

Regional-based Sustainable Planning in the Western Negev: The Key to Integrating Environmental, Climatic, Social, and Economic Elements

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In the past year, since the events of 7 October 2023, residents of the Western Negev have faced complex challenges of rehabilitation. Subsequently, the violence and ongoing war have led to serious injury to both body and mind, extensive damage to property – mainly public infrastructure and private homes – as well as massive damage to, and pollution of, the surrounding area. However, the challenges not only included physical and mental damage, but also the dismantling of social textures causing growing concerns about the future among local communities, which are still facing the moral and economic consequences of these events. Looking back after a year, it is clear that rehabilitation efforts have largely failed due to lack of coordination between the various entities, lack of clarity about goals and processes, and particularly a lack of comprehensive regional vision. Furthermore, climate and environmental considerations have hardly been incorporated into the planning of the renewable area. We will argue that optimal rehabilitation of the affected area must be undertaken, and a regional approach based on the principles of sustainable development adopted. We propose that a broad regional perspective should be adopted when considering the reestablishment of settlements and rebuilding infrastructures, and communities; that rehabilitated communities should be fully involved in the decision-making and implementation processes; and that maximum use should be made of the natural, social, and economic resources in the region. In addition, we will outline the key features that make up the geographic, climatic, social, and economic characteristics of the Western Negev, so that they can be harnessed together – as they should be – to promote personal, regional, and national resilience and prosperity for the entire region.

Keywords: *Western Negev, Regionality, Sustainability, Rehabilitation, Disaster-response*

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The Iron Swords War, which followed on the heels of the October 2023 terrorist attack in the Western Negev in Israel, contributed further to the damage already inflicted on the communities, infrastructure, and surrounding area. Events threatened to dismantle the local communities, unravel the unique fabric of the Western Negev region, and damage local resilience. A year and a half later, although neither fighting nor healing have ended, several plans have been formulated for the rehabilitation, development, and renewal of the Western Negev. Some of these, for example construction plans, the return of public services, restoration of the local economy, and ways of attracting new, robust populations, have even been approved and budgeted, and are already being implemented on the ground. However, aside from addressing the security threat, in order to build long-term resilience, we must take into account the environmental, social, and economic challenges, including reducing social and economic gaps and preparing to cope with the trials of climate change. This paper presents a view that optimal rehabilitation and regeneration of the affected area must be undertaken by adopting a regional approach based on the principles of sustainable development, even viewing regionality as a fundamental internal component of sustainable development. This approach includes a broad regional perspective on the reestablishment of settlements, infrastructures, and communities, involving the rehabilitated communities fully in the decision-making and implementation processes, refined utilization of natural resources, and maximum use of the social and economic resources available in the region.

The sustainability model, which dates back to the 1970s (Wolfson, 2016), is based on nature's ability to enable processes to continue steadily over time, while considering their environmental, social, and economic aspects. This means that there must be equilibrium between nature's ongoing ability to sustain natural systems and support life on earth, and the development and needs of a particular population (human or otherwise) that depends on these processes. Sustainability also seeks to consider the effects of each action on both individual citizens and society, at the local and global levels, for the short and long term. Moreover, sustainability aims to define how to design and manage processes while maintaining the conditions necessary for the existence of humans and the natural environment.

While a region, natural or artificial, defines a given space, regionality refers to actions taking place in the same area. These processes can be natural and environmental or social and economic, in a space that connects the localities, local authorities, and regional councils and crosses administrative boundaries. As such, the region is based on the functionality and existence of patterns of daily life. The concept of regionality, which divides large areas into smaller parts, is based primarily on the fact that everyone's quality of life is often derived from the level of local non-national services. Among these are education and health, but also community, a sense of belonging, and security. It describes a situation in which state and non-state entities cooperate and coordinate strategy within a given region, enabling them to advance common goals. It also encourages civic engagement, a combination

of top-down national resource distribution and bottom-up growth. The research activity in the regions seeks to observe broad systems of entire regions rather than focusing on closed structures of administration, economics, culture, or politics. This approach enables the state to establish policy based on regions, promote policy for regional development, allow political decentralization, and even regional autonomy (Keating, 2016; Börzel and Risse, 2016; Söderbaum, 2016).

The New Regionalism Paradigm, which has grown in recent decades in Europe, is based on a comprehensive regional-planning perspective, which promotes cooperation between communities in the region around the construction of the regional economy and its connection to the national and global economy, on the understanding that the move will lead to regional and national growth. This paradigm has been implemented over the past decade in EU regional policy; it holds that each region has the potential for economic growth if it can leverage its unique key productive industries (Savitch and Vogel, 2000; Ezekiel et al., 2018).

