KUYOG: An Integrated Agricultural Research and Learning Facility, The Aldergate College – Aurora Campus, School of Agriculture Building

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ABSTRACT

Despite agriculture being a primary source of livelihood in the Philippines, it is often considered an undervalued profession. To address the industry's challenges, this research proposed a project in Aurora, Quezon, focused on enhancing agricultural education. The goal was to create a vibrant, modern learning space for future agricultural practitioners, providing them with the necessary skills and knowledge to improve the farming economy through an integral biophilic design for a cutting-edge building complex. Utilizing a qualitative design approach, data were collected from various sources, including interviews, site visits, and design standards. The study's outcomes and framework can serve as a model for future initiatives, inspiring young people and others to enter the field of agriculture by creating a conducive learning environment. This research integrated various architectural strategies to empower future Filipino farmers by establishing a sustainable community and training ground to cultivate their passion and drive them towards success, thereby boosting the Philippine agricultural sector. Furthermore, acknowledging the importance of college campuses in shaping future professionals and serving the community, this study developed a design solution for the new Aldersgate College campus as a semi-agricultural school. The proposed design for the Agricultural Research Center on campus was informed by data gathered through consultations, site visits, architectural literature, and relevant resources. This data was analyzed to facilitate the design process, employing an applied research approach. The study culminated in a comprehensive design solution, including architectural plans, elevations, sections, and perspectives, enriched by market analysis, technical assessment, financial evaluation, management studies, socio-economic analysis, and environmental assessment.

Keywords: Integral, Biophilic, Campus, Agriculture School, Aldersgate College, Agricultural Research Center

INTRODUCTION

The Philippine agricultural sector, vital to livelihoods and food security, struggles with low productivity and limited access to technology. To address this, particularly in the fertile Cagayan Valley, Aldersgate College—Aurora Campus proposes "KUYOG: A Haven for Agricultural Research and Learning" is proposed. This new School of Agriculture aims to be a central hub for research, education, and innovation, fostering regional and national agricultural growth by equipping farmers with modern skills, attracting youth, and building on the Philippines' rich history in agricultural education.

Despite this historical significance, agricultural education faces declining enrollment and underinvestment. However, integrating sustainable agriculture and collaborating with ASEAN offers new opportunities. Globally, agricultural education is evolving to emphasize practical skills for food security and sustainability. Philippine semi-agricultural colleges provide specialized training, using demonstration farms to teach modern techniques and combat declining productivity, increasingly recognized for driving economic growth through innovation.

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Agricultural education boosts economic growth by promoting informed resource use, aids social development by empowering communities, and supports environmental stewardship through sustainable practices. Agricultural research centers are key to overcoming challenges like limited education and infrastructure by focusing on crop improvement, resource management, and knowledge sharing. Well-designed agricultural school buildings, like the proposed "KUYOG" project, are crucial for bridging theory and practice, offering practical learning spaces and integrating sustainability to equip youth with essential agricultural skills and advance the sector in Cagayan Valley and the Philippines.

METHODOLOGY

This chapter details the research's framework, encompassing its setting, design, data gathering tools and procedures, analytical methods, and ethical guidelines.

Ocular Inspection

The researchers did a thorough analysis of the proposed site for the Semi-Agricultural Education project. This assessment encompassed environmental factors, existing structures, accessibility, climate, zoning regulations, and social considerations.

Consultation

Consultation interviews with experts provided valuable insights into the project, informing both the technical aspects and design solutions. By analyzing this data, the researchers defined the project's scope and identified potential challenges and opportunities. The information gathered, particularly about the agricultural research center, significantly influenced the initial design. This data-driven approach guides the project, from conceptualization to development and beyond.

