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Thesis/Practicum Reports
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Title:	**Leaf litter production and decomposition of Gigantochloa levis (Blanco) merr and Dendrocalamus asper (Schultes F.) Backer ex Heyne at the UP Laguna Quezon land grant**
Author:	**Asuelo, Paul Calderon**
Adviser:	**Galang, Marco A.**
Abstract/Executive Summary:	The thesis aims to provide baseline information on the production and decomposition of leaf litter from two economically important bamboo species, namely: Bolo [Gigantochloa levis (Blanco) Merr.] and Giant Bamboo [Dendroclamamus asper (Schultes f.) Blacker ex Heyne]. Leaf litter production was estimated through placement of eighteen litter traps in the bamboo plantation of UP Laguna-Quezon Land Grant while decomposition was estimated by placing litter bags in the plantation floor. Soil chemical indicators like soil carbon, soil organic matter, and nitrogen content were also measured to see if the presence of bamboo litter on the plantation floor has a significant effect on soil quality. Leaf litter production from the two species is found to be minor compared to other bamboo species and other land use G. levis produced only 1761 kg ha-1 while D. asper produced 1883 kg ha-1. Leaves were estimated to be 50% decomposed at 126 and 121 days for G. levis and D. asper, respectively, while 95% decomposition for both species exceed 500 days. The relatively slow decomposition rate can be partly explained by the high carbon-nitrogen ratios of leaves for both species. Soil chemical indicators show no significant difference between plantation and in an adjacent grassland, but values found are nonetheless considered above average (SOM>6%and N>0.3%). The result of this study shows that bamboo plantations produce slow decomposing leaf litter that explains the high amount of organic matter found in the plantation floor. This information can be important when deciding what crops can be planted on marginal lands to improve soil quality as well as adaptations to prevent possible fire occurrences.

Title:	**Comparative analysis of above ground carbon sequestration potential of secondary mixed forest and dipterocarp plantation in Mt. Makiling Forest Reserve, Laguna Province, Philippine**
Author:	**Baggay, Jomari Christian Dela Cruz**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	The objective of the study is to compare the aboveground biomass and Carbon sequestration potential of the trees in Permanent Field Laboratory Area 1 (PFLA 1) and Dipterocarp arboretum and to compare the overall Carbon stock of the two study sites in Mount Makiling Forest Reserve (MMFR), University of the Philippines-Los Baños, Laguna. Primary and secondary data were collected and gathered in this study. Primary data was obtained in Dipterocarp arboretum, full inventory of the study site was done. Trees having 10cm dbh and above were considered in data gathering. The total height, crown area and location of the trees were also measured and recorded using the field instruments provided by the Institute of Renewable and Natural Resources department. On the other hand, secondary data was collected from the practicum report of Angela Tamoria (2017) entitled Carbon Storage Determination of Trees with dbh > 5 cm in Permanent Field Laboratory Area 1 in Mount Makiling Forest Reserve. With the enough data that were gathered, computation for the aboveground biomass and Carbon sequestration potential of the two study sites was done in MS Excel. The total aboveground biomass and Carbon being stored by the trees represents the Carbon sequestration potential of the two study sites which were analyzed and has been compared. White Lauan had the highest aboveground biomass and Carbon stored in Dipterocarp arboretum, while PFLA 1, Bagtikan is the highest. Overall, Dipterocarp arboretum contained relatively higher Carbon sequestrated compared to that of PFLA 1.
Title:	**Soil fertility assessment of the different land covers in Barangay Concepcion Banahaw, Sariaya, Quezon**
Author:	**Bolaños, Joana Iris Santos**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	The practice was conducted in Barangay Concepcion Banahaw, Sariaya, Quezon from June to July 2017. The aim of this practicum was to expose the student on the practical aspect of conducting soil fertility assessment among the different land covers in Sariaya, Quezon. Soil samples were collected from cultivated perennial, cultivated annual, open forest, closed forest and shrubland to assess the current fertility status of the soil from each land cover type. The chemical properties of the soil samples were analysed. The results revealed that all soils were acidic, have very low available phosphorus (P) and exchangeable potassium (K) but the percent (%) organic matter and percent (%) nitrogen among land cover

	were highly. The farmers also experienced low productivity of their farmlands due to depletion of soil nutrients and scarcity of water. These results suggest that the soil was not productive anymore thus causing constraint on crop production. The researcher learned that somehow human farming practices could affect soil quality, and the effect of it depends on the soil type, parent material and species composition of the vegetation sampled. The recognition of the current soil fertility status among different land covers is essential for the long-term planning of soil management objectives of rehabilitating degraded forestlands.
Title: Author: Adviser: Abstract/Executive Summary:	**Litter deposition assessment of a two-hectare permanent monitoring plot, Mount Makiling Forest Reserve, Philippines** **Caña, Marlo Mandi** **Bantayan, Nathaniel C.** Litterfall along three categorized levels of elevation in a two-hectare plot in Molawin-Dampalit watershed inside Mount Makiling Forest Reserve was evaluated throughout the existing 50 subplots (10 m x 10 m) in the site. Litterfall production for one month during the dry season was determined using 50 1m x 1m litter traps positioned randomly inside the subplots. The aim of the study was to provide an assessment of the spatial distribution of the litterfall in relation to the three classified elevation levels of the subplots. To describe the relationship of the spatial distribution of the litterfall in the site and the varying elevation, correlation coefficient between the both factors was determined. The computed mean litterfall along the 50 subplots ranged from 1.597 to 7.299. Spearman correlation coefficients between litterfall distribution and the elevation level were obtained. The quantity of litterfall was not significantly affected by the elevation of the subplots.
Title: Author: Adviser: Abstract/Executive Summary:	**Land capability assessment for agroforestry development in Mariveles Bataan using ALCAMS and GSIS** **Castillo, Wilnette Margarette Palancia** **Baliton, Romnick S.** In the study, a land capability assessment of the municipality of Mariveles, Bataan was conducted in order to locate the areas which are capable for agroforestry development. The use of maps was indispensable for they showed patterns and relationship of the features and provided better understanding of the processes operating within the planning environment. Parameters such as slope, land cover, soil fertility, and elevation were used to generate GIS-based maps. ALCAMS was used as a guide in the study and AHP was used to develop weights that will dictate the influence of each parameter in determining the capability of the land. Based on the average weights given by the respondents, soil fertility ranked as 1st having an influence of 35%, followed by slope having an

	influence of 33%, then land cover ranked as 3rd with influence of 21% while elevation exhibits the least with 11%. The municipality of Mariveles exhibits land capability classes of 2, 3, and 4 which is conditionally capable, marginally capable and highly capable respectively. Most of the areas in Mariveles exhibit land capability class of 2 which is highly capable for agroforestry development having a total land area of 10,463.67 hectares.
Title: Author: Adviser: Abstract/Executive Summary:	**GIS aided tree diversity assessment of Mt. Makiling Forest Reserve rubber plantation** **De Torres, Lyndley Morales** **Lapitan, Renato L.** Tree diversity assessment is a useful tool in the proper management and utilization of our forest that can lead to sustainable development. It also helps in the monitoring of general problems or progress of our forest by tapping those in need of proper care and maintenance as well as those species with economic and ecological uses. In this, practicum study, a tree inventory aided by Geographic Information System was conducted to gather data needed for the tree diversity assessment. This study aims to assess the diversity through analyzing the distribution, evenness, richness and dominance of the species collected in Block 7, Plot 2 of Mount Makiling Forest Reserve Rubber Plantation. It also aims to evaluate the findings to further provide recommendations for better and proper utilization and management of trees and natural resources in general. Consequently, it was analyzed that species in Block 7, Plot 2 of Rubber Plantation have very low diversity because of ecological factors specifically climate which greatly affects the distribution and growth patterns of the species. It was evident also that there were 3 dominant species in the plantation namely Pararubber, Palosanto and Mahogany which could outgrow other species with less tolerance to climate change. Generally, tree diversity assessment could be a great tool to monitor and evaluate those species who need proper utilization as well as to achieve sustainable development.
Title: Author: Adviser: Abstract/Executive Summary:	**Socio economic status, awareness and willingness of farmers in Brgy. Abo, Nagcarlan, Laguna to adopt agroforestry as a farming system** **Gomez, Michael John Cadotdot** **Galang, Marco A.** Agroforestry in simple terms is the collective name for land use systems and technologies where woody perennials are deliberately used on the same land management units as agricultural crops in the form of spatial arrangement or temporal sequence. It can also be defined as an ecologically based resource management that increases the benefits at social, economic and environmental levels

	of the people using it (FAO, 2015). This report focuses on the assessment of the socio-economic status of farmers, their awareness and willingness to adopt agroforestry as farming practice in Brgy. Abo, Nagcarlan, Laguna, as part of the project on Development of Decision Support System for Enhancing Climate Change Resilience of Smallholder upland Farmers in Selected Communities of CALABARZON, Philippines of the Institute of Agroforestry. Specifically, the practicum aimed to determine the socio-economic conditions of the upland farmers in Brgy. Abo, Nagcarlan, Laguna, estimate the percentage of farmers aware of agroforestry as a farming system and measure the willingness of farmers to adopt agroforestry as a farming system. The survey was conducted from May 23 to July 19. A total of 59 farmer respondents were randomly chosen by IAF for the survey. Each respondents were individually interviewed following a pre-tested questionnaire. The questionnaire requires on the socio-economic status of the farmers, their level of awareness of Agroforestry farming practice, and their willingness to adopt Agroforestry practice in the farm. Majority of the farmers interviewed were male. Analysis of their response showed that farming is still their main source of income followed by non-farm activities such as tricycle driving, food packaging and livestock raising. Off-farm activities like serving as laborers in the farms were also indicated as their source of extra income. It was determined that the level of awareness of farmers to agroforestry is high. Most farmer's know the benefits of agroforestry with 78% of the respondents already adopting agroforestry. Similarly, the farmers willingness to adopt agroforestry as a farming practice is also high with 80% of the respondents answering yes. The indicated reasons for non-agroforestry adoption are: it requires more work (tedious) and with uncertainty with regards to its real benefits.
Title:	**Evaluation and documentation of selected parks and Central islands along Manila City National Capital Region Philippines**
Author:	**Icomo, Gina Celzo**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	Significant learnings and experiences were acquired during the practicum which was done from June to July 17 in Manila City. There were four selected parks and center islands that were identified by the DENR-NCR which needed evaluation for the study. The first two weeks of the activity were mainly spent on the inventory and documentation of the parks and center islands in Manila City was used to recommend a landscape design in enhancing the urban greening in the city. Based on the results of the practicum report, the park is composed of diverse species of plants as well as ornamental plants that are distributed around the park. The recommended improvements in the existing landscape were done using the softwares AutoCAD and Adobe Photoshop. For the further improvement of landscape in the park and center islands, the proper selection species, appropriate planting and landscape design, and systematic maintenance management can minimize destruction of urban greenspaces in the city.