A disaster caused by natural or human activity (such as war or terrorism) is defined as an event that causes great damage, loss, destruction of property, human suffering, and injury to human life. Recovery in disaster-stricken areas focuses on the rehabilitation, development, and recovery of affected communities in terms of community planning, housing, economy, infrastructure and services, health (in particular mental health), natural resources, and culture. However, the effectiveness of medium-term recovery and long-term rehabilitation requires planning, management, and operation from a broad, integrative, and forward-looking perspective (Western Negev Cluster and Reut, 2018). Few studies and position papers published in the past year seek to discuss the rehabilitation of the Western Negev using this regional, inclusive approach, and aiming at social, economic, and environmental (i.e., sustainable) resilience (Yavelberg et al., 2024; Kaplan et al., 2024; Ezekiel, et al., 2018; Spatial Plan, n.d; Tal, 2021). This article focuses on proposing policies for the sustainable development of the Western Negev to better rebuild and strengthen it in preparation for dealing with future threats, while applying the regional concept.

What follows begins with a short review of the recent history of the Western Negev, and then a review of the steps taken to develop areas in the region prior to and following 7 October 2023. It also presents several regional-based principles that should be implemented for the development and prosperity of the entire region, together with examples that illustrate the implementation of these principles in the region.

THE WESTERN NEGEV: HISTORY AND SECURITY CHALLENGES

The Western Negev, located in the southern part of Israel, is an agricultural and tourist area covering about 2,500 square kilometers, with about 650,000 inhabitants, 85% of them in cities. It has played a significant role in the country's history and development. Originally a sparsely populated desert region, it became a focal point

for agricultural settlement during the British Mandate and the early years of the State of Israel. The establishment of kibbutzim and moshavim in the 1940s and 1950s was part of Israel's national strategy to populate and secure its periphery (Chaitin, et al., 2022).

The region's proximity to the Gaza Strip has shaped its demographic, economic, and security dynamics. The kibbutzim and moshavim established here, such as Nir Oz, Nahal Oz, and Be'eri, were founded as part of Israel's frontier settlement policy, aimed at maintaining a strong presence along the volatile border. Over the decades, the region developed into an agricultural hub, but its status as a security frontier remained dominant.

Since the early 2000s, the Western Negev has been at the heart of ongoing conflicts with Hamas, including five major wars: Operation Cast Lead (2008-2009) – A large-scale military operation following years of rocket attacks from Gaza; Operation Pillar of Defense (2012) – A response to intensified rocket fire from Hamas; Operation Protective Edge (2014) – A prolonged war that involved ground incursions and heavy bombardments; Operation Guardian of the Walls (2021) – A conflict triggered by tensions in Jerusalem, leading to heavy rocket barrages on Israeli communities; The 2023 War – The most devastating round of violence, resulting in extensive destruction, loss of life, and a profound humanitarian and strategic impact on the region.

The repeated wars and ongoing security threats have had profound impacts on the residents, economy, and infrastructure of the Western Negev (Efrat, 2005). While agricultural production and innovation have continued, the constant threat of rocket attacks, cross-border raids, and infiltration attempts have led to population fluctuations, economic instability, and significant trauma among residents (Stein, et al, 2018).

NEW RATIONALITY IN THE WESTERN NEGEV

Even before the 2023 war, the Israeli government prioritized the Western Negev for development and strategic investment. The rationale was to strengthen the region's resilience, encourage population growth, enhance local economies, and improve quality of life. In addition, strengthening this region was aimed at fortifying the security frontier, while investing in infrastructure, defensive systems, and emergency preparedness to mitigate future threats. Government programs have included the expansion of protected housing, improved early warning systems, and economic incentives for new residents and businesses.

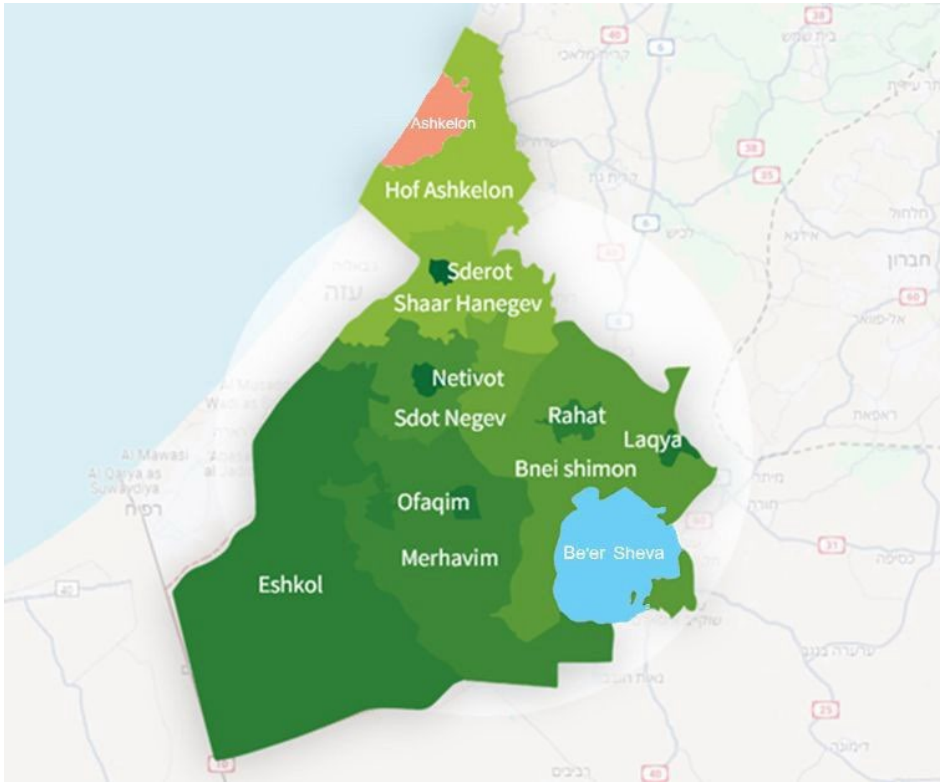
In 2013, the "cluster of the Western Negev" was established (see Figure 1) as part of the policy of the Ministry of Interior, the Ministry of Finance, and the Joint Israel organization, with the aim of promoting regional development and cooperation between the partner authorities on issues such as economic development as well as

