on the Marina of Acre and the Port of Jaffa. We propose alternatives based on this outcome for a hypothetical rise in sea level and consequent flooding of the ports, aiming to find the most acceptable option among the citizens.

Consensual alternative: New port | Economic revival | No reconstruction

The question on port management (Question 19) serves as the starting point because a consensus was found among all the categories for both ports. Almost every respondent believes that sea level rise would be an enormous disruption that would affect the economy and development of the city, and that building a new port close to the current one would be a good solution, rather than reconstructing the latter. From these answers, we distil citizens' awareness of how a natural disaster may impact their city and the economy; there is low interest in reconstructing the current port. The new one should include the economic activities to compensate for the loss from the old port.

This means that implementing physical disaster mitigation mechanisms, such as a dam or barrier systems, would not be an adequate solution from a citizen's perspective. Instead, focusing on response plans that include planning a new port would attract more agreement, meaning the municipality should prioritise such planning.

If the construction of a new port close to the current one is chosen based on popularity among the citizenry, deciding on the uses this new port would accommodate and which it would not is fundamental to guarantee its sustainability.

The New Marina of Acre

Alternative uses for the (new) Marina of Acre

The most valued elements of the Acre port are related to cultural, economic, and social interactions, whereas the least valued elements are linked to the urban and environmental aspects. The new port should include excellent views of the sea, greenery, and a nice clean space to walk. Economic activities related to the local economy and tourism should be included. Cultural values should be promoted by enhancing the gastronomy, festivals, and the buildings and monuments of the new port. Also, the new port should be easily accessible, close to public transportation and a parking area.

The preferred morning uses for the port, in almost every category, includes a fishing port and a green park. These uses connect to the need for a green and clean space and enhance the local economy and the desire to fish among the elderly. The only group that opposed the green park is the age range between 35 and 49. To compensate for their choice being neglected, their most preferred use should be included: the local market. This aspect would work out fine, as it is one of the most preferred uses for the evening, along with the sea promenade. The new project should not include boat tours, as this is one of the most undesired uses.

Altogether, the new port would provide a sea promenade and a green park, where fishing activity would be possible, both as a recreational activity and professionally. This area would include a local market that is attractive for locals and tourists, including traditional arts and crafts and local food. Tourist attractions should be integrated. These could include historical buildings, monuments, and exhibitions showing local arts and crafts. Boat tours should be avoided.

Issues raised by the alternative – Acceptance Evaluation

This alternative raises a series of issues and doubts that need to be addressed by the municipality, mostly linked with the process, timing, and stakeholder acceptance. Firstly, selecting the location for the new port would create a high probability of confrontation among Acre's stakeholders. Second, the timing for the construction of the new port could be controversial. From a disaster risk management (DRM) point of view, mitigation and preparedness are prioritized over response. Therefore, constructing the new port before the sea level rises would be the DRM better option. Yet, this entails a great level of economic resources, and as mentioned above, a high level of controversy about its location. It suggests that measures would be taken when the public perceives the risk so that the level of acceptance is high. Finally, neglecting the historical and cultural value of the Marina of Acre as part of a World Heritage site is not trivial. The heritage and cultural sectors would oppose the abandonment and deterioration of the area, advocating its reconstruction regardless of citizens' perceptions. Altogether, it generates a conflict of interests and priorities among stakeholders and shuffling the DRM, cultural heritage, economic, and urban priorities. In any case, the final decision should include citizen engagement to guarantee a reasonable level of acceptance.

The New Port of Jaffa

Alternative uses for the (new) Port of Jaffa

Regarding the most and least valued elements of the port of Jaffa, the cultural and economic aspects should be maintained, and the urban and economic aspects improved. Therefore, following the most desired uses, a green park and fishing port should be included to tackle the environmental aspect as well as the preference for walking and spending time with friends and family. For the evening, most categories proposed a local market as a desirable use. This is aligned with the fact that many respondents selected no change for the uses in the morning and evening. This means that the current use of the port, sea promenade, local market, restaurants, and cafes should be integrated with the new port, and avoid boat tours, as most categories opposed to them.

Overall, the new port of Jaffa should be in an area with views, near the sea to promote recreational fishing. The space should include a green area, nice and clean, with space for local markets, restaurants, and cafes that attract tourists and promote the local economy. The site should be easily accessible by public transportation and close to a parking area for those using a private vehicle.

