

Post-Catastrophe Reconstruction Strategies: Lessons from Global Cases for The Reconstruction of Gaza

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Abstract— The current changes on the ground in Gaza during the ongoing war call for urgent and comprehensive efforts to develop strategic frameworks and post-war plans that are in line with the unique reality of Palestinian society, particularly in Gaza, while taking into account cultural, social, historical, and economic factors. Understanding contemporary reconstruction strategies has prompted researchers to review and analyze a range of post-disaster recovery projects initiated and completed locally and globally over the past decade: the Jenin refugee camp in Palestine, the Nahr al-Bared refugee camp in Lebanon, and Japan's experience. This analysis aims to derive lessons and avoid mistakes made by previous planners, particularly in the areas of community participation, social justice, urban resilience, and sustainability. It also addresses critical challenges confronting decision-makers—such as land tenure and social cohesion, cultural heritage preservation, and the fulfillment of population needs—serving as a foundation for developing a comprehensive post-war reconstruction strategy for Gaza. The study followed a comparative analytical methodology for both local and global cases. It examines the phenomena and processes these cases underwent at all stages, from the disaster and reconstruction to the aftermath of their occupancy by the affected population. It also discusses the most important criteria adopted by these cases, compares them, and analyzes their results through three models: Building Back Better (BBB), Culture in City Reconstruction and Recovery (CURE), and Reconstruction of Beirut's Southern Suburbs (WAAD). A set of recommendations was reached for the best strategies that can be relied upon to avoid the negatives facing these projects at all their various stages, and to ensure effective and sustainable reconstruction in Gaza after the conflict.

I. INTRODUCTION

Disasters, Disasters, whether natural or human-made, significantly impact human life. When disaster strikes, the immediate response is to recover the essential needs for affected residents; emergency shelters are among them. This is followed by the reconstruction phase in its various aspects to restore the pre-disaster level. However, when the disaster is a sudden event that causes severe damage, it is then named a Catastrophe [1]. This difference between a disaster and a catastrophe will be clarified through the case studies that will be studied and analyzed in this research. The cases of Jenin and Nahr al-Bared camps are both considered disasters, while the case of Japan is a catastrophe. And this is what happened in Gaza. While Gaza has witnessed numerous disasters over the past decades, the events that happened after October 7, 2023, were the most severe to date, which caused large-scale damage and suffering, affecting all aspects of life. Dr. Ismail Ibrahim Al-Thawabta, Director General of the Government Media Office in the Gaza Strip, stated in an interview with Al-Watan that the percentage of destruction caused by the war on Gaza has reached approximately 88% of all buildings, including more than 250,000 housing units. As a result, around 250,000 families have become homeless by March 2025 [2].

According to Nadia Habash, head of the Engineers Syndicate, many authorities proposed plans and studies for reconstruction; however, Gaza was often treated as a blank slate, with insufficient consideration of the issues of ownership, social fabric, cultural, and architectural heritage [3]. In addition, many workshops and conferences talked about reconstruction without establishing clear and coherent criteria for implementation, and the unique context of Gaza was not taken into account largely. Therefore, it was necessary to have well-studied strategies drawn from previous global post-disaster reconstruction experiences. Through studying and analyzing these strategies, it is possible to develop strong foundations for reconstruction that are compatible with the requirements of Gaza and its residents.

II. LITERATURE REVIEW

The process of rebuilding cities has always been the responsibility of the political authorities, whose role is linked to the power given to them, regardless of the governance form. From the dawn of history until the Industrial Revolution, both natural and human-made disasters were the primary causes of urban destruction, population displacement, and the decline of ruling power, as seen in the great fires in Lisbon, Istanbul, and London [4]. Local authorities were always responsible for the reconstruction process, serving the ruling powers' vision, authority, and political orientations. Usually, the main buildings, such as mosques and churches, were restored to their former glory, reflecting the urban character and power of the ruling authority, while taking into account the city scale and its most important economic resources [5]. Disasters could be an opportunity to re-plan cities in modern ways. However, rulers often monopolized such opportunities in order to achieve their political orientations and visions, at the expense of the humanitarian or urban functionality. Christopher Wren's plan to rebuild **London** after the Great Fire of 1666, by widening the streets and adopting a radial system of roads, marked the beginning of Western urban planning thought during the Renaissance [6]. This period introduced a new perspective that sought to restore the ideal city by translating Greek and Roman books and re-studying all historical towns in an attempt to modernize and improve cities after the Middle Ages. However, Wren's plan was not implemented due to a clash between the proposed plans and the social, demographic, and real estate realities, which tipped the scales in favor of preserving property and speeding up completion over the idea of planned modernization. [7]. Meanwhile, the reconstruction of **Paris** under Napoleon III led to the Haussmann plan to reshape the city to improve health and cleanliness, and enhance the power and security control of the French state over the city of Paris. These objectives were achieved through expanding roads, demolishing residential houses, pushing the poor classes to the outskirts of the city,

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providing infrastructure for sewage and drinking water, and enhancing parks such as the *Parc des Buttes Chaumont*, in addition to establishing safe and efficient connections between the city and its suburbs [6]. The Haussmann plan reflected the authority and the power of the state, and made the city of Paris a global model with modern specifications; however, it strengthened the social class divide, and wealth became concentrated in the hands of a few at the expense of the majority. This occurred despite the job opportunities and economic revitalization. Public health also improved, but traditional popular heritage in Paris was demolished [8] [9]. After World War II, a new phase of reconstruction began, especially after the great **Marshall Plan**, attributed to the U.S. President in 1947 [10]. This led to the reconstruction of Europe with American support, aiming to enhance the stages of recovery from the effects of the war, promote international trade, prevent the spread of communism, and reinforce the concepts of capitalism. The main objectives were overcoming the state of chaos that Europe experienced and rebuilding the destroyed cities, using modern materials and technologies that emerged after the Industrial Revolution, especially in West Germany and France. The plan was executed within administrative and organizational frameworks, reflecting the political strength of the supporting state [11].