aspects of education, welfare, and the environment. This cluster, which is based on the voluntary association of neighboring authorities, aims in improving the quality of life for residents, while optimizing and pooling resources, leading systemic initiatives, and promoting a comprehensive regional perspective on a variety of issues. The challenges envisaged during the formation of the new cluster include the region's periphery, the difficulty of attracting large robust businesses, the need to bridge traditional and innovative methods and models, and the need to differentiate and distinguish the region in terms of each of its growth levers.

In her article "New Regionality' in the Cluster of the Western Negev?" Tal (2021) notes that peripheral areas can benefit from the new multi-dimensional, multidisciplinary, inclusive regional paradigm that will open a variety of development options to them. Yet, realizing this potential is especially challenging because the peripheral areas suffer from structural challenges such as a lack of human capital, infrastructure, knowledge, and technologies, as well as difficulties in attracting investments. These include poor economic resources, difficulty in attracting investments, limited manpower (with negative immigration), lack of appeal for residential and business opportunities, limited professional knowledge, under-developed business infrastructure, and limited access to technologies. Tal also notes that the strategic plans developed in the Western Negev are mainly focused on economic rather than social and environmental issues, and on the physical infrastructure needed to advance the strategy, for example in transportation. Moreover, there is an inherent difficulty in developing several core branches simultaneously.

Although Ashkelon and Be'er Sheva are not included in the cluster of the Western Negev, both are key to the Western Negev area: 55% of the area's residents live in these cities, and they are both centers of government and the economy. Moreover, the concept of sustainability is based on a broad and comprehensive perspective with strong connections at the local, national, and even global levels. Thus, it is essential to include them in the rehabilitation and growth plan, and we did so (see Figure 1). The cluster is comprised of various localities and socio-economic groups – regional councils alongside rural and urban, as well as religious and secular Jewish and Bedouin cities and communities.

Figure 1: Western Negev municipalities



Source: Western Negev Cluster

PLANS AND BUDGETS

Before 7 October 2023

Since the establishment of the “cluster of the Western Negev” in 2013 and before October 7 2023, the government and cluster administration have prepared strategic plans, promoting existing infrastructure in the region, mainly in agriculture and tourism. In addition, the cluster administration has prepared a comprehensive plan for preparing for the climate crisis (Western Negev Cluster and Reut, 2018; Ezekiel et al., 2018; Prime Minister’s Office, 2023), and the government approved a resolution for the development of the Western Negev some months before the war (Prime Minister’s Office, 2023). Although these plans were developed from a regional perspective, the government plan was more general and lacked a strong regionality focus, whereas the cluster plan was more detailed and emphasized local collaborations. However, both plans primarily focused on socio-economic growth, with less consideration given to environmental aspects. In contrast, the strategic

plan for climate crisis adaptation incorporated spatial and networking projects that leverage climate and environmental solutions to support social well-being and economic prosperity. Summary of the three plans and the government resolution as well as their regionality and sustainability aspects are detailed below.

Government Resolution No. 2017: A Multi-year Strategic Plan for Growth and Development, 2014

In accordance with Government Resolution No. 2017 of 21 September 2014, the Ministry of Development of the Periphery, Negev and Galilee promoted a multi-year strategic plan for growth and development of settlements and residents within their territory. This was undertaken in cooperation with Eshkol, Hof Ashkelon, Sdot Negev, and Sha'ar HaNegev – the four regional councils of the Western Negev (TARA, 2018). The plan was submitted at the end of 2018 and includes three core issues:

Agro-technologies

The regional councils in the Western Negev have extensive knowledge and experience in the field of advanced agriculture and provide considerable agricultural produce for the whole of Israel. Combining the existing experience, knowledge, and tools will enable the Western Negev to become a leading global center in research and development of future agriculture, human-facing climate change, and resource shortages.