Title:	**Landscape pattern analysis of the Agos River Watershed in Quezon Province, Philippines using FRAGSTATS**
Author:	**Legaspi, Angela V.**
Adviser:	**Tiburan, Cristino L., Jr.,**
Abstract/Executive Summary:	The watershed is an important source of ecosystem services and helps in sustaining the vital role of the society. However, the watershed is also one of the most vulnerable areas to drastic landscape changes due to adverse activities like deforestation that significantly alters the natural processes. Hence it is important to monitor our watersheds to effectively provide sufficient information that will aid in improving its condition and the ecosystem services that come with it. This study specifically aims to determine the fragmentation of the Agos River Watershed in Quezon Province with the aid of remotely sensed data and FRAGSTATS software. Temporal change analysis was employed in this study covering three periods namely, 2002, 2010, and 2018. Satellite images from different years were classified into six (6) different land cover types and these are the forest, grassland, agriculture, barren, built-up area, and water. An accuracy assessment was also applied to validate the classified images and the process generated overall accuracies of 95%, 94%, and 97% with a Kappa Coefficient of 85%, 87%, and 86% for 2002, 2010, and 2018 maps, respectively. This was followed by analyzing land cover changes and results showed that a drastic change occurred in grassland. Although an increasing trend from 2002 (18,779 ha) to 2010 (19,753 ha) was observed, there was a significant decrease in 2018 (1,739 ha). Forest, on the other hand, was found to have an increase from 2010 (64,316 ha) to 2018 (83,235 ha). Furthermore, the changes in the landscape pattern were analyzed using several landscape metrics using FRAGSTATS. These include Percentage of Landscape (PLAND), Number of Patches (NP), Patch Density (PD), and Mean Patch Area (Area_MN) at the class level, while Largest Patch Index (LPI), Landscape Shape Index (LSI) and Contagion (CONTAG) were used at the landscape level. Results showed that at class level, the watershed is found to be more fragmented and complex in 2010 as indicated by the increase in NP and PD, and the decrease of Area MN. The NP for the forest, grassland, and barren increased from 251, 367 and 260 in 2002 to 355, 1242, and 545 in 2010, respectively. Along with the increase in NP, the PD of these land cover types also increased by 0.11 for the forest, 0.96 for grassland, and 0.31 for barren land making a much smaller and dispersed patch across the study area. Meanwhile, the 2018 trends in the values of the class level spatial metrics indicated that the watershed's forest cover has become more aggregated or connected already. In terms of landscape metrics, results showed that from 2002 to 2010, the watershed is deemed to be more fragmented and complex, as indicated by the decrease in CONTAG by 8.08% and LPI by 5.03, and the increase of LSI by 12.2. On the contrary, the watershed during the 2010 to 2018 period has found to be more aggregated, more connected, and less complex as signified by the increase in CONTAG and the decrease

	of LSI. With the increase in forest cover in the area, the landscape and class level metrics have confirmed that Agos Watershed's landscape became more aggregated as compared to previous years, although forest cover loss and fragmentation still were observed in some parts of the watershed. The results of this study may be utilized in sustaining the rehabilitation, conservation, and improvement of the Agos Watershed. Furthermore, these findings may also be used in targeting critical areas and would aid decision-makers and managers in taking appropriate measures to further improve the condition of the watershed.
Title:	**Documentation of agroforestry farming practices in Barangay Bukal, Nagcarlan Laguna**
Author:	**Loto, Princess Diane Solis**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	The practicum was conducted from June to July 2017 in Barangay Bukal Nagcarlan Laguna. The objectives of this practicum were: (1) acquire knowledge and experiences through face-to-face household interview and field work activities, (2) determine existing agroforestry system practices in the area, (3) identify the socio-economic profile of the farmers in the area, and (4) provide recommendations for future research purposes. The activities performed during the practicum were socio-economic survey using semi structured questionnaire and farm characterization. Data obtained are from 46 farmer respondents through interviews. Majority of the respondents (54.3%) have an annual income of Php > 50,000 from farming, non-farm and off-farm activities. Their main source of their income was from farming and non- farming activities and these activities are mostly being done by the father/ mother only or father/mother with hired laborers (32.61%). Annual cropping and agroforestry are two major farming practices in Barangay Bukal, Nagcarlan Laguna. The latter was the common farming practice in Barangay Bukal and can be further categorized into multi-purpose trees, multi-purpose trees with livestock, multi-storey, trellis with multi-purpose trees and trellis with multi-purpose trees with livestock. The annual crops in Barangay Bukal are mostly sayote and gabi and other crops. In terms of perennial crops, the majority of the farmer-respondents planted Jansones and coconut. The common arrangement of crops was in block or strip manner. This practicum gave the author the opportunities to gain new ideas and to experience new things. The author also acquired new experiences and knowledge especially about agroforestry farming practices and determined the usual crops planted by the farmer-respondents in the area. The practicum activities improved the author's skills of being a forestry student.

Title:	**Assessment of tree risk in Quezon Protected Landscape, Philippines**
Author:	**Magkawas, June Briones**
Adviser: Co-adviser:	**Villanueva, Teodoro R.** **Dida, Jan Joseph V.**
Abstract/Executive Summary:	The Quezon Protected Landscape (QPL) is situated in the southern Sierra Madre mountain range on Luzon Island. The landscape is a lowland rainforest with karst landscape vegetation. The condition of trees in the QPL at Malicboy Pagbilao, Quezon Province, particularly in the ecotourism sites was assessed from June to July 2018 to determine their risk ratings. Currently, there is no definite protocol to assess tree risk, hence, the Basic Tree Risk Assessment (Level 2) Form of the International Society of Arboriculture was utilized. This practicum study attained the following: (1) tree species inventory, (2) tree risk assessment, and (3) recommendations of tree risk management. The research study focused on the assessment of the condition of trees in the selected ecotourism site. All tree species in the selected ecotourism site with at least 5cm were inventoried to determine the tree species composition and diversity. A total of 205 trees were assessed representing 64 tree species. Results showed that the ecotourism sites had very high species diversity (H' = 3.646) and high evenness (J' = 0.685). The second objective was done using the Basic Tree Risk Assessment Form adapted from the International Society of Arboriculture. This assessment tool provides qualitative tree risk ratings from low, moderate, high to extreme. The evaluation of the health condition of trees covered the (a) crown and branches (b) trunk (c) roots and root collar. The most common defects were codominant defects in crown and branches leaning trees in trunk and buried root collar. The final risk rating of all trees showed that the selected ecotourism sites in QPL were in good condition, since 95% trees received a low risk rating and 5% only had a moderate risk rating. Among the sixty-four tree species, six of them had a moderate risk rating, namely Aglaia luzoniensis, Celtis philippinensis, Enterolobium cyclocarpum, Mitrephora lanotan, Palaquium merrillii, and Shorea astylosa. The rest of the tree species had a low risk rating and no other risk ratings. There were four areas in the ecotourism site, and the trees with highest possible rating i.e. moderate risk rating were in a certain part of the Malabayabas Forest followed by the View Deck and Pinagbanderahan. There was a low risk rating in a certain part of the Buenavista Spot. Overall, trees in moderate risk should be given an immediate corrective action on tree defects while trees in low risk rating should have proper care, maintenance and management. It is recommended that the QPL and its ecotourism sites adopt the Basic Tree Risk Assessment Form of the International Society of Arboriculture to ensure safety and security of people who visit these areas for research and leisure purposes.

Title:	**Evaluation of hazardous tree branches in Avilon Zoo, Rodriguez, Rizal. Philippines**
Author:	**Mangino, Julia Allen Hebron**
Adviser:	**Valle, Pura Beatriz S.**
Abstract/Executive Summary:	The practicum was conducted at Avilon Wildlife Conservation Foundation, Rodriguez, Rizal, Philippines from June 11, 2018 to July 20, 2018 with the general objective of evaluating the hazardous tree branches of Avilon Zoo. Specifically, the study aimed to: (1) classify the common branch defects, (2) assess the load factors that may cause branch defects, (3) identify the targets of defective trees. The evaluation of trees includes species identification, tree measurements, identification of defective branches, causes of defects, assessment of tree load factors, and identification of targets based on the tree risk assessment form by the International Society of Arboriculture. A total of 931 trees were inventoried in the 7.5-hectare zoo, representing 72 tree species. More than 71% (659 trees) of the trees were found to have branch defects, such as dead branches, broken hangers, and overextending branches. The top 5 species with the most number of trees with defective branches were Swietenia macrophylla, Albizia saman, Ficus benjamina, Eucalyptus camadulensis, and Polyalthia longifolia. These species were characterized with a large crown (LCR >50%), dense crown and dense internal branches. The trees with defective branches were also exposed to external loads such as full wind, improper pruning (flush cuts and topping), and biotic pests. Finally, the targets such as infrastructures and animal enclosures, of each tree were listed to identify the trees that can be considered hazardous. The results showed that trees with large crown, and dense interior branches were prone to develop branch defects.
Title:	**Assessment of the conditions of selected barren recreational trails of Mount Takao National Park, Jachioji, Tokyo, Japan**
Author:	**Mondragon, Jiferson**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	The pursuant of this practicum report revolves around the assessment of selected barren recreational trails located in the established national park in Mt. Takao, Hachiōji, Tokyo, Japan. This assessment study was conducted in response to the essential demand for the International Practicum for Contribution to Sustainable Development of Megacities 2018 program. The practicum involves hands-on opportunity and full exposure to the study site in relation to the conduct of the assessment study. In describing the study site, the researcher made use of secondary information. The standardization of the assessment technique was facilitated by the use of the Trail Problem Assessment Method (TPAM) which became the basis for the identification of variables

	measured and analyzed. The assessment strategy specified the collection of both numerical and descriptive data necessary for the assessment analysis. The study site is composed of ten different trails which are dominated by cemented trail treads. As a result, for the assessment to be able to materialize, the researcher only selected and studied the barren ones which is three out of the ten identified trails. All of the variables were individually measured and obtained by the researcher through the establishment of a number of trial segments with the aid of systematic point sampling technique. There are two sets of data obtained from each of the established trail segments, physical or the inventory data and impact factor data. Graphical and tabular representation of the information was created to aid in the analysis. To help in the characterizing the degree of damage where each of the three trails belong, the researcher adapted the class condition guidelines of Marion (2006), which indicated that all the studied barren recreational trails are classified under Class 3 which means that the trails need immediate repair and rehabilitation due to the combined presence of different impact factors. From this analysis, the researcher recommended that further study shall be conducted in the area to have a more in-depth understanding of its condition and finally come up with a proper management and maintenance strategy which should be implemented strictly. One of which is for the management to have a systematic way of monitoring the number of visitors of the park on a daily basis. With this information available, studies will be able to account anthropogenic causes which will help in the understanding of other impact indicators which are not able to be measured in this particular study such as soil erosion, soil compaction and existence of multiple tread. This demands a more comprehensive result entails a longer duration of study period which the researcher strongly recommends.
Title:	**The influence of soil mineralogical and geochemical characteristics on the landslide occurrences in Mount Makiling Forest Reserve, Laguna, Philippines**
Author:	**Oblena, Ma. Jesselyn Ablog**
Adviser:	**Padrones, Jenielyn T.**
Abstract/Executive Summary:	Mineralogical and geochemical characteristics of soil are two of the most important parameters to consider in evaluating the effect of soil in landslide susceptibility assessments. This study examined the geochemistry and mineralogy of soils from areas with and without landslide occurrences along the stations 11 to 17 of the Mariang Makiling trail, Mt. Makiling Forest Reserve in Laguna, Philippines. The mineralogical and major element compositions were carried out using X-ray Diffraction (XRD) and X-ray Fluorescence (XRF) techniques. Soil colloid analysis revealed that most of the soil samples are non-expansive types of clay. This is further confirmed by the XRD data, whereas soil samples taken from areas with and without landslides are made up of inactive (non-expansive) types of clays such as kaolinite/chlorite and illite.

