Strategic Sustainability Plan In Denpasar 2040

Yuchen Liu¹, *, and Hongyi Tao²

¹The Faculty of Science, The University of Melbourne, Melbourne, VIC, 3000, Australia
²The Faculty of Arts, The University of Melbourne, Melbourne, VIC, 3000, Australia

*Corresponding author’s email: yuchenl13@student.unimelb.edu.au

Abstract. By 2040, Denpasar will become a vital international city. There are traditions flourishing and unique cultural history alongside sustainability innovations, modern technology, and empowered communities. Its core is that Denpasar embraces traditional philosophy, harmony with God, people and the environment. This report discusses various strategies for making Denpasar a sustainable city in 2040. The region's natural resources are managed fairly and sustainably to enhance social cohesion and improve resistance to environmental risks. The city will reduce waste through a variety of economic, extensive reuse and waste recycling projects and support a wide range of industries and opportunities for the Denpasar people. Tourism will continue to promote employment and the economy without compromising related ecosystems and biodiversity. Denpasar will not only thrive, but will also be sustainable.

1. What is a sustainable city?
Sustainable cities are cities that have high economic and social equity and focus on quality of life and a healthy environment [4]. To achieve this goal, cities need to dynamically adjust their social environment and socio-economic role [1]. The existence of a city cannot be separated from people and society, and a sustainable city must provide a safe and fair space for humans within certain ecological limits.

By taking into account social and global boundaries, cities can minimize their focus on economic growth as an isolated measure of economic performance, a way to ignore environmental degradation, contributions of unpaid work and unfairness. The goal of resource use in a sustainable city is not to keep it below natural thresholds to avoid consumption and performance degradation, but to ensure that resources are distributed fairly among users. In this way, sustainable cities need to meet the needs of residents' development rather than imposing sustainable demand on natural resources and systems in the region or the world.

The concentration of urban development means that the city cannot be self-sufficient within its own country, but its high density can effectively provide services and transportation, which is the key to a sustainable future. Cities must develop economies in the direction of effective use of resources, and sustainable levels of resource consumption should take into account the relationship between the city’s ecological footprint and the Earth's capacity and strive to eliminate ecological deficits. However, in cities like Denpasar, people should take into account unique characteristics such as the expansion of ecological footprints due to tourism.

Sustainable cities could implement ecological values, equity and public accountability, democratic decision making, and scientific and artistic talent cultivation [6]. Population growth could be consistent with the city's unique social and economic development and managed while improving the
urban environment. Biodiversity is one of the foundations of a sustainable city [7], and cities could have a sustainable goal to improve and regenerate their local environment and surrounding ecosystems [3].

2. Today’s Denpasar
Denpasar is the largest city in Bali, which is the economic centre of tourism in Indonesia. The city is part of Sarbagita, a larger urban agglomeration area, and Sarpaita aims to cooperate in urban development with multi-level partnerships between Denpasar, Badung, Gianyar and Tabanan. With a population of 897,300 in 2017, it accounts for 2.18% of the total area of Bali. Bali is the only Hindu island in Indonesia, but the interpretation includes many unique Balinese customs similar to Islam in other parts of Indonesia. Denpasar has a rich culture of Cameron, shadow performances, dances, sculptures, paintings and crafts.

Denpasar Island is a few degrees south of the equator and has a tropical climate that is hot and humid year round, with wet and dry seasons. From an ecological point of view, Bali is part of the coral triangular region of the Indonesian archipelago, the center of world marine biodiversity. This makes Bali’s marine ecosystem intrinsically linked to neighboring islands in Indonesia and other countries, and is also a significant part of its tourism appeal. Bali's mangroves are an important source of carbon uptake, but are currently threatened by dredging and human-centered coastal activity, and there is a risk of releasing large amounts of carbon dioxide.

Denpasar is vulnerable to tsunamis, storm surges, earthquakes, strong winds and landslides [5]. With flat terrain and abundant rainfall and three rivers downstream, Denpasar is prone to flooding and uneven distribution (Figure 2).

Tourism has been part of Bali since the 1930s. Under Suharto's new ordering system, the central government promoted and planned mass tourism until the late 1990s [2]. After the banking regulations were abolished in 1987, a historic investment boom occurred, creating a controversial "big project" against Bali's demands, but the number of tourists increased significantly (Figure 1). During this period, many tourists, especially the Bali bombings of 2002 and 2005, have experienced significant declines. Despite these shocks, Denpasars increasingly rely on tourism, which directly or indirectly dominates the local economy. Agriculture and small-scale industries are also important factors, but their share has declined significantly over time (Figure 2).