Tourism

The regional councils also combine many elements of “rural tourism”, plus an infrastructure of tourist and heritage sites that may serve to increase existing tourism volumes. In addition, the councils can provide some of the leisure culture for the nearby urban communities and even to capture a significant segment of tourism from elsewhere. Thus, the Western Negev can become a focal point for rural tourism in Israel and serve as an economic engine and branding tool for the entire region.

Growth Agreements to Strengthen Conditions of Competition

These agreements build on the trend of demographic growth in the region, while continuing to strengthen the population and create an optimal infrastructure for future economic development through government assistance.

The Social and Economic Leap Program in the Western Negev, 2018

In 2018, the cluster of the Western Negev, together with the Reut Institute, prepared a regional strategic plan titled Social-Economic Leap in the Western Negev (Western Negev Cluster and Reut, 2018). The program was based on a systemic approach that harnesses local authorities and leadership to focus on identifying the region's unique assets to transform them into growth engines for excellence at an international level; this, with the aim of leading to an increase in employment and productivity, and an improvement in the residents' quality of life. The plan identified three unique regional properties, which tell the story of the region as a pioneering and robust periphery: the ethos of settlement, relating to the founding stories of the inhabitants;

the combination of physical and human geography; and local resilience in the form of successful adaptation to threat or disaster. These three elements represent the Western Negev and its uniqueness. The four growth engines are as follows:

Advanced Desert Agriculture

The Western Negev is agricultural in nature, comprising about 44% of all the agricultural land in Israel. In this region, agriculture includes field crops, orchards, dairy farms, and chicken coops, and it provides about 50-70% of the vegetables consumed in the domestic market. In addition, over the years, the area has developed considerable knowledge and experience in sustainable agriculture, semi-arid agriculture, and agro-tech. The strategic plan has set a goal of meeting the national and global challenge to provide food security, and to make the Western Negev a leader in advanced agriculture, with the integration of independent farmers, agricultural companies, research and development and training institutions, startups, marketing companies, and more. In addition, the area will promote agricultural tourism, the values of sustainability, connection to land and nature, and a healthy lifestyle.

Reconstruction and Community Integration

Over the years, the Western Negev region has seen an accumulation of skills in community building, community resilience, crisis management, and expertise in physical rehabilitation and community integration. The strategic plan aims to make the region a leader in rehabilitation and community integration by combining independent therapists, private and public spaces for treatment, and academic and training institutions. It will serve as a beta site for examining technologies and models of treatment and resilience, and for the development of medicinal tourism.

Media Industry

Sapir College, an educational and cultural anchor for the development of the Negev in general and the Western Negev in particular, is an academic leader in Israel for media studies. There are also many other anchors in the area, such as the Sderot Cinematheque, the South Cinema Festival, and more. According to the strategic plan, the Western Negev will lead in fields of the media industry, including cinema, television, animation, gaming, digital communication, design, soundtrack, editing, production, and more. The plans include media production studios, photo studios, and among the best editing and post-editing studios in Israel and will attract artists from Israel and around the world due to the region's professionalism and the comfortable conditions it will offer.

Rahat as a Unique Metropolis

Rahat is the largest Bedouin city in the region, but it is not the main center for the Bedouin population of the Negev. According to the strategic plan, Rahat will be an urban center of consumerism, co-life projects, Bedouin culture, tourism, and a local and international model for maintaining traditions alongside renewal and shared life that engender pride in the Bedouin culture.

Strategic Plan for Climate Crisis Adaptation, 2022

This plan was formulated through a government initiative, which was part of a national endeavour to prepare local climate-change preparedness plans (Eshkol Regional Council, 2022). It includes proposals for a wide range of spatial and networking projects, both in terms of sustainable energy management (energy efficiency, solar energy production, clean transportation, sustainable waste, and agricultural conservation) and increased climate resilience (cooling of settlements, water management, increasing sustainable lifestyles, increasing climate resilience of ecosystems, and more).

Government Resolution 462 for the Development of the Western Negev, 2023

Over the years, the state has also prepared several plans for the development of the Western Negev region, in particular the settlements around the Gaza Strip; it even adopted a government decision in April 2023 centered on strengthening civilian resilience in the Western Negev (Prime Minister's Office, 2023). The government resolution aims at empowering the local residents and strengthening the community-support networks. In particular, it is concerned with strengthening education, empowering young people, and bolstering personal and community security. In addition, it is aimed at consolidating and developing the local and regional economy by advancing local and regional growth engines. Furthermore, it is focusing on supporting local government by strengthening its financial resilience, increasing the readiness of the Authority for Emergency and Development, and upgrading public space. The program includes: economic and social development, including the promotion of building and agricultural programs in the region and encouraging the transition to sustainable energy; investment in the treatment of municipal and agricultural waste and establishing additional waste facilities; rehabilitation, development, and accessibility of open spaces, in particular regulating and rehabilitating ecological functioning in the area of Nahal Shikma and the Besor River, including the removal and prevention of environmental hazards to ensure the functioning of open spaces for ecosystem services; constructing promenades and bicycle paths alongside the streams and creating a continuum of open spaces and ecological corridors; and treating sewage and water systems. However, the plan has not yet been implemented.

