

DESIGN MATRIX FOR SOCIAL SUSTAINABILITY
THROUGH ARCHITECTURE AND VERTICAL FARMING
IN MASJID TANAH, MALACCA

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An appreciation and dedication to my supportive parents and family, whom have always given me words of motivation.

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ABSTRACT

Social sustainability plays an important role in forming a vibrant and culturally strong place. It emphasizes the connectivity between places and people, making the place as a bonding medium for the people. Masjid Tanah, a Malacca town is facing a problem of losing its young population whereby the place has no community hub that empowers the local and with a local market that is less integrated which caused pollution. The aim of this research is to create a design matrix for social sustainability through architecture and vertical farming in Masjid Tanah. The matrix focuses on the access and linkages; sociability; uses and activities; and comfort and image. These aspects are intended to empower the local economy activities and connect the local community. The research examines the local community and economic activities that pose opportunity and potential to the future development of Masjid Tanah. The target groups for the research are the educational institution's staff and students around the town, as well as the residing locals. A literature review of urban terminology, methods of place making, social sustainability, and application of vertical farming is done to understand the inter-relationship of these three elements, which are the place, the people, and the technology. Then, a design matrix framework is formed to analyze three case studies of vertical farming facilities, which then is used to propose the design matrix for Masjid Tanah. The findings are acquired through site observation, ethnographic study, and interviews for collecting information about Masjid Tanah town center. Two design matrices are proposed, one for the urban scale and one for the standalone building scale, based on the analysis of the findings. Finally, the research proposes a viable solution by using architecture and vertical farming technology to revitalize the town in terms of social sustainability.

ABSTRAK

Kemampuan sosial berperanan penting dalam pembentukan tempat bersemangat dan berbudaya. Ia menekankan hubungan di antara tempat-tempat dan orang, menjadikan tempat sebagai medium ikatan orang tempatan. Masjid Tanah, sebuah bandar di Melaka sedang menghadapi masalah kekurangan pemuda disebabkan ketiadaan hab komuniti yang memanfaatkan orang tempatan dan pasar tempatan yang kurang bersepadu telah menyebabkan pencemaran. Tujuan kajian ini adalah untuk mewujudkan matriks reka bentuk untuk kemampuan sosial melalui seni bina dan pertanian menegak di Masjid Tanah. Matriks ini memberi tumpuan kepada akses dan rangkaian; cara pergaulan dan aktiviti; dan keselesaan dan imej. Aspek-aspek ini adalah bertujuan untuk memberi sumbangan kepada aktiviti ekonomi tempatan dan menyatukan masyarakat setempat. Kajian ini meneliti aktiviti kemasyarakatan dan ekonomi tempatan yang mewujudkan peluang dan potensi untuk pembangunan masa depan Masjid Tanah. Kumpulan sasaran bagi kajian ini ialah kalangan staf dan pelajar dari institusi pendidikan di sekitar bandar, dan juga penduduk tempatan. Tinjauan literatur mengenai istilah bandar, kaedah membuat tempat, kemampuan sosial dan aplikasi pertanian menegak dilakukan untuk memahami hubungan antara ketiga-tiga unsur, iaitu tempat, penduduk dan teknologi. Kemudian, rangkaian matriks reka bentuk ditubuhkan untuk menganalisis tiga kajian kes kemudahan pertanian menegak, yang akan digunakan untuk mencadangkan matriks reka bentuk berkemampuan social untuk Masjid Tanah. Penemuan ini telah dilakukan melalui pemerhatian tapak, kajian etnografi dan temu duga yang mengumpul maklumat mengenai pusat bandar Masjid Tanah. Dua matriks reka bentuk, satu pada skala bandar dan satu pada skala bangunan yang berdiri sendiri dicadangkan berdasarkan analisis dapatan kajian. Akhir sekali, kajian ini mencadangkan penyelesaian yang berdaya maju dengan menggunakan seni bina dan teknologi pertanian menegak untuk mencergaskan semula bandar dari segi kemampuan sosial.

