International Journal of Scholarly
Research and Reviews
Journal homepage: https://srrjournals.com/ijsrr/
ISSN: 2961-3299 (Online)

(REVIEW ARTICLE)

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Sustainable Eco-village for the Displaced Community of Hatay, Turkey

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International Journal of Scholarly Research and Reviews, 2023, 02(02), 054–072

Publication history: Received on 09 April 2023; revised on 17 May 2023; accepted on 20 May 2023

Article DOI: https://doi.org/10.56781/ijsrr.2023.2.2.0034

Abstract

Recent earthquake outbreaks and refugee crisis in southern Turkey demands more wholesome and considerate approaches in built environment design more so than ever for the country. Sustainability has been a subject of concern in various levels of our society. Many times, urban design overlooks the unusual and rich achievements of Ecovillages. Ecovillage offers the society an orderly, recyclable and sustainable life on contrary to polluted hectic city life. Overconsumption is replaced by underconsumption and self-consumption. Adobe is used as an alternative sustainable material for this proposal. Qualitative case studies on different eco villages, adobe city and sustainable urban projects are made. This paper discuss how sustainable architecture can facilitate the displaced people by proposing Eco-Village design in Hatay region of Turkey.

Keywords: Eco Village Design for Displaced Community; Adobe Design for Displaced Community; Sustainable Architecture; Eco Village; Design for Hatay

1 Introduction

The main philosophy of Ecological village is 'man's return to nature from crowded, difficult, concrete cities' or to soil' (Eryildiz & Eryildiz, 2022) .

Increasing population, traffic, building density, air and environmental pollution, decrease in living species, increase in carbon rates, decrease in natural resources, toxication and increasingly unhealthy living conditions in today's cities and metropolises disrupt the ecological balance and destroy the unique dynamics of the natural environment. It causes alienation from the environment in which people live. However, nature is the context of human beings since its existence is the essence of our being. There are future visions that emerged as a reaction to all these conditions and the sustainable development discussions. The desire to rebuild the ties between man and nature have led to the search for new life codes and the emergence of ecovillages as a solution.

Cities are serious consumers, and in this context, they have serious effects on their environment and even on the entire planet. When designing cities (from scratch or re-design), importance should be given to the integration of ecology and its systems with the built environment, and the strong natural cycle between them, taking into account the social structure. Many methods such as permaculture, ecological architecture, green production, alternative energy and community building practices are used. Policies and strategies should be developed to establish principles regarding sustainable quality of life in eco-villages. Wheels' 9 basic working areas for sustainable planning;

- Compact, balanced land use,
- Vehicle use and easy access,
- Rational use of resources, reduction of waste, prevention of environmental pollution,

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- Restoration of natural systems,
- Good housing and living environment,
- Healthy social ecology,
- Sustainable economy,
- Public participation,
- Protection of local culture and social values

Global Ecovillages Network-Global Ecovillage Network-GEN was established in 1995 after the 2nd Habitat meeting organized by the United Nations in Istanbul. The process from the 1960s to the 1990s was spent with the establishment of the first ecovillages and the creation of the first ecological symbiosis communities. When globalization knocked on our door in the 1990s, it was time to organize around the world and transfer knowledge to future generations. The Global Ecovillage Network (GEN), which manages the communication network of eco-villages around the world, was established with this understanding. The first steps of GEN were taken by GaiaTrust, founded by Hildur and Ross Jackson in Denmark. The first spark was that the Gaia Foundation commissioned Robert and Diane Gilman a report on sustainable communities.

Ecovillages have the characteristics Conscious Community Movements. The unity, solidarity and opposition to war have direct reflections in these communities. Conscious communities mean communities that share common values and develop cooperation towards this. Bill Metcalf, who is known for his work on community life, defines 'conscious communities' as people who prefer to live close enough or close to each other in a common lifestyle, a common culture and for a common purpose. "A group of people who have come together to work together in pursuit of a common ideal or vision. Most, if not all, share land or residences. Conscious communities come in all shapes and sizes and show an incredible diversity in their shared values. This diversity manifests itself socially, economically, spiritually, politically or ecologically. Some are rural, some are urban, some household members live in a single residence, some may be in separate households (...), some are secular, some are spiritually based, and some contain both."

2 Literature Review

2.1 Sustainable Architecture and Eco Villages

Sustainable development is defined "to afford today's needs without making concessions from opportunity of affording future generations' own needs" by United Nations Brundtland Common Future Report.

(Eryildiz, 2008) noted that Norwegian philosopher Arne Næss divides ecological actions into two:

- **Shallow ecology movements**: Only deals with pollution and consumption of sources. Its main aim is to protect health and comfort of developed countries societies.
- **Deep ecology movements**: accepts human as a part of nature. It defenses not bio-global equality, variety and living together (either you or me, live and make it live instead), strikes against class system, complexity of organism (not its chaos), but it defenses local autonomy and decentralization with a war against pollution and consumption of sources; it does defense them in the same importance level.