The two general strategic programs (A. and B. above) focus on condensing and strengthening existing anchors in agriculture and tourism while developing the region's uniqueness – for example focus on desert agriculture. However, while the Western Negev cluster plan is more comprehensive than the government plan, and involving various stakeholders at the national and global level, including academia, philanthropic foundations, venture capital funds, and more, both lack a strategic, interconnected, and cooperative approach to development. They do not sufficiently balance local needs with broader regional opportunities or establish channels for resources sharing and knowledge transfer to promote economic synergy across the entire region. Additionally, to enhance sustainability, the plans should integrate

connections between various growth engines, for instance, by developing unique agro-tech tourism—while also incorporating more sustainable foundations that enhance system effectiveness rather than just efficiency. This could include solutions for energy and transportation. Strengthening these elements would improve regional preparedness for economic downturns, natural disasters, and climate crises, ultimately fostering greater resilience. Finally, as alongside the strategic spatial plans, each council and locality in the region has independent strategic plans and development anchors, they should correspond with the general plans. For example, the city of Ofakim promotes an urban plan in agro-tech, which can be a center for research, development and training in the field, while the surrounding agriculture area can serve as a ‘sandbox’ for testing technologies before scaling them up for broader implementation.

After 7 October 2023

After 7 October 2023, the regional and national effort to rehabilitate and renew the Western Negev were dramatically intensified, with additional funding allocated to rebuilding damaged communities, supporting displaced populations, and reinforcing critical infrastructure. The government of Israel declared a new region, Tkuma, which includes 47 settlements that exist in area of seven km along the Gaza border that had been damaged following the outbreak of the war. On 19 October 2023 the Tkuma Administration, which lead the effort to rehabilitate the communities and for the revival of the entire region, was established. This organization comprises the heads of the following state divisions: construction and housing, economy and business, settlement liaison, people and community, and other officials whose job is to assist in planning, building, and promoting work programs. In April 2024, six months after its establishment, a budget was approved by government (decision no. 1699) that stands at 19 billion NIS (approx. US\$5.3 billion) for the years 2024-2028. Of this, 14.05 billion NIS have been allocated for the rehabilitation of the communities defined as part of the plan (Prime Minister’s Office, 2024a).

Monitoring the status of the projects in the area indicates that most of the budgets are directed at security issues, education and health, welfare and community, sports and religion (Prime Minister’s Office, 2024b). Few specific budgets have been allocated to environmental issues; the allocations that exist are invested mainly in rehabilitating damaged and small infrastructures. Based on the data above, Table 1 summarizes the expected investments.

Table 1: Budget for environmental initiatives within Tkuma's approved funding framework

Allocated Budgets	New Israeli Shekels (In millions)
Building climate and environmental resilience, including agricultural waste treatment	40
Encouraging reuse and reducing waste	4
Closing the Daya landfill site	4
Strengthening environmental counseling in the Association of Cities for Environmental Protection	2
Rehabilitation of streams	3
Establishment of open private spaces and forestry in Sderot	9
Rehabilitation of damaged transportation infrastructure	67
Expansion of Sderot's wastewater treatment facility	60
Upgrade of Holit's wastewater treatment facility	95
Preparation of a master plan for water and sewage	5
Total sum for 2024-2028	289

In December 2023, the Ministry of Environmental Protection presented a plan for environmental renewal and the rehabilitation of the “Tkuma¹ region” (Ministry of Environmental Protection, 2023), known as “Darom Yarok” (the green south). This region is also called “Darom Adom” (the red south) due to the fields of red anemones covering the area during wintertime. The title “green south” therefore symbolizes renovation and growth. The focus of the program is waste treatment, asbestos evacuation, and providing public accessibility to nature and the environment, including the evacuation of agricultural waste in the communities and along scenic roads, the treatment of construction waste and scrap damage, the establishment of waste sorting and treatment facilities, and the removal of hazardous asbestos. It also includes the restoration and cultivation of courtyards in Sderot, the installation of solar roofs, and the cultivation of urban nature sites in the city. Part of the plan's budget of 400 million New Israeli Shekels (NIS), around US\$125 million, comes from the existing Maintenance and Cleanliness Fund and other office budgets; more is expected to come from the budget of the Tkuma region administration. As evident from the two programs mentioned above, they are not sustainable. In addition, although they are designed for a specific region, they lack key aspects of regionality. The following principles are proposed to enhance the sustainability and regionality focus of the rehabilitation programs for the Western Negev.