Issues raised by the alternative – Acceptance Evaluation

Like Acre, the new location and project implementation timing issues create more controversy than the new alternative proposal. In the case of Jaffa, we do not have the World Heritage status, lessening objections regarding cultural heritage. Yet, the intangible cultural heritage elements found on the site should not be neglected, nor the historical value of the port. The latter would probably open the debate

on moving the port, as the connection with biblical episodes represents a solid reason to fight for its reconstruction over a new port.

In addition to selecting a new location, the construction schedule is also an issue in this case, as it would clash with political interests. The decision-makers would need to prioritize the citizens' perspectives and the municipality's main concerns over the DRM criteria. Again, this choice would interfere with the overall objective of this exercise: addressing disruptions boosted by climate change with a high level of citizen acceptability as part of a holistic resilience approach.

Heritage - Tourism alternative: Mitigation | Reconstruction | Economic development

One of the issues observed in constructing a new port is the objection by heritage experts and the difficulty in finding a new location linked to the municipality's priorities and other political interests. Therefore, following the fourth point in the Deep Adaptation Agenda, R4 reconciliation, we propose an alternative that addresses the difficulties of building a new port, obviating the responses to the question about port management in the case of sea level rise.

The proposed alternative is the reconstruction of the Marina of Acre, as this site is more charged with cultural and heritage values, connected to its UNESCO WH status. This option would include two fundamental elements. The first element concerns flood risk mitigation aiming to delay the disaster by constructing physical mitigation systems, such as water barriers. Second, a reconstruction plan for the ports is needed, which should include a response mechanism for the time of flooding, and the plan for the reconstructed port, to address the recovery phase.

Again, the key element for this alternative to be successful is citizen engagement and awareness. The surveys show that the citizenry is aware of the consequences of such a disaster. Their engagement can be guaranteed by taking into account the disaggregated data. In this case, the focus is on the recovery phase⁶: the main elements and uses to be included/not included in the reconstructed port.

Regarding the choice of flood risk mitigation system, the economic factors need to be considered. Decision-makers are more reluctant to implement mitigation systems, as their impact is long term, conflicting with political interests that are more focused on short or medium-term impacts. Therefore, the key stakeholders taking a leap of faith to prioritize a DRM solution over other issues in the city would require high levels of institutional awareness and trust in science.

Conclusions

The Deep Adaptation Agenda offers a new approach in which resilience-related aspects are included (R1), but which also integrates issues linked to perceptions, culture, and interests (R2-R4). Combining this perspective with cultural resilience aims to provide alternatives beyond the traditional DRM approach or the economic, business as usual perspective. Including the social and cultural values into the procedure provides different solutions to the same problems, placing the human beings and citizens in the focus.

6

The response phase is too complex to be addressed in this paper, and should be considered in further studies.

This study provides adaptive reuse alternatives for a hypothetical disaster and mainly focuses on understanding the multiplicity of voices in the city and reaching a more or less consensual alternative for the citizens. It should be noted that the periods of disruptive change provoked by the implementation of the proposed alternatives are not addressed. Neither are the impact of the institutional, public, private, and civil society actors on the acceptance and implementation of the resulting solutions. This leaves space for further research on these topics.

The outcomes of the analysis and alternatives proposed for the Marina of Acre and Port of Jaffa have many similarities. They range from the similar responses among all categories of respondents to the final alternatives derived from the surveys. In the same way, the issues with the actual implementation are shared, showcasing the challenges around climate action. Reaching a consensus or partial consensus among the multiplicity of identities in a city is fundamental to starting the conversation and finding the most acceptable alternatives. Yet, this is just the first step in a complex, multi-level, and multi-disciplinary stakeholder process intertwined with political priorities. A response to the challenges raised by the climate emergency requires citizen engagement and a solid commitment by decision-makers.

Summing up, this paper explored how to combine Jem Bendell's Deep Adaptation Agenda with the cultural resilience approach. It can result in adaptive reuse alternatives, aiming to promote reconciliation and the four spheres of sustainable urban development while tackling the climate crisis and disaster-related issues. The study shows how combining these approaches reveals the voices in the city and provides a baseline for dialogue and engaging solutions. Merging the urban realm with culture and DRM as a method and testing it in the contested sites of Acre and Jaffa reflects the complexity the urban world is facing and the need to propose innovative and integrated methods so that all the voices are included and solutions provided.