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CHAPTER 1

INTRODUCTION

1.0 Introduction

Globalization is an imminent trend and so Malaysia had become one of the United Nations participating countries that pursue the unanimous goal that is to create a better future. As of 25th September 2015, the United Nations had announced new guidelines that will guide nations towards sustainability, named Sustainable Development Goals, officially known as Transforming our World: the 2030 Agenda for Sustainable Development (United Nation, 2016). In the agenda, there are a few concerns such as no poverty, good health and wellbeing, quality education, decent work and economic growth, sustainable cities and communities and responsible consumption and production. These very much relate to what Malaysia would need to improve and develop upon. Malaysia has to deliver to all the above agendas in order to become a sustainable country. Rapid development brings better infrastructure, job opportunities, lifestyle improvement, and better living environment. However, it also comes with a cost of being unsustainable as most of the rural, secondary town areas are left out.

Throughout the country, there are secondary towns such as Masjid Tanah that becomes the victim of rapid urbanization in Malacca Town and Kuala Lumpur. There is a staggering 60% of the nation's population that resides in the urban areas and it is expected to spike up to 75% by the year 2020 (Shuid, 2004). By 2030, it is estimated that more than three-quarter of Malaysians will be in the urban areas (Siong, 2008). By losing more economically productive population, Masjid Tanah will suffer from the rupture of the social and economic structure. Effects like vacant shop lots in the newly developed zone of the town, the local market operating at less than 20% of the day, public facilities under-utilized and poorly maintained heritage houses will adversely affect the image and sustainability of the town. If the situation continues, it negatively impacts the welfare of the locals with poor infrastructure, less economic growth, and disconnected community.

By referring back to the Sustainable Development Goals, the town could adopt several items in the drive to revitalize the town. Elements like the elimination of poverty; creating good health and well-being; decent work and economic growth; industry, innovation and infrastructure; and finally sustainable cities and communities could be the focus tools for the local community to utilize. Vertical farming could be the catalyst that can improve both social and economic sustainability of the town. It could be presented as an educational medium, a food production factory, a job producing industry, an efficient system that reduces carbon footprint and an aesthetic architectural feature that could act as façade, cooling medium, sun shades, and wastewater filtration medium.

The main intention of the research is to identify the fundamental social problems that lead to the degradation of the town and come out with a research aim and objectives that deliver in-depth understanding and recommendations on how to revitalize the town through vertical farming architecture. The research envisions to elevate the social sustainability of the town for the local community that is eventually able to empower the future generations of the town.

1.1 Problem Statement

Masjid Tanah is currently suffering from social disintegration and economic rupture whereby both of these elements are closely related. Despite the local authority produced a structured plan for the town with the intention to further develop the town, there is little improvement to be seen from the site study of the town undertaken in 2015.

1. The losing productive population which degrades the town.

Productive population refers to the work capable population between the age of 21 and 60. The town is experiencing under development due to the switch of federal roads that used to be the main path that connects Malacca town and Kuala Lumpur to the North-South Highway. Thus, the town had lost its vitality ever since then and this adversely affected the economy and social aspects. By taking a glimpse into the near future, Masjid Tanah would slowly disintegrate into a vacant town due to the reduction of demography and the rupture of the economic structure due to poor human capacity. Thus, it is critical to introduce a new form of catalyst that could reinvent the town in terms of demography and economy.

2. The absence of proper community hub that empowers the locals that promote social cultural value.

Rapid urbanization took place in the town whereby shop lots were blooming since 2000. However, it was unforeseen that the demography of the town loses 20% of the young, economically productive population. Moreover, there is no conducive and flexible community center that could empower and gather the people. During the site visit, a single story building and gated 'Balai Raya' with a stage and badminton court facility, that rarely open to the public. Finally, there is a public field which is accessible but with no supportive facility like washrooms, stores, or café. In addition to that, roads and rows of shop lots segregate all of these communal facilities. This will definitely discourage the usage of the facilities and result in disengagement of the community. Therefore, a

solution to promote community empowerment should be one of the elements to make the urban revitalization a success.

3. Poorly integrated and under-utilized local market design that caused pollution and impacted the economic vitality of the town.

The local market is only utilized for 20% of the day and the spaces are only 40% occupied during the operational hours (Urban United, 2015). Furthermore, the hygienic condition of the market is bad where solid waste is not managed properly and scattered around. The liquid waste is also discharged into the Sungai Baru which in the long run will cause pollution to the river. Locals have no choice but to come to this local market to buy grocery as it is the only option and the neighboring towns are relatively far, which is about 20-30 minutes' drive. It is a right for the locals to have a decent local market and not a privilege. Therefore, a new well-integrated market should be proposed to revamp the current one.

