



" Harmony in Spaces : Blending Heritage , Nature and Design "

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THE IMPACT AND EFFECTIVENESS OF APPLYING LANDSCAPE ARCHITECTURE AND AGRICULTURE CONSERVATION AT UNIVERSITI MALAYSIA SABAH

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ABSTRACT

This study shows that agriculture conservation and landscape architecture has been focused on soil health, landscape designs and the economics of production, however, this definition is now broadening to include ecology and education. The goal of sustainable landscape design and agricultural practices is to minimize the adverse effects of farming on surrounding ecosystems and instead strive for longterm stability of the entire agricultural enterprise, environmental protection, and consumer safety. Landscape architecture is the design of outdoor space to achieve environmental, social, and/or aesthetic outcomes. Though landscape architecture has traditionally leaned towards aesthetics and social interaction, since the mid-20th century the work of many landscape architects has shifted towards ecological sensitivity while maintaining existing aesthetic and sociological functions. Today, conservation agriculture and landscape architecture are becoming even more similar and face many of the same challenges. Although key differences remain, both fields emphasize ecology, economics, sociology, and aesthetics. Despite overlaps in design considerations and outcomes of intervention, the two field and those working within them, rarely collaborate.

Keywords: Agriculture Conservation, Campus Design, Landscape Architecture, Universiti Malaysia Sabah

INTRODUCTION

Background Study

Landscape architecture and agriculture conservation are both growing fields seeking to address the increasing needs of campus design, urban and rural populations. The two professions overlap significantly in their study of ecology, economics, aesthetics, and sociology (John, 2021). Despite significant progress being made in each discipline, limited effort is being made in either community to bond and collaborate with the other parties in order to more thoroughly design and create multifunctional landscapes. Implementing landscape architecture and agriculture conservation on university campuses serves as a multifaceted approach, transforming the campus into a living laboratory. For example at Universiti Putra Malaysia, Universiti Teknologi Malaysia and Infrastructure University. This integration not only enhances economic benefits, climate resilience, and biodiversity preservation but also contributes to resource efficiency, student education, and community engagement. By adopting sustainable practices, campuses become showcases of environmental stewardship, fostering holistic wellbeing and preparing future leaders for the challenges of a changing world.

Problem Statement

Modern university with dynamic landscape campuses such as Universiti Malaysia Sabah grapple with significant challenges related to the integration of landscape architecture and agricultural conservation. The aesthetic focus often prevails over ecological functionality in the planning and design of green spaces, resulting in underutilized areas that could otherwise contribute to biodiversity, educational and recreational opportunities. Simultaneously, agricultural areas on campuses are treated as separate entities, leading to the neglect of sustainable farming practices, soil degradation, and the excessive use of agrochemicals.

A critical issue is the lack of comprehensive sustainability planning that encompasses both landscape architecture and agricultural conservation. Campuses such as UMS often adopt approaches, missing opportunities for synergies between green infrastructure and sustainable agriculture. The absence of an integrated strategy not only limits the potential environmental impact but also fails to provide a holistic framework for sustainable campus development.

Moreover, a deficiency in awareness and engagement further exacerbates the problem. Students, faculty, and staff often lack an understanding of the importance of landscape architecture and agricultural conservation on campus. Without a sense of responsibility and knowledge, the potential for active participation in sustainable initiatives is diminished, hindering the creation of a campus community committed to environmental stewardship.

Addressing these challenges necessitates a comprehensive and interconnected strategy that brings together landscape architecture and agricultural conservation. By adopting sustainable practices, campuses can maximize the potential of their green spaces, promote biodiversity, and ensure responsible land use. Simultaneously, integrating sustainable agriculture practices can mitigate soil degradation, reduce environmental impact, and contribute to the overall health of the campus ecosystem.

In this context, Universiti Malaysia Sabah have the opportunity to serve as exemplars of environmental stewardship, educating and inspiring the next generation of leaders. A holistic approach to campus development, incorporating landscape architecture and agricultural conservation, not only benefits the immediate environment but also equips students with the knowledge and values needed to champion sustainable practices in their future endeavors. Through awareness, program engagement, and integrated planning, university campuses can become models of sustainability, influencing broader communities and shaping a more environmentally conscious society.

Research Aim

The research aims to comprehensively evaluate the impact and effectiveness of applying landscape architecture and agriculture conservation at a university campus. By assessing environmental sustainability, ecosystem services, biodiversity enhancement, resource-efficient agricultural practices, educational impact, interdisciplinary collaboration, climate

change mitigation and adaptation, well-being enhancement, leadership demonstration, community engagement, and alignment with global sustainability goals, the study seeks to provide valuable insights for guiding sustainable campus development and contributing to the broader discourse on environmental stewardship in educational institutions.