Research Participants

The participants included in this study consisted of the following:

a. Aldersgate College Vice President for Administration, Engr. Josephine P. Jasmin, MBA, MEP-CE, is responsible for all administrative affairs of the said college, including future developments in the academe.
b. Aldersgate College Head of Planning and Development, Engr. Godofredo M. Batarao, Jr., RCE, RGE, is the principal planner and engineer of the college's main campus.
c. Aldersgate College Aurora Campus Executive Designer Engr. Angelito G. Capuno, RME, MBA, is responsible for the new campus and its infrastructure development at the college in the municipality of Quezon.
d. Ms. Maybelle Blossom Dumlao-Sevillena, head of the Quezon Municipal Planning and Development Office, manages and implements infrastructure development and public works projects of the Local Government Unit of Quezon.

Architectural Books and Other Resources

Additional information needed to support the study was acquired through books, e-books, manuscripts, manuals, building codes and regulations, published studies, journals, articles, and the internet.

A. **National Building Code of the Philippines:** This code outlines regulations for architectural design to ensure safety and prevent fires in buildings.
B. **Revised Fire Code of the Philippines:** This manual provides guidelines for fire prevention, safety measures, and correcting fire safety violations.
C. **Batasang Pambansa Blg. 344 (2024):** This law mandates accessibility for people with disabilities in public buildings.
D. **TESDA Program Manuals:** These manuals are valuable references for designing the project, as they contain information on service access, requirements, utilization, and appropriate architectural design for specific TESDA courses.
E. **Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990:** This law regulates the handling, disposal, and control of toxic substances and hazardous waste.
F. **Sustainable Development Goals (SDGs):** These goals provide a comprehensive framework for sustainable development, ensuring that the project aligns with global sustainability objectives.
G. **UI-GreenMetric Guidelines:** These guidelines offer a framework for assessing the project's environmental sustainability performance, helping to identify areas for improvement and ensure that the project contributes to a more sustainable future.

Consultation Results

Aldersgate College plans to establish a new campus in Quezon, Nueva Vizcaya, including a School of Agriculture offering agriculture-related courses and TESDA programs, with partnerships with the Agricultural Training Institute (ATI). The proposed campus will feature a School of Agriculture building, a School of Divinity building, an athletics oval, bleachers, parks, entrance arches, and an administration building. The proponent has provided flexibility in the placement of infrastructure to achieve an optimal layout. Consultations with the Vice President for Administration of Aldersgate College revealed no specific requirements for the new campus or its infrastructure.

Marketing Program

Agricultural education and research centers are crucial institutions that provide education, conduct research, and engage with the community. Given their importance, effective marketing strategies are essential to ensure they attract students, secure funding, and advance agricultural knowledge and innovation. This involves strategically communicating the value and resources of these centers to various audiences.

Here are some key marketing strategies:

Digital Presence: A strong online presence is vital, including a user-friendly, SEO-optimized website with program, facility, and faculty information, as well as active social media for communication.

Print Materials: Visually appealing brochures, flyers, and posters highlighting unique offerings remain effective for distribution in local schools, community centers, and agricultural events.

Community Engagement: Active engagement through workshops, demonstrations, and field trips for farmers, students, and the public provides hands-on learning and highlights the importance of agriculture.

Partnerships: Strategic collaborations with LGUs and government/private sectors can broaden reach, providing funding, resources, and access to local networks for community events.

Alumni Engagement: Maintaining connections with alumni through newsletters, events, and social media can highlight successes, inspire students, and provide valuable feedback and support.

Targeted Communication: Utilize diverse channels to reach different audiences:

- **Radio:** Effective for broad awareness, especially in remote areas.
- **E-Newsletters:** Regular updates on initiatives, services, and staff.
- **Blogging:** In-depth information and engagement for activities like workshops.

TECHNICAL STUDY

Project Location: Aldersgate St., Aurora, Quezon, Nueva Vizcaya, Region II, Northern Luzon Philippines
Region: Region II (Cagayan Valley)
Climate: Tropical Rainwater Climate

SWOT Analysis

Strengths:
- **Abundant Agricultural Land:** Extensive farmland for agricultural education and research.
- **Level Terrain:** Flat ground simplifies construction, reducing costs and time.
- **Direct Farming Experience:** Active agricultural site provides immediate hands-on learning.
- **Natural Water Source:** Creek offers a natural water supply for irrigation and ecological studies.