PRINCIPLES FOR THE SUSTAINABLE DEVELOPMENT OF THE WESTERN NEGEV

Although security threats ranging from missiles to incendiary balloons have struck the Western Negev over many years, the area has flourished and prospered. However, the gaps between the cities and the kibbutzim and between Jewish and Arab communities have persisted, and the various regional plans alongside the government's great promises have been largely unrealized. The severe damage to the region from the attack on 7 October 2023 and thereafter, and the need for rehabilitation and renewal in social, economic and environmental terms, also provided a unique opportunity to combine the perception of new areas with the sustainability model, and to build the region again in a better and more robust way. Below are some of the principles we propose incorporating into future development to optimize the processes going forward.

Wide Regional Perception

Shortly after the 7 October 2023 attack, the State of Israel began to promote the development of the Tkuma zone, defined as extending up to seven kilometers from the Gaza Strip border, to strengthen national resilience and the security of the area's inhabitants, as well as to make it prosperous and attractive economically and socially. However, proper development, the renewal of buildings, infrastructure and services, building resilience and a thriving community life cannot be confined to an area of up to seven kilometers; *it must include the entire Western Negev region, including Ashkelon and Be'er Sheva*. Dividing the space into two areas with one extending up to seven kilometers from the border and the other beyond that mark, with differential investment in each, will create inequality and significantly impair the ability to promote the newly established administration's goal of turning the area into a magnet for quality population and diverse businesses.

Partnership With the Residents

Public participation is a process that involves different stakeholders from the general public in policy design, processes of decision-making, and implementation. Involving the public actively and fully with decisions and actions that will affect their lives and future is seen as a necessary part of the recovery and construction of communities. Concomitantly, public participation brings additional knowledge, a variety of opinions and ideas, helps identify obstacles and difficulties in advance, and promotes more informed and practical decisions. In addition, public participation also strengthens people's trust in their elected representatives and increases their commitment and responsibility to the process. In this case, the need for an active partnership and dialogue with the public is essential for rehabilitation, prosperity, and addressing aspects of mental health (Rowe and Frewer, 2000; Webler et al.,

2001). For example, in the rehabilitation process following the 2016 earthquake in Kaikoura, New Zealand, psychological and social welfare and public participation were found to be key to the success of the recovery process (Neeraj et al., 2021). However, public participation can also lead to a delay in implementing processes, and it is often difficult to choose who will participate. Moreover, it is important to remember that the various communities will have experienced severe trauma and therefore may not be free to participate in the rehabilitation process. Thus, it is important to create an effective path for public participation and promote it through elected officials and local community leaders.

Rebuild and Better

Recent studies have shown that areas affected by, or prone to, disasters also pose a significant threat to sustainable development. Therefore, over the years, various disaster-management strategies and models have been developed, including actions aimed not only at preventing or reducing the negative effects of the disasters, but also at preparing for future events (Zaychik et al., 2024; Coles and Buckle, 2004; Lloyd-Jones, 2006; Mannakkara et al., 2018). One of the most widely accepted approaches in the world today is the Build-Back-Better (BBB) approach to disaster recovery that reduces exposure to future disasters while building community resilience to cope with physical, social, environmental, and economic shocks. In the case of the Western Negev, community resilience must also specifically target mental resilience and personal security, so that risk reduction becomes a central part of any development and renewal activity. The BBB approach offers the opportunity to rebuild safer, disaster-resistant infrastructure and systems while building resilience in employment, economy, community, and environment (Alrehaili et al., 2022; UNDRR [UN Office for Disaster Risk Reduction], 2016). Therefore, the establishment of food, water, and energy security in the Western Negev should assess land, water, and energy resources efficiently and intelligently, for example by promoting solar energy production using agricultural land, or producing biogas from anaerobic and urban agricultural waste, as well as using recycled water. In recent years, various rehabilitation models based on BBB paradigms have been implemented and social and economic indicators of recovery have been developed (Coles and Buckle, 2004; Fernandez and Ahmed, 2019; Kim and Olshansky, 2014).

Nature-based Solutions

In recent years, the regional approach has intensified to build sustainable resilience, especially in disaster or war-ridden areas, and to prepare for future risks and disasters by implementing nature-based solutions, such as planting trees, building or improving parks, collecting, capturing and channeling rainwater, and more. These can provide good solutions in built-up areas, but at the same time it is important to ensure the restoration, maintenance, and improvement of open spaces,

ecosystems, and the diversity of species in them. Such areas can help build resilience through carbon fixation, heat reduction, rain conservation, and wind protection; additionally, they help reduce water and energy consumption, improve physical and mental well-being, and contribute to increasing social cohesion.

As well as the great importance of natural areas and open spaces in carbon fixation and storage, one of the new strategies in recent years for adapting to climate change is based on protecting and promoting the proliferation of ecosystems and the services they provide (ecosystem-based adaptation). For example, habitat protection provides natural flood protection, water bodies such as rivers and lakes provide natural drainage to reduce flooding, and reforestation can delay desertification processes.

Another strategy gaining momentum today is based on an ecosystem, disaster risk-reduction strategy, which includes a combination of approaches to natural resource management, or sustainable management of ecosystems, with disaster risk-reduction methods. Nature-based solutions are also included in this category. Thus, in the Western Negev region, comprehensive management of the water basin to reduce flood and flood risk and prevent desertification and land-erosion would be achieved by regulating flows, planting adapted forests, and more.