Following the Lebanese civil war in the 1990s, one of the most significant reconstruction projects in the Arab region was initiated through the Solidere project. It was carried out as a semi-governmental initiative led by former Prime Minister Rafik Hariri. Downtown Beirut and its historical center were reconstructed and transformed into a commercial, tourist, and regional center to attract investors to **Lebanon** and create a modern model in the Middle East, within the idea of creating the "Switzerland of the East", as Lebanon was called at that time. During the reconstruction process, the original owners of small shops were excluded and compensated with shares in the Solidere Company [12]. The middle and poor classes were also excluded from work and housing in the city center, which was reflected in the process of restoring vernacular buildings; also, restoration of some historical buildings was rejected due to their economic infeasibility. The Lebanese architectural character was absent from the place in favor of the foreign character; consequently, the community participation of the original residents was neglected. This experiment primarily reflects Solidere's desire to realize its vision of Beirut as an elite center for the affluent class of society, without paying attention to the daily needs of the less privileged population. Furthermore, downtown Beirut has become a nearly empty area during working hours, lacking a diverse urban life [13]. David Harvey discusses this through his concept of "accumulation by dispossession" [14]. Meanwhile, Sami Makarem [15]. In his study of identity and planning in Beirut, he links the reconstruction process to the loss of cultural identity that occurred in Beirut, which made the city disconnected from its true inhabitants [16].

The Rwandan experience after the 1994 genocide is considered an important model that demonstrated the strengthening of the state's strategy in resolving internal societal problems among the population. Rwanda witnessed destruction in which institutions collapsed, millions of people were displaced, and the social fabric disintegrated [17]. However, the priorities and mechanisms of reconstruction were among the inspiring successes of the process. National reconciliation was given priority before the reconstruction process by establishing a

traditional local court system that does not rely on the Western system, called Hchatcha, to restore societal trust among people, solve problems, and prosecute perpetrators of crimes. The national identity of society was also strengthened, instead of tribalism, and institutions were built, the state was reformed, corruption was fought, and an advanced judicial system was built. Hence, the process of re-planning, urbanization, and community development was carried out based on sustainability, integrating refugee-affected areas, bridging the gap between rural and urban areas, strengthening the role of youth, women, children, adults, and all segments of society, supporting diverse economic projects, rebuilding vital buildings such as schools and hospitals, and restoring important historical buildings [18]. All of this was within a local national vision that made a difference, and they emphasized the importance of building a unified national identity, which is essential in post-conflict societies [19].

The post-earthquake reconstruction in Haiti in 2010 demonstrates the societal and institutional weakness of the state's role in the recovery plans, which complicated the goals and made them difficult to achieve. The absence of state involvement in aid management and housing provision and design resulted in rejected plans by local residents. As a result, more than 60,000 displaced people remained homeless even five years after the disaster [20]. This confirms the necessity of effective local institutions, strong leadership, and coordination between international and local actors to achieve the necessary urban justice to avoid marginalization, lack of transparency, and corruption in the reconstruction process [21].

III. COMPARISON AND ANALYSIS CRITERIA FOR CASE STUDIES

To avoid all the negatives that post-disaster reconstruction operations are exposed to, at all local and international levels, financial and moral, at the level of decision-makers and residents, and based on the latest reconstruction concepts, materials technology, and elements of environmental and urban sustainability, a set of concepts and reports has been issued that seek to establish a clear, sequential, and approved methodology for post-disaster reconstruction [22]. This methodology enhances community engagement, grows the economy, achieves long-term sustainability, and preserves the local culture of the population, while ensuring a better quality of life for the population. This approach is based on transparency and local community institutions trained and qualified to achieve governance and good governance with minimal corruption, and to build what enhances the sustainability of cities that have been exposed to natural or human-caused disasters [23]. This approach transforms calamity into opportunity, disaster into blessing, and pain into hope. In this study, we will focus on the "Culture in City Reconstruction and Recovery (CURE)" memorandum, which deals with local culture before, during, and after the reconstruction process, issued by the World Bank and UNESCO in 2018, and the "Build Back Better" (BBB) memorandum, which focuses on achieving a better life after reconstruction, which was launched with the 2004 tsunami and was adopted as a reconstruction methodology at the World Conference on Disaster Risk Reduction, held in Sendai, Japan, in 2015. These two are considered key references in establishing the foundations and principles of reconstruction processes, which will be used to analyze the case studies in this study [24].

A. *Culture in City Reconstruction and Recovery (CURE)*

This note, published by the World Bank and UNESCO in 2018, addresses the topic of culture in the reconstruction process [25]. It seeks to establish a conceptual framework for promoting and preserving culture before, during, and after the reconstruction process following crises and tensions in cities, particularly in areas of fragility, conflict, and violence (FCV). It is based on seven main principles:

- The city is a "cultural structure" interwoven with the urban and social fabric.
- Embarking on reconciliation by rebuilding important cultural landmarks.
- Using cultural expression as a tool to address post-crisis shocks.
- Incorporating culture into early planning and quick-benefit actions.
- Involving local communities and local governments in all phases of recovery.
- Modeling financing that balances immediate needs with long-term planning.
- Managing cultural identity restoration and basic service needs [26].

This is accomplished through phases of damage assessment, participatory policy design with the community, securing funding from major international funding sources, and implementation through the establishment of local institutional and strategic structures and international monitoring. This is all done with culture as an integral part of the post-disaster recovery process, emphasizing effective community participation, early planning, balanced funding, and transparent and flexible implementation. This focus on culture enhances the process of building safe, sustainable, and inclusive cities [25].