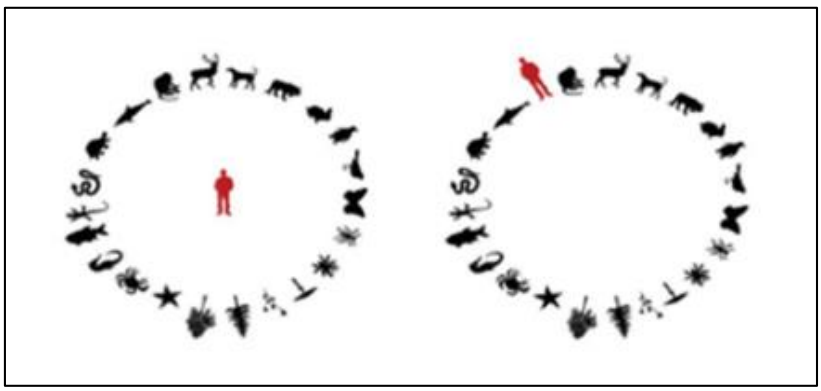

Figure 1 Relationship between human nature - https://www.macerita.com/blog/derin-ekoloji-cevre-odakli-bir-dunya-algisi

Sustainable architecture refers to the practice of designing buildings and structures that minimize their impact on the environment and promote sustainable living. It involves the use of energy-efficient and eco-friendly building materials, as well as the implementation of innovative design strategies that reduce energy consumption and waste. Sustainable architecture also takes into consideration the building's lifecycle, from construction to demolition, and strives to create structures that are durable and long-lasting, reducing the need for replacement and minimizing waste. Overall, the goal of sustainable architecture is to create buildings that are not only aesthetically pleasing and functional but also socially and environmentally responsible.

The "Wheel of Sustainability" was developed as part of the research at RIC by Felix Wagner and Sandra Mende. It is intended to help illustrate the elements and the dynamics of a culture of sustainability and thereby give guidance for the societal organizational process, which includes reflection, negotiation, implementation, and evaluation. (Andreas & Wagner, 2012)

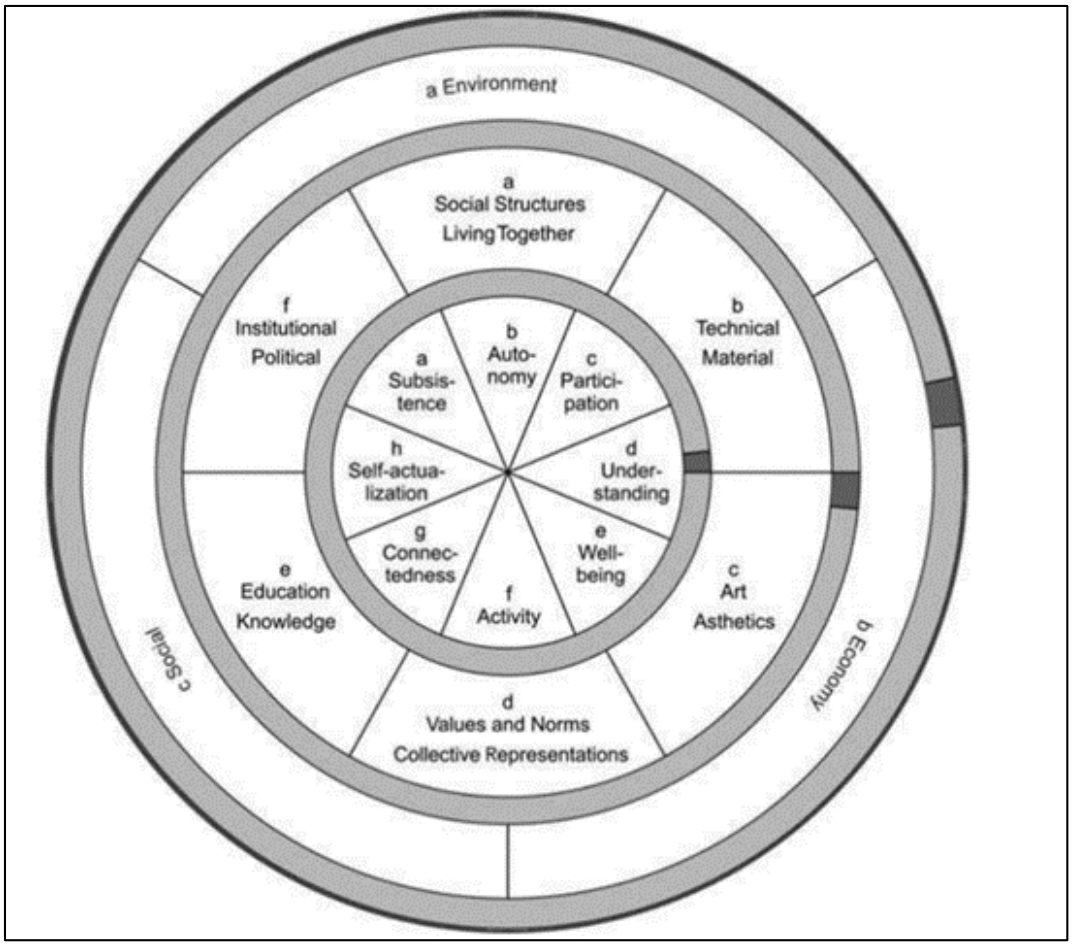

Figure 2 Conceptualization of the Wheel of Sustainability developed by Felix Wagner and Sandra Mende

Although across cultures there can be different expectations of what houses should provide, across the multiple case studies (Andreas & Wagner, 2012) have researched there were some commonalities in what people wanted houses to be in eco-villages; these included aesthetically pleasing; comfortable and offering convenient facilities (water, bathrooms, heat, refrigeration); solid and long-lasting; cheap and easy to maintain; financially secure; spacious and flexible in function; private; and a place worthy of investing emotion, time, and money.