The power of the Java-Bali grid comes almost entirely from coal and natural gas, and currently less than 10% of Indonesia's energy is renewable. Most of the electricity is produced in Java, but in Bali there are some imported electricity (760 MW in 2013) and mostly from imported fossil fuels. In 2013, only 1% of Bali's power generation came from renewable energy sources, and its low wind energy potential has challenged the future power grid transformation.

Indonesia is a country with abundant water resources, but due to management and distribution issues, the water shortage in Bali, including Denpasar, is serious. Competition for water resources between agriculture and tourism continues, both of which have been the country’s long-term development priorities. It is estimated that 85% of the tourism economy is controlled by non-Bali, but this sector uses 65% of fresh water [2]. Public water suppliers can’t meet demand, so many families...
and hotels can dig wells themselves, but when the groundwater is low, only hotels can dig to the depth they need [2]. Bali’s overall awareness of the water situation is lacking, and current action means there is no adequate feedback mechanism for water issues in large water users or regulators. Along with other pressures, these factors led to uncontrolled changes in land use. As some farmers sold the land, new developments increased the impervious surface, reduced groundwater recharge, and introduced more water. As more land is converted, the value of land on nearby farms increases, so farmers cannot afford the land tax along with deteriorating water supply, making farming increasingly difficult and sales and land use constantly changing. Figure 3 illustrates this and other interactions.

Figure 3. Denpasar’s socio-ecological system related to tourism numbers.

In Bali recently, garbage has become a serious problem. According to national regulations, all garbage must be properly disposed and disposed of, but more garbage is generated than the official channel. There is an active and effective informal waste sector that helps fill this gap, but illegal dumping of river banks and mangroves has become common. This practice makes Indonesia one of the largest sources of marine plastic pollution in the world. Plastic waste is dispersed after high rainfall and can spread to farms outside the city. Many recyclable resources were eventually thrown away, and the degree of waste and pollution began to worry tourists on the island.

3. Current trajectory

If the current development trend continues, Denpasar will face a series of serious problems by 2040. Advances in tourism will find opportunities by attracting more Indonesian immigrants from Java and other islands. Since there is no policy or infrastructure to disperse these effects, most people will eventually focus on the Sabai region. This intensive development will put a lot of pressure on Denpasar’s infrastructure and environment along with many tourists and a lot of resources. The developments conducted to cope with this growth often do not cover the city’s cultural heritage and characteristics, as there is no policy to protect cultural heritage sites. For example, Subak (traditional irrigation paddy fields) is used instead of houses. In the future, it is expected that many legacy will be replaced by new developments to support the growing population and tourism needs. This can form a negative feedback loop between tourism and neglect of heritage. That is, popular tourist attractions are eliminated and the demand for tourists is reduced.

In addition, tourism has a higher priority than locals in terms of water use, and as the water shortage increases, the disproportionate distribution of water and pressure to the hydrological ecosystem in Denpasars will increase [2]. A drop in water level can lead to seawater intrusion and the rest of the groundwater is not suitable for agricultural or household use.

Waste and plastic pollution is a serious problem today. The decline in the performance of the main tourist attractions, beaches and dive sites, eventually leads to a decrease in tourism income. In addition to prominent tourist attractions, the deterioration of rivers and farmland and the health impact of burning household waste will continue to increase.

The impact of global warming on Denpasar and its surrounding ecology has many implications. As the variability in temperature and rainfall increases, the incidence and seasonal length of mosquito-borne diseases may also increase. In Bali, malaria cases increased from 18 cases per 100,000 cases in
1998 to 48 cases per 100,000 cases in 2000. In addition, the condition of the island of Bali means a high risk of sea level rise. Climate change, such as extreme rainfall, rising sea levels, and rising temperatures exacerbates environmental risks. Soon Denpasar may feel this effect because it is partially enclosed by the coastline, and the development project must retreat inland as the coast continues to deteriorate.

4. Vision 2040

4.1. People
We expect that by 2040, Denpasar will become a modern city with a famous and historical base. Bali's Hindu culture thrives with a variety of religions, while the energetic pasa and lively vitality are still preserved in the local pasa. Local art, music, and food are exhibited throughout the city, encouraging strong community spirit.