B. *Build Back Better (BBB)*

It was established after the 2004 tsunami disaster in Indonesia and was officially adopted within the Sendai Framework for Disaster Risk Reduction [27]. It relied fundamentally on the process of improving reconstruction operations on strong infrastructure and rapid response in providing temporary shelters for residents and community participation by integrating residents and involving them in the reconstruction process, especially marginalized groups, through the restoration of symbolic places and preserving the spatial memory of the community, which enhances the sustainability of the place. It also cares about the basic principles of environmental sustainability in terms of its use of sustainable building materials and techniques, and alternative energy in community energy production. Energy production. Therefore, the basic idea of these guiding principles that constitute BBB is to create a better life for residents in an integrated manner between buildings and society, sustainability of buildings, and the creation of recreational and service areas, and to enhance the presence of the community as a whole within the city itself, while maintaining environmental sustainability, as the most important fundamental principles of BP are: avoiding reconstruction, not rebuilding the danger again, the community. He is the leader of the recipient. Risks must be assessed at every stage. The focus must be on

institutional structures, not just infrastructure. Do not rush, and balance between rushing and deliberation [28].

C. *Reconstruction of Beirut's Southern Suburbs (WAAD)*

The WAAD experience, which took place in the reconstruction process of the southern suburb of Beirut after the 2006 war, where the southern suburb of Beirut was exposed to great destruction, and the project was launched on the initiative of the Jihad Foundation for Construction and Reconstruction as an alternative to the Lebanese state [29]. The project is characterized by the speed of relief and completion within four years while preserving the identity of the place. Local committees were established, and a clear participatory process took place in the process of reconstruction and preservation of land ownership, with the ability of owners to deal with modifications to their residential units. Housing was also made and provided for every eight from the beginning of the events until their neighborhoods were rehabilitated, to which they will return after the reconstruction process [30]. Therefore, the positive aspect of the project was the speed and interaction with the community, rehabilitating the streets, preserving the memory of the place, organizing the paths, providing public parks, and creating urban designs that are compatible with the surrounding environment, all while preserving the local population in its place. All of this indicates the interaction of the population with the local committees, that the pace of achievement was without democracy and was devoid of conditions, and there was a high level of confidence among the residents in the local committee that belonged to them. However, the weaknesses that formed in the reconstruction process in WAAD are the lack of noticeable development of the social fabric while maintaining the previous social and planning situation before the reconstruction process, and maintaining the transportation networks without finding solutions and innovative environmental solutions, and the weakness of local urban innovation. It is an inspiring local experience that confirms the importance of the existence of an internal reconstruction committee and reminds us of the importance of getting rid of some bureaucratic work in the reconstruction process, especially in trying to balance between achievement and speed of achievement, and the bureaucratic slowness that appears in the reconstruction work of international institutions [31].

IV. ANALYSIS OF THE CASE STUDIES

This section of the research presents an analysis of case studies of post-disaster reconstruction around the world. These cases varied from a local Palestinian case study, a regional case from Lebanon, and an international case study in Japan. The reason for choosing these samples is similar to the following points:

First: Expanding the scope of analysis through diversity and variation in case studies.

Second: Highlighting local and global contexts.

Third: Providing flexible strategies that are applicable in different settings.

The case studies were distinguished by the diversity of disaster types, whether natural or man-made. The post-disaster approach varied according to specific criteria and strategies tailored to each case and based on the circumstances,

difficulties, and challenges faced. This diversity and difference have created a range of options for rebuilding Gaza after the disaster, taking into account all the state of affairs and limitations it faces in all aspects.

A. Local Case: Jenin camp, Palestine

Located on the Border of the Jenin municipality, it is the northernmost camp in Palestine, see "Fig. 1." Established in 1953, it was severely impacted by the Second Intifada in 2002. The Israeli military occupied the camp after ten days of intensive fighting, destroying more than 400 houses, severely damaging hundreds more, and displacing more than a quarter of the camp's population [32]. As UN News reported, Peter Hansen, UNRWA Commissioner-General for the Palestinians, inaugurated the first phase of the reconstruction of Jenin camp on December 16, following its destruction by Israeli forces in April 2002. This phase includes the construction of approximately 450 shelters, at \$27 million, provided by the Red Crescent Society of the United Arab Emirates [33].

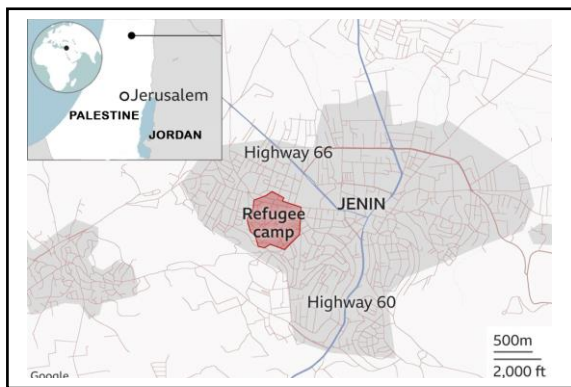


Figure 1. Jenin camp, an inset map of Palestine. Source [34].