	The computed weathering indices values such as the chemical index of alteration (CIA), chemical index the weathering (CIW) and plagioclase index of alteration (PIA) ranges from (59.72 to 94.81%), (63.13 to 96.43%) and (60.90 to 96.37%), respectively. These values indicate moderate to advanced weathering of plagioclase to kaolinite for both areas with and without landslides. The results of the study will hopefully provide a means of evaluating the influence of mineralogical and geochemical properties of soil in the landslide occurrences in the areas with volcanic lithologies.
Title: Author: Adviser: Abstract/Executive Summary:	**Zone mapping ang characterization of Mount Makiling Forest Reserve** **Orendain, Bea Isable Rivamonte** **Lapitan, Renato L.** Makiling Botanic Gardens (MBG) is a 300-hectare facility established to support professional instruction and research related to forestry and plant sciences and to serve the educational, recreational and tourism needs of the public"" on June 20, 1963 under the Republic Act No. 3523. MBG is situated in the College of Forestry and Natural Resources of the University of the Philippines Los Baños. The main objective of this activity is to delineate the boundary of the zones of MBG and characterize each zone. From July to August 2018, the boundary of MBG that is accessible to the public was delineated and the coordinates of the perimeter of the zones were collected using a handheld GPS. Thereafter, the data were encoded in Microsoft Excel, comma separated values format. Secondary data, such as digital elevation map and shapefiles of slope, contour, and soil type, were obtained from PhilGIS and from the MBG management. ArcGIS 10.5 was used to process the data, produce maps, and get the areas of the zones. Each zone was characterized, and the maps of the boundary of the zones were presented. MBG comprises 13 zones. The zones can be observed by going through the eco-trail. MBG, accessible to the public, has a land area of 26.29 hectares. The zone with the biggest area, 26.94% of MBG, is the Natural Forest and the least area, with 0.23%, is the Zingiberales. At present, activities such as bird watching, photography and hiking can be enjoyed in MBG, Zone delineation shows the shape, size and boundary of an area and the characterization of zones is necessary to understand the role of each zone.

Title:	**Assessment of potential ecotourism sires in Banila Watershed, Pangasinan using Geographic Information System (GIS)**
Author:	**Parangat, Roel Campanero**
Adviser: Co-adviser:	**Racelis, Diomedes A.** **Dida, Jan Joseph V.**
Abstract/Executive Summary:	Ecotourism is a subset of tourism focused on the use of natural resources in considering sustainability through the promotion of conservation and protection (Fung and Wong, 2005). It is seen as a helpful tool to engage people with nature and to give them a first-hand experience of the natural resources. In developing an area for a proposed land use, proper identification is a necessity. This paper aims to identify the potential sites for ecotourism land use in Banila Watershed in Pangasinan, a sub-watershed providing water services for 99 barangays, and to support the local government in conducting a watershed management plan. The Geographic Information System (GIS) is used in assessing the potentiality of the site. There are 4 criteria used in this assessment namely Naturalness, Topography, Accessibility and Community Characters. Each criterion is measured by corresponding thematic maps which are scored based on the weight of importance. The scores were obtained from a similar study on land suitability analysis in Thailand which used the Analytical Hierarchy Process in decision analysis. Among the criteria, Naturalness and Topography scored the highest relevance. Upon analyzing the maps, the result shows that Caraballo mountain is classified as moderately to highly suitable for ecotourism. The most suitable areas are located at the elevated portions of Barangay Mabani, Municipal of San Quintin while the least suitable are the areas that are highly urbanized, low elevated lands and near to primary roads.

2018

Title:	**Development of Geodatabase of the forest inventory of CFNR Rubber Plantation, Mt. Makiling Forest Reserve, Los Baños, Laguna**
Author:	**Abadilla, Angelica Gene de Leon**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	This manuscript highlights the result of the study on the development of a geodatabase of the forest inventory of College of Forestry and Natural Resources Rubber Plantation in Mount Makiling Forest Reserve, Los Baños, Laguna. Specifically, this study was conducted to: a. identify the different forest tree species in CFNR Rubber Plantation b. establish tree species clustered based on their dbh, height, and crown area using ArcGIS and c. create a attribute query using ArcGIS. Through geodatabase, spatial and attribute data of the site such as the shape file of the plot and its corners, boundary of the site, tree points and its attributes were able to collate in one large file Using the geodatabase subtypes functionality, the scientific names of the trees and tis families were able to be included in the inventory. Species composition and distribution and top ten tree species in every species structure were able to identify using the Summary Statistics tool of ARCGIS. The top one species in terms of Average dbg, height and crown area are Rain Tree (Samanea sama), Ipil-ipil (Leucaena leucocephala), and Rain tree (Samanea saman) again, respectively. Other inquiries about the data collected from the forest inventory can be answered using the Select by Attributes tool of attribute table.
Title:	**Farm characterization of rainfed agriculture farms in the upland areas of Concepcion Banahaw, Sariaya, Quezon**
Author:	**Alcantara, Ma. Kristel Nova**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	This practicum report was done to characterize rainfed farms in Barangay Concepcion Banahaw, Sariaya, Quezon at different elevation. It was conducted from June to July 2017. Twenty-nin farmer-respondents were interview and nine of them (3 farms per elevation category low, mid and high) were selected as sub-samples for farm characterization based on elevation, land characteristics, land use patterns and production systems, and farm components. In low elevation, farm (100%) are dominantly multi-storey (annual-based) which is dominated by annual crops such as sitaw, beans, patani, sigarilyas, and sibaste as major source of income and perennial crop are also cultivated as an additional income. In mid-elevation, two farms (66.67%) are agricultural, one is purely agricultural crops and the other is combination of annual crops and livestock, and one (33.33%) is agroforestry dominated by agricultural crops as major source of income with coconut

	(sustenance). Lastly, farm in high elevation were characterized as an agroforestry (66.67%) and coffee and lanzones plantation (33.33%). Perennial crops as major sources of income and annual crops as sustenance and additional income.
Title:	**Management strategies of selected protected areas in Palawan**
Author:	**Bautista, Janelle Colin Mojica**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	The practicum student evaluated and documented the management strategies of selected protected areas in Palawan. The practice started from 13th of June and ended on 19th of July 2017. Student visited different protected areas specifically in northern, middle and south parts of Palawan, specifically the El Nido- Taytay Managed Resource Protected Area (ENTMRPA), Malampaya Sound Protected Landscape and Seascape (MSPLS), Puerto Princesa Subterranean River National Park (PPSRNP), and Rasa Island Wildlife Sanctuary, respectively. The practicum activities were not only conducted in the said protected areas but as well as the other activities such as Almaciga inauguration ceremony and tree planting with Batak Tribe in Puerto Princesa City retrieval operation of Autonomous Reef Monitoring Structures (ARMS) in Snake Island, field visit in the Palawan Wildlife Center in Puerto Princesa City the opening ceremony of PPSRNP Conference Meeting with tourism officials, Katala Festival parade and celebration in Narra, Palawan participated in workshops on updating the general management plans of Malampaya Protected Landscapes and Seascapes and El Nido-Taytay Managed Resource Reserve, and field interview with the park rangers of the protected areas. Throughout the visit in the protected areas, there were issues and problems assessed in relation to the protection of wildlife present in the protected areas, the carrying capacity of the islands, inadequate number of park rangers, and the maintenance of the protected areas. Due to problems and issues identified in the protected areas, the student recommended more studies especially in carrying capacity of the protected areas, inculcating the park rangers through trainings and seminars, and more involvement of the LGUs and local people in various activities of the protected area offices, and DENR for the improvement of protected area management.

Title:	**Analysis of the productivity of the Para rubber (Hevea brasiliensis) plantation in Mount Makiling Forest Reserve (MFFR) incorporating financial and carbon values**
Author:	**Bueno, Lorenso Luis Canon**
Adviser: Co-adviser:	**Lapitan, Renato L.** **Codilan, Analyn L.**
Abstract/Executive Summary:	Para rubber (Hevea brasiliensis) trees at Mt. Makiling Forest Reserve (MMFR) in CFNR, UP Los Baños, Laguna were studied to determine the productivity of the site incorporating financial and carbon values. The study used the inventory data of a 1-hectare rubber plantation that was gathered last June 13, 2017 to July 2, 2017. The assessment of productivity of Para rubber plantation incorporates financial value by means of production of latex, and ecological value by means of carbon stock. Significance of harvesting of rubberwood was also included in the study. The Para Rubber Plantation in MMFR has the capacity to generate revenue by harvesting latex. The revenue generated from the plantation is significantly greater compared to the newly established rubber plantation. The total net revenue that the rubber can generate by harvesting latex is Php3,770,821.82, which is Php163,663.69 bigger compared to the newly established standard rubber plantation. On the other hand, the carbon stock of the Para rubber Plantation in MMFR is 260.991 metric ton. Eighteen percent (108.28 ton) of the carbon stock of the area was produced by Para rubber trees. The carbon stock of Para rubber trees after 25 years was also estimated, yielding a total of 1,802.51 ton. Harvesting rubberwood at the end of the economic life of Para rubber trees (25th year) can be a source of revenue but it decreases the ability of the plantation to sequester carbon. Harvesting rubberwood can yield net revenue of Php193,102, with cost amounting only to Php12,548.69. However, it loses 48.72-ton of carbon to the plantation. Rubber Plantation in MMFR is recommended for harvesting latex since it can generate positive revenues. In addition, policies and regulations within the site are not violated by harvesting latex instead, it is beneficial ecologically by its carbon stock sequestration.
Title:	**Gap identification on the draft forest land use plan for the Municipality of Taytay and El Nido, Palawan**
Author:	**Calijan, Benjie Ganal, Jr.**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	Palawan Council for Sustainable Development (PCSD was established on June 19, 1998 through Republic Act No. 7611 or Tree Strategic Environmental Plan for Palawan Act which goal is to provide a comprehensive framework for sustainable development for the province. It was stated that PCSD is formulated to govern and implement the SEP Act. On June 18, 2008, it was transferred from the Office of the President to the