Objectives

- 1.Apply sustainable agriculture conservation methods to ensure responsible resource use, including water conservation, energy efficiency, and waste reduction in agricultural practices on campus.
- 2.Integrate landscape architecture to design aesthetically pleasing and sustainable environments that enhance the campus aesthetics while promoting ecological health.
- 3.Establish the campus as a living laboratory for students and researchers, offering hands-on educational opportunities to study and implement sustainable landscape architecture and agriculture conservation practices

LITERATURE REVIEW

Redefine the link Conservation Agricultur and Landscape Architecture at Campus focus

The link between Conservation Agriculture and Landscape Architecture in a campus setting involves harmonizing sustainable farming practices with thoughtful landscape design to create a resilient and environmentally conscious campus. Conservation Agriculture principles, such as minimal soil disturbance, permanent soil cover, and biodiversity, can inform the layout of green spaces for urban farming, native landscaping, and educational initiatives. Landscape Architecture plays a pivotal role in integrating these agricultural practices into the campus design, ensuring aesthetic appeal, water and energy efficiency, and community engagement. The collaboration between Conservation Agriculture and Landscape Architecture fosters a campus environment that not only supports sustainable food production but also enhances biodiversity, water conservation, and educational opportunities for the campus community.

The Principle of Conservation Agriculture

The Principle of Conservation Agriculture is consistently acknowledged as a sustainable farming approach comprising minimal soil disturbance, permanent soil cover, and diverse crop rotations. This agroecological strategy is widely supported for its potential to enhance soil health, reduce erosion, and foster long-term sustainability in agriculture (FAO, [2013]; Smith et al., [2008; Johnson & Jones, [2015]). The minimization of tillage, retention of crop residues on the soil surface, and integration of diverse crops collectively contribute to improved soil fertility, water conservation, and heightened resilience of agroecosystems. Numerous studies underscore the significance of Conservation Agriculture in addressing contemporary challenges and advancing environmentally friendly and economically viable farming practices.

The Principle of Landscape Architecture

The principles of landscape Architecture are guidelines that designers use to create attractive, pleasing, and comfortable landscapes. The principles include proportion, order, repetition, and unity. These principles are the foundation of composition that professionals use to plan all kinds of open spaces, including homes, parks, golf courses, businesses, and countless other organizations (Adkins, 2021).

In addition to these principles, there are six principles of landscape design that can be used in all types of projects. These principles include scale, proportion, order, repetition, unity and rhythm. Understanding each of these principles is essential for creating a cohesive landscape design (Felber, 2022).

The Importance of Conservation Agriculture and their practices

The importance of Conservation Agriculture lies in its trans formative impact on sustainable farming practices. This approach, characterized by minimal soil disturbance, permanent soil cover, and diverse crop rotations, addresses critical agricultural challenges. Conservation Agriculture enhances soil health, mitigates erosion, and promotes water conservation, contributing to long-term soil fertility (Hobbs & Govaerts, 2010; Pittelkow et al., 2015). By minimizing tillage, retaining crop residues, and diversifying crops, this strategy fosters resilience in agroecosystems, mitigates climate change effects, and sustains agricultural productivity (Kassam et al., 2019; Verhulst et al., 2010). Its importance is underscored by its potential to reconcile environmental stewardship with economic viability, offering a holistic paradigm for contemporary and future agricultural sustainability.

The Importance of Landscape Architecture in Campus Design

Landscape architecture is pivotal in campus design, ensuring a harmonious and sustainable environment. By blending aesthetic appeal with functional outdoor spaces, ecological balance, and considerations for climate resilience, it contributes to a positive atmosphere, promotes well-being, and enhances the identity and sustainability of educational institutions. This comprehensive approach not only supports the academic mission but also influences recruitment, fostering a positive and vibrant campus community (ASLA, 2017).

The Importance of Conservation Agriculture in Campus Design

Conservation agriculture is crucial in campus design for its sustainable and environmentally responsible practices, promoting water conservation, soil health, and biodiversity. By incorporating conservation agriculture principles, campuses contribute to ecological resilience, aesthetic appeal, and the education of sustainable practices, fostering a harmonious relationship between the built environment and the natural world (MASS Design Group, 2019). Rwanda Institute for Conservation Agriculture.

METHODOLOGY

Respondents of the Study

This survey involved students at Universiti Malaysia Sabah (UMS) which is famous for its landscape and agriculture background studies. The questionnaire was distributed to Bachelor Degree students at any fields.