Urban Fabric: The urban fabric of Jenin camp, like other camps, consists of a group of residential neighborhoods. These neighborhoods are not spatially divided by fixed boundaries or spaces. They were formed as a result of the population gathering in groups linked by kinship or belonging to the same city or village from which they were displaced during the Nakba. In 2002, the camp was subjected to a large-scale invasion, during which entire sections of the camp were completely destroyed. It was completely reconstructed according to an engineering plan and renamed the new camp, marking the first time such a large-scale urban intervention had taken place in the camp [35]. The reconstruction of Jenin camp following the 2002 bombings was one of the largest local humanitarian interventions at the time. Led by UNRWA with Emirati support and supervised by the Palestinian government, it rebuilt civilian infrastructure, residential shelters, and established essential community facilities. After years of effort, the camp emerged with a modern look that restored some of its residents' roots and attachment to the land [36]. Most of the construction and infrastructure were completed by 2004. Reconstruction unfolded in three overlapping phases:

Phase 1: Damage assessment, rubble removal, mine clearance, and partial repair of the most severely damaged homes, which took 9 months.

Phase 2: 400 complete housing units were built, and infrastructure, including roads, water, electricity, sanitation, and public areas, was provided over 19 months.

Phase 3: Community facilities were rehabilitated within 15 months. Such as schools, hospitals, and mosques [37].

Architectural Design and Urban Planning: Residential

density was decreased by expanding outward through the purchase of new land outside the "ground zero" area, allowing for larger, brighter, and better-ventilated homes. Buildings were designed to maintain the traditional architectural character, avoiding a completely organized grid and instead aiming to preserve some of the original organic layout. Each housing unit included a private space, such as a courtyard or garden, for agricultural use, future expansion, or to provide social privacy. The plan aimed to lower population density and improve the quality of life while leaving open spaces for self-expansion or agriculture [36]. In the old camp, before reconstruction, the roads were laid out in a specific gradation from public to private, resulting in a series of alleys and lanes with closed ends that were publicly owned by the neighboring residents. These defined areas within the camp, separated from the rest of the camp fabric and subject to the residents' control. This was due to the nature and manner in which the population gathered at the time of the camp's establishment, in contrast to the situation in the new camp, where alleys and lanes with closed ends were absent. The scale of the old camp was intimate, unlike the new camp. This scale was imposed by the distinctive cultural, religious, and social values of the residents, and reinforced by the residents' attachment to moral values represented by the dream of returning to Palestine and their view of the camp as a temporary place of residence [35].

Community Participation: Weekly meetings were held between UNRWA and refugee representatives to review and adjust designs based on the needs of the residents. A "local committee" was also appointed within the camp to ensure communication between residents and the agency and resolve disputes during implementation. This approach gave the project a unique character in terms of involving beneficiaries in planning [38].

Summary: The urban fabric before reconstruction consisted of narrow tunnels and alleys crowded with cramped houses, a large portion of which were destroyed. After reconstruction, wider streets, a new road network, and organized urban planning were introduced. Pre-reconstruction roads included opening large military roads during clashes to facilitate the movement of military vehicles. After reconstruction, the wide roads became part of the civilian infrastructure and were officially prepared. Allowing these military vehicles to enter so easily has been criticized. Facilities and infrastructure were destroyed, including water, sewage, and electricity networks. After reconstruction, new water, electricity, and sewage networks were established, part of the projects supported by UNRWA and the Emirates Red Crescent.

B. Regional Case: Nahr el-Bared Camp, Lebanon

Located in the North of Lebanon, near Tripoli. Established in 1949 to house Palestinian refugees after the 1948 Nakba. Population before destruction: 30,000. In 2007, fighting erupted between the Lebanese Army and the Fatah al-Islam group, resulting in the almost complete destruction of the camp [39]. The primary goal of camp reconstruction is to resettle residents in their homes, improve infrastructure and public services, and regulate the security situation. It also aims to preserve the social fabric of the camp and integrate participatory design* with the needs of the residents. See "Fig. 2".

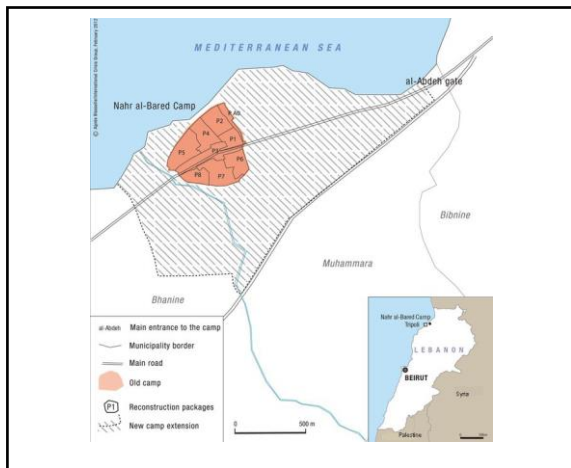


Figure 2. Nahr al-Bared refugee camp, inset map of Lebanon. Source [40].

Numerous donors, activists, and actors participated in the reconstruction process. The most prominent of these was UNRWA, the main donor and implementing agency, along with the Lebanese government, which was responsible for the security and legal framework and issuing permits. International donors included the European Union, the Saudi Fund for Development, and the Islamic Bank. Prominent among these were independent planners and architects, such as Dr. Ismail Sheikh Hassan and his team, who developed the "participatory planning with the population" model.

*Participatory design model: Camp residents were involved in the design of neighborhoods and homes through workshops and collective proposals. This approach helped residents achieve a sense of "moral ownership" of the space and reduced tensions with authorities.

The camp was redesigned based on a new intersecting street network that allows access for ambulances and civil defense vehicles. New reinforced concrete housing units were built to replace the old informal settlements. Modern infrastructure was established, including water, electricity, sewage networks, and asphalt roads. New security restrictions were implemented, including the establishment of permanent checkpoints around the camp. The reconstruction of Nahr al-Bared camp faced numerous challenges and difficulties, most notably slow funding flows, with some donors delaying the receipt of funds; security restrictions, with permanent checkpoints imposed around the camp, a contentious issue between security and civil rights; and the problem of lost documents, with many families losing their home ownership documents during the war; in addition to legal complications from the Lebanese state [41] [42].