All of the above issues are the imminent components to revitalize the town and will be delivered through this research on the justification of feasibility and the how-to for implementing the proposal.

1.2 Research Questions

The primal focus of the research is about how vertical farming can help to catalyze the urban revitalization in Masjid Tanah in terms of social economy sustainability.

1. What are the potential communal spaces that can be improved in the urban fabric of Masjid Tanah?
2. How can vertical farm architecture create a positive social impact for the locals?

3. How to provide an integrated solution that utilizes vertical farming as a catalyst to revitalize Masjid Tanah in terms of social sustainability?

1.3 Research Aim & Objectives

The research aim is to improve the social sustainability of Masjid Tanah by the use of vertical farm architecture in communal spaces, which contribute to image reinvention and revitalization of the town.

The objectives of this research are as follow:

1. To identify the different types of communal space in the urban fabric of Masjid Tanah.
2. To identify the positive social impact that could be generated by vertical farm architecture.
3. To make recommendations that can improve the social sustainability of Masjid Tanah via vertical farm architecture.

1.4 Significance of the Research

The research could provide a significant impact on the community of Masjid Tanah in terms by:

1. Identifying the opportunities within the urban fabric of Masjid Tanah in order to plan out viable social activities in existing communal spaces that are underutilized.
2. Providing an opportunity for vertical farming that can involve the locals in terms of social gathering and skills empowerment.
3. Creating the types of vertical farming that can fuse with the architecture of the communal building in Masjid Tanah to achieve social sustainability.

1.5 Research Statement

Masjid Tanah is currently losing its young population, with 10% of the population under the poverty line, resulting in regression of the town's viability. Within the next 5 years, it has minimum upcoming projects like construction of a new mosque and Tesco outlet. There are no developments for improving the social sustainability of the town that empowers the people and revitalizes the town. The research intends to propose the use of vertical farming as a catalyst to reinvent the town into a Green Town as planned by the local authority. By fusing vertical farm with communal spaces, it creates both social and economic benefits to the locals as well as improves the sustainability of the town.

1.6 Scope of Research

The scope of research is limited to the context of the central town of Masjid Tanah to make the data site specific. This is to ensure that the data will suit the local community needs. Besides, the research focuses on the social aspect of the town whereby the intention is to create a socially sustainable community. The vertical

farming's research is limited to how much social value it can contribute to the locals. Lastly, the communal spaces' research is based on the local market, community center and open field of the town.

1.7 Research Methodology

Research methodology is used to align the research direction with research aim through literature reviews methods and case studies. The overall flow of the research is in four segments, which are the identification of research problem, data collection, data analysis and conclusion. There is a further elaboration of discussion in Chapter 3 about the preferred methodology and the anatomy of the research. The source of primary data comes from interviews, ethnographies (observation) and focus group research which is all qualitative methods. In the meantime, data that are sourced from existing literature reviews, journal, articles, dissertation or dissertations, books, case studies, and reports are categorized as secondary data to back the primary data. Overall, the research methodology is based on a qualitative approach which has a higher flexibility than quantitative and enables participants and researchers to interact and collaborate.

1.8 Expected Findings

At the end of the research, there will be a list of recommendations that enable the local authority and community to collaborate and work with a unanimous aim on achieving a socially sustainable township. The research provides in-depth findings, discussions, and recommendations on the opportunities of communal spaces around

the town, the best vertical farming typology that suits the local social context and design guidelines on integration of vertical farming into communal buildings

1.9 Structure of Dissertation

Six main chapters are structured in this dissertation whereby it starts with Chapter 1 that provides an overall understanding and brief introduction of the research, including items like background study, research aim, and objectives, research questions, research statement, research methodology and expected findings. This continues with Chapter 2 that covers the literature review of topics that relate to the urban fabric of the town, characteristic of the communal spaces, the social context of the town, types of vertical farming and the social impact, as well as the architecture design concept of communal buildings that fits the social context and vertical farming feature. All of the topics are covered through readings, focus group discussion, site observation, and interviews. Chapter 3 explains the research methodology for the primary and secondary data and these data is analyzed and documented in Chapter 5. On the other hand, Chapter 4 documents and analyses three case studies of vertical farming facilities by using Chapter 3 summarization. Finally, Chapter 6 will conclude the findings and discussions from Chapter 5 and recommendations about the limitations, challenges and guidelines are provided. Appendix is also attached to relate the research findings with the thesis design proposal.