Research Instruments

The research instrument used to collect the data is an online questionnaire. The questionnaire contained three sections, which gathered in a quantitative form. Section A of the questionnaire gathered information about the background of respondents, such as age, gender, level of education, and course of study

In Section B, the question is to identify and the students Knowledge about Landscape Architecture and Conservation Agriculture around the Campus that can suggest a better future planning towards the sustainable design for Universiti Malaysia Sabah Campus.

For Section C, it distinguished the awareness and perception of the respondent. It reviewed the data in the form of multiple choice where the respondent had chosen their priority based on the options provided. This section is important to know the student's thought on how awareness and perception towards the environment.

For section D, which ascertains the evaluation of the respondents towards the campus future development. This is also to know how the students evaluate and how agriculture conservation can help how it can applied or proposed at the campus environment which can aid students to practice the overall agriculture at outside campus.

For the last section, the students have to give general comments and suggestion to propose or giving future ideas for the landscape and agriculture development at Universiti Malaysia Sabah Campus.

Procedure Method

In this research, the methodological approach used is a mixed-method oriented that synthesize both qualitative as well as quantitative methods as below:

Participant Observation

This techniques was implemented by doing physical observation at UMS main campus in Kota Kinabalu and also UMS branch at Sandakan,

Sabah. It was conducted by taking photos of UMS surroundings/ environment particularly those that have landscape architectural or agricultural design.

Survey/Questionnaire

This technique was conducted by distributing a questionnaire form (google form platform) to undergraduate students of UMS.

The survey form contains nine question. The first part is mainly regarding the student academic background such as faculty and year of study. The second part focuses on question regarding to research objectives. The final part is students giving comments/suggestion related to campus design, landscape architecture, or conservation agriculture at UMS.

The survey has been done by asking family members, friends and acquaintance at UMS and Sabah to share the google form link with their students or family members who are studying at UMS. (How many) students have participated in the survey.

RESULT & FINDINGS

In this chapter, the findings of the study which were obtained through a questionnaire are presented and discussed. This will ensure that the research aim is achieved, and research objectives are fulfilled. This questionnaire was distributed to 106 students at Universiti Malaysia Sabah (UMS). The student's personal info details are based on gender, faculties, and their year of semester. Out of 106 respondents, 63 percent were male while female has total of 37%. Next, most students who responded are from the Faculty of Sustainable Agriculture, followed by students from the Faculty of Business, Economics, and Accountancy. Most of the respondents are from their 1st year of studying which represents 56.3 percent followed by students in their 3rd year of study which represents 31.1 percent.



In section B, regarding their knowledge or heard of Landscape Architecture and Conservation Agriculture, about 71.7% of the respondents said they knew and heard about the subject given in figure 2.



In section C, regarding their awareness and perception, most of the respondents agree that Sustainable Agriculture can help the environment and agriculture students around the UMS Campus. About 39% voted 4 over 5 that the UMS Campus has a decent and better landscape environment. Pantai Odec became the most appealing aspect at UMS at 34% followed by Jeti UMS. Next, most of the respondents voted for Greenery open space to be applied at the UMS campus followed by aesthetic designs in figure 3.



Section C – Figure 3

In section D, Figure 4, the most appealing aspect of Universiti Malaysia Sabah is at Pandai ODEC followed by Jeti UMS. Secondly, 39.8 percent out of 104 respondents rated 4 out of 5 based on the overall design of the UMS Campus environment. Thirdly, there are two highest design that has the same respondent which are Greenery open space and applying aesthetic design. Next, all 104 respondents agree that Sustainable Agriculture can help the environment and agriculture students around Universiti Malaysia Sabah. Lastly, 88 out of 104 respondents said that there are existing agriculture or gardening spaces in the campus environment.



In section E, 30 respondents gave additional comments or suggestions related to campus design, landscape architecture, or conservation agriculture at UMS.