Summary: The importance of this case lies in its complex civilizational and humanitarian project, influenced by the region's political, social, and urban factors. The Nahr el-Bared project sets a precedent in humanitarian urbanism, combining physical reconstruction with preservation of social and cultural identity and involving the local community in decision-making. Extensive reconstruction efforts were necessary.

C. International case: Fukushima, Iwate, and Miyagi in Japan

In March 2011, Japan experienced a disaster described as a triple disaster, consisting of an earthquake exceeding magnitude 9.0 on the Richter scale, a tsunami with an average height of 9.3m, followed by a nuclear accident at the Fukushima Daiichi Nuclear Power Plant, which led to

widespread radioactive contamination [43]. The prefectures of Fukushima, Iwate, and Miyagi were the most affected. "Fig. 3." According to the Japan Reconstruction Agency, more than 22,000 people were confirmed dead or missing, and approximately 470,000 people were evacuated, and about 400,000 buildings had been partially or destroyed [44]. This prompted the submission of accelerated reconstruction plans.

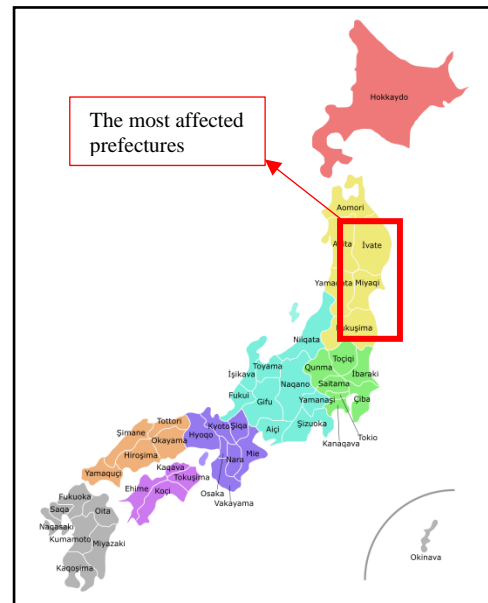


Figure 3. The most affected prefectures by the disaster of 2011 in Japan. Source [45].

Reconstruction plans encompassed multiple sectors, housing and infrastructure, and economic revitalization, including tourism, trade, and agriculture. Additional measures included environmental reconstruction and decontamination of evacuation zones in communities near the Fukushima nuclear power plant. Reconstruction has been completed in the prefectures of Iwate and Miyagi, while it remains incomplete in Fukushima prefecture due to the extensive damage caused by the presence of nuclear reactors there [43].

Since 1919, Japanese urban planning, known as (Toshi-Keikaku), has been intrusive and centralized, neglecting the conditions and needs of the local population. Later, the concept of (machi-zukuri) _ literally "hand-made creation of cities and towns" emerged, a participatory approach that integrates planning of the physical environment with the community environment, fostering social and human capital. This approach has developed significantly after the 2011 triple disaster and has gained increasing popularity [46].

One month after the disaster, the Japanese Cabinet issued a comprehensive vision for post-disaster recovery. Each affected prefecture submitted a conceptual planning proposal, which served as the basis for the individual municipalities to prepare their master and detailed plans [46]. The detailed revitalization plans were primarily aimed at restoring populations to pre-disaster levels within 10 years (2011-2021). The process was structured into three phases: recovery, restoration, and revitalization [47].

One of the major challenges facing reconstruction officials was the loss of public trust in the government authorities, combined with the resistance from some landowners to decontaminating the area. The charrette process was introduced as a participatory approach to involve the community in the early stages of reconstruction design. The city of Minamisoma, located in Fukushima Prefecture, was one

of the most prominent cities to adopt this approach. The process included initial preparation, design, planning, and presentation [47].

- Initial Preparation:** a 4-day phase, which involved comprehensive field visits, problem-explanation sessions, and informal interviews that aimed at identifying the challenges and recovery needs of the affected population. Participants were local community leaders, officials from non-governmental organizations (NGOs) and non-profit organizations (NPOs), farmers who had previous experience in solar-based agricultural projects, horse farm owners due to a traditional horse-related ritual, and other residents. Brainstorming activities were made for participants who were divided into groups. Each participant recorded their ideas on a poster and placed them on a printed map of the area. A spokesperson from each group was then assigned to present the group's ideas to the broader assembly.
- Planning and Design:** This phase involved a multidisciplinary group of participants, including academic researchers in the fields of agriculture, sociology, geography, alternative energy, land use, landscape design, and environmental management, as well as Japanese and non-Japanese eco-energy experts. The main concerns in this phase were the revival of cultural heritage, the restoration of the agricultural sector_ especially after the halt in exports caused by the nuclear leaks_ and the development of an alternative energy source following the destruction of the Fukushima Daiichi nuclear plant. Participants were divided into groups tasked with either planning tourism development projects or designing plans for sustainable and self-sufficient agriculture and energy systems. Project leaders provided a map of the area, including key geographical features, current land use conditions, and government-designated evacuation zones. A transparent overlay was placed on the map, allowing each group to hand-draw proposed plans, which were then converted into presentation slides for further discussion [47].
- Presentation and Discussion:** During this phase, each group formally presented its plans, followed by a session for questions and answers. Subsequently, groups reconvened to discuss and provide suggestions for improvement. The groups were then tasked to create clay models as a 3-dimensional illustration to visualize their ideas and alternatives. This approach was characterized by its short duration and emphasis on community participation and heritage preservation, which helped restore public trust in government planning projects. It also helped residents understand their land boundaries and reuse options, especially after the phrase “cannot find a way out” became a challenge. However, there were a number of obstacles, including the lack of training for local participants and the in-depth analysis of available resources; on the other hand, most of the participants were non-Japanese-speaking [47].