Advanced Concept of Public Health

In order to ensure economic, social, and environmental resilience and prepare for the ecological-climate crisis, and in tandem with restoration of the human environment, it is crucial to rehabilitate and enhance the natural environment, i.e., the open green areas and their biodiversity. These areas are essential because they provide nature and humanity with benefits in the form of ecosystem services and help create economic and social resilience (Ayalon et al., 2021). Natural areas are also essential for advancing a one-health approach that views health more broadly and is based on a combination of human, animal, and environmental health (Lederman and Verbinovitz, 2014). Therefore, alongside the construction of homes and infrastructure and the return of various services, the recovery and renewal of the Western Negev must promote the restoration of open areas from past damage, and from the extensive damage created by terrorist and combat activities in the wake of 7 October 2023. In addition, it is important to promote nature-based or integrated solutions, for example in the field of reducing greenhouse gas emissions and preparing for climate change. In this context, it is noteworthy that tourism in the Western Negev, which is a strategic economic anchor for the entire region, is largely based on open areas, including forests, streams, drainage basins, and wetlands. Therefore, promoting hiking and cycling trails and rural accommodation combined with nature – and guarding them – will leverage the region into a unique regional economic and tourist space.

Preparation for the Ecological-Climate Crisis

In addition to all the principles listed above, we must remember that the entire region, like the State of Israel and the rest of the world, must prepare for the ecological-climate crisis. Human activity has already caused significant damage to ecosystems and this crisis is now considered the greatest threat to life on earth (Elsner et al., 2025). It has serious implications for nature's ability to sustain processes and replenish resources, and therefore also for human health due to the resulting lack of available clean water, food, and air. The crisis also has far-reaching social and economic impacts, including damage to human life, property, agricultural crops, social order, increased violence and crime, economic performance, competitiveness, and the spread of disease, and more. Moreover, the State of Israel is expected to be more affected by the climate crisis due to its geographic location, and the Western Negev is expected to become hotter and drier thereby suffering desertification processes. Therefore, the programs proposed by the state in the Western Negev region must also promote the reduction of greenhouse gas emissions, for example by switching to renewable energy sources, public and electric transportation, proper waste management, and preparing for climate change. Adaptation will require, for example, plans to channel, and collect runoff water for managing floods, as well as urban planning and climate-adjusted construction.

Table 2 presents key environmental aspects of the principles enumerated in this article, which are part of the concept of achieving a holistic and durable environmental system by integrating all these factors we offer for the sustainable development of the Western Negev.

The aspects are a collection of many information sources and was adapted for the purposes of this article.

Table 2: Key environmental principles to promote resilience and completeness

Key principle	Short description
Decreasing the emission of greenhouse gases	Reducing carbon di-oxide and other greenhouse gas emissions to mitigate climate change
Strengthening climate resilience	Enhancing adaptive capacity to withstand climate-related shocks and stresses
Provision of water, clean air, and defense against their degradation	Ensuring access to clean resources and preventing environmental pollution
Establishment and reinforcement of sustainable infrastructure	Developing resilient and eco-friendly infrastructure to support long-term sustainability
Preservation of biodiversity and maintaining natural ecosystems	Protecting natural habitats and promoting ecological balance

Environmental innovation based on behavioral change	Encouraging sustainable practices through education, policies, and incentives
Food security and sustainable agriculture	Ensuring reliable food production while minimizing environmental impact
Improved supply chains and advancing a circular economy	Optimizing resource use and reducing waste through sustainable business models

POSSIBLE IMPLEMENTATION OF THE PRINCIPLES

The following are some examples that illustrate the importance of regional planning and development with the attendant integrated economic, social, and environmental aspects. The examples do not include techno-economic analysis or detailed planning, but rather a general outline of the need for a comprehensive spatial perspective. They were organized into three groups: A) Those that are more general and applicable everywhere, B) Those that emphasize the regional aspect, and C.) Those that are unique to the Western Negev region. But all were enriched with examples relevant to the Western Negev.

Transportation

The development of public and electric transportation requires an infrastructure of roads and railways with continuous electric charging among the communities around Tkuma, as well as between them and the communities of the Western Negev (in particular the Sderot, Ofakim, Ashkelon, and Be'er Sheva railway stations), and between these and communities throughout the country.

Power

This includes the expansion of energy production volumes from renewable sources (the sun) and the establishment of a microgrid (Abbasi et al., 2023, 484) – an autonomous system that generates the electricity it consumes in a relatively small area, and includes independent storage and management systems connected to the central network only for emergency backup. It also requires a smart grid (Orumwense and Abo-Al-Ez, 2023) – a network that combines intelligent and tailored management of production and demand through technologies of measurement, control, and communication. In the Western Negev, these systems should be deployed on a sufficient scale (both in the construction of dual solar systems – on roofs or in agricultural fields, both in micro networks), in order to enable proper operation and maximum efficiency. The network will connect manufacturers and consumers with various facilities in a fast two-way manner and will enable an efficient adjustment between consumption and production, and will also take electricity to consumers northwards.