According to (Kuruoğlu et al., 2021), Eco-Villages are grouped under three categories according to their characteristics; population and distance, design philosophy, and community type.

(Takeuchi, Namiki, & Tanaka, 1998; Jackson & Svensson, 2002; Meijering et al. 2007).

Table 1 Eco-villages formed according to population and distance (adapted from Takeuchi et al., 1998)

	Urban Fringe	**Rural Fringe**	**Natural Area**
Population Density	Population Density 100 persons/ha	Population Density 10 persons/ha	Population Density 1 persons/ha
Total Population	10,000 - 60 villagers	1000	100 - 60 villagers 40 visitors
Land Use	70 ha rural land use (20 ha hobby gardens) 30ha residential area Sharing between villagers and urbanites is important Direct	90 ha rural land use 10 ha residential area Ecological network	99 ha rural land use 1 ha residential area Protection of natural areas
Characteristic	Direct interaction between urban and rural components	Ecological corridors	High communication links Long-term accommodation

Figure 3 Sustainability dimension in ecovillage design education (EDE) (URL 3, 2019)

2.1.1 Ecologic dimension

Ecovillages create work where people live, produce fresh local foods and allow for a diversity of recreational and creative activities, all within walking distance, resulting in a higher quality of life while using fewer resources. (Jackson, 2004) noted that Crystal Waters in Australia and Earthhaven in the USA as particularly successful with the ecological motive. Both are global leaders in permaculture techniques. Crystal Waters transformed itself from a dry and desolate wasteland into a beautiful paradise of high trees and beautiful ponds and swimming holes in less than twenty years.

According to (Mahlabani et al., n.d.), some of the important points to consider are energy storage, waste recycle with emphasis on recycle for low effect on environment, using water treatment plants and using some methods of design to produce food products and establishing ecological buildings.

- Developing organic food in community of region
- Establishing houses by natural and local materials by local architecture tradition
- Using renewable energy system with local focus
- Evaluation of biological cycle of products and activity
- Protection of water, air and soil health via correct energy management and avoiding resources and energy waste
- Encouraging bio-diversity and protection of natural non-residential areas
- Recycle of waste and creating a self-refining system

2.1.2 Social dimension

In traditional political thinking, social networks are not usually seen as an important aspect of sustainability. But the social dimension is definitely critical. According to (Jackson, 2004), Ecovillages create holistic social models for an alternative to the destructive trends of our fragmented modern society. The elderlies, handicapped, unemployed and other marginalized groups have a say in decision making and can all participate actively in the community. It is possible that Ecovillages may be the only way to keep the welfare state alive in the long run. (Mahlabani et al., n.d.) listed following characteristics to consider in building Ecovillages.

- Maintaining one's identity
- Learning how to take correct decisions and resolving disputes
- Dividing common resources and providing mutual support
- Emphasis on preventive healthy methods
- Providing useful work for all members
- Providing a complete life for children, elderly and minority group
- Promoting permanent education
- Encouraging to unity and respecting the differences
- Development of cultural manifestations
- Social capital, identity and social consistency

Eco-village economy is planned as a social and family life is supported with saving in financial needs.

- Self-reliant economy
- Ecologic or green economy
- Entrepreneurship
- Local production, regional to global market
- Alternative banks
- Local income production

2.1.3 Cultural/spiritual dimension

Eco-villages are inclined to renovate and find new cultural manifestations via communication of human being and nature and the world. They try to live a new worldview of global interconnectedness and solidarity. Within GEN, spiritual and religious diversity is seen as a blessing and not as a problem. Members of eco-village see Buddhists, Muslims, Hindus, Christians and Jews coexisting happily with each other and with other lesser-known spiritual traditions, not to mention atheists. They meditate and celebrate together with total mutual respect as they learn from each other without any problems. (Jackson, 2004) stated that one of the favorite pastimes at GEN meetings is learning new circle dances from different cultures. Ecovillage Living is a simple, mindful life, which is possible for everyone on the planet.

Culture and spirituality in eco-village are shown as:

- Development of happiness via religious rituals and the festivals following natural cycle
- Emphasis on creativity and art as the manifestation of unity
- Expressing a spiritual worldview by global relationship
- Respecting the ecological rules
- Respecting the spiritual statements by various methods
- Respecting the manifestation of different cultures
- Facilitation of individual growth and correct spiritual tradition
- Reliance on variety

3 Eco Villages in Turkey

The eco-village initiatives in Turkey in the later periods are generally regarded as small-scale businesses. Today they are generally agriculture-and-tourism-oriented farms which produce agricultural products and distribute products all over Turkey and which function as tourist destinations with guest houses. Large-scale eco-village initiatives, on the other hand, have not been successful due to factors such as insufficient equipment and poor adaptation of newcomers to rural life (Kuruoğlu et al., 2021).