Bil	Comments and Suggestions	Focus Point
1	Proposing more trees and vegetation around the campus	Planting Design
2	Applying more greenery design to add a more sustainable approach toward the environment	Greenery Design
3	Any designs that can match the cultural or design element implemented at the UMS Campus	Suitable Landscape Design
4	Making sure any proposed design is effective and worth the budget cost	Cost Budget
5	Increases and provide more sidewalk seating at the Faculty of Sustainable Agriculture Lake	Sidewalk / Walkway Design
6	The walkway needed to be improve in terms of design comfort and friendly user	Walkway Design
7	Running water elements such as waterfalls are so good to let out the stress while on campus and landscape.	Water Elements
8	Build a space where it is not too hot for other people can stay and wait for their next classes	Public and Open Spaces
9	Sculpture that represents the environment of students and the identity of UMS with the application of natural element	Sculpture
10	More aesthetic design at lake view	Lake Design
11	Adding agriculture field for agriculture students so they use for landscape practices	Agriculture Practices and Uses
12	Students can learn better in a comfortable and aesthetically pleasing open and public space.	Open and Public Space

Most Focus Point

- Open and Public Spaces at Campus
- Walkway and Sidewalk Design
- Planting Design
- Lake Design

DISCUSSION & SUGGESTION

In the quest for sustainable and holistic campus development, this seminar report investigates the synergistic integration of landscape architecture and agriculture conservation. Recognizing campuses as crucibles of innovation and experimentation, the report explores the intricate tapestry of benefits

and challenges associated with this comprehensive approach.

Landscape Architecture in Campus Design

Aesthetics and Well-being

The journey commences with an exploration of how thoughtful landscape architecture contributes to the visual appeal of the campus. Through the interweaving of diverse plantings, green spaces, and pedestrianfriendly pathways, the aesthetic quality of the campus is elevated, impacting the well-being of its inhabitants.

Sustainable Design

Beyond aesthetics, the study delves into the pivotal role of landscape architecture in sustainable campus development. Incorporating waterefficient designs, green roofs, and native plantings establishes a foundation for reducing the environmental impact, creating resilient and ecologically sensitive landscapes aligned with broader sustainability goals.

Social Spaces

Campuses, as dynamic hubs of social interaction, necessitate landscapes that foster community bonds. The study explores the creation of communal spaces designed not just for aesthetics but to accommodate diverse social activities, promoting interaction, relaxation, and outdoor learning. The emphasis is on designing flexible spaces that evolve with the vibrant campus community.

Accessibility and Exclusivity

Ensuring outdoor spaces are accessible to everyone is fundamental to landscape architecture. The study discusses on how landscape architects contribute to inclusivity by incorporating elements such as ramps, smooth pathways, seating areas, and sensory gardens, creating an environment catering to the diverse needs of the campus populace.

Ecological Education

The landscape emerges as an educational canvas, promoting awareness of native ecosystems, biodiversity, and sustainable practices. Informational signage, interpretive trails, and outdoor classrooms become tools for engaging students in environmental stewardship and fostering a deeper

connection to the natural world.

Agriculture Conservation in Campus:

Local Food Production

Shifting focus to agriculture conservation, the report examines the integration of local food production into the campus fabric. Community gardens, rooftop farms, and vertical agriculture initiatives are explored as means to reduce the carbon footprint associated with food transportation while promoting sustainable agricultural practices.

Biodiversity Conservation

Sustainable agriculture practices contribute to biodiversity conservation, preserving native species and creating habitats for wildlife. The report delves into the balance between agricultural activities and ecological preservation, emphasizing organic farming methods and the establishment of wildlife corridors within campus landscapes.

Water Conservation

Water, a precious resource central to agriculture conservation, is discussed in terms of responsible water management practices. Efficient irrigation systems, rainwater harvesting, and the selection of droughtresistant plant varieties are explored as strategies contributing to overall campus water conservation efforts.

Educational Initiatives

Agriculture on campus becomes not just a source of sustenance but a living laboratory for educational initiatives. By offering agricultural courses, organizing farm tours, and providing hands-on experiences, campuses can instill a deeper understanding of the food production process and promote sustainable agricultural practices among students.

Campus Resilience

Diversifying campus landscapes with agriculture contributes to resilience against climate change and environmental challenges. The report explores the integration of resilient crop varieties, agroforestry practices, and adaptable landscapes capable of withstanding changing climatic conditions, ensuring the long-term sustainability of the campus environment.

CONCLUSIONS

Integrating landscape architecture and agricultural conservation on university campuses is critical for creating sustainability, improving education, and engaging the community. The overall suggestion provided by UMS students is quite useful, but it does not provide the most specific response to the application of landscape design to the environment. This could be because UMS does not offer a landscape architecture degree program, resulting in an unplanned landscape design approach to the campus.

The suggestions and recommendations take a comprehensive approach that not only improves the aesthetics of the campus environment but also adds to critical ecosystem services, resource efficiency, and biodiversity. It converts the campus into an educational hub, educating students for realworld difficulties and demonstrating environmental leadership. By actively involving the community, universities become catalysts for widespread environmental responsibility, paving the way for a resilient and ecoconscious future.

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Setuju.

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