The increase in farming and urban agriculture allows rice and other local food production to feed the Denpasar community and promote local economy and wealth circulation within the city. As the flood is controlled, all families can get clean, sanitary water, and the incidence of water and mosquito diseases decreases.

4.2. Environment
The new architectural language cleverly combines sustainable materials, practicality and Bali's design values to clean up the entire area in terms of housing and tourism. In the past, noisy, polluted, and crowded streets no longer existed, and most Denpasar residents use electric motorcycles, bicycles, or modern, clean, popular rail systems.

The city will continue to provide adequate water supply through a variety of channels, including water-sensitive city design for groundwater recharge, advanced water recovery technologies, extensive water efficiency and awareness measures. Flooding is no longer common in this comprehensive design, and the comprehensive infrastructure provided enhances the city's resilience. Most of Bali's energy is generated from the island's renewable energy, including rooftop solar energy, which is widely used in Denpasar.

Recognizing Indonesia's historical contribution to marine plastic pollution, the company has made major collaborations with industry and major universities to promote regional innovation in the recovery and transformation of marine plastics. Denpasar is currently a leader in the production of recycled materials and marine clean technologies, and is actively working to restore the beach and aquatic ecosystems in the region. The surrounding coral reefs do not have plastic and are rich in biodiversity.

Climate change will be central and driving momentum in the Denpasar model. In Denpasar, industry, government, and communities are exceeding the city's Paris climate goals. The city's ability to deal with these issues is much stronger than usual.

5. Implementation strategies
Various issues surrounding the future of a sustainable city are addressed through educational, economic, technological and policy tools, eliminating unsustainable practices and systems.

5.1. Water use
Educational activities aimed at raising awareness about Bali's groundwater reduction are aimed at locals and tourists. Many hotel staff are unaware of a series of measures to reduce water use, and in this way, informing tourists of this issue will further strengthen support for these measures, such as choosing a water-saving shower head, towel and linen reuse.

Policy and government-supported infrastructure improves existing water resources systems in the following ways:
• All new large buildings and roads must adopt water-sensitive urban design measures prior to groundwater infiltration.
• An urban scale water recovery and recycling system will be introduced to capture, purify and redistribute water across the city.
• In existing communities where environmentally friendly infrastructure is not directly applicable, community infiltration ponds will be used to collect water.
• Trees on the street get nutrients from the flow of the road, and in the dry months there is a storage layer.
• People will invest in the development of a small, compact, domestic rainwater storage tank (probably made from recycled marine plastic) produced locally.

5.2. Plastic pollution
The goal of plastic pollution is to reduce the public's dependence on disposable plastics by sharing the negative health effects of plastics plastic burning, Indonesia's major global contribution to marine plastics and the resulting negative perceptions and future tourism and other industries. Potential impact. This requires institutional change, and education is an important form of downstream intervention. In addition, by 2025, all disposable plastics are completely removed and existing plastic contamination is collected and reused through a waste recycling system.

5.3. Tourism
To reduce the pressure on the environment, economy and society of Denpasar tourism, a multi-faceted approach is required:
• Future tourism development will need to incorporate green infrastructure into the building, such as the use of renewable low-carbon materials such as bamboo.
• Policies will be developed to support small-scale tourism to better distribute the social, economic and environmental benefits of industry (e.g. family lodging, sustainable craft and forest products).
• Agricultural tourism incentives are introduced.
• Two parts of the tourism sustainable development tax were introduced: 1) the cost paid at the port of arrival and 2) the accommodation tax. This income can be used to finance the island's series of sustainable infrastructure.

5.4. Flood risk resilience
We will improve our ability to fight floods by improving infrastructure, training and funding for vulnerable areas.
• Funding will be provided to areas with low coping skills.
• The flow of the river is divided from flood to dam, which can store drinking water in the event of a flood, and the disease is more prone to unsanitary water.
• Management of all estuaries that supply water to Denpasar will be integrated for flood preparedness.
• Establish strong coastal development policies to shape flood hazard areas and sea level rise.

6. Conclusion
The city faces many challenges today, but the Denpasar people have the resources, knowledge and wisdom to overcome these challenges. The plan first explores the complex relationship between the current state of Denpasar today and the entire social ecosystem, highlighting two very different future development trajectories-business as usual and a more active and sustainable choice. The specific steps taken to bridge the gap between these developmental trajectories will help the Denpasars choose a positive, ambitious and prosperous future across the community and across Bali.
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