Figure 4 The regional distribution of ecological settlement initiatives in Turkey prepared by Kuruoğlu, 2021

Table 2 Eco-villages' features in Turkey prepared by (Kuruoğlu, 2021)

Name of Eco Villages	Architectural Approach	Housing Type	Building Parts	Construction Materials	Type of Energy
Güneşköy Eco-Village	Vernacular / Innovative		Meeting Area/ Greenhouse	Masonry/ Straw Bale	Solar/ Greenhouse
Dedetepe Ecological Life Farm	Vernacular / Innovative	Log Houses/ Nomad Tent	Houses (5)/ Meeting Area/ Nomad Tent/ School Bath/ Dining Hall/ Toilet/ Market	Wood	Solar/ Wind
Çamtepe Ecological Life Center	Vernacular / Innovative	Shared Housing	Shared Housing (1)/ Kitchen Area	Adobe Stone/ Reed	A central system established by distributing the water heated by wood to the radiators
Eko-Foça Eco-Village	Vernacular	Village Houses	Houses (3 blocks/in total 9 pieces)/ Meeting Area	Stone/ Half-Timbered/ Masonry/ Wood	Solar Energy
Marmariç	Vernacular /	Stone Houses /	Meeting Area/	Slate Stone/	Only houses are heated with

Eco-Settlement	Innovative	Wood Bungalows	Old School Building/ Old Public Housing/ Bungalows (4)	Wood/ Earth Plaster	solar panels. Prity, the stove system produced in Bulgaria, is used to heat the spaces. The heat generated by the radiators is dissipated.
Dutlar Collective House	Vernacular	Shared Housing	Shared Housing/ Common Area/ Dining Hall	Straw Bale/ Wood/ Masonry	An energy system created with solar panels and bicycles.

4 Case Studies

4.1 Toranomon-Azabudai Project, Tokyo, Japan

This project is a balance between urban and nature. 'Mori Building' plans to build an 8.1-hectare eco-friendly space that will soon become an immense hub connecting three super high-rise towers with a total floor area of approximately 860,000 square meters, and commercial facilities in the lower levels overflowing with greenery. The planned usage configuration includes offices, residential units, commercial facilities, a hotel, cultural facilities, and an international school. Planners are aiming for the entire sector to be powered by 100-percent renewable energy (Ruide, 2019) A city-within-a-city full of greenery will be built with the concept of *"Modern Urban Village" - a huge open space filled with lush greenery, bringing people closer together* (MORI, 2023)

The two core elements of this "Modern Urban Village" are "Greenery" and "Wellness". (Mori Living, 2023) stated that diversity of people gather to form a new community where people can connect and inspire each other in an environment full of overwhelming greenery and in harmony with nature.

4.1.1 Sustainable Awards

In 2021, the Azabudai Hills received top Platinum-level precertification of LEED ND (Neighborhood Development, v.4), the prestigious rating system that evaluates cities. This project was also precertified for the Platinum-level BD+C (Building & Design/Core and Shell Development) rating in 2022, targeting environmentally friendly and efficient green buildings. The envisioned awarding of final Platinum-level certifications under both LEED ND and LEED BD+C (CS) could be the first two cases among major projects worldwide. The project also aims to receive CASBEE-WO (Wellness Office), a new rating system of CASBEE. (MORI, 2023)

4.1.2 Design

It is designed by 'Heatherwick Studio' and lead architects are shown in figure 7. Working with a complicated, irregular-shaped plot spanning more than eight hectares, the studio has sought to bring harmony and to create a distinctive identity that is particular to Tokyo. The team devised a pergola-like system scaled up to district proportions to organize and unify many different elements of various sizes. In this way, the design allows for significant green space both at ground level and climbing up the podium buildings, without sacrificing connectivity to the ground. Echoing the natural forms of the project's valley setting, the undulating structure rises like a gently sloping hillside before puncturing the ground to allow natural light to pour deep into the basement retail zones.

Traditional Japanese crafts have also been referenced such as the Edo kiriko glass etching technique to ensure the project feels distinctively Tokyo from even the smallest, human-scale details (Architizer, 2023a).