	Department of Environment and Natural Resources. Mr. Nelson Debanadera is the current director of PCSD who is also the one who elicited assistance from the students of the College of Forestry and Natural Resources, University of Los Baños to help in the on going project of Palawan, the development of the forest land use plan (FLUP) where PCSD is one of the major stakeholders. The Department of Environment and Natural Resources requires the whole country to have FLUPs to strengthen the existing guidelines on the use of forestlands. It is crafted together with the Department of Interior and Local Government and it mandates the local government units to take charge in the formulation of the said project. FLUP focuses mainly on the appropriate use of forestlands maximizing the participation of LGUs in the management of its areas. Also, it is expected to be integrated into the respective Community Land Use Plan (CLUP) of LGUs after the approval from the Sanggunian Bayan and Regional Office of DENR (Gatumbata, 2013). Eleven practicum students were involved from the Institute of Renewable Natural Resources, CFNR, UPLB under the supervision of assistant professor Pura Beatriz Valle. They were divided into four groups and deployed in four sites in Northern Palawan namely Taytay & El Nido, Dumaran, Arceli, and Magsaysay. The practicum activities were conducted in the municipalities of Taytay and El Nido where the student was assigned. The status of the FLUPO for Taytay and El Nido in Palawan were at the same stage of development. Both are nearly done on 2015 but failed to have the approval of the DENR regional office because of gaps in data collection and report-writing. In 2015, the regional office returned the draft to the respective municipality and is expected to be implemented in 2016. Even though a meeting was done months after the review to address and analyze the revisions needed, the notes from the meeting were lost because nothing was done to address the issues after the said meeting of stakeholders. At the end of the practicum activity, the students' PCSD supervisors, Mr. Daryl Licerio and Engr. Raul Quejano expected the students PCSD supervisors. Mr. Daryl Licerion and Engr. Raul Quejano expected the students to provide all the gaps and recommendations needed for the improvement of the draft in FLUP. They also presented the findings through a meeting that was attended by the Local Government Unit officials of each municipality. A comprehensive narrative report was submitted and presented at the main office of PCSD in Puerto Prinsesa City, Palawan during the exit conference.
Title:	**Assessment of vulnerabilitties association with landslides : the case of Pagsanjan-Lumban Watershed**
Author:	**Chio, Blessy Mharie Tan**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	Watersheds provide many valuable resources to its occupants. Resources such as food, land, and water are all found within a watershed and it is of utmost importance that they are protected and sustainably managed. All throughout history, natural hazards are identified as some of the most destructive events which threaten the

	health of watersheds. Landslide events are some of these identified hazards. As such, it is very important that watershed managers are well informed of the indicators of landslide events. A landslide vulnerability assessment is an important tool in identifying indicators of landslide vulnerability. It not only determines where landslide events are most likely to happen, but also the elements at risk and the area's capacity to cope with the negative impacts of such an event should it occur. It is a function of sensitivity, exposure, and adaptive capacity. It is valuable because it not only gives information with regards to where landslides are likely to happen, but also as to how an affected area would respond to such an event. For landslide sensitivity, the indicators used in this study were slope, elevation, rainfall, soil texture, land cover, and lithology. For landslide exposure, indicators used included population density, road density, and structure density. And finally, for landslide adaptive capacity, the sole indicator included in the study was poverty incidence. Upon overlaying the generated maps for landslide sensitivity, exposure, and adaptive capacity, a landslide vulnerability map was produced. It was revealed in the resulting vulnerability map that the areas with high vulnerability to landslides can be found in the municipality of Magdalena in Laguna. Therefore, landslide mitigation strategies in these areas should be assigned high priorities when developing watershed management plans. It is also revealed in the resulting landslide vulnerability map that most of the watershed is moderately vulnerable. This should also be taken into account when developing landslide mitigation strategies. Building on the generated vulnerability map by adding more indicators and more up-to-date data would help watershed managers get more accurate results and information about the occurrence of landslide events.
Title:	**Assessment and comparison of socio-economic and biophysical status of select rainfed agroforestry farms in Barangays Abo and Bukal, Nagcarlan, Laguna, Philippines**
Author:	**Corpuz, Ma. Cristelle Jimenez Corpuz**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	This report presents the findings of a study conducted from June to July of the year 2017 in two barangays of Nagcarlan, Laguna namely, Abo and Bukal. The study was done together with the collection of data for a project headed by Dr. Roberto G. Visco which includes a thorough documentation and characterization of the agroforestry farming practices of the small scale upland farmers of both barangays that also discusses their socio-economic status and the biophysical status of their farms. To assess the socio-economic status of the farmers, primary data were collected from 105 respondents through an interview with the use of a questionnaire and occasional conversations with random farmers during the farm sketch. On the other hand, the assessment on the biophysical status of the farms was done during the farm visits through soil sampling and documentation. The visitation was also done to check the accuracy of the data provided by the farmer-

	respondents. Both assessments were done in order to come up with an appropriate recommendation to improve the existing agroforestry system, practices, or technologies found in both barangays. Throughout the data collection, three classifications of agroforestry systems that are adopted were identified in both areas. These are: Agrosilvicultural, Silvopastoral, and Agrosilvopastoral. In addition to this, it was observed that the farms were practicing a multi storey farming system that uses trellising to support the growing crops.
Title: Author: Adviser: Abstract/Executive Summary:	**Parametric and non-parametric estimation of households Willingness To Contribute Labour (WTCL) for flood prevention and mitigation projects: the case of Silang-Santa Rosa Subwatershed** **Cuaderno, Rose Anne Cabrera** **Predo, Canesio D.** Extreme flooding in Silangan-Santa Subwatershed is being experienced due to intensive land use change brought about by rapid urbanization and industrialization, population growth and changing climatic patterns. There have been many initiatives to overcome this, however, financial resource is one of the factors that delay its success. Labour contribution was used as panacea to this problem. The study aim to measure the Willingness To Contribute Labour (WTCL) of household for flood prevention and mitigation projects via improved watershed management. The study interviewed a total of 166 respondents in the six selected flood-prone barangays. The mean WTCL using Turnbull Lower bound estimator and Kristrom midpoint model was estimated to be 2.51 and 3.78 hours/week, respectively. For the logit model, mean WTCL was 3.44 hours/week (bid only model) and 3.41 hours/week (multivariated model) while 4.12 hours/week for the spike model/. Logit regression analysis revealed that WTCL was significantly and negatively affected by bid amount (NID) and years of residency (YRSRSDCY) while it was positively influenced by flood experience (FLExp) of the respondents. A fraction of the mean hourly rate of the positive bidders was computed to impute the monetary equivalent of households WTCL. For the total household population, the highest monetary equivalent amounted to about PHP 522,646,813 per year, which is much higher than the total allocated budget for the projects funded for prevention, mitigation and preparedness at PHP 105,885 million per year as described by the City Disaster Risk Reduction and Management Plan of the City government of Santa Rosa only. A simple benefit-cost analysis was done to compare the present value of benefits from WTCL of relevant household population and cost of flood prevention and mitigation projects over a 5-year period. The present value terms at 12% discount rate for the aggregated monetary benefits was computed to be PHP 1,968, 549,743 which was significantly higher than the present value for budget allocation in Santa Rosa City amounted to PHP 487,576,728 over the same period. This finding would be useful in justifying the need

	for increased allocation for flood-related projects specifically, in prioritizing improved watershed management and forest rehabilitation for flood impacts reduction. Furthermore, this study would be useful for policy analysis and science-based decision-making in the case of Silangan-Santa Rosa Subwatershed.
Title:	**Analysis of visitors' awareness, preferences and participation on park management at Rainforest Adventure Experience Park, Pasig City, Philippines**
Author:	**Deocampo, Rizza Mae Purpora**
Adviser:	**Valle, Pura Beatriz, S.**
Abstract/Executive Summary:	The Study aimed to analyze the awareness, preferences and participation of the visitors in Rainforest Adventure Experience (RAVE) Park on Urban Forestry. RAVE Park is one of the city's projects toward the care for the nature and the environment as well as for the promotion of urban greenery and sustainable urban development, thereby making RAVE known as a public park greenery. A survey-type of questionnaire was used with 18 different type of questions such as dichotomous, contingency and an openended questions. A total of 244 questionnaires were randomly distributed through on site-site survey and online survey by means of Facebook and Instagram. However, only 152 out 255 questionnaires were completed thus gave a 59.61% return rate. The analysis of social awareness showed that the urban tree benefits commonly perceived by the visitors were supply of fresh and clean air, shade and fruits. On the other hand, the most commonly perceived negative attributes urban trees were cable wire obstruction, property damage, and massive litter production. The T-Test analysis showed that there were significant difference on the importance attributed by the visitors with different employment status to the intangible benefits from urban forest specifically on providing cleaner water (p-value =- 0.0333), increasing property value (p-value = 0.0337), and reducing absenteeism in work (P-value = 0.0060). Furthermore, the analysis of visitor attitude and preferences on urban forestry showed that most of the visitors have trees planted around their neighborhood and workplace, that they prefer to remove tree litter around the park, and that happiness was the key feeling evoked by the park to the visitors. Lastly, for the analysis of motivation and participation and participation, more than half of the visitors were willing to participate in urban greening programs such as tree planting in order to enhance recreational activities the park, to show their appreciation because they were satisfied with their visit, and to help conserve natural resources. However, time factor was the major reason for not joining urban greening programs and for not willing to pay extra fee. Taking into consideration the viewpoints of the local community in general will help the urban planners and managers in crafting a more sustainable management and conservation strategies.