REFERENCES

- Alor Gajah District Local Authority. (2010). *Kajian Rancangan Tempatan Daerah Alor Gajah, 2020*. Alor Gajah.
- Abipp, B. L. (2016). *Vertical Farm at Wigan UTC*. Retrieved October 13, 2016, from positive image photography: <http://www.manchester-architectural-photographer.co.uk/positive-image-photography-projects/educational-building-photography/215-vert-farm-wig>
- Alor Gajah Local Authority. (1995). *Draft Structure Plan of Alor Gajah District (1995-2015)*. Alor Gajah: Alor Gajah Local Authority.
- Association For Vertical Farming. (2016). *Glossary for Vertical Farming and Urban Agriculture*. Retrieved October 11, 2016, from Association For Vertical Farming: <https://vertical-farming.net/vertical-farming/glossary-for-vertical-farming/#>
- Association for Vertical Farming. (2016). *Resources - Vertical Farming Explained*. Retrieved October 11, 2016, from Vertical Farming Net: <https://vertical-farming.net/info/>
- Bolova, V. (2016, September 2). *Singapore's High-tech Vertical Farming*. Retrieved October 13, 2016, from Eatglobe: <http://www.eatglobe.com/news/farming/407-singapore-s-high-tech-vertical-farming.html>
- Burdge, R. a. (1995). Social Impact Assessment. *Environmental and Social Impact Assessment*, 31-65.
- Department of Statistic Malaysia. (2016). *Report of Household Income and Basic Amenities Survey 2014*. Retrieved December 4, 2016, from Department of Statistic Malaysia Official Portal:

https://www.statistics.gov.my/index.php?r=column/cthemedByCat&cat=120&bul_id=aHhtTHVWNVYzTFBua2dSU1BRL1Rjdz09&menu_id=amVoWU54UT10a21NWmdhMjFMMWcyZz09

Department of Statistics Malaysia. (n.d.). *Department of Statistic Malaysia, Official Portal*. Retrieved December 4, 2016, from Population and Housing Census: https://www.statistics.gov.my/index.php?r=column/cone&menu_id=bDA2VkxRSU40STcxdkZ4OGJ0c1ZVdz09

Design Trust For Public Space. (2012, June). *FIVE BOROUGH FARM: PHASE I 2009–2012*. Retrieved October 13, 2016, from FIVE BOROUGH FARM 2009–2015: <http://designtrust.org/projects/five-borough-farm/outputs/54/>

Despommier, D. (2010). *The Vertical Farm: Feeding the World in the 21st Century*. United States: St. Martin's Press.

Despommier, D. (2016). *The Vertical Essay*. Retrieved October 4, 2016, from Vertical Farm: http://www.verticalfarm.com/?page_id=36

Food and Agriculture Organization of the United Nations (FAO). (2015). *The State of Food Insecurity in the World 2015*. Retrieved October 11, 2016, from Food and Agriculture Organization of the United Nations: <http://www.fao.org/hunger/en/>

Google Map. (2016). Retrieved October 4, 2016, from Google Books Ngram Viewer: https://books.google.com/ngrams/graph?year_start=1800&year_end=2008&corpus=15&smoothing=7&case_insensitive=on&content=sustainable&direct_url=t4%3B%2Csustainable%3B%2Cc0%3B%2Cs0%3B%3Bsustainable%3B%2Cc0%3B%3BSustainable%3B%2Cc0%3B%3BSUSTAINABLE%3B%2Cc0

Henry Gordon, S. (2016). *Urban Agriculture in NYC*. Retrieved October 12, 2016, from <https://api-site.paris.fr/images/72467>

Jacobs, J. (1961). *The Death and Life of Great American Citiies*. New York: Random House.