Figure 5 Architects of Toranomon-Azabudai Project

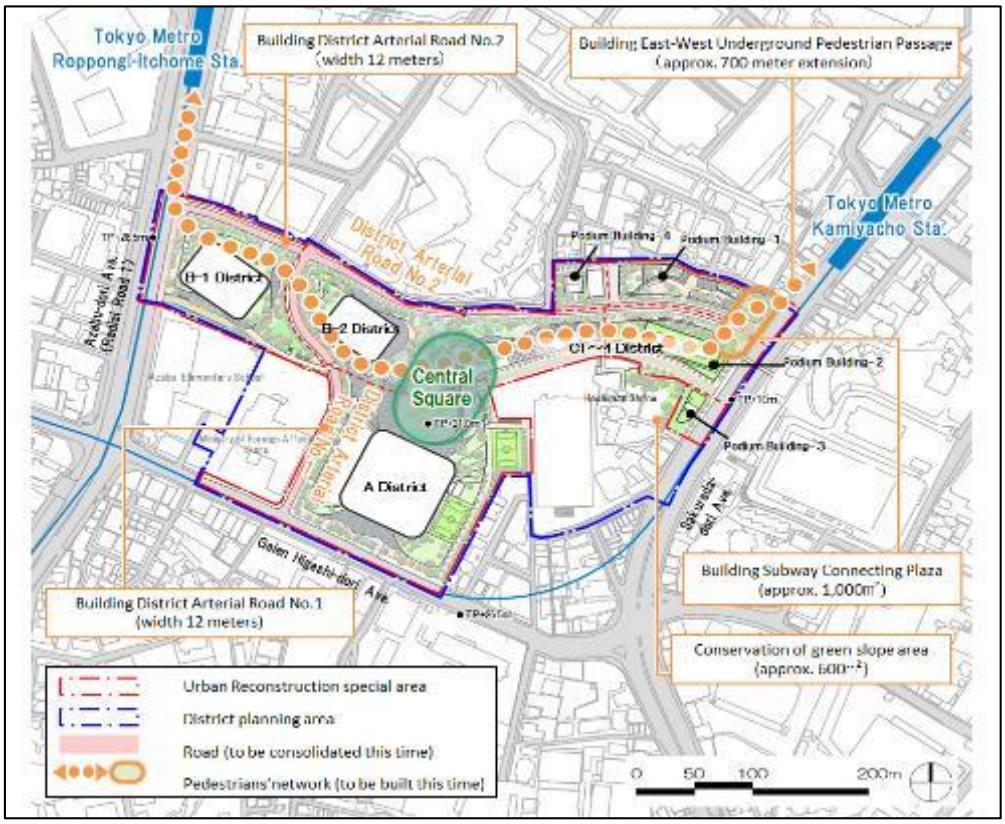

Figure 6 Site Plan of Toranomon-Azabudai Project (www.mori.co.jp)

Figure 7 Toranomon Azabudai project, Urban Eco Village, Tokyo - retrieved from (http://sonranews24.com/)

Figure 8 Toranomon Azabudai project, Urban Eco Village, Tokyo - retrieved from (http://moriliving.com/)

5 Auroville, India - The Eco-City

Auroville is currently the largest existing eco-city attempt in the world with a goal to realize human unity. A mission statement from the founder of Auroville, Mirra Alfassa, describes the universal town as a place where a variety of men and women are able to live in peace and progressive harmony above all creeds, all politics and all nationalities. Auroville has the highest concentration of alternative and appropriate energy systems in India. This includes the strong use of solar, wind and biogas generating systems to create a climate-friendly community (Angell, 2021).

Auroville was named after Sri Aurobindo, one of the famous independence figures of India, and dedicated to achieving human unity and international understanding. Auroville was inaugurated 10 kilometers (6.2 miles) north of Pondicherry on a barren wasteland with the participation of 5,000 people from 125 countries and all Indian states, each of whom brought a handful of earth from their homeland to a marble- clad lotus-bud shaped urn that still stands at the center of this planned city. (Kundoo, 2007)

5.1 Art and Culture Facilities

Auroville has developed an extraordinary cultural scene that is quite remarkable. With art, music and dance being essential to human survival, development, and happiness, the implementation of theaters, concert venues, and art centers create an individual and collective identity to the residents that strengthen the overall bio-culture.

5.2 Educational Facilities

With a goal to provide continuing education and a strong system to nurture the children's potential to its highest possible level, the community uses a "free choice" educational technique and facilities to introduce the concept of a life-long process of development towards a person balanced in body, mind and spirit.

5.3 Environmental Regeneration

A wasteland reclamation and reforestation work has transformed the landscape from a near barren state to a lush green environment.

5.4 Heath and Healing Facilities

Facilities housing health care amenities such as allopathy, homeopathy, acupuncture, chiropody, massage, etc., has proven to increase residents' overall comfort, mood and productivity on any given day. An implementation of many exercise and meditation facilities are also included within the city.

5.5 Innovative Building Technologies

Auroville implements several innovative, appropriate and cost-effective building technologies, especially earth construction and ferro-cement.

5.6 Organic Farming

The development of an ecologically sound agriculture to reverse the previous use of dangerous chemicals and inputs in the form of fertilizers and poisonous pesticides. Further training programs for the farmers of Auroville are organized regularly to introduce sustainable agriculture practices throughout the bio-region.

5.7 Renewable Energy

The major forms of renewable energy used at Auroville include solar, wind and biomass. Over 1,200 solar photovoltaic panels, 30 windmills, and ferro-cement bio gas systems are implemented within the Eco-City. A research facility is also on-site to further investigate renewable energy strategies and techniques.

Figure 9 Auroville, 1971- Matrimandir, a space for concentration, is located at the center of the city

Figure 10 Roger Anger's Sanskrit School, Auroville, 1971. Here, free-flowing spaces held by free-flowing playful forms were realized while experimenting with ferrocement technology that permits almost any shape

Figure 11 Fabian Ostner's House for Klara, Auroville, 2003 A hybrid and structurally challenging building, this house attempts to create interesting and aesthetic living spaces within a flexible steel structure using industrial materials not commonly found in India

6 Ithaca Ecovillage, New York, U.S.A

Ecovillage at Ithaca (EVI) is an intentional community on 175 acres (70.8 hectares) of land two miles (1.2 km) west of Ithaca, in the Finger Lakes region of Upstate New York, USA. Currently one hundred adults and 60 children live in 60 houses in two neighborhoods, each organized as a cohousing cooperative with its own by-laws, common house, and self-management procedures. (Andreas & Wagner, 2012) claimed that EVI is one of the best-studied ecovillages in the world.