Residential and infrastructure: Disaster risk areas are areas where the construction of primarily residential buildings is restricted. To encourage residents to move to safer areas, local governments_ supported by the national government_ purchase residential sites in these areas if the owner wishes to

sell [48]. The affected prefectural governments were initially required to select new sites for housing displaced residents by providing temporary houses, as either prefabricated units or rented apartments [49]. As part of the tsunami evacuation plan, emergency housing towers were built at distances calculated based on a person's walking speed, and the speed of incoming tsunami waves, which dams cannot fully block [50]. “Fig. 4” shows the progressive reduction in evacuation areas between 2011 and 2023.

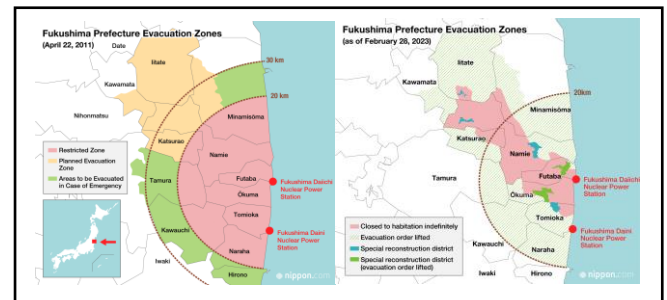


Figure 4. To the left, Fukushima Prefecture evacuation zones in 2011, and to the right, evacuation zones in 2023. Source [51].

The housing reconstruction plan began with the resettlement of residents to temporary housing inside or outside the city, while permanent housing construction progressed steadily. Cities were rezoned horizontally, placing fishing and processing industries in coastal areas, while residential and commercial functions were located inland. Green belts served as buffer zones between these areas. Cities were also rezoned vertically. In Kesenuma, for example, the ground level was raised by (1.8-5m) [46], while the urban area was raised by 10 meters, and sea walls were built in Rikuzentakata. By 2021, emergency housing use in Rikuzentakata had dropped from 2,131 households to just 28 [52].

Otsuchi-cho, a coastal city in Iwate Prefecture, eastern Japan, implemented a phased plan for reconstruction. The early phase (2011) focused on rubble removal and relocation of affected residents to safer areas; the intermediate phase (2012-2015) involved the construction of emergency houses alongside permanent housing projects, and transportation reconstruction began. The late phase (2016-present), during which all public housing was completed and occupied by the end of 2019, as well as a high percentage of the railway and expressway were constructed [44].

According to a survey conducted by Nakamura et al. 12 years after the disaster, most Fukushima residents are satisfied with the reconstruction of their homes and believe that public emergency housing is still being built to face future disasters [53].

Economic and cultural: The primary objectives in the economic reconstruction were the early recovery in terms of employment and livelihoods, with the vision of a future without tsunami-related deaths or poverty [43]. The reconstruction strategy prioritized the revitalization of traditional industries, such as fishing, and the development of new industries, like cosmetics and spices made from fish and sea urchin extracts, in Kesenuma [46]. Temporary villages were established to accommodate local businesses destroyed by the disaster [44].

Tourism in Otsuchi-cho revived through the construction of memorial facilities for the pre-disaster era.[44] In Rikuzentakata, the site of the only surviving pine tree after the disaster was turned into a unique and attractive tsunami memorial museum [52]. There were also significant efforts to

restore the waterfront to encourage tourism, as shown in “Fig. 5.” In the agricultural sector, rehabilitation operations focused on regenerating damaged soil, removing sediments, repairing irrigation systems, and restoring fisheries. Ten years after the disaster, the agricultural sector reached a recovery of about 94%. [43]



Figure 5. To the left is a residential area destroyed by the 2011 tsunami in Rikuzentakata City, and on the right is the same area in 2025. Source [52].

Cultural reconstruction efforts included Educational, medical, and healthcare facilities, such as the construction of public hospitals, community centers, and educational institutions [44]. In Minamisoma City, for example, a key focus was revitalizing cultural heritage, particularly that related to horses. Planners planned cultural projects specific to the study area, such as the "horse-chasing ritual" project, to revive and promote the horse-related heritage prevalent in the city [47].

Environmental sustainability: Coastal protection served as the first line of defense against tsunamis. To achieve this approach, authorities constructed dams whose height is proportional to the tsunami height in the area. However, this solution was of high cost, also restricted access to the sea, disrupting the coastal ecosystem. In the city of Kesennuma, the reconstruction Plan _titled "To Live Together with the Sea,"_ emphasized creating an urban environment in harmony with nature, community planning for local identity, and avoiding future disasters. The participatory planning process also included experts in the field of alternative energy to promote sustainable development [46].

Summary: In the Japanese cities studied in this research, reconstruction efforts focused on three main axes: residential, infrastructure, and economic recovery. These efforts proved successful within a relatively short timeframe. Social issues, however, were not adequately addressed in most of the affected cities [44]. It has been observed that affected citizens showed higher demand for housing in areas they participated in selecting and designing than in areas selected solely by the government, which, in their opinion, did not meet residents' needs in terms of accessibility, parks, and public spaces [49]. Among the reasons for success in small cities in Japan that lack resources and political support were the presence of visionary leaders, strong local public-private partnership, and the emphasis on investing in human capital through human-centered projects such as establishing schools to train small business owners. Regular training courses, led by universities,

banks, and non-profit organizations, targeted youth and adolescents, including field visits to other countries to learn from their experiences, as well as training programs for the elderly [46].