- James, P. (2015). *Urban Sustainability in Theory and Practice: Circle of sustainability*. Oxon: Routledge.
- Lynch, K. (1960). *The Image of The City*. Massachusetts: MIT Press.
- McKenzie, S. (2004). Social Sustainability: Towards Some Definitions. *Hawke Research Institute Working Paper Series*, 4-6,12-22.
- McLeod, S. A. (2008). *Social Identity Theory*. Retrieved October 8, 2016, from Simply Psychology: <http://www.simplypsychology.org/social-identity-theory.html>
- Muhammad Rasmuna Mazwan, M. R. (2015). *The Potential of Urban Farming Technology in Malaysia Policy Intervention*. Selangor, Malaysia: Economic and Social Science Research Centre, MARDI.
- Munro-Faure, D. H. (2008). *Urban Agriculture For Sustainable Poverty Alleviation and Food Security*. Urban and Peri-Urban Agriculture.
- Nevin Cohen, K. R. (2012). *Five Borough Farm: Seeding the Future of Urban Agriculture in New York City*. New York: Design Trust for Public Space.
- Nicholson, C. (1993). *The Woody Yaloak River Catchment Action Plan*. Corangamite, Australia: Department of Agriculture.
- P. Gill, K. S. (2008). Methods of data collection in qualitative research: interviews and focus groups. *British Dental Journal* 204, 291 - 295.
- Pepperdine, S. (2016). *Social Indicators of Rural Community Sustainability: An Example from the Woody Yaloak Catchment*. Retrieved October 12, 2016, from The Regional Institute: <http://www.regional.org.au/au/countrytowns/strategies/pepperdine.htm>
- Project for Public Spaces. (2016, August 16). *Architecture of Place: Buildings that Work for People*. Retrieved October 12, 2016, from <http://www.pps.org/blog/architecture-of-place-a-call-for-buildings-that-work-for-people/>

- Project For Public Spaces. (2016). *What Makes a Successful Place?* Retrieved October 12, 2016, from <http://www.pps.org/reference/grplacefeat/>
- Reitano Elizabeth, G. E. (2006). *Socioeconomic and Political Implications of Vertical Farming*. United States: Medical Ecology of Columbia University.
- Renault, V. (n.d.). *Section 14. SWOT Analysis: Strengths, Weaknesses, Opportunities, and Threats*. Retrieved December 3, 2016, from Community Tool Box: <http://ctb.ku.edu/en/table-of-contents/assessment/assessing-community-needs-and-resources/swot-analysis/main>
- Rosenfield, K. (2012, November 8). *First Commercial Vertical Farm opens in Singapore*. Retrieved October 13, 2016, from ArchDaily: <http://www.archdaily.com/291403/first-commercial-vertical-farm-opens-in-singapore/>
- Scott Reeves, A. K. (2008). Qualitative research methodologies: ethnography. *BMJ* 2008, 337.
- Shuid, S. (2004). Urbanization and Housing in Kuala Lumpur City Centre: Issues and Future Challenges. *19th EAROPH World Planning and Housing Congress 2004*. Melbourne, Australia.
- Siong, H. C. (2008). Urban Governance and Rapid Urbanization Issues in Malaysia. *Jurnal Alam Bina*, Jilid 13: No.4.
- Sky Greens. (2015, August 28). *Singaporean company – Sky Urban Solutions wins INDEX: Award 2015, the world’s biggest design award*. Retrieved October 13, 2016, from Sky Greens: <http://www.skygreens.com/singaporean-company-sky-urban-solutions-wins-index-award-2015-the-worlds-biggest-design-award/>
- Smailes, P. &. (2003). *The Gilbert Valley, South Australia*. Centre for rural Social Research.
- T.Olson, E. (2002, August 20). *Personal Identity*. Retrieved October 8, 2016, from Stanford Encyclopedia of Philosophy: <http://plato.stanford.edu/entries/identity-personal/>

- Tajfel, H. T. (1979). An integrative theory of intergroup conflict. *The social psychology of intergroup relations?*, 33,47.
- United Nation. (2016). *Sustainable Development Goals, 17 Goals to Transform Our World*. Retrieved September 20, 2016, from United Nation:
<http://www.un.org/sustainabledevelopment/sustainable-development-goals/>
- Urban United. (2015). *Masjid Tanah Urban Report*. Johor Bahru: FAB.
- Wigan UTC. (2016). *Vertical Farm*. Retrieved October 13, 2016, from Wigan UTC:
<http://www.wiganutc.org/our-college/vertical-farm/>
- Wolf, K. &. (2014). *Reflect & Restore Urban Green Space for Mental Wellness*. Annapolis, MD:: The TKF Foundation.
- World Health Organization. (2016, June). *Obesity and overweight fact sheet*. Retrieved October 11, 2016, from World Health Organization:
<http://www.who.int/mediacentre/factsheets/fs311/en/>
- Xenia Viladas, M. B. (2016). *Urban Farming Ecosystem: A NOLA Case Study*. Savannah: Savannah College of Art and Design.