6.1 The Degree of Sustainability

The Ecovillage at Ithaca mission statement reads as: "To promote experiential learning about ways of meeting human needs for shelter, food, energy, livelihood, and social connectedness that are aligned with the long-term health and viability of Earth and all its inhabitants."

6.2 The Nature of Community Life

As an intentional community, EVI attracted a number of political activists and idealists who saw closer community ties as an end in themselves. Community solidarity can also influence environmental variables in at least two ways. Firstly, closer community ties can function to partly replace the materialistic addiction to products as a means of life satisfaction. Secondly, solidarity can lead to community practices that directly lessen the footprint. For example, the two on-site organic farms and the winter root vegetable cooperative reduce total community travel to supermarkets.

7 Lynedoch Ecovillage, South Africa

The sustainability approach of the village is born out of an understanding that sustainable living is only fully possible when social justice issues are adequately addressed (*The Lynedoch Eco Village*, 2023).

A number of adobe brick homes have been erected for staff members of the Sustainability Institute and the Lynedoch community. Adobe bricks were made on site using a single hand hold form and then cured for a few weeks on the premises. Adobe soils contain a mixture of clay, silt, sand and aggregate. Clay provides the glue which holds the bricks together. It is important that they should be dry, hard and crack-free (Roux & Alexander, 2007).

Adobe bricks have the capacity to absorb, store and release solar heat, i.e., thermal mass, though their thermal capacity is much lower than that of clay-fired bricks or concrete. The walls were built on a concrete foundation and set on a two-brick pre-wall to protect the adobe bricks from moisture damage (damp). The external walls were also protected by a lime and clay mix plaster. Insulated wooden ceiling were installed, and corrugated roof cladding. Vines and trees can be grown to protect them from driving rains. Vine overhangs also provide shading from the sun on north-facing windows during the summer months.

Insulation can include building cavity walls filled in with materials such as mineral wools, strawboard, wood, glass fiber, and cellulose fiber or recycled carpet under felt as used in the Stonehouse project.

However, insulation is only really necessary in the colder climate regions of Northern Europe and America (Roaf, S et al. 2003). In South Africa's low-cost housing sector, the only issue is to provide ceilings with proper insulation in order to reduce the thermal comfort of tin-roofed matchbox RDP houses (The envelope effect).

Figure 32 Adobe brick homes in Lynedoch Eco Village - Photo by Pierre Roux

Adobe is a truly natural building material, and because the bricks are often made by hand on site, energy use is minimal.

The Tlholego Development Project near Rustenburg in the North West Province is a sustainable ecovillage described in Building without Borders by Joseph Kennedy (2004). The building system used is locally manufactured mud-brick walls built on concrete block and stone foundations. The walls were rubbed down with water to reduce cracks and then coated with linseed oil and turpentine for weather resistance. Insulated timber ceilings were installed, with corrugated iron roofs. Passive solar techniques were used like solar orientation, thermal mass and overhangs. (Roux & Alexander, 2007)

8 ReGen Villages, Almere, Netherlands

A Danish studio EFFEKT designed their own modernized, tech-integrated and regenerative sustainable village. The founder of RenGen Villages James Ehrlich, describes his brand as "engineering and facilitating the development of off-grid, integrated and resilient neighborhoods that empower and feed self-reliant families around the world." The village, called RenGen Villages, are home of several buildings with attached greenhouse structures that produce all their own food as well as an integration of sustainable techniques to produce their own energy. This project was developed as a conceptual community to show what can be done with technology that already exists by combining architecture and science. The project then pushed the start of the sustainable community in Almere, the Netherlands. The projects typology will sit in a rural setting in various locations with averaging 100 homes a site.

8.1 Energy Power Homes

RenGen's design showcases energy positive homes. Energy power homes are zero energy residential structures that produce more energy than consumed to leave extra energy to use in other ways. This strategy works well for communities who share energy. An implementation of solar panels throughout the site are used to convert sunlight into electricity. Energy is stored from these panels as well as other energy absorbing techniques to power the individual home as well as leave extra energy for community use. Overall, the community produces more energy than it consumes.

8.2 Waste-to-resource systems

The use of waste as an input material creates usable products as an output material. Composting, a biological process where bacteria and insects break down organic materials, is one technique used in the design as a natural was of returning needed nutrients to the soil.

8.3 Passive Heating and Cooling Systems

Design techniques for passive heating and cooling manage the interior temperature and air quality of each individual home. The design allows for a pressure difference between the indoor and outdoor air to reduce unwanted heat gain during the day. (Architizer, 2023b)

Figure 43 ReGen Villages - www.architizer.com

Figure 54 ReGen Villages - www.architizer.com

Figure 65 ReGen Villages - www.architizer.com

9 Shibam (Yemen)

Shibam is a dense fabric built completely of earthen tower houses of mostly six floors, a unique architecture that originated (according to all indications) in South Arabian civilization. (Leiermann, 2021) claimed that mud brick is the appropriate building material in Wadi Hadramout, where the climate is extremely hot and arid and the desert stone is so hard that its use is traditionally limited to foundations. However, the main structural problem in Shibam, however, is the modern sewage and drinking water infrastructure. The introduction of drinking water and sewage pipes to the city, in which water access and drainage were organized by wells and water pipes for centuries, created a permanent risk for humidity in the ground and caused leaning walls, cracks and the eventual destruction of buildings (Rouxel, 2018). (Hidden Architecture, 2023) called Shibam, 'Manhattan of the desert.' It is located in an irrigated agricultural land; Shibam is built on a rock basement. This basement has let the city to survive to the floods of the area. Most of its buildings were built during the XVI century, after the massive flood that destroyed the previous settlement in 1532-3