Acknowledgements

This research is conducted as part of the HERILAND project. HERILAND is a pan-European research and training network on cultural heritage in relation to Spatial Planning and Design. It is funded by the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 813883.

References

- Anthropocene*. (2021). <https://www.dictionary.com/browse/anthropocene>
- Apserou, O. (2013). *Adaptive Reuse. Evaluating the concept of adopting Adaptive Reuse as a sustainable strategy for the built environment*.
- Bandarin, F., Hosagrahar, J., & Sailer Albernaz, F. (2011). Why development needs culture. *Journal of Cultural Heritage Management and Sustainable Development*, 1(1), 15–25. <https://doi.org/10.1108/2044126111129906>
- Bandarin, F., & van Oers, R. (2012). *The Historic Urban Landscape: Managing Heritage in an Urban Century*. Wiley-Blackwell. <https://doi.org/10.1002/9781119968115>
- Bendell, J. (2018). "Deep adaptation: A map for navigating climate tragedy".
- Crutzen, P. J. (2002). Geology of mankind. *Nature*, 415(6867), 23–23. <https://doi.org/10.1038/415023a>
- Galili, E., Rosen, B., Zviely, D., Silberstein, N., & Finkielstejn, G. (2010). The Evolution of Akko Harbor and its Mediterranean Maritime Trade Links. *The Journal of Island and Coastal Archaeology*, 5(2), 191–211. <https://doi.org/10.1080/15564891003664487>
- Gilbert, C., & Bower, J. L. (2002). Disruptive Change: When Trying Harder Is Part of the Problem. *Harvard Business Review*, May 2002. <https://hbr.org/2002/05/disruptive-change-when-trying-harder-is-part-of-the-problem>
- Harari, D. (2012). *Acre Tourism Development Strategy*. <https://www.akko.org.il/en/Acre-Tourism-Development-Strategy>
- Holtorf, C. (2013). Cultural Heritage and the Challenge of Sustainability. *Heritage & Society*, 6(2), 199–204. <https://doi.org/10.1179/2159032X13Z.0000000008>
- IOM. (2020). *STRENGTHENING DISASTER RISK REDUCTION AND MANAGEMENT AT THE LOCAL LEVEL*. International Organization for Migration.
- Keeping the promise: United to achieve the Millennium Development Goals* (Intergovernmental Resolutions A/RES/65/1). (2010). United Nations General Assembly.
- Killebrew, A. E., DePietro, D., Pangarkar, R., Peleg, S.-A., Scham, S., & Taylor, E. (2017). Archaeology, Shared Heritage, and Community at Akko, Israel. *Journal of Eastern Mediterranean Archaeology & Heritage Studies*, 5(3–4), 365–392. JSTOR. <https://doi.org/10.5325/jeasmedarcherstu.5.3-4.0365>
- Maly, E., & Suppasri, A. (2020). The Sendai Framework for Disaster Risk Reduction at Five: Lessons from the 2011 Great East Japan Earthquake and Tsunami. *International Journal of Disaster Risk Science*, 11(2), 167–178. <https://doi.org/10.1007/s13753-020-00268-9>
- Marzeion, B., & Levermann, A. (2014). Loss of cultural world heritage and currently inhabited places to sea-level rise. *Environmental Research Letters*, 9(3), 034001. <https://doi.org/10.1088/1748-9326/9/3/034001>
- Mathey, K., & Steinberg, F. (2018). *Urban Renewal and Revitalization*.
- Parris, A., Bromirski, P., Burkett, V., Cayan, M., Hall, J., Horton, R., Knuuti, K., Moss, J., Obeysekera, J., Sallenger, A., & Weiss, J. (2012). *Global Sea Level Rise Scenarios for the US* (Technical OAR CPO-1.; p. 37). Global Sea Level Rise Scenarios for the US National Climate Assessment. NOAA. https://cpo.noaa.gov/sites/cpo/Reports/2012/NOAA_SLR_r3.pdf
- Pereira Roders, A., & van Oers, R. (2011). Editorial: Bridging cultural heritage and sustainable development. *Journal of Cultural Heritage Management and Sustainable Development*, 1(1), 5–14. <https://doi.org/10.1108/2044126111129898>
- Plevoets, B., & Van Cleempoel, K. (2019). *Adaptive reuse of the built heritage. Concepts and cases of an emerging discipline*. Routledge Ltd.
- Plevoets, B., & Van Cleempoel, K. (2020). Heritage, Adaptive Reuse and Regeneration in Retail Design. In *Retail-Design: Theoretical Perspectives* (A. Petermans & A. Kent, A. Petermans & A. Kent, pp. 114–134). Routledge. https://www.academia.edu/30522489/Heritage_Adaptive_Reuse_and_Regeneration_in_Retail_Design
- Reimann, L., Vafeidis, A. T., Brown, S., Hinkel, J., & Tol, R. S. J. (2018). Mediterranean UNESCO World Heritage at risk from coastal flooding and erosion due to sea-level rise. *Nature Communications*, 9(1), 4161. <https://doi.org/10.1038/s41467-018-06645-9>
- Rofe, Y. (2008). The White City of Tel-Aviv: The Conservation of Modern Planning and Architecture and the Current Debate on Urbanism. *Journal of the Italian Institute of Planners*, 136, 95–102.
- Roy Britt, R. (2005, June 9). The Snowball Effect of Global Warming. *Live Science*. <https://www.livescience.com/9329-snowball-effect-global-warming.html>