Weaknesses:
- **Limited Residential Proximity:** Lack of nearby housing may reduce community engagement and access to resources/labor.
- **Central Residential Plots:** Existing plots can disrupt layout, limit expansion, and create privacy concerns.

Opportunities:
- **Local Agricultural Education:** Enhances local farming skills, livelihoods, and collaboration.
- **Unique Educational Offering:** Establishes the center as a vital resource, attracting students, funding, and partnerships.

Threats:
- **Road Network Challenges:** Central residential plots may complicate road construction and accessibility.
- **Land Use Conflicts:** Potential disputes between land uses could delay development and lead to legal issues.

Major Zones Overview

1. **Academic Zone**

This area primarily consists of classrooms and offices for the School of Agriculture faculty and staff. It also includes spaces designed for collaboration and multiple uses.

2. **Laboratory Zone**

This zone provides general laboratory spaces for various agricultural courses, along with associated storage and additional classrooms.

3. **TESDA Zones**

In addition to serving the School of Agriculture students, the building will accommodate TESDA agricultural training programs, featuring lecture rooms, testing facilities, and on-site dormitory accommodations for trainees.

1. School of Agriculture Building

1.1 TESDA Office: Administrative hub for managing and overseeing technical-vocational training programs, strategy, policy, and initiatives for quality skills development.
1.2 Waiting Area: Designated space for individuals waiting for appointments, interviews, or meetings.
1.3 TESDA Testing Rooms: Standardized rooms for skills evaluation, exams, and certification.
1.4 TESDA Lecture Rooms: Learning spaces for training, workshops, and lectures with audiovisual tools.
1.5 Cafeteria: Communal dining area for meals, refreshments, and social interaction.
1.6 Clinic: On-site facility providing basic medical services, first aid, and healthcare for building occupants.
1.7 Open Study Hall: Flexible space for individual/group study, research, and academic activities with available resources.
1.8 Classrooms: Rooms in the School of Agriculture for traditional and interactive learning.
1.9 Dean's Office of the School of Agriculture: Administrative command center for the school, managing operations, strategy, planning, and communication.
1.10 Faculty Office: Private spaces for professors for research, student consultations, and administrative work.
1.11 General Labs: Laboratories equipped for agricultural experiments, research, and practical training.
1.12 Flex Module Rooms: Adaptable rooms for group discussions, workshops, and seminars with flexible layouts.
1.13 Large Lecture Rooms: Rooms for large student groups, equipped with audiovisual technology and appropriate seating.
1.14 Computer Laboratory: Lab with computers and software for learning computer-based agricultural sciences.
1.15 Garden Atrium: Tranquil indoor space with natural elements for relaxation, social gatherings, and events.

Design Objectives and Considerations

Design Objectives

Campus Plan Objectives:

- Establish a university campus on agricultural land for agriculture-related programs and services.
- Design a campus integrating educational opportunities within buildings, facilities, and natural spaces to foster student learning.
- Implement a landscape plan balancing active, relaxing, and accessible spaces for a healthy learning environment.

School of Agriculture Building Objectives:

- Design a building that effectively houses academic programs and serves as a training center for agriculture-related TESDA courses.
- Develop an energy-efficient building plan incorporating natural light and ventilation to minimize environmental impact.
- Create an inspiring and motivating learning environment fostering productivity, collaboration, and community.

Campus Plan Design Considerations:

- **Accessibility:** Prioritize equal access for all through barrier-free pathways, ramps, and accessible entrances.
- **Pedestrian-Friendly Design:** Encourage walking with green spaces, seating, clear signage, and multiple walkways for the community.
- **Efficient Circulation:** Optimize movement with smooth pathways, roads, and transportation routes.
- **Enhanced Safety:** Implement adequate lighting, emergency call boxes, and clear sightlines for security.
- **Campus Cohesion:** Create a unified environment through consistent architectural styles, landscaping, and wayfinding.
- **Healthy:** Foster a healthy environment by maximizing natural light, green spaces, fitness amenities, and good air quality.