Water and Sewage

Development and maintenance of the water and sewage supply infrastructure and its treatment is essentially spatial. Investments, monitoring, and regulation cannot be confined within seven kilometers, as the advantage provided by size requires large, centralized treatment facilities. In addition, the treatment of the drainage must include an integrated and broad basin vision, which cannot be treated specifically.

Waste

The management of household and agricultural waste in the area requires spatial vision, both in the efficient economic and environmental disposal of waste, and in promoting local-end solutions, such as an anaerobic digestive facility, an energy production facility, a site for treating building waste, a landfill site, and more.

Air Pollution

Air pollution is one of the main causes of mortality and morbidity in Israel. The long-term reduction of air pollution requires regulation, supervision, and enforcement relevant to the Western Negev and the entire country.

Mental and Communal Resilience

Victims of the 7 October 2023 disaster also live beyond the seven-kilometer border, together with many other communities whose residents have been evacuated from their homes. Trauma and evacuation have also resulted in a rupture from jobs, education, social frameworks, and recreation (sports, extracurricular activities). Among the injured and evacuated, there are many who work in the center of the country, and the trauma they experienced has had a rippling effect among the cities in which they are now living. Among the evacuees are many children who have been absorbed into education and leisure systems far from their places of residence. Emotional and community support should therefore be provided well beyond the seven-kilometers limit.

Local Economy

A sustainable economy and economic resilience must be established in the Western Negev. This requires strengthening the local economy and creating a network of factories and small, medium and large businesses in the fields of agriculture, tourism, production, and services, and providing quality employment for all the residents of the area. (See the principles of regional development in the framework of industrial 4.0 development, Zonnenshain et al., 2020).

Polluted Soils

Due to military activity in the Western Negev, the land contaminated with explosives and fuel, and damage caused by tanks and other heavy-duty vehicles must be treated. Untreated pollution will result in pollutants leaking from untreated to treated areas, and will harm groundwater, local agriculture, infrastructure, and more.

Open Spaces

The preservation of open spaces and biodiversity is essential, as they provide benefit to nature and humanity in the form of ecosystem services. They are also of central importance in creating resilience, physical and mental health, and for advancing a one-health approach.

Advanced Agriculture

The region should be turned into a center demonstrating knowledge and implementation in the fields of precision agriculture and agro-tech, so that local agriculture can be promoted, and innovation can be advanced to a global level. Moreover, sustainable agriculture uses technological means to ensure that water, pesticide, and fertilizer use is accurate and efficient, so it combines machinery and other technological means to increase yields with minimal inputs and emissions to the environment (for example, a combination of automatic drip and robots and various sensing methods in the soil), and to increase the efficiency of resource use. In this case, too, limiting the area to seven kilometers will not advance the overarching goal of demonstrating and implementing sustainable and accurate farming practices in the region.

Tourism

The Western Negev region can become a unique tourist area, a regional economic landscape based largely on open areas such as forests, streams, and wetlands, as well as hiking and cycling trails and rural accommodation that are both integrated into and protected by nature. At the same time, it is important to promote measures that will ensure that tourism, known as wasteful and with a high ecological footprint, is sustainable, adaptable to the region and considers the values of nature and the needs of the host communities (Streimikiene et al., 2021).

CONCLUSION

A national policy for the rehabilitation of the Western Negev through strategic planning based on the principles of sustainability is necessary to strengthen security and resilience in the affected area and across the entire country. Currently, despite an “allocated” budget for the rehabilitation of the Western Negev, much of the

funding has been directed toward addressing immediate security concerns rather than building long-term capacity. These resources have primarily filled gaps in physical and social security, leaving critical investments in sustainable infrastructure, environmental restoration, and community resilience largely unaddressed.

The programs should be implemented to bring prosperity to the region, provided they are based on broad regional thinking that integrates local communities and their local leadership from the outset and aligns existing knowledge with their needs and aspirations. Planning should rely on existing strategic plans for the area that can be developed and executed, connecting the area's various communities with infrastructure and services. In addition, regional-based sustainable planning and development should be promoted, relating not only to the infrastructure but also to the unique qualities of the entire region while effectively consolidating resources. This will help generate economic, social, and environmental cooperation, increase the efficiency and benefits of the processes, and leverage the entire Western Negev cluster. The decisions that will be made should be based on established scientific knowledge but must also be applicable and realistic. Beyond the current needs, it is also important to include the needs and infrastructure for dealing with the climate crisis, including the intelligent maintenance and development of open spaces, the creation of sustainable energy networks, water systems, food, agriculture, and more. Only a policy based on the combination of science, good planning, and realistic budgets will allow the region not only to recover, but also to grow and thrive.

NOTE

- 1 Tkuma means revival.

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