- Sherwood, H. (2012). Israel's historic city of Acre faces tourist and settler tensions [News]. *The Guardian*. <https://www.theguardian.com/world/2012/jun/24/israel-historic-city-acre-tensions>
- Stone, S. (2020). *UnDoing buildings: Adaptive reuse and cultural memory*. Routledge, Taylor & Francis Group.
- Suppasri, A., Leelawat, N., Latcharote, P., Roeber, V., Yamashita, K., Hayashi, A., Ohira, H., Fukui, K., Hisamatsu, A., Nguyen, D., & Imamura, F. (2017). The 2016 Fukushima earthquake and tsunami: Local tsunami behavior and recommendations for tsunami disaster risk reduction. *International Journal of Disaster Risk Reduction*, 21, 323–330. <https://doi.org/10.1016/j.ijdr.2016.12.016>
- Sweet, W. V., Kopp, R. E., Weaver, C. P., Obeysekera, J., Horton, R. M., Thieler, E. R., & Zervas, C. (2017). *Global and Regional Sea Level Rise Scenarios for the United States* (Technical NOS CO-OPS 083). Center for Operational Oceanographic Products and Services National Ocean Service National Oceanic and Atmospheric Administration U.S. Department of Commerce. https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf
- UNDRR. (2015). *Sendai Framework for Disaster Risk Reduction 2015–2030*. https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf
- UNESCO. (2011). *Recommendation on the Historic Urban Landscape*. UNESCO.
- Unesco. (2016). *Culture: Urban future : global report on culture for sustainable urban development*.
- UNESCO World Heritage Centre. (2020). *Heritage in Urban Contexts: Impacts of Development Projects on World Heritage properties in Cities. Final Outcomes*.
- United Nations. (2015a). *Sustainable Development Goals*. <https://sustainabledevelopment.un.org/?menu=1300>
- United Nations. (2015b). *ADOPTION OF THE PARIS AGREEMENT*.
- United Nations Human Settlements Programme (Ed.). (2012). *Mid-term evaluation of the Cities and Climate Change Initiative*. UN-HABITAT.
- Wong, L. (2017). *Adaptive Reuse: Extending the lives of buildings*. Birkhäuser.
- World Heritage Centre. (2013). *World Heritage Periodic Report—Section II - Old City of Acre*.
- Zalasiewicz, J., Williams, M., Smith, A., Barry, T. L., Coe, A. L., Bown, P. R., Brenchley, P., Cantrill, D., Gale, A., Gibbard, P., Gregory, F. J., Hounslow, M. W., Kerr, A. C., Pearson, P., Knox, R., Powell, J., Waters, C., Marshall, J., Oates, M., ... Stone, P. (2008). Are we now living in the Anthropocene. *GSA Today*, 18(2), 4. <https://doi.org/10.1130/GSAT01802A.1>