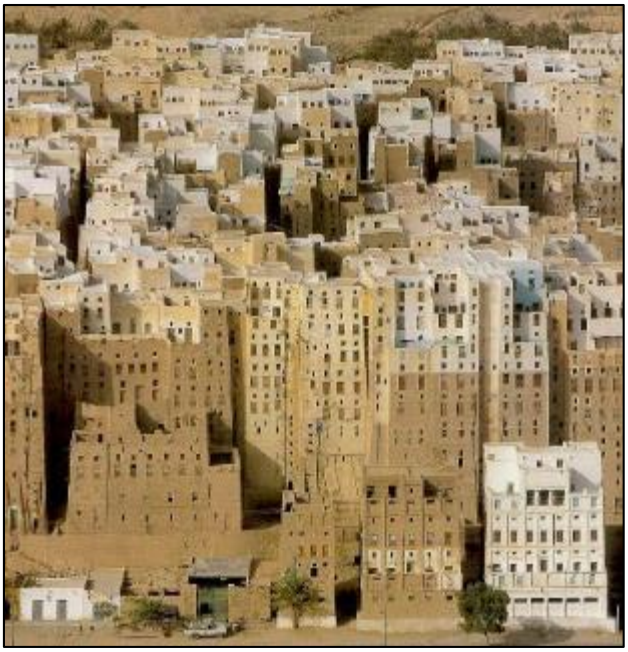

Figure 76 The city of Shibam, (Hidden Architecture, 2023)

Figure 87 The city of Shibam, (Hidden Architecture, 2023)

10 Hatay

Antakya is a capital of Hatay located in southern Turkey. Neighborhood population data is around 390 according to (The Disaster and Emergency Management Presidency, 2021)

Hatay is a province located in the southern part of Turkey, on the Mediterranean coast. It has a varied landscape with mountains, valleys, and coastal plains. The climate in Hatay is Mediterranean, characterized by mild winters and hot summers, with average temperatures ranging from 10°C in January to 28°C in August. The area is also known for its high humidity levels, which can be as high as 85% in the summer months. Antakya is located in a well-watered and fertile valley on the Orontes River, about 20 km from the Levantine Sea

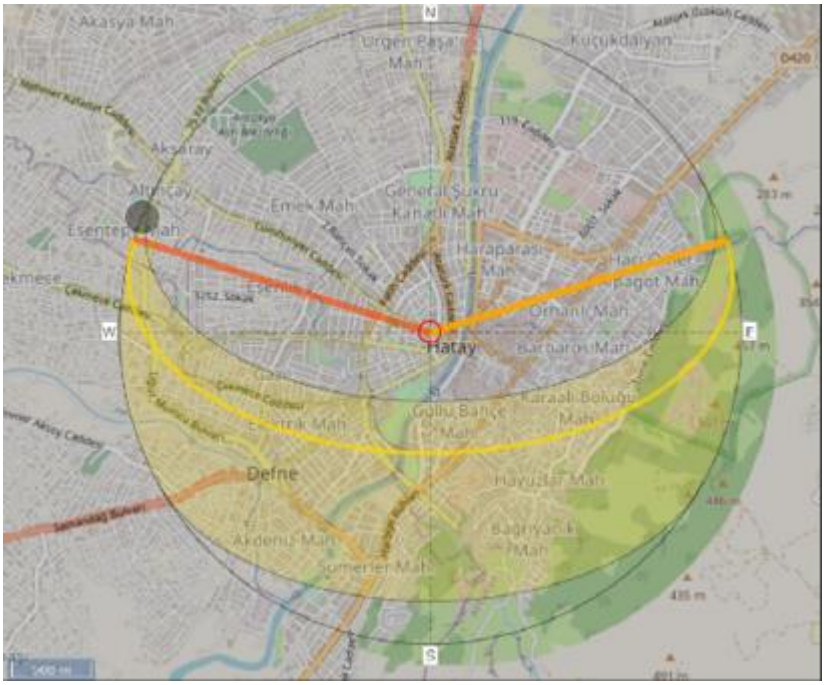

Figure 18 Sun Direction of Hatay, Turkey

Figure 19 Geomorphology map of Hatay Province (Korkmaz H., 2011)

When building Eco-Village in Hatay, it is important that we consider the climatic conditions and geological characteristics of the area. The region is located in an earthquake-prone zone, so buildings must be designed and constructed with this in mind.

In terms of building design, buildings should be oriented to take advantage of natural ventilation and light. The hot and humid climate makes air conditioning necessary, but good ventilation can help reduce the energy required for cooling. Buildings should also be designed to minimize solar heat gain, with shading devices such as awnings or louvers.

In terms of materials, local materials should be used where possible to reduce transportation costs and promote sustainability. Hatay has a rich history and culture, and our newly design Eco Village should reflect the local heritage. Sustainable building material, Adobe will be used to reduce the environmental impact of construction.