V. DISCUSSION

The study and analysis of previous case studies demonstrate that planning and preparation for the post-disaster reconstruction phase are among the most important measures to ensure the success of the process. The first steps determine the contours of subsequent phases, reflect the policy adopted, and directly impact the level of population engagement and participation in, or withdrawal from, reconstruction efforts. This is demonstrated in the Japanese experience, where the government quickly formed local committees and groups aimed at strengthening the population's trust in the central authorities and donor agencies, and ensuring their acceptance of the reconstruction plan. This approach contributed to achieving the best results throughout all phases of reconstruction. The importance of integrating various social groups through community participation was also highlighted, as demonstrated in the case studies of Japan, Jenin Camp, and Nahr al-Bared Camp. This participation strengthened the population's sense of belonging to the reconstruction process, whether in reconstructing buildings or reorganizing the urban environment. The pivotal role of culture in consolidating identity and belonging is highlighted here. This was demonstrated in Japan through the preservation of the only tree that survived the tsunami disaster, which was later transformed into a sociocultural center, enhancing the symbolic and cultural dimension of the place. In the cases of Jenin and Nahr al-Bared, the primary focus was on reconstruction and service provision, with less emphasis on cultural elements. Furthermore, the economic revitalization process was a key component of the Japanese experience, contributing to the sustainability of the city and its residents and investing in human capital. In Jenin, however, the process was limited to the reactivation of previously existing basic economic services, without major development. In Nahr al-Bared, the central role of the state was evident in the design of roads to serve security arrangements, such as the deployment of the army at the city's entrances. This also applies to Jenin, where roads opened during Israeli military operations were designated as main roads in the reconstruction plan. In Japan, the central role was combined with local initiatives, as individuals were empowered to build their own homes, thus mitigating the state's control over the process.

Sustainability is more evident in the case of Japan. This is attributed to the centralized, state-led financing process, which enabled investment in city sustainability and modernization using the latest technologies and contemporary building materials. In Jenin and Nahr al-Bared, modern building materials and relatively comprehensive approaches were used, but attention to urban and community sustainability was limited after reconstruction. The Japanese experience also highlights the importance of illustrating the role of regional and local levels. Governorates and urban areas were given the freedom to develop their methodologies within the framework of a comprehensive master plan, which helped create individualized solutions tailored to the specificities of each

area. This is crucial in shaping a sustainable post-disaster environment, as differentiating each area according to its needs leads to more favorable outcomes for residents. Furthermore, the heavy reliance on external donors, as in the case of Jenin, reduced the ability of local communities to participate effectively, weakened the cultural aspect of reconstruction, and slowed implementation due to restrictions and conditions imposed by donors. In contrast, Nahr al-Bared did not rely primarily on international donors, which accelerated the construction and housing process. This pattern appears clearly in the case of Japan, which relied mainly on local funding, allowing for prioritization of economic and cultural aspects.

Although the common goal of the reconstruction processes in the three cases was population resettlement, implementation approaches differed. In Japan, the emphasis was on nuclear safety standards and infrastructure development, incorporating renewable energy. In Jenin and Nahr al-Bared, greater emphasis was placed on improving infrastructure, such as roads, sewage, and water networks, with little emphasis on the traditional social fabric. In terms of design, Japan relied on modern technologies and flexible planning to account for future disasters, while Jenin and Nahr al-Bared adhered to preserving the pre-reconstruction public spirit, with less emphasis on cultural identity. In Japan, the resettlement process was relatively complex but organized, while in Jenin, it was sequential and reliant on external funding. In Nahr al-Bared, it faced additional complications due to funding constraints and the presence of Lebanese local authorities. Community participation also varied between the cases: in Nahr al-Bared, it was strong and visible, while in Jenin it was less so, and in Japan it emerged through local groups supported by the authorities. This contrast reflects the relationship between centralized decision-making and the degree of popular participation, with Japan combining both, while Jenin and Nahr al-Bared tend toward centralization or externally imposed constraints.

Reliance on external funding played a key role in accelerating the completion and settlement process in Nahr al-Bared and Jenin. However, it limited the integration of renewable energy projects and long-term economic initiatives, unlike Japan, which paid special attention to these aspects, in addition to implementing nuclear safety standards and earthquake protection systems, as these are among the most significant potential risks in the country. In terms of city sustainability, Japan was the most prepared to confront future disasters, while Jenin and Nahr al-Bared remained vulnerable to potential destruction due to military operations or security restrictions, despite their improved infrastructure after reconstruction. Emergency response in Nahr al-Bared was also constrained by Lebanese security considerations, which affected the speed and efficiency of interventions.

It can be argued that the Japanese case is closer to the "Build Back Better" (BBB) model, focusing on technology, resilience, and sustainability, but it was weaker in the cultural aspect and the concept of "Culture in Reconstruction" CURE, in addition to relatively limited community participation. The Jenin case is closer to the WAAD model in terms of the speed of reconstruction and repopulation, but it has lost some of its cultural fabric, and the CURE and community participation

elements are weak, with centralized planning dominating and a lack of attention to economic sustainability. The Nahr al-Bared case is closer to the CURE model due to strong community participation, but it was slow to implement and heavily reliant on external funding. Security and funding challenges also distanced it from the WAAD model. Accordingly, the principles of CURE, BBB, and WAAD were not fully applied in any of the cases studied, supporting the idea of developing a hybrid model that combines the sustainability and resilience of BBB, the identity, participation, and culture of CURE, and the speed of reconstruction and housing of WAAD. This hybrid model could represent the optimal framework for the Gaza reconstruction phase, balancing technical, cultural, economic, and social aspects to ensure a sustainable urban environment capable of facing future challenges. Table 1 summarizes how the three case studies: Jenin Camp, Nahr al-Bared Camp, and Japan in this research addressed different aspects of reconstruction based on key determinants identified by the experiences of BBB, CURE, and WAAD.