Title:	**A comparative study of a Kern Aaru Transit Theodolite and an Optical theodolite J2-2 in Mountains Banahaw-San Cristobal Protected Landscape**
Author:	**Domingo, Lalaine Gabion**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	This study focused in comparing two surveying instrument which are the Kern Aarau Transit Theodolite and the Optical Theodolite J2-2. This practicum was conducted at Barangay Malinao, Majayjay, Laguna within the Mts. Banahaw-San Cristobal Protected Landscape on July 2015. It Aimed to discuss proper methods in surveying as well as discuss the importance of surveying in forest management. Differential leveling was implemented to achieve the data needed which was obtains the elevation of established points within the study site. 6 stations were established for both the surveying instruments. After calculating and analyzing the data, the results showed that the Kern Aarau Transit Theodolite and the Optical Theodolite J2-2 had values that were close to each other but far from the true base value. Both instruments exceeded approximately 3 meters above sea level. The most probable cause for this result was because of errors during the data collection. These can stem from incorrect readings, improper setup, the plate level not being stable and other factors. One of the more probable causes was the condition of the weather at the time. It is important to remember that proper handling, correct measures and good weather be observed during data collection to be able to produce more promising results.
Title:	**Tree inventory and risk assessment at Solenad 1 Lakeside Evozone in Nuvali, Sta. Rosa, Laguna**
Author:	**Enriquez, Catherine Coronado**
Adviser:	**Galang, Marco A.**
Abstract/Executive Summary:	Tree Risk Assessment has evolved greatly in recent years starting from being a hazard evaluation to now a more advanced risk assessment. Better techniques and methods were established to assess trees and quantify the results of the assessments as the field of arboriculture further developed. Today, the standardized risk assessment methodology, were based on qualitative visual inspections and the rating, on a non-linear scale, of the failure potential, the size of the part suspected of potential failure, and the value of the potential target (Wassenaer & Richardson, 2009). It allowed comparison, and encouraged the inspector to standardize his or her own methods from evaluation to evaluation. The main objective of this study is to conduct an inventory and risk assessment of the trees located at Solenad 1 Lakeside Evozone in NUVALI, Sta. Rosa, Laguna. Eight streets namely, Buhi Street, Taal Street, Caliraya Street, Venado Street, Evozone Street, Evolving Center, Picnic Grounds, and NUVALI Boulevard, under

	the Solenad 1 Lakeside Evozone, were identified as the location for tree inventory and risk assessment. Diameter at breast height and total height of trees were measured. Risk was assessed using the procedure of Albers, Pokorny, & Johnson. Thereafter, four trees were chosen for the observations of the arboricultural practice in the area. Data analysis reveals that the recreational area is dominated by Narra (Pterocarpus indicus), Rain tree (Samanea saman) and Balitbitan (Cynometra ramiflora). Narra also ranked first in terms of importance. The most common risk rating level identified is medium risk (5-7), which is mostly for Rain tree (Samanea saman), Narra (Pterocarpus indicus), Siar (Peltophorum pterocarpum), and Dita (Alstonia scholaris). In the case of arboricultural practices, the pruning observed from the area was found to be properly implemented. Guying, was found to be poorly practiced. The study showed that the trees in the greenspaces under Solenad 1 Lakeside Evozone are in good condition with low and medium risk based on the result of risk rating. The data collected will serve as baseline information for future risk assessment in the area.
Title:	**Land cover change analysis of Barangay Concepcion Banahaw, Sariaya, Quezon using remote sensing and GIS techniques**
Author:	**Estremera, Lester John Asido**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	Land cover change mapping Is usually done at macro level. In this study, land cover change analysis was applied at the micro level, particularly in Barangay Concepcion Banahaw in Sariaya Quezon, Philippines. Using Remote Sensing and Geographic Information System (GIS), pixel-based (supervised classification) classification was applied to LANDSAR images acquired in 2010 and 2015. Maximum likelihood method is used with the aid of auxiliary data such as elevation, slope, 2015 NAMRIA Land cover classification, and the GPS points from soil sampling. Google Earth images with the same year were used in the accuracy assessment. In the calculation of the land cover changes, pixel-by-pixel detection is done. The analysis focused on the relative change in land cover and the creation of change matrix that shows the conversion for each land cover from 2010 to 2015. The results indicate that Cultivated Perennial showed the largest but negative change with -34.92 hectares (-3.86%) which is a decrease in the area from 2010 to 2015. It is followed by Inland Water but also a decrease in its area with -23.40 hectares (-2.59%). Among the seven classes, Closed Forest exhibited the last relative but positive change with 0.81 hectares (0.09%). Furthermore, 2.88% of open forest has been transformed into Closed Forest, 11.79% of Shrubland into cultivated land and 12.69% of cultivated perennial into Built-up area has been observed as a result of anthropogenic activities.

Title:	**Arboricultural and greenspace management in Market Market, Bonifacio Global City, Taguig City, Metro Manila, Philippines**
Author:	**Eusebio, Bianca Belle Gibas**
Adviser:	**Valle, Pura Beatriz, S.**
Abstract/Executive Summary:	The practicum was conducted at Market Market, Bonifacio Global City, Taguig City, Metro Manila, Philippines from June 15 to July 15, 2017. Market Market is a commercial property in Bonifacio Global City composed of a mall, outdoor, food court and boutiques, public utility vehicle, terminal, and parking lots. It was developed by Ayala Land Inc. (ALI), which is a real property developer known for its green landscape design. Out of many landscape maintenance and tree care providers in the Philippines that provide its clients a green, good quality and beautiful environment, the Professional Maintenance Group Inc. (PMGI) is Market Market's service provider since 2014. Four activities were done to assess the arboricultural and green space management in the study site: (1) floral species inventory from groundcover to trees, (2) documentation of arboricultural and landscape maintenance practices including stress, hazard, and aesthetic management activities (3) interview with the supervisor and gardeners and (4) inventory of facilities, tools and equipment. During the practicum, there was no hands-on participation done as advised by the human resources head of the company. Hence, practicum activities focused on addressing identified research and on assisting the supervisor in monitoring the implementation of, only observation on the landscape maintenance practices such as watering, trimming, weeding was done as well as the operations such as pruning, nutrient management, fertilization and grass cutting. PGMI provides adequate maintenance treatments for the landscape. But their tree care service lacks in some of the areas looked for in the assessment. First, in technological capabilities, results showed that among the particular activities currently employed in the landscape, only the pest and disease management was not implemented on a regular schedule as organic pesticides were only applied when presence of certain pests were already observed thriving in the floral species. Among the species selected for landscape in the site, Plumeria sp. were the species found frequently infested by a pest called aphids. Lack of tools and equipment in the assessment of logistical capabilities were also recorded as stated by the Project Supervisor of Market Market mainly due to insufficient funds. Moreover, areas for facilities specifically, for nursery operations and storeroom for equipment, need to be developed and improved. In the documentation of practices, it was found that wearing of Personal Protective Equipment (PPE) of workers was not strictly implemented by the company which was very necessary. In Market Market, the landscape maintenance team is mainly comprised of the partnership between Ayala Land Inc. and PMGI. Staffs from the Ayala Land serve as decision makers responsible for the management and technical activities necessary for the landscape maintenance while

	employees coming from PMGI acts as influencers. The main workers for the maintenance of the landscape gardens located in the vicinity of Market Market includes seven employees with each having individual roles one stands as the lead man who overlooks the overall management of the landscape and assignments of his co-workers. Two of the personnel were appointed for prun thisning and grass cutting activities, while the remaining four functions as gardeners. During the assessment, it was discovered that while most of the workers had gone through trainings on landscape maintenance, there were still some who were not trained for their work. Nonetheless, workers were found having professional relationship with each other which makes their work less complicated and satisfactory. Also included in this report is the assessment of financial requirements for landscape maintenance. Due to the confidentiality in data, the student preferred to perform estimation. Based from the findings, approximately 70% were allocated for the salary of laborers which was the largest portion of the total expenditures. It was followed by the grass cutting costs which comprised 24% and the least expense belongs to the fertilization necessities at 3%. Overall, an estimated annual cost of maintenance was calculated roughly at P1, 000,000.00. For attaining a more suitable landscape designs, which the PMGI has been continuously thriving for, the need to resolve the problems identified in this report must be addressed fully. Furthermore, proper species selection was believed to make maintenance easier and undemanding thus development of specific criteria for appropriate choice of species for landscapes was commended.
Title:	**Predicting land cover change of Addalam River Watershed in Cagayan Valley, Philippines**
Author:	**Gabriel, Marie Jessica Cabasal**
Adviser:	**Tiburan, Cristino L., Jr.**
Abstract/Executive Summary:	The Addalam River Watershed (ARW) has abundant resources to offer, however, different activities such as mining, improper land conversion, swidden farming, and industrialization made it unsustainable over the years. This also caused the significant decline of the ability of the watershed to support its various ecosystem services. Hence, this study was conducted to understand the dynamics of land cover change in ARW. In particular, the study analyzed the land cover changes that happened in the area from 1990 to 2001 and predicted future land cover for 2030, 2050, and 2070. The object-oriented classification technique was initially used in classifying the land cover of ARW for three different periods - 1990, 2001, and 2015. These classified images also generated high overall accuracy assessment for the different periods. - 85% for 1990, 86% for 2001, and 80% for 2015. Using these land cover maps, the changes from 1990 to 2001 were analyzed using the Land Change Modeler of IDRISI. The same software was also employed in modeling future land cover of the watershed. The factors considered in the model were elevation, slope, distance from the streams, distance from roads, distance

	from built-up areas, distance from agricultural areas, and population density. The model was further validated using the 2015 land cover map and statistically verified using the VALIDATE and Relative Opening Characteristics (ROC) tools of IDRISI. The transitions to built-up and open areas were then utilized in predicting land cover changes of the watershed. Based on the analysis, the model obtained an accuracy of 76.06% and 78.28% in transition to built-up and transition to open areas, respectively. Project land cover of the watershed using the two transitions revealed that built-up and open areas will continue to increase until 2070. Built-up areas are predicted to increase by 213%, 281%, and 320% in 2030, 2050, and 2070, respectively. Meanwhile open areas are expected to increase by 158% in 2030, 181% in 2050, and 194% in 2070. The results of this study enable one to visualize the future effects of current activities in the watershed. Hence, the study can be utilized as an input in helping watershed managers to sustainably manage the area and may also aid in the formulation of policies that are geared in addressing issues on land use and land cover change.
Title:	**Assessment of funding and popularity trend of the Makiling Botanic Gardens**
Author:	**Jacob, Richelle Joy Sasota**
Adviser:	**Racelis, Diomedes A.**
Abstract/Executive Summary:	The author conducted the practicum in Makiling Botanic Gardens (MBG), Los Baños Laguna on June 28 to July 22, 2017. It is under the Management of Makiling Center for Mountain Ecosystems (MCME) of the University of the Philippines Los Baños, College of Forestry and Natural Resources. She was exposed to field work such as surveying and documenting the condition of MBG. Botanic gardens are invariably a significant part of the history of a community. This research explores the importance of botanical gardens up to its role and popularity to the people nowadays. Its focus is to integrate how botanical gardens affect the environment, its funding and improvement of facilities in their priority. Partnerships with the private sector would give an advantage to MBG to further improve the facilities such as the comfort rooms to satisfy the needs of the visitors. The study was conducted to assess the funding and trends in MBG. The results will determine how funding and popularity trends affect the management and activities MBG offers.