Finally, it is important to consider the impact of building on the local environment. Careful planning and design can help minimize disturbance to local ecosystems and promote sustainable development. Building regulations will be followed to ensure that buildings are constructed safely and in a way that is respectful of the natural environment.

11 SWOT Analysis of using Adobe Building Material in Eco-Village

Table 3 SWOT Analysis of Adobe for Hatay Region

Strength	Weakness	Opportunity	Threat
Environmentally-friendly and sustainable building material	Requires regular maintenance to prevent weathering and erosion	Growing interest in sustainable and eco-friendly construction materials	Competition from other sustainable building materials such as bamboo, timber, or recycled materials
Low cost compared to other building materials	Not suitable for areas with high humidity or rainfall	Increasing demand for affordable housing solutions	Changes in building codes and regulations that may restrict or discourage the use of Adobe building material
Good insulation properties that can help reduce energy costs	Limited durability compared to other building materials like concrete or steel	Emerging markets in developing countries with limited access to traditional building materials	Economic downturns that may reduce demand for construction materials
Easy and Fast to Build	Only low-rise buildings	Low cost and can be made on site	Environmental factors such as floods or earthquakes that can damage Adobe buildings
Easy to work with and adaptable for various construction needs	Limited design options and aesthetic appeal compared to other building materials	Collaboration with architects and designers to create unique and innovative building designs	Limited availability of skilled labor for construction using Adobe building material.
Ability to maintain a comfortable indoor temperature in both hot and cold weather	Limited availability in some regions		
Suitable for Hatay Climate			

12 Design Proposal

After a natural disaster, it is important to prioritize reconstruction efforts in a way that not only rebuilds homes and infrastructure, but also creates a sustainable and resilient community that can withstand future disasters. An eco village is a great way to achieve this goal, as it promotes sustainable living and community resilience.

Key elements that would be included in a post-disaster eco village proposal are as follow:

- Sustainable Housing: The village would be designed with sustainable housing options that are built using eco-friendly materials, designed to minimize energy usage, and can withstand natural disasters. Adobe is proposed for this Eco-Village model.
- Renewable Energy: The village should prioritize renewable energy sources such as solar power, wind power, and geothermal energy. This will not only reduce the carbon footprint of the community, but also ensure that the village has a reliable source of energy in the event of future disasters.
- Permaculture Gardens: The eco village is to incorporate permaculture gardens into the design to provide a sustainable source of food for residents. These gardens will be designed to maximize biodiversity, promote soil health, and minimize water usage.
- Community Spaces: The eco village would have community spaces such as a community center, outdoor recreational areas, and shared gardens. These spaces will promote social cohesion and community resilience, as well as provide a sense of place and identity for the village.
- Education and Training: The village should provide education and training opportunities for residents to learn about sustainable living practices, disaster preparedness, and emergency response. This will empower residents to take an active role in their own safety and well-being, as well as create a culture of resilience within the community.
- Water Conservation: It is important that the village prioritize water conservation measures such as rainwater harvesting, greywater systems, and water-efficient appliances. This will ensure that the village has a reliable source of water, even in times of drought or other water shortages.

Overall, this eco-village proposal for post-disaster reconstruction would prioritize sustainability, resilience, and community building. By incorporating these elements into the design, the village can not only rebuild after a disaster, but also create a thriving and sustainable community for years to come.

Table 4 Key elements to include for eco-village proposal

Social	**Culture**	**Economy**	**Ecology**
Restaurants	Library	Renewable Materials	Renewable Materials
Wellness Center	Gallery	Work Space	Farming
Library	Community Hall	Farming	Solar Panels
Community Hall	School	Greenhouse	Greywater Circulation
Community Park			Rainwater Harvesting

13 Conclusion

The recent earthquake outbreaks and refugee crisis in southern Turkey have highlighted the urgent need for more wholesome and considerate approaches in built environment design. The current unsustainable practices in urban design overlook the potential benefits offered by Ecovillages. Sustainability has become a subject of concern across various levels of society. As cities continue to consume resources and contribute to environmental degradation, it is crucial to prioritize the integration of ecological systems with the built environment. This involves designing cities with careful consideration for social structures and implementing practices such as permaculture, ecological architecture, green production, alternative energy, and community building. The establishment of principles for sustainable quality of life in eco-villages is essential. These principles encompass compact and balanced land use, efficient transportation systems, rational resource utilization, waste reduction, environmental pollution prevention, restoration of natural systems, provision of good housing and living environments, promotion of healthy social ecology, sustainable economy, public participation, and protection of local culture and social values.

To conclude, the implementation of Eco-Village design in the Hatay region of Turkey presents an opportunity to embrace a more sustainable and considerate approach to built environment design. By adopting the principles of sustainable architecture and leveraging the benefits of Ecovillages, we can create a harmonious coexistence between humans and nature while providing a viable solution for the displaced community. It is imperative that we prioritize these efforts to mitigate the adverse effects of urbanization, promote environmental stewardship, and foster a more sustainable future for Turkey and its people.

Compliance with ethical standards

Acknowledgments

Acknowledgments to Professor Semih Eryıldız and Architecture Department of Istanbul Okan University for their support and supervision.

Disclosure of conflict of interest

There is no conflict of interest.

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