Monitoring vegetation cover change using vegetation indices in Tangbo River, Barangay Tangbo, Samboan

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Tangbo River is an important resource in Cebu's southern town of Samboan for being the site of Aguinid Falls, a known tourist destination. Monitoring the changes in the river's riparian vegetation is important since it has impacts on its ecological role of helping maintain biodiversity and river water quality. This study aims to detect vegetation index changes along the Tangbo River corridor using three vegetation indices: NDVI, EVI, NDMI, and Tasseled Cap indices, specifically for the years 1998, 2004, 2009, 2016, and 2019. It also aims to monitor the changes in NDVI and EVI values alongside tourism arrivals in Aguinid in 2018.

Cloudless Landsat 5 (1998, 2004, 2009, and 2016) and Landsat 8 (2019) imagery were selected. Thirty reference points were plotted along the river with a 30-m distance between each point. Vegetation Indices (VI) and Tasseled Cap values were generated using data from these points and were compared for each selected year. NDVI and EVI values from the same reference points used in Landsat were generated from selected cloudless months of 2018 Planetscope imagery. Inbound tourist records were acquired from the tourism office of Samboan and the tourism arrivals for the year 2018 was then graphed with the Planetscope VI values for better visualization.

Landsat imagery showed that there was a general upward trend in the vegetation indices from 1998 to 2019. Tasseled Cap Greenness and Wetness showed an increase in values from 1998–2019 while Tasseled Cap Brightness showed the opposite. Results from Planetscope data for the year 2018 showed that there was an inverse pattern between NDVI and tourism arrivals. Tourism arrivals peaked during the months of April and May based on annual records, while VI values dropped. On the other hand, both VI values peaked towards the last quarter of the year while tourist numbers dropped. This suggests that the pattern of VI values and tourism arrivals seemed to be influenced by seasonal changes rather than with each other. Findings from the study shows that further data collection is required to be able to establish a relationship between tourism and vegetation index values.

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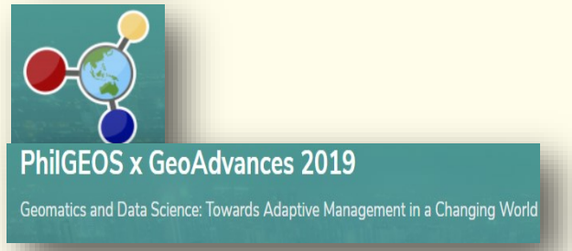

Runoff estimation using SCS runoff curve number method in Cebu Island

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Cebu, with its growing development and increasing demand for water, needs tools and inputs to efficiently understand and manage its water resources. Rainfall runoff models were developed to model surface runoff which may be used to assess water availability. Soil Conservation System (SCS) Runoff Curve Number (CN) method predicts runoff based on an empirical curve number for ungauged watersheds. This study aims to estimate the amount of runoff for the catchments of Cebu Island using the SCS-CN Runoff technique. The data needed for the application of the method in this study were rainfall distribution data, land use/land cover and soil texture for curve number assignment, LiDAR DEM for the delineation of the catchments, and supporting runoff measurements from a different runoff estimation model for assessment of the results. The collected data were prepared by assigning the mean statistics of the rainfall distribution and the composite curve number for each catchment using Geographic Information System (GIS). The calculation of the runoff was also done using the same framework. Maps representing Cebu Island's catchments' runoff estimates were produced. Since observed runoff data were unavailable, the results were verified by comparing the SCS-CN estimated runoff to the results of a physically-based distributed hydrologic and hydraulics modelling software, FLO-2D. The SCSCN estimations were found to coincide with the FLO-2D runoff estimates based on various statistical assessments. Although the results may have higher uncertainties due to the unavailability of observed runoff data, the SCS-CN Runoff method provided relevant results to that of a complex simulation model. Thus, the method may be applied to estimate runoff of ungauged catchments of Cebu Island, the results of which could provide relevant information for water resource management.