Title:	**Documentation and evaluation of species survival rate of Energy Development Corporation's (EDC) Binhi Tree for Life and Tree for Food Projects with different farmers' association in Pantabangan, Nueva Ecija**
Author:	**Laparan, Rinzel Joyce**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	BINHI Tree for Life (TFF) and Tree for Food (TFF) program of Energy Development Corporation in partnership with the different farmers association in Pantbangan, Nueva Ecija is one of the reforestation projects that were implemented in some areas of Pantabangan-Carranglan Watershed (PWC). With the collaboration of EDC to Philippine Agroforestry and Research Network, an audit of the program was conducted which includes the evaluation of the establishment of different plantations under the program using the species growth performances and survival rate. The practicum activity was conducted in July 2017 in Pantabangan, Nueva Ecija. The activity includes site reconnaissance, inventory of the species planted and evaluating the species survival rate as well as identifying some factors affecting it. This report presents the inventory of the species planted in different plantations. Using the data gathered, survival rate of the species planted were high contributing to the possible success of the establishment of the different plantations. Moreover, some factors affecting the results were also enumerated.
Title:	**Prefeasibility study of establishing a tree care management and maintenance services firm in Urban Area**
Author:	**Lopez, Edilyn Lambino**
Adviser:	**Castillo, Arturo Mark, II**
Abstract/Executive Summary:	Tree care management and maintenance services (TCMMS) are proliferating especially in urban areas. Although it seems promising, it is still a young industry and the guarantee of success in establishing a TCMMS firm should first be determined. The feasibility of establishing a TCMMS firm in an urban area was determined through an interview of non-systematic, non-random, and biased samples of establishments using key informant interview material (KII) and secondary data available. The samples were sorted into four categories, which are residential areas, golf courses, parks, and memorial parks. The study was conducted in three cities, which are Makati City, Taguig City, and Quezon City. It was found that the demand for TCMMS is high but the demand for the TCMMS firm is low. Therefore, establishing a TCMMS firm today is not feasible given the current and prevailing market competition prices and the high demand for an in-house TCCMS.

Title:	**Assessment of air pollution tolerance of Ficus benjamina var. benjamina (Linn.) species in Epifanio Delos Santos Avenue (EDSA), Metro Manila, Philippines**
Author:	**Maligalig, Regine Lalap**
Adviser:	**Valle, Pura Beatriz S.**
Abstract/Executive Summary:	The greening of the major thoroughfares of Metro Manila, such as Epifanio Delos Santos Avenue (EDSA) includes planting of Ficus benjamina var. Benjamina (Linn.) trees along roadsides and center islands. This study aimed to assess the tolerance of F. benjamina var. benjamina to atmospheric pollution in EDSA. It is investigated the physiological and structural attributes of planted F. benjamina var. benjamina trees through leaf biochemical analysis and tree risk assessment, respectively. The arboricultural practices in the maintenance of these trees were also documented to determine their impact on tree health. The results of the leaf biochemical analysis, including pH, relative water content, chlorophyll and ascorbic acid, revealed that the F. benjamina var. benjamina trees planted along EDSA had intermediate air pollution tolerance (APTI = 18.33). The result was similar with the air pollution tolerance (APTI = 23.90) of F. benjamina var. benjamina trees planted in Paseo De Sta. Rosa, a commercial development in the province of Laguna, Philippines. The F. benjamina var. benjamina APTIs obtained by the study were relatively higher than the APTIs of tree species commonly planted along the roadsides of Indonesia (Masud et.al.,2008), such as Swietenia macrophylla (APTI = 13.59, sensitive) and Lagerstroemia speciosa (APTI = 9.43, sensitive). The resistance of F. benjamina var. Benjamina to air pollution was also manifested by the low risk rating received by most (55%) of 269 trees assessed in EDSA. Approximately 13% of the trees received high to extremely high risk ratings due to poor tree conditions. The most common structural defects found in F. benjamina var. Benjamina trees were presence of cankers, weak branch union, and poor tree architecture. These were attributed to inadequate arboricultural treatments, such as improper pruning and staking, insufficient watering, fertilization and pest management, as well as tree vandalism caused by urban dwellers. The results of the study proved the tolerance of F. benjamina var. Benjamina trees to air pollution, as it was able to maintain its physiological and structural integrity despite intensive exposure to air pollution and other environmental stresses in EDSA. However, the use of single species in road side planting was discouraged to avoid proliferation of pests like Ficus thrips, in the case of F. benjamina var. Benjamina. Other air pollution tolerant species, nutrient and pest management strategies, and regular tree risk assessment by the study to improve the health of the urban ecosystem in EDSA.

Title:	**Soil fertility assessment of farms in Barangay Abo and Barangay Bukal, Nagcarlan, Laguna**
Author:	**Manabat, Andrea Mae Nacianceno**
Adviser:	**Galang, Marco A.**
Abstract/Executive Summary:	The practicum was conducted in Barangay Abo and Barangay Bukal, Nagcarlan, Laguna with the general objective of assessing the soil fertility of the agroforestry farms in the area as part of the Institute of Agroforestrys (IAF) project on the Development of Decision Support System for Enhancing Climate Change Resiliency of Smallholder Upland Farmers in Selected Communities of CALABARZON, Philippines. Specifically, the study aimed to: (1) compare the fertility status of the two sites (2) characterize the farms and farming practices that impact fertility status in the area and (3) recommend measures for fertility management in the two barangays. Soil sampling was done following a stratified random sampling with land use of each farm serving as the strata. Thirteen (13) sampling points with a depth of 30 cm were taken from each farm and were composited as one. The collected soil samples were brought to the Institute of Agroforestry (IAF) for sample preparation and were later sent to the Soils Laboratory at the Agricultural Systems Institute (AIS), Division of Soil Science for soil pH, percent organic matter, phosphorus, and potassium analyses. The results obtained showed that there is a little difference between the soil chemical properties of Barangay Abo and Barangay Bukal. Results showed that the different land uses in both areas has low and acidic pH reading and lacks the available nutrients that the plant needs. The land area of the farms in both barangays ranges from half to one hectare and are composed of floras such as Cocos nucifera (coconut), Lansium domesticum (lanzones), and Gliricidia sepium (kakaute). The farmers in both barangays are practicing the use of the trellis system, soil fertilization, crop rotation and are also inclined in using agroforestry practices. Recommendations such as the provision of knowledge to farmers regarding agroforestry, introduction of fertilizers for the improvement of soil quality and increase in the yield of crops, and more comprehensive study in the area were given to improve the fertility management of the soils in the two barangays.
Title:	**Watershed physical and morphometric characterization of Banila Watershed using Interferometric Synthetic Aperture Radar (IFSAR)**
Author:	**Manaig, Ruth Micah Valdez**
Adviser:	**Racelis, Diomedes A.**
Abstract/Executive Summary:	The Interferometric Synthetic Aperture Radar (IFSAR) digital elevation model (DEM) was used as an input in watershed analysis of Banila Watershed in Pangasinan province. Primary and

	secondary data collection were done for data gathering particularly site visit, topographic maps, digital elevation model (DEM), and other shapefiles. Physical characterization (slope, elevation, soil and land use) and morphometric density, texture ratio, basin length, elongation ratio, circulatory ratio, form factor and length of overland flow) were assessed. The northern east portion of the watershed has steep slopes and high elevation in forestland and grassland areas. Majority of the area has Annam clay loam which indicates that the watershed is composed of permeable subsurface material, fine vegetation cover, and low relief. The stream frequency was 15.81% which indicates that the watershed comprises rocky terrain and very low infiltration capacity. The texture ratio value was 0.22 which denotes a coarse drainage texture and a long basin lag times. The elongation ratio was 0.33 which means that the watershed and has a steep slope similar with circularity ratio, with the value of 0.30, indicates the elongated shape of the watershed and the low discharge of runoff. Lastly, form factor has a low value of .27, which indicates a low peak flow. These will serve as an important component to be considered in watershed management and planning for natural resources conservation.
Title:	**Recreation preferences for the Makiling Botanic Gardens of undergraduate UPLB students**
Author:	**Manese, Krizelle Kaye Mangohig**
Adviser:	**Calderon, Margaret M.**
Abstract/Executive Summary:	The Makiling Botanic Gardens (MBG) allows daytime activities like educational trips, bird watching, hiking, photography sessions and picnics, but the visitation rate remains less than what MBG can accommodate. This study was conducted to explore the recreation preferences of UPLB undergraduate students for outdoor recreation at MBG, and evaluate the potential of overnight camping. A survey was administered to 100 UPLB undergraduate students to describe their preferred nature-based recreation, familiarity with MBG, knowledge on nature-based recreation, and their interest in overnight camping at MBG. The Results show that walking, jogging, and hiking were the top three (3) recreation activities engaged by the students. Most of the respondents were familiar with MBG and nature-based recreation activities. The nature-based recreation activities that respondents were interested in were stargazing, camping and exposure to endemic plants. A logit regression model was developed to estimate the probability of a yes response to the question that asked about the respondents WTP for overnight camping at MBG. The estimated WTP of the students for overnight camping was P441.64 per person. Two (2) variables that significantly affect WTP are bid amount and number of outdoor activities engaged in. Since the results show that UPLB students are interested in engaging in overnight camping and have expressed willingness to pay for it, MBG may offer overnight camping and develop facilities for overnight camping at MBG. A feasibility study may be undertaken to evaluate the feasibility of overnight

	camping from the market, technical, financial, and organizational feasibility aspects.
Title:	**Comparative analysis of built-up expansion and population growth in Natividad, Pangasinan using GIS**
Author:	**Maris, Kim Fern**
Adviser:	**Racelis, Diomedes A.**
Abstract/Executive Summary:	Urbanization had the potential to ruin the initial landscape, land cover and land use of a given place hence the occurrence of urbanization in the countryside or the rural parts of the country must be monitored closely. Monitoring may be done through the use of advanced technologies such as Geographic Information System (GIS). The projections from aerial photographs and satellite images were useful in identifying areas where urbanization was clearly materializing at a rapid rate. Indicators of urban growth like built-up areas and population count may be assessed and compared to deduce the effect of one on the other. Changes can be detected by classifying images, identifying the trend, quantifying the extent of land conversion and analyzing statistical data.
Title:	**GIS analyis of factors influencing heat and air quality in Mount Makiling Forest Reserve (MMFR)**
Author:	**Maturan, Ma. Christine Bernadeth S.**
Adviser:	**Tiburan, Cristino L., Jr.**
Abstract/Executive Summary:	The CALABARZON region is now faced with various impacts of urbanization and rapid economic development such as temperature increase and poor air quality. These impacts do not only affect the urban centers in the region but also its peripheries. Hence, this study is focused on identifying and analyzing the factors that influence heat and air quality, and determine their levels within the Mount Makiling Forest Reserve (MMFR). The study utilized Geographic Information System (GIS) as a tool for most of the analysis. Initially, air temperature and Particulate Matter (PM) data were gathered from PAGASA and DENR-EMB Region IV. These were processed and interpolated to generate coverage of MMFR. The use of Pearsons R correlation coefficient was also used to determine the association and strength of the spatial factors such as slope, building density, and population density to the increase in heat and poor air quality within MMFR. Percentiles between 80 and 90 of the various parameters were likewise used to act as thresholds for the factors in the study site. Results revealed that population density and building density have strong positive correlations with air temperature and PM concentration. However, a negative correlation was discovered to slope and PM concentration and air temperature. In terms of their spatial distribution, the majority of the thresholds were found in Brgy. Batong Malake and Brgy. Anos. These barangays both have high population and building density that further aggravated the