School of Agriculture Building Design Considerations:

- **Environmental Responsibility:** Reduce environmental footprint through energy-saving systems, water efficiency, and sustainable materials.
- **Inclusive Design:** Ensure universal access to all areas and facilities for diverse abilities.
- **Streamlined Movement:** Prioritize clear and efficient flow with intuitive navigation and strategic placement of entrances/exits.
- **Adaptable Spaces:** Incorporate flexible and modular elements for evolving needs.
- **Visual Harmony:** Create an aesthetically pleasing and cohesive architecture reflecting institutional values and local context.
- **Optimized Illumination:** Maximize natural light and use energy-efficient artificial lighting.
- **Safety:** Prioritize safety with emergency exits, fire protection, secure access, and attention to agricultural-specific hazards.

Design Philosophy

Ludwig Mies van der Rohe's concept of harmonizing nature, architecture, and human experience guided the design, aiming to seamlessly blend natural elements into the building to foster a holistic and interactive environment. Alexander Isley's idea that good design sparks curiosity and learning was also central. The building was envisioned as an integral part of the educational process, shaping individuals through its spaces and inspiring them to achieve their full potential.

Design Approach

The Aldersgate Aurora School of Agriculture building embodied **Integral Architecture**, a holistic design approach that seamlessly blends three key principles:

Biophilic Architecture integrates natural elements like materials, light, views, and plants to boost well-being and productivity. **Bioclimatic Architecture** optimizes buildings for local climate and energy efficiency through passive solar design, natural ventilation, and adaptive materials. **Biomimicry Architecture** creates sustainable and responsive structures by emulating natural forms, functions, and processes.

Design Strategies and Solutions

The campus planning and the School of Agriculture Building's design strategies were based on Terrapin Bright Green LLC.'s 14 principles of biophilic design.

Campus Plan - Biophilic Design:

Biophilic design enhances well-being by deeply integrating nature into buildings. This involves maximizing visual connections to nature through large windows and strategic layouts, as well as non-visual connections such as natural scents and tactile materials. The design incorporates non-rhythmic sensory stimuli (irregular patterns, dynamic lighting), thermal and airflow variability (natural ventilation, passive cooling), and the presence of water (indoor/outdoor features). It optimizes dynamic and diffuse light through daylighting and fosters connection with natural systems through green infrastructure and local biodiversity. Biomorphic forms and patterns use organic shapes, and prioritization of raw materials connects them to nature. The design balances complexity and order with natural patterns and surprising elements. It creates a sense of prospect with clear views, offers refuge in comfortable, protected spaces, and adds mystery through winding paths and obscured views. Lastly, it safely integrates elements of risk/peril, such as trails and observation points.

School of Agriculture Building - Biophilic Design:

Biophilic design in architecture enhances well-being by deeply integrating nature. This involves maximizing visual connections with nature through ample natural light, strategic views, indoor plants, and garden-adjacent seating. Non-visual connections are fostered by using natural materials for tactile engagement, incorporating water sounds, and including scented native plants. The design introduces non-rhythmic sensory stimuli through subtle sensory changes and varied textures. Thermal and airflow variability is optimized through natural ventilation, adjustable shading, and thermal mass. The presence of water in features provides tranquility and visual/auditory stimulation, while reflective surfaces enhance light. Dynamic and diffuse light is maximized through daylighting, diffused lighting, and user-adjustable controls**.** A

connection with natural systems is achieved by showcasing natural processes, offering green views, and integrating sustainable features. Biomorphic forms and patterns use organic shapes in architecture and furniture, emulating natural textures and patterns. A material connection to nature is emphasized through the selection of natural building materials, textures, and finishes. The design balances complexity and order with a sensory hierarchy and nature-inspired patterns. Prospect is maximized through scenic views, framed natural views, and transparent materials. Refuge is provided through enclosed retreat spaces and privacy controls. Finally, mystery is created with winding paths and surprise elements, and controlled risk/peril is integrated through safe elevated walkways and observation points.

Design Technologies

This building integrated innovative design technologies for sustainability, aesthetics, and functionality. Photovoltaic panels on the roof provided clean energy, while colored glass panels enhanced visuals and managed natural light. A reflecting pool created a serene connection to nature, and living moss columns improved indoor air quality with minimal upkeep. Skylights maximized natural light, and VentiBricks offered natural ventilation and a unique architectural element. Inside, modular furniture ensured flexible learning spaces.

Form Concept

The School of Agriculture building's structure was based on Cubism, an early 20th-century art movement known for its radical approach. The key reasons for incorporating Cubist principles into the building's exterior are:

Exterior Design Concept (Cubist-Inspired):

- **Fragmented Views:** Exterior featured a dynamic, multi-perspective look using geometric shapes.
- **Geometric Forms:** Utilized cubes, cylinders, and spheres for a modern and striking appearance, also aiding cost-effective construction.
- **Space and Volume:** Explored the relationship between space and volume through strategic placement of shapes and contrasting materials/colors for depth and adaptability.

Interior Layout (Tartan Grid System):

- **Adaptable and Modular Layout:** Spaces organized along intersecting lines, allowing for easy rearrangement to accommodate evolving needs.
- **Effective Movement:** Facilitates efficient circulation with clear pathways established by the intersecting grid lines, creating a hierarchy of spaces.
- **Versatile Functionality:** Easily accommodated diverse functions and activities with modular spaces of various sizes and shapes.

Structural Concept (Combined Concrete and Steel):

- **Concrete Slab and Beam System:** Primary structural element with beam dimensions varying based on span length (narrow/deep for long spans, wider/flatter for short spans) to accommodate architectural design.

- **Structural Column Grids:** Consistent orthogonal grid aligned with the Tartan interior, strategically placed to support the Cubist exterior's fragmented elements and optimize load-bearing capacity.
- **Overall:** Provided necessary strength, stability, and flexibility for large open spaces and program load demands, working in harmony with the architectural design.

Electrical and Mechanical Concept:

- Designs and installations adhered to the Fire Code of the Philippines.
- Sustainable energy solutions, including photovoltaic panels, will be planned and installed in coordination with experts.

Final Design Concepts:

Name Concept: Kuyog

The project drew from the Cebuano term 'Kuyog,' meaning 'companion,' to foster a sense of community, shared learning, and collective growth. The campus is designed to be a gathering place that uplifts and empowers students, faculty, and the surrounding community through collaboration, shared knowledge, and a strong sense of belonging. 'Kuyog' serves as the guiding principle for a connected and collaborative learning environment within the agricultural education landscape.

Design Concept:

This project sought to revitalize agriculture by creating a modern educational complex that inspires youth and empowers future agricultural professionals. It provides the necessary knowledge and skills to boost the farming economy through sustainable design principles that harmonize with the natural environment, ultimately cultivating a thriving community of Filipino farmers and strengthening the nation's agricultural sector.

Campus Plan:

- **Social:** Fosters community engagement through educational programs and workshops, promoting knowledge exchange and social interaction.
- **Educational:** Provides hands-on learning in agriculture and other courses, enhancing opportunities for students, farmers, and community members; supports skill development through training, workshops, and research.
- **Health:** Offers access to fresh produce through urban farming and community gardens; provides green spaces and wellness programs for physical and mental well-being.
- **Economic:** Stimulates job creation through internships, research, and local partnerships; fosters innovation in urban agriculture and agribusiness; drives local income through boarding houses and commercial establishments.

- **Environmental:** Promotes sustainability through water conservation, waste management, and biodiversity efforts; minimizes ecological footprint with green infrastructure and energy-efficient systems.

School of Agriculture Building:

- **Social:** Serves as a community hub for public education on sustainable agriculture and food production, strengthening community ties and environmental responsibility.
- **Educational:** Equips students with practical skills in animal husbandry, crop production, and food processing; biophilic design creates a stimulating learning environment.
- **Health:** Increases access to fresh, nutritious food through urban agriculture; promotes physical and mental well-being through gardening and farming activities.
- **Economic:** Creates jobs in construction, maintenance, and operations; empowers local farmers with training and resources to boost productivity and regional incomes.
- **Environmental:** Contributes to local ecosystem and biodiversity conservation through biophilic design and native biodiversity integration; reduces the local food system's carbon footprint by promoting sustainable agriculture.

Financial Study:

The initial cost estimate excluded land development expenses and was based on minimum building construction rates per square meter in the Philippines for 2024-2025. A future detailed cost analysis may yield different figures.

Table 1
Total Project Cost

COST	**TOTAL COST**
Direct Cost	335,095,136
Indirect Cost	3,920,490
	TOTAL: P 339,015,626

Table 2
Return on Investment

INCOME	**TOTAL COST**
Annual Income	12,514,690
Total Project Cost	339,015,626

	If half is funded by TESDA and the Department of Agriculture: 169,507,813
	RETURN ON INVESTMENT: 27 YEARS **Public-Private Ownership: 13.54 or 14 YEARS**

Financial Viability of the Project

The projected building cost for this project was ₱166,540,000.00. This figure, compared to the estimated cost for the School of Agriculture building, suggests the project's feasibility. However, the final cost is expected to differ slightly after incorporating land development expenses and conducting a detailed estimate. Furthermore, a complete return on investment (ROI) calculation is not possible at this stage due to administrative factors established by Aldersgate College Inc., such as tuition fees, TESDA assessment fees, campus business rent, and employee labor rates. Future research can explore data for other development areas within the campus plan.

CONCLUSION AND RECOMMENDATIONS

CONCLUSIONS

The design objectives and problems from Chapter 1 were addressed by the highlighted concepts and strategies of Chapter 3, as detailed in these conclusions:

This study focused on the design of a Semi-Agricultural School for the new Aldersgate College Campus in Aurora, Quezon. The core goals were to transform the college farm into an ideal learning environment, optimize the educational experience, and maximize efficiency.

The architectural design embraced Integral Architecture, blending biophilic, bioclimatic, and biomimicry principles to create student-focused spaces that foster a productive, healthy campus. The researcher developed comprehensive architectural plans for both the campus and the School of Agriculture building, ensuring alignment with project goals.

Ultimately, the study proposed a campus plan that addresses key issues by promoting community growth, enhancing educational opportunities, and supporting environmentally sound agricultural practices. This plan emphasized sustainability, community integration, clear organization, and student needs, aiming for a vibrant, safe, adaptable, and visually appealing campus well-connected to its surroundings. The design specifically incorporated the 14 patterns of Biophilic design throughout the campus and building plans, highlighting the importance of eco-friendly materials and sustainable practices to minimize environmental impact.

RECOMMENDATIONS

This paper presented a preliminary campus plan for the new Aldersgate campus. As such, detailed technical specifications are not included. The following recommendations are made for future development:

- For practical implementation, a more thorough evaluation of technical and structural aspects is necessary, as this study primarily serves academic purposes.
- It is advised that the proponent consult with relevant professionals to assess the design's feasibility if they intend to use this study as a foundation for project implementation.
- Regular monitoring and evaluation of the campus plan and building performance are recommended to identify areas for improvement and ensure the project's objectives are met.
- Due to limited financial data, a comprehensive financial study, including ROI analysis, is required.
- A detailed study on the photovoltaic panel system, including battery storage requirements and panel capacity, should be conducted.
- Future research should examine the current state of the Boliwao Creek on the site to determine the need for erosion protection measures.

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