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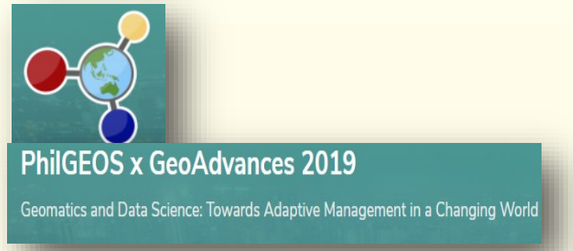

Geospatial ecological forest corridor modelling in the Mount Lantoy key biodiversity area

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In biodiversity conservation, ecological corridors are assumed to increase landscape-level connectivity and to enhance the viability of otherwise isolated wildlife populations. Mapping these corridors serves as a feasible method to support forest management efforts in pinpointing areas to give special attention to. Here, we assess the current forest presence in the 3,000 hectare Mt. Lantoy, Key Biodiversity Area in Argao, Cebu and present potential forest corridors that could enhance the canopy cover of the current protected area. We present a method to map the potential corridors through the identification of the forest patches obtained from the global forest cover dataset and the creation of a species distribution model for the black shama, an endemic bird species in Cebu island and a great biodiversity indicator for the area. Our ecological corridors were acquired through the sum of the cost distance rasters obtained from the weighted overlay and cost surface tools of the black shama habitat suitability model. With the obtained corridors from the study, four potential forest corridors/ extensions were identified connecting five different forest patches. These corridors have areas that range from 0.47–2.17 square kilometers, with a potential to increase the forest cover in the KBA to more than 33% after corridor modelling. for water resource management.

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Analyzing the status of mango trees in Brgy. Cantipay, Carmen, Cebu using NDVI and Time Series Clustering

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The Department of Agriculture – Region VII reports that many mango orchards in Cebu province are dying because of the absence of required post-harvest attention. Lacklustre yields and erratic pest infestations have driven some farmers and growers to abandon mango orchards. To help revive low-yielding mango orchards, there is a need to distinguish actively bearing mango trees from those that remain dormant throughout the year. Using remote sensing techniques, mango trees from separate orchards in Brgy. Cantipay, Carmen, Cebu were mapped and studied using multi-temporal Sentinel-2 data (from January 2018 through May 2019). Prior to that, a field visit was conducted to survey the area using UAVs and field observation, and in the process, was able to identify an abandoned mango orchard. Pixel-based Normal Difference Vegetation Index (NDVI) values were extracted from each of the 822 geotagged mango trees with an average of 16 trees among 53 divisions. Time series were derived from the average of the NDVI values from each division and plotted per month of extraction from oldest to latest. Clustering was applied to the time series data using Hierarchical Clustering with Ward's Minimum Variance as an algorithm to determine the divisions with the closest time series. Using the resulting dendrogram as basis, two major clusters were selected based on the value of their distances with each other: Cluster 1 containing 29 Divisions, and Cluster 2 containing 24 Divisions. Cluster 1 contains most of the Divisions in and around the biggest active mango orchard. In contrast, Cluster 2 contains most of the Divisions that are in and around the previously identified abandoned mango orchard. An alternative dendrogram was also created by using Complete Linkage algorithm in Hierarchical Clustering, after which 3 relevant clusters were selected. The second dendrogram highlights the stark difference between Division 1, contained in Cluster 3, from the rest of the other clustered divisions at 2.17 units from the next closest one. Notably, Division 1 is located smack in the middle of the abandoned orchard The remaining clusters, Cluster 2 with 21 divisions containing most of the divisions in the abandoned orchard, is 2.46 distance units away from Cluster 1, which has 31 and hosting most of the divisions in the active mango orchards. Two major clusters emerged from using the two algorithms. Divisions with higher and more variant NDVI values seemed to come from the mango trees which were more active during the fruiting cycle. Divisions from the abandoned mango orchards were observed to have lower and less varied NDVI values because of minimal activity in the trees. Other Divisions clustered under the abandoned orchard could have been juveniles based on their size

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PhilGEOS x GeoAdvances 2019
Geomatics and Data Science: Towards Adaptive Management in a Changing World

Green House Gas Inventory for A State University in Cebu Philippines

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The Philippines is one of the 196 nations that ratified the Paris Agreement under the United Nations Framework Convention on Climate Change. The agreement is heavily focused on greenhouse gas (GHG) mitigation starting 2020.However, accounting of GHG emission is necessary so that the amount and sources of emissions could be determined firstly and then monitoring and moderation of GHG could follow. Following the protocol set by the Philippine Climate Change Council, this study accounted for the GHG emissions of the University of the Philippines (UP) Cebu. UP Cebu is one of eight constituent universities of the University of the Philippines which is the national university. The main goals of this study are to: determine the sources of GHG emissions within the university; determine the temporal variations of GHG emissions; and suggest possible mitigation strategies based on the GHG emission profile. Inventory of the GHG emissions covered from January to December 2018. Emission sources in UP Cebu were classified into Scope 1 and Scope2, for emissions related to university vehicles and official travels, and for emissions related to purchased electricity respectively. Emissions related to transportation were determined through university records of vehicular fuel consumption and official domestic and international travels. Emissions related to purchased electricity were determined through monthly electricity consumption indicated in the electricity bill. It was found that the electricity provider obtains energy from geothermal, coal, oil, and mix sources and thus emission factor used for GHG calculation was adjusted accordingly. Total GHG on a per day basis expressed in ton CO2e was obtained by adding the CO2 emissions, N2O emissions, and CH4 emissions. Results of the inventory could raise awareness among university students, faculties, administrators, staff, researchers, and other constituents on minimizing carbon footprints.

Keywords: greenhouse gas; carbon footprint; climate change; global warming potential; emission factors

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ESP Tutorial Program for Humanities and Social Sciences Students

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This case study aims to present the impact of a customized English for Specific Purposes tutorial to four Grade 11 students at Arcelo Memorial National High School. Using a qualitative method, it used interviews and content analysis; and the ADDIE Instructional Design in making the tutorial program. In the Analysis stage, the researchers analyzed the needs of the respondents through profiling and administering a diagnostic test which became the basis of the tutorial design's content, activities, and assessment. The tutorial was conducted from September 24, 2018 to October 19, 2018. The results of the research are the following: (1) manifestations of progress in pronunciation and enunciation; (2) evident spontaneity in language use and (3) improvement in diction and sentence construction. The respondents evaluated the program to be beneficial and effective in addressing language deficits. The research recommends that language teachers utilize tools that enable learners to take responsibility for their own learning.

Presented during **International Conference for English Teaching Professionals,** by the United States Department of State, Regional English Language Office Manila, Philippines January 31-February 1, 2019, University of San Jose Recoletos, Cebu City.

Neoliberalism and Migration: A Critique of the Labor Export Policy of the Philippines

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Since the regime of the late dictator Ferdinand Marcos, labor export has been institutionalized as an important economic policy in the Philippines. While there may be contrasting views among academics and analysts as to the value of the policy, the brute fact that foreign remittances have highly supported the macroeconomic stability of the country is uncontestable. While this may seem advantageous, a more critical analysis of the policy's origin and purpose will show how this could be damaging to the country and to the Filipino workers in the long run.

This paper will present a critique of the labor export policy (LEP) in the Philippines via a critical discourse on neoliberalism. As an analytical research, I will present and evaluate relevant facts, information, and discourses to build the argument that neoliberalism, as enhancing the situations of poverty in the Philippines, conditions LEP. I will argue that being "a temporary measure to address the country's immediate problems"[1] at the time of its conception, the policy as such does not aim to salvage a crisis-stricken economy but actually aggravates recurring crises. I will specifically argue that the LEP: 1) is a consequence of a semi-colonial and pre-industrial economy; 2) dialectically maintains the same backward economy dependent on foreign demands and remittances; and 3) is detrimental to the democratic interests of the Filipino workers.

[1] Dovelyn Rannveig Mendoza, 'Human capital: The Philippines' labor export model,' *World politics review*. 6 June 2015, http://www.worldpoliticsreview.com/articles/15998/human-capital-the-philippines-labor-export-model (03 June 2017).

Presented during **Asia Pacific Peace Research Association (APPRA) Conference 2019**, 02-04 May 2019.

Social Media Research in Language Education: Data, Approaches, and Analysis

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This presentation discusses how to use social media in education and conduct research about the impact of social on teaching-learning. First it presents the research on "Using Facebook as a Learning Management System in Teaching". This study presents the attitudes and perceptions of the students towards using Facebook (FB) Group in teaching Research. It was conducted for one semester to 75 secondary students. Employing descriptive research, this study used the Student Attitudes and Perceptions of Using FB Survey by Pollara & Zhu (2011) and focus group discussion. Findings show that students "Somewhat agree" that using FB Group in teaching Research developed their content learning, motivation, and collaborative skills. The instant messaging promotes collaborative learning and direct interaction among co-students and teachers. Despite the distractions in the FB Group environment and the lack of internet connection among the students' homes, the respondents still suggested to continue using FB Groups as an alternative elearning system. The second presentation discusses a collaborative research between UP Cebu Adjunct Professor Sean Edgley on using Instagram in writing poetry and micro fiction. Over two months, Prof. Edgley conducted workshops at UP High School Cebu, supervised by Dr. Vilbar. In addition to providing background on poetry and short fiction, the course presented students with micro-literature and invited them to self-publish their own writing on Instagram. Using mixed methods research, student engagement was tracked over the course, using pretest-posttest surveys, journals, and interviews. Findings show that students' skills and motivation to write poetry and fiction were developed. After the course, Grade 8 students began the service learning component, teaching creative micro-literature to Grade 7. Findings provide a heartening model that can be used in conjunction with the teaching of the DepEd competencies.

Presented during the **Mindanao State University Iligan Institute Technology Department of English Research Colloquium on Social Media, (Discourse, Culture, and Language.** 1-2 May 2019, MSU-IIT, Iligan City

College of Arts and Social Science
ENGLISH DEPARTMENT

Emancipating the Patriarchal Consciousness Through Resistance vis-a-vis Simone de Beauvoir's The Second Sex

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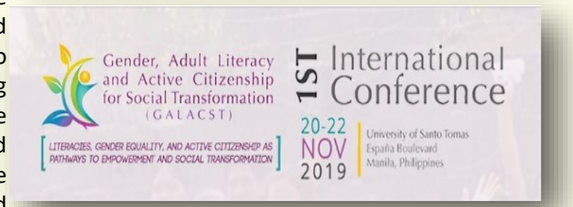
Naïve, indecisive, dependent… In a woman's world, these labels are still attributed to her being even though the Philippines ranks high in gender responsiveness. Despite the advancement of feminism in the country, many men still see themselves as superior to women imposing a patriarchal chauvinism in a semi-feudal society whether in the field of work, religion, education, household, or in the larger society. Many tend to accept women as 'the second sex' subservient to the macho-feudal patriarchal culture. Hence, this paper aims to look into society's patriarchal consciousness vis-a-vis Beauvoir's *The Second Sex*. In doing so, participatory research is employed but not limited to conversations, dialogues, focus group discussions, and interviews. Conducted in a fourfold manner, the first thing done is asking the participants to identify the issues and problems they face in their respective households, workplace, and in the community related to parity between men and women. The second is to identify the individuals and/or institutions causing hindrance in achieving parity. The third is to chart the future of women and feminism if the issues and problems they identify are not addressed. Lastly, the participants drew solutions to their identified problems. Consequently, women are still struggling for parity with men but they're not 'the second sex'. There is no second sex either. Women are the equal counterpart of men. Classifying women as 'second sex' subsists in the subconscious. Unconscious discrimination from households to the corporate world impairs women's self-esteem. Since the macho -feudal patriarchal consciousness subsists, there is, then, a need to sustain and advance further women's role at home, in the workplace, in the church, and in the larger society. There is a greater need to strengthen the mainstreaming of women's nature, role, and rights. Through the new narratives, resist the male-and-market-defined social construct women attributes.

Presented during **1st International Conference on Gender, Adult Literacy and Active Citizenship for Social Transformation (GALACST)**, held on 20-22 November 2019, at the University of Santo Tomas



Rising from Rubbles: Looking into the Recovery and Challenges of Community Based Tourism Sites after the Earthquake in the Province of Bohol, Philippines

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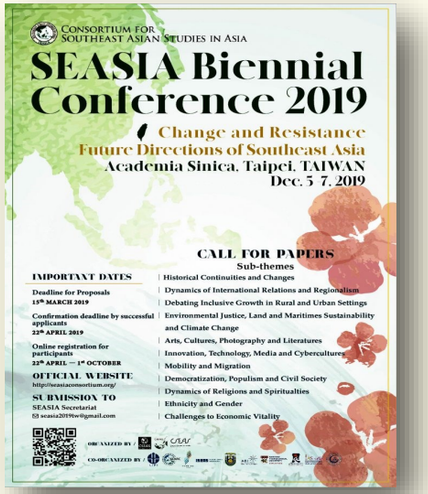
Bohol takes pride as one of the top tourist destination in the Philippines. With its pristine beaches and natural eco destinations, it became a familiar host for commercial tourism. Apart from the conventional tourism, other stakeholders such as people's organization with the aide of the Local Government Units(LGUs) and Non Government Organizations(NGOs) developed community based tourism, which started in the late 1990s. It involved local communities' participation in the establishment, management and promotion of the initiative. However, the 7.2 magnitude earthquake in October 2013 abruptly immobilized the tourism industry in the island province. Tourism spots both commercial and community based were badly damaged. The commercial tourist industry was quick to recover as the private investors poured recovery funds. In contrast, community based tourism still have to coordinate with the local governments and NGOs to its recovery plans.

This paper explores selected community based tourism sites' recovery from the earthquake. It presents case studies of collective effort from the community, local government and NGOs towards the resurgence of the local tourism initiatives. Particularly, the paper uncovers the challenges and experiences encountered by local communities on the on-set of the calamity. Furthermore, the paper describes how the communities rebuild their tourism development infrastructures after being razed to the ground by the natural calamity. In sum, this paper not only showcases the collective effort of people in preserving their local tourism initiative but it displays the "resiliency and the empowerment" of people in the process of rising from the rubbles of a disaster.

Keywords: disaster, recovery, empowerment, community based tourism, resiliency

Presented during **SEASIA Biennial Conference** held on 5-7 December 2019, Academia Sinica, Taipei, Taiwan



Human rights in a Time of Populism: Philippines under Rodridgo Duterte

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Although much of the researches on populism intimately delineates its relationship with democracy, few studies have been done relating it to human rights, which is presently under siege with the rise of populist leaders and groups. This paper seeks to examine the intersectionality of populism and human rights by looking at the case of the Philippines under President Rodrigo Duterte. The "new" ideational approach of populism analyzes populist ideas as latent demand or disposition that is activated and mobilized by populist actors, and appropriating the notion of "contestation." This paper argues that Duterte's populist political attitude is a mere reflection of the country's authoritarian culture and illiberal values characterized, among others, by the disregard for liberal political institutions, norms, and practices. The failure of the liberal democratic regime to sufficiently respond to basic social ills was harnessed and mobilized by Duterte, the "strongman" from Davao, into political action. In addition, Duterte's indifference and violative treatment of human rights as a principle and a standard that needs protection transpired in a highly unequal and elitist political system. This implies that turning against this populist challenge to human rights necessitates treating populism as an ideal that is initially hidden but must be surfaced. Also, although there needs to be continual opposition and contestation, there has to be an acknowledgment of populist's structural contexts. Future studies could venture into quantification and measurement of empirical variables to complement the prevailing methodological vista of populism research in the Philippines.

Keywords: authoritarianism, democracy, human rights, Philippines, populism, Rodrigo Duterte

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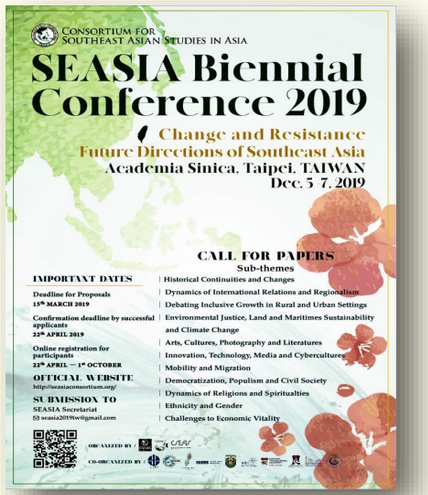

Cooperative Development and the Philippine Mango Industry: Towards Inclusive Growth in the Local Agricultural and Tourism Economy

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In most rural areas, agricultural work is being considered as a primary source of income and living for the locals. This is true in most countries of Southeast Asia which is highly dependent in agriculture that dominantly drives their national economy to prosper. However, challenges pertaining to the agricultural economy continuously persisting in rural areas as a product of the fast pacing trends of industrial development, migration and modernization.

Innate in the geographical characteristic of Southeast Asia, the Philippines as a tropical country of the region promotes cultivation of tropical fruits and agricultural product. In this case study, it focuses on the mango industry of the Guimaras Province in the Philippines where it identifies the role of cooperative development in organizing the agricultural community for a sustainable, collaborative, and inclusive advancement. Based on the key informant interview conducted, the findings shows that (a) the cooperative though organized, has not sustainably enabled representation of the mango sector, (b) there is a low membership among the mango sector in the cooperative, (c) the cooperative is disenfranchised in the processes of governance, and (d) though the mango economy boosted agritourism development has left the mango workers and laborers not benefiting from the proceeds of their effort. The study concludes that mango sector in the local agricultural economy was not inclusively involved in the processes of decision making, and collaborative governance initiatives, thus, making them alienated and marginalized in the systems of agricultural and tourism development. Likewise, the returns of the advancement made is only centered to the state and the market, leaving the workers benefiting less to none. It can be concluded further that the idea of cooperative development was used only in establishing an organization for the sector, however, was not fully mobilized towards inclusive growth of the local mango industry.

It is important to note that in addressing development initiatives and agendas, the role of cooperation, collaboration, and inclusivity is significant in providing an avenue for the marginalized sector to be properly represented. A policy recommendation has been provided for the local government and the cooperative in considering as a course of action in addressing these concerns.