	temperature and poor air quality in MMFR. Through this study, potential impacted areas were determined hence proper mitigation strategies can be developed to avoid further impacts to people and environment. This can also assist the local government units in crafting policies and regulation to climate impacts and management.
Title: Author: Adviser: Abstract/Executive Summary:	**East and West golf courses of Wackwack Golf and Country Club in Mandaluyong City as mango fruit basket of Metro Manila** **Mendoza, Ian Paulo** **Palijon, Armando M.** The student spent a month in WackWack Golf and Country Club in Mandaluyong City to assess the mango trees and its feasibility as a source of fruits of Metro Manila. Under the different estimators for age computation and production computation by Philip Oguntunde (2011) and Doug Flowerree (2010), respectively, the total production capacities were calculated. The costs and revenues for production of mangoes for a year were calculated based on similar study by the Bureau of Agricultural Statistics and the Department of Agriculture in 1996. After the analysis, the student found out that utilizing the mangoes from the mango trees of the east and west courses could add another source of income for the club. Knowing that the real function of the courses is not for production, the student still recommends the club to market their mango fruits and to have proper maintenance and improvement of tree care for the increase of production.
Title: Author: Adviser: Abstract/Executive Summary:	**Documentation and characterization of farming practices of rainfed agriculture farmers in the upland Barangays of Sariaya, Quezon, Philippines** **Montecillo, Ma. Ericha Vivas** **Visco, Roberto G.** Assessment of distribution of Zingiberaceae species along elevational gradients was done in Greater Sipit subwatershed, Mt. Makiling Forest Reserve (MMFR) using transect-based method and opportunistic method. In transect-based method, nine (9) transects were created in every 50 meters (m) elevation. Three (3) plots measuring 20 m x 20 m were created 30 m apart in each elevation. Also, associated with vegetation of Zingiberaceae species were observed during transect-based method in which 99.34% were Alpinia brevilabris C Presl and 0.66% were unidentified Zingiberaceae species. In opportunistic method, a total of 354 Zingiberaceae individuals were observed in which 91.53% were A.brevilabris C Presl, 7.34% were unidentified Zingiberaceae species and 1.13% were Hornstedia species. 600-650 m above sea level (asl) elevation were found to be the elevation where

	Zingiberaceae individuals most frequently occur. Tree species (36) were the most numerous associated vegetation. The most numerous individuals associated with Zingiberaceae was Nephrolepis biserrata (Sw.) Schott which was also found in every elevation. However, low confidence was given to the association of vegetation and Zingiberaceae species. Moreover, the elevation that has the most diverse vegetation was at 600 m asl (3.287) while the least was at 550 m asl (1.545). Nonetheless, associated vegetation was evenly distributed.
Title:	**Customer preference and awareness towards purchasing services offered in gardens by the Bay, Singapore**
Author:	**Narido, Jenefa Mei Mojica**
Adviser:	**Castillo, Arturo Mark A., II**
Abstract/Executive Summary:	The study aimed to determine customers preference and awareness towards purchasing services offered in Gardens by the Bay, Singapore. Customers preference can be defined as their favorable or unfavorable attitude towards the services offered by Gardens by the Bay while awareness is the customers knowledge and perception of the place, location and the services it offers. The services offered in Gardens by the Bay are sights from the OCBC (Oversea-Chinese Banking Corporation) Skyway, view of the Supertrees, experiences from the conservatories - The Flower Dome and Cloud Forest, and rides on Shuttle Services and Garden Cruiser Audio Tours. A total of forty (40) respondents were interviewed from areas within the four Mass Rapid Transit (MRT) stations in Singapore. Two MRT stations from the yellow line where most residential and recreational areas are located. Another two stations were from the green line which the route nearest to the most offices and business areas. For every station, ten respondents were interviewed. The major findings of the study were: Working employees (29) respondents whose ages ranged from 26-36 and are single (24) respondents) composed the greatest number of customers. Majority of the customers (12) are Singaporeans and most of them (15) respondents come from the yellow line, namely Bayfront and Botanic Gardens. Majority of the respondents (31) had college education. Among the socio-demographic variables acquired from the interviews of the respondents, location was found to be significantly related to customers awareness towards purchasing services in Gardens by the Bay. All the other variables such as age, nationality, educational attainment, marital status and occupation or employment have no significant relationship. On the other hand, the attributes found to be significantly related to customers preference towards purchasing services in Gardens by the Bay are uniqueness, attractiveness of nature, amenities and ticket prices. The other attributes, namely distance and travel cost, are found to have no significant relationship towards customers preference in availing services offered by Gardens by the Bay. The results of the study suggest that transportation to the recreational areas can be provided to make the place more accessible for customers who will be coming from far places. Advertisements in locations near business establishments can also be useful in getting

	more preference over other recreational areas. Lastly, the ticket prices should be given more attention. Since ticket prices are one of the attributes that show a significant relationship, discounts and promos can help attract more customers in purchasing the services offered.
Title:	**Biomass and carbon sequestration prediction models for Acacia manguim Willd plantation in Tain Nguyen Province, Viet Nam**
Author:	**Nguyen, Hung Tuan**
Adviser: Co-adviser/s:	**Villanueva, Teodoro R.** **Carandang, Wilfredo M. ; Pulhin, Juan M. ; Carandang, Myra G.**
Abstract/Executive Summary:	The study developed a model to estimate current biomass and carbon stocks as well as predict future biomass and carbon sequestration potential for forest plantations of Acacia mangium Willd in Thai Nguyen Province, Vietnam. Specifically, the study: 1) characterized the Acacia mangium Willd plantation in Thai Nguyen Province, Vietnam 2) estimated the current biomass and carbon stocks of tree and stand for Acacia mangium Willd plantations 3) developed a biomass and carbon models for tree of Acacia mangium Willd 4) determined the future conditions of plantation based on the programs and policies of the government and 5) recommended appropriate management strategies to improve the forest plantation development and management. A total of 126 plots representing various ages of plantations were established at the bottom, hillside, and hilltop of the plantation. Data collected from each plot included age of plantation, spacing, density, diameter, total height, basal area, and volume. Estimates of the various plantation characteristics showed significantly higher values in the bottom compared with those in the other parts of the plantations sampled. The data for biomass and carbon estimation and development of prediction models came from 54 destructive sampled trees of different diameter classes (big, medium, and small) of the different ages. Six candidate non-linear regression equations using variables as diameter, total height, and age of plantation were tested and assessed for statistical validity and accuracy in biomass and carbon prediction. Data analysis was carried out in Excel and STATA 14 PM software. The study showed that the major biomass and carbon of trees are boles, followed by branches and leaves. Biomass and carbon models were tested for separated ages (each age class was tested by the model), as well as all age levels from ages 2 to 7 Acacia mangium Willd plantation (all age classes from 2 to 7 were tested by the model). In terms of separated ages, the model with one variable as diameter (D) showed better values than variable height (H) and two variables (D, H) combined due to the high correlation efficiency (R'), small standard error (SE), and higher F values. As for the models tested for all age levels combined with the addition of the variable age (A), there was no significant difference observed between single predictor and combined predictors. The accuracy of the values was tested by chi-square and residual analysis to compare between

	observed and predicted biomass and carbon. The prediction equations were used to assess future biomass and carbon sequestration in the province. Scenarios of biomass and carbon change were assessed based on the programs and policy of the government.
Title: Author: Adviser: Abstract/Executive Summary:	**Influence of riparian zone vegetation on stream water quality of Quinale sub-watershed in Bicol, Philippines** **Ocampo, Maria Christina C.** **Cruz, Rex Victor O.** This study was conducted to highlight the importance of the riparian system to stream water quality among the 14 sampling points along the Bicol River. Data gathering was undertaken from the 28th of June 2017 to 7th of July 2017. The planning stage was immediately undertaken from August 2017 to March 2018. Specifically, the study sought to (1) study the influence of the riparian vegetation to stream water quality, (2) know the plant diversity in the area, (3) assess the health of watershed, and (4) recommend an ideal riparian area management for the project site. Primary and Secondary data gathering were done with the help of Bicol University College of Agriculture and Forestry Team. These were both used to obtain the profile of riparian vegetation composed of Shannon-Wiener Index, and Biomass and Carbon Stock. Meanwhile, the profile of water quality is composed of six parameters: temperature, electrical conductivity, pH, dissolved oxygen, turbidity, and total dissolved solids. Using Pearson Correlation Analysis, the relationship of the riparian vegetation to stream water quality was studied. Overall, results showed that riparian vegetation is positively correlated with good stream water quality. However, most of the sampling points have a poor water quality condition which could be attributed to influences of human activities in the study site since it has a moderate to very low riparian diversity from upstream to downstream watershed.
Title: Author: Adviser: Abstract/Executive Summary:	**Integration of small green space in urban setting: the case of East Service Road, Center Island, fronting TESDA Women's Center Gate 2, Barangay Wester Bicutan, Taguig City, Metro Manila** **Oliveros, Carmel Lofranco** **Lapitan, Renato L.** The researcher conducted the study at Taguig City's East Service Road, Center Island Public Park, fronting TESDA Women's Center Gate 2 in Barangay Western Bicutan. The public park occupies approximately. 184 ha in total land area. Together with the City's local government unit, City-Environment and Natural Resource Office (City ENRO), the researcher managed to create a comprehensive urban land use plan for the idle park. The practicum started on June 13, 2017 to July 20, 2017. Additional

	data was also gathered from January to March of 2018. Several activities were done with the City ENRO including reconnaissance survey, biophysical and biological data collection, infrastructure measurement, interview with the officer in-charge of the City-ENRO, grading of plant suitability for the park, park model generation, and suggestion for appropriate maintenance and plan. Supplementary activities within the judiciary of City ENRO were also conducted such as tree planting on Arbor Day, other park assessments, street tree pruning, financial analysis, as well as office work. These activities were specifically initiated to: (1) characterize the biophysical environment of the study site (2) assess the organizational structure capability and landscape plan and (3) recommend appropriate species, maintenance practices, and plan. Both primary and secondary data were used in the study. The primary data was collected within the premises of the public park, while the secondary data was in the form of Taguig City's Comprehensive Land Use Plan (CLUP), assessing the biological and socioeconomic status from city to the barangay level. The researcher also utilized two different software programs for this study, namely ArcGIS and SketchUP, to generate various maps of Taguig City and to create the park's visual model both before and after the employment of the proposed urban landscape plan respectively. The park was specifically proposed for development by the current Mayor of Taguig City, focusing on initiating its utilization and aesthetic purposes and mitigating negative environment changes pronounced in the highly urbanized areas of the city. Composed of the simplest features, the proposed area is open to the public everyone is welcome to visit once the area is developed. It specifically benefits the residents of barangay Western Bicutan, commuters, vehicle drivers, and other groups of people in proximity to the area. Selection of the biological components was thoroughly identified using several factors, namely light preference, temperature preference, preference of the City ENRO staff, aesthetic factor, water requirement, maintenance requirement, plant background, and environmental factors--nitrogen dioxide (NO2) and sulfur dioxide (SO2). As for the project's scheduling and management, the Western Bicutan Public Park Development Project was estimated to have a duration of at least 7 months, where several activities include preconstruction activities, hardscape component improvement, procurement of materials, softscape component development, and lastly, operational/post-construction activities. City ENRO's organizational structure was also analyzed and the appropriate measures were recommended. Meanwhile for the proposed project budget, the total amount is four hundred sit eight thousand four hundred forty six pesos (PHP 468,446,00), where a contingency fund of 10% was already included. Then, the monthly proposed budget for maintenance is six thousand one hundred fifty pesos (PHP 6,150.00). There is a total of seventy three thousand eight hundred pesos (PHP 73,800.00) proposed annual budget for the operational phase. The researcher highly recommends an extensive feasibility study to be finalized first before any further development and implementation are initiated in the park because the government budget allocation should prioritize projects that would best benefit the public's welfare.