TABLE I. THREE CASE STUDIES OF DIFFERENT ASPECTS OF RECONSTRUCTION: BBB, CURE & WAAD.

■ Jenin camp ■ Nahr al-Bared ■ Japan

Item	WAAD	CURE	BBB
Primary Objective	Rapid resettlement within a cohesive social structure	Integrating Culture and Identity into the Urban Recovery Process	Building stronger, faster, more inclusive, and sustainable
Cultural Role	Preserving local identity and community structure	Central- Culture is a tool for healing and re-establishing identity	Secondary- within the social dimensions
Economic Role	Limited- Focusing on quickly revitalizing local economic activity	Limited- through stimulating cultural tourism and traditional crafts	Creating temporary job opportunities through reconstruction projects and infrastructure support
Community Participation	High- Residents participate in decision-making and construction	Basic- Community is a partner in design and implementation	Important to ensure responsiveness and inclusiveness
Financing	Local and unconditional (from Hezbollah and Lebanese institutions)	International (World Bank + UNESCO)	International (governments, organizations, donors)
Environmental Sustainability	Low- Greater focus on speed and implementation	Med- Linked to the cultural and social context	High- Adoption of renewable energy and recycling
Speed and Effectiveness	High- Reconstruction completed within 4 years with high efficiency	Relatively slow- Due to the procedures of international institutions	Med- Influenced by administrative and bureaucratic structures
Design Flexibility	Med- Preserve traditional construction style	Based on cultural and contextual specificity	High- Scalable depending on location and event
Urban Planning Level	Focus on rapid residential reconstruction	Dedicated to historical and cultural areas	Comprehensive- Integrates planning, infrastructure, and services
Political Neutrality	Low- Led by a party (Hezbollah)	High- Led by neutral international bodies	Relative- Sponsored by the United Nations or donor governments
Urban Outcomes	Traditional- Identical to the original structure	Diverse- In keeping with the cultural character and local context	Modern- Based on principles of sustainability and contemporary planning
Resettlement	Rapid and comprehensive- Repatriation to virtually the same locations	Cautious- Integrates with cultural heritage protection	Incremental and based on resource availability

VI. CONCLUSION

The analysis of local, regional, and international case studies in Japan, Lebanon, and Palestine relied on global reconstruction models of BBB, CURE, and WAAD. It

demonstrated that post-disaster reconstruction is a complex, multi-stage process, beginning with the disaster, through planning and implementation, and finally, housing and sustainability. These experiences have provided an important knowledge lever for understanding the mechanisms, most prominent challenges, and obstacles that may be faced post-war reconstruction in Gaza. The findings confirm that the success of the process requires the concerted efforts of society, institutions, and decision-makers, through a comprehensive and integrated framework that ensures coordination across all levels.

The study recommends the establishment of a "unified reconstruction room" that brings together the government, municipalities, and UN agencies such as UNRWA and UNDP, as well as professional unions, universities, the private sector, and civil society organizations, similar to the Japanese experience. This goal aims to enhance a participatory approach and ensure effective coordination. It also calls for the development of a clear phased plan that begins with the emergency phase, moves on to early recovery, then reconstruction, and ends with economic recovery, with a precise timeline and transparent metrics, by the BBB system. To ensure community engagement, it is advisable to form neighborhood committees representing residents, assess their needs and options, prepare planning maps for public spaces, residential areas, and pedestrian paths, and divide the sector into community zones that reflect their residents and urban environment. Specific criteria and standards should be established for each zone, taking into account its social, cultural, and economic characteristics.

The findings also emphasize the need to provide rapid and effective housing solutions, whether through prefabricated shelters or rental housing units. These should be located close to their original homes to avoid severing social ties and enable residents to follow the reconstruction process on the ground, strengthening their sense of belonging and making them an active part of the reconstruction workforce. Furthermore, areas of social or historical value should be restored and revitalized, infrastructure should be strengthened by green building and disaster protection standards, water and sanitation networks should be developed in a modular manner to reduce disruption, and emergency shelters should be provided. It is also important to manage rubble through sorting, crushing, and reusing materials in construction, with the assistance of local and international experts. Supporting the local economy by establishing temporary business villages to revive local crafts, implementing small projects or training programs for youth, and developing contemporary technological skills such as distance learning, programming, and design, thus contributing to the creation of local and global job opportunities. On the cultural side, the study emphasizes the importance of reviving spatial memory by creating memorial gardens, narrative trails, urban and artistic landmarks, and museums that reflect different historical periods. It also emphasizes the reconstruction of buildings with a local character using traditional materials and providing shade, and the development of educational and community programs through the arts, cultural, and religious centers, mosques, youth centers, schools, and universities, thus supporting the collective identity of residents by the CURE

approach. On the environmental side, and based on BBB's ideas, sustainable energy must be promoted through solar panels and storage, rainwater harvesting for reuse in irrigation and providing safe drinking water, graywater treatment for green spaces, and connecting schools, markets, and community centers to sustainable green networks. On the security and social side, the militarization of urban planning must be avoided, and wide, open streets must be replaced with graded road networks that serve the community and achieve natural social control through active facades and good lighting, while providing multiple emergency exits. A field documentation center should also be established to protect property rights using witnesses or community maps in the absence of official documentation. A temporary legal framework should also be established to guarantee rights during the reconstruction phases, while a clear-cut funding system should be designed to prevent slow implementation, drawing on the WAAD program's rapid implementation. By implementing this comprehensive vision within a stable political environment and consistent funding, Gaza can serve as a global model for post-disaster reconstruction, based on speed, justice, and sustainability.

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