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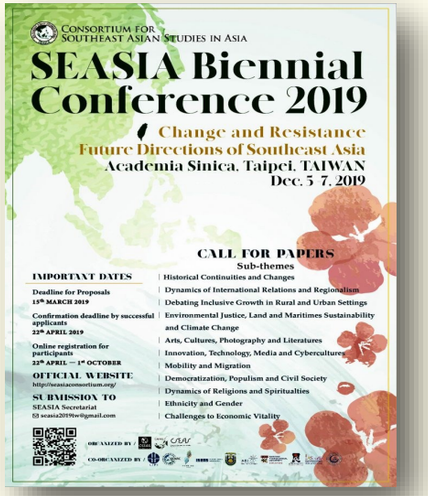

Complementary Use of Airborne LiDAR and Terrestrial Laser Scanner to Assess Above Ground Biomass/Carbon in Ayer Hitam Tropical Rain Forest

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This study aimed to develop a method of assessing the AGB/carbon stock of a tropical lowland rainforest with a vertically complex structure. The method utilizes the complementary strengths of airborne LiDAR and terrestrial laser scanning system to assess the upper and lower canopies of the forest to achieve reasonable results. The method was implemented in Ayer Hitam Forest Reserve in Malaysia. The upper canopy layer was assessed by generating tree parameters using airborne LiDAR to obtain height from CHM and segmenting the Orthophoto to obtain CPA. DBH was modelled through multiple regression using the derived parameters as independent variables and the field DBH as the dependent variable. The modelled DBH achieved an R^2 value of 0.90 and RMSE of 0.02 cm for the 16 plots. To estimate the AGB an allometric equation was applied to the modelled DBH together with LIDAR derived height. The modelled AGB was validated using the field DBH and LiDAR derived height. The derived model has an R^2 of 0.98 and RMSE of 69.44 Kg for the 16 plots.

The lower canopy layer was assessed using the registered scene from the TLS. This is to complement the trees that were not identified from the upper canopy layer. Scanned trees in the plot were extracted. Then DBH and height parameters were measured using RiSCAN Pro software interface. These parameters were then used for the allometric equation to estimate the AGB for the lower canopy. The correlation of the TLS measured DBH and field measured DBH was established and achieved an R^2 value of 0.99 and RMSE of 1.03 cm. The modelled AGB was estimated using the TLS measured height and DBH by applying the allometric equation. The model was validated using the field measured DBH and TLS derived height. The result was a model with an average R^2 value of 0.99 and RMSE of 19.23 Kg for the 16 plots. The derived AGB from the upper and lower canopies were combined. The accuracy of the complementary method of deriving the estimated AGB from the two sensors was assessed by obtaining the R^2 and RMSE of the two sensors. The achieved R^2 and RMSE is 0.98 and 188.35 kg respectively for the 16 plots.

The results in this study presented a potential method of addressing the need to provide accurate AGB/carbon assessment for a complex multi-layered tropical rain forest.

Keywords: Airborne LiDAR, Terrestrial laser scanner (TLS), Segment, AGB, allometric equation.

Presented during **the 40th Asian Conference on Remote Sensing** , held on 14-18 October 2019, Daejeon Convention Center South Korea

Issues, Challenges, and Opportunities in Sustainable Tourism Development in Central Visayas: Specific and Common Concerns of Cebu and Bohol

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This paper explores the status, issues and concerns, and challenges and opportunities in sustainable tourism development in Central Visayas using the framework of sustainable development, with its three aspects of socio-cultural sustainability, ecological sustainability, and economic sustainability. Cebu and Bohol, the top two tourist destinations in Central Visayas, are popular for the following: world-class hotels, beaches, and resorts; meetings, incentives, conventions, and exhibitions (MICE) tourism; community-based ecotourism; cultural tourism; and agri-tourism. Both provinces have issues and concerns, challenges, and opportunities—some of which are specific to each, while some are common to both. Among the specific issues and concerns in Cebu are the need for good governance and inter-agency coordination for sustainable tourism, particularly in ecotourism sites, and the need to develop and strengthen more types of alternative tourism. Bohol is concerned with restoring and preserving itsheritage structures and ensuring equitable economic growth and environmental sustainability. Their common issues include tourism-induced prostitution, climate change, disaster risk preparedness, growing traffic congestion, water sustainability, solid waste management, air pollution controls, quality of water in seas, preservation of marine resources, the need for an efficient public transportation system, and the implementation of their tourism and environmental codes to ensure sustainability.

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