Title:	**Attitude, knowledge, and perception of households from Santo Tomas, Batangas regarding the Mount Makiling Forest Reserve**
Author:	**Panting, Ria Lyn Manese**
Adviser:	**Pampolina, Nelson N.**
Abstract/Executive Summary:	The practicum was conducted in the municipality of Santo Tomas, Batangas from May 9 to May 13, 2012. During the practicum, a survey involving 100 respondents from four barangays (San Rafael, San Antonio, San Bartolome, and San Vicente) was undertaken. This report describes the uses that selected communities from the municipality of Santo Thomas, Batangas have for the Mount Makiling Forest Reserve (MMFR). Specifically, it describes the benefits derived by the households from MMFR, evaluates the knowledge and perception of households from MMFR, and identifies the products derived by communities from MMFR. The study found that most respondents were not aware that the Makiling Center for Mountain Ecosystems (MCME) is the institution that manages MMFR. The survey also revealed that most of the respondents were familiar with Mount Makiling, and were aware that part of it is forest reserve. They were also willing to help in the protection of MMFR. The respondents identified some of the problems in the management and protection of MMFR, such as uncontrolled timber poaching, poverty, lack of forest guards, lack of awareness among people , lack of funds, privately-owned lands, and that some guards and volunteers were paid by politicians or other powerful people. The benefits derived by households include scenery, water, medicine, wildlife, fuelwood, charcoal, food, vegetables/crops, fresh air, and flood control. Based on the results of the survey, the author concludes that the respondents are not very dependent on the MMFR for their livelihood. They have many work opportunities due to the growing commercialization in the municipality of Santo Tomas and the adjacent city of Calamba, Laguna. However, the rapid commercialization in the area can still be a threat to the Reserve because it makes it possible for non-residents to migrate to the area in search of job opportunities and thus compete with residents. In addition, the MCME should educate the community regarding the importance of MMFR, and engage the people to participate in protecting and conserving the Reserve.
Title:	**Problems associated with the adoption of rubber (Hevea brasiliensis) as plantation crop in Laguna**
Author:	**Razon, Razver Ace Veridiano**
Adviser:	**Gascon, Antonio F.**
Abstract/Executive Summary:	Rubber plantations are common in Mindanao however at present, such plantations are now being adopted in places wherein rubber is not traditionally planted. Laguna was found to be suitable

	for rubber farming. The observed site characteristics of Laguna and site requirements for rubber are matched. However, few individuals and households venture on rubber farming. In this study, the reasons for less adoption of rubber in Laguna were investigated by gathering the perception of adopters and non-rubber adopters. The STRPC members from Laguna were chosen as the first set of respondents to represent the main adopters of rubber. The non-members were likewise included as the second set of respondents to have another side of understanding problems. The non-member respondents were purposively selected for the study. Two sets of interview schedules were constructed using previous adoption study as reference and were pre-tested before the actual interview. FGD was also conducted to have deeper insights from the adopters. The gathered information was then organized and analyzed. In identifying causes of less adoption, four aspects were considered: socio demographic and economic, site, cultural and technological, and institutional. The factors identified that greatly influence the adoption were: frequent occurrences of strong typhoons or bad weather, competing with other crops serving as the main source of income, small areas of their farm, availability of the land, accessibility, financial resources, ownership of the land, objectives of the farmers, technical assistance, extension services, use of media, price of cup lump, and slow return of investment. It was recommended that LGUs should push for the wider adoption of rubber as one of the high value crops and plan more activities and program related to rubber farming. The STRPC should also extend their invitation through information campaigns and trainings.
Title:	**Assessment of the arboricultural practices and maintenance activities in Ninoy Aquino Parks and Wildlife Center (NAPWC) Quezon City, Philippines**
Author:	**Reyes, Rose Anne De Castro**
Adviser:	**Valle, Pura Beatriz, S.**
Abstract/Executive Summary:	The study was conducted at Ninoy Aquino Parks and Wildlife Center, Quezon City, a protected area in an urban area. The study specifically aims (1) document and assess the different arboricultural treatments (2) identify the arboricultural tools and equipment (3) evaluate tree worker skills and safety and (4) propose potential recommendations for the improvement of the tree maintenance and management, if necessary. The practicum was conducted at Ninoy Aquino Parks and Wildlife Center. It started on June 20, 2016 and commenced on July 17, 2016. Assessment of the arboricultural practices and treatments in the park was started by documenting the existing practices in the park through observation approach. Inventory of tools and equipment together with the safety gears was done to validate the equipment and gears at present. These were assessed in terms of availability of soundness (working/notworking) and proper / safe use. The operation and maintenance requirements of the equipment and tools were also determined. The human resource of the organization was evaluated in terms of their educational attainment, experience and training

	attended. The data were then analyzed by comparing with standard arboricultural practices and best practices from private parks of Ayala land. The data were gathered through interviews with park supervisors, division chiefs and laborers. These were validated through ocular inspection and review of secondary data. After a 28-day inventory at 64.58 hectares of land which is 15 hectares are forested, there are 2,286 trees representing 101 species as well as unidentified dead trees which are 3.9% of the tree population. The park management is knowledgeable with arboricultural practices however, they lack necessary expertise and facilities to implement it. Among the available tools and equipment, 65% of the tools and equipment are new and 99% are in working condition. NAPWC assures that they are equipped with the most basic tools and equipment in performing arboricultural practices in the area. Because of limitations in funds, there are some specialized tools that are lacking. There are instances that they need to improvise for the unavailable tools or equipment. It is found out that all of the laborers in the park are unskilled with regards to arboricultural work but equipped with basic safety gears. The management should conduct continuing personnel training and seminars regarding the principles, concepts and techniques involved in arboricultural practices. Certified standards used by the arboricultural and landscape industry should be adapted to properly execute the practices done in the park. NAPWC should also consider hiring a permanent arboriculturist that will head the implementation, management and monitoring of all the arboricultural undertakings and related works in the site.
Title: Author: Adviser: Abstract/Executive Summary:	**Hazards analysis in Majayjay, Laguna** **Salamat, Ronianne Kristine B.** **Lapitan, Renato L.** The Philippines has a remarkably high exposure to natural hazards such as earthquakes, volcanic eruptions, typhoons, floods, and drought. It has experienced disasters that have damaged people, socially and economically. The impacts of natural events, which are hazardous and life threatening, such as typhoons, and earthquakes may possibly worsen because of human activities that would likely increase the vulnerability, and the potential damages due to lack of anticipation and mitigation plants. This study focused on the possible natural hazards found in the area. The practicum was conducted at Brgy. Malinao Majayjay, Laguna last Jul 14, 2015. The general objective of the report is to identify all po the possible natural hazards and analyze the land capability of the area. Using the shapefile data on slope, elevation, and land cover of the area as well as the ad-hoc approach, the possible natural hazard and the land capability of the area are determined. The possible natural hazard that can be observed in Majayjay, Laguna is soil erosion and its land capability are for protection, agricultural production, reforestation, and settlement with mitigation, agroforestry, rehabilitation, relocation and rehabilitation.

Title:	**Documentation and characterization of agroforestry farming practices of rainfed agriculture farmers in Silang, Cavite, Philippines**
Author:	**Salazar, Shaira Fhaye Aguila**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	The study was conducted in 15 barangays of Silang, Cavite from June to July, 2015. The objective of the study was to document and characterize the agroforestry farming practices and the farms of smallholder rainfed agriculture farmers in the area. Data were collected from 223 respondents through interview and informal conversations using a survey questionnaire. Actual farm visits were also done in order to cross-check the farmers' farm characteristics. Three classifications of agroforestry farming practices were adopted in the area, namely annual crop production, annual crop production with livestock, and agroforestry. These farming systems are based primarily on coffee, banana, and pineapple as main crops and other crops grown in the land parcels. In general, the farmer-respondents had a positive attitude towards the practice of agroforestry. However, most of the respondents (85.1%) had small landholdings which limit the integration of large numbers of crops within the farms. More than one-third (34.4%) had an income of less than Php10, 000 per year from farming activities.
Title:	**Comparative assessment of the leaf area index (LAI) of trees in selected Urban parks and closed forest in Negors Occidental, Philippines**
Author:	**Samson, Diana Therese Aala**
Adviser:	**Valle, Pura Beatriz S.**
Abstract/Executive Summary:	The leaf area index (LAI) influences the photosynthetic progress and growth of trees, and can be altered by changes in environmental condition. This study aim to compare the LAI of three native species in urban parks and closed forest in the province of Negros Occidental, Philippines., The LAI of trees were estimated using digital cover photography and digital image processing techniques. The comparison between urban and closed forest and among species were made through one-way ANOVA for RCBD. The LAI of trees were also correlated with the above-ground biomass (AGB) to determine its effect on tree growth. Results showed that there were significant differences on the leaf area indices of trees in urban and closed forest (p=0.041518474), with the Pterocarpus indicus forma indicus having the highest LAI followed by Terminalia catappa and Vitex parviflora. Finally, the r values revealed that LAI and AGB had strong and moderate positive linear relationships, in closed and urban forests, respectively. The result of the study was similar with the published LAIs of the same species, thus the use of digital cover photography and image processing techniques, particularly ImageJ, were found

	to be useful and accurate in estimating LAI. Further studies should compare this method with the traditional and harvesting methods of estimating LAI. The determination of significant environmental factors that affect LAI was also recommended to identify appropriate arboricultural treatments to ensure optimum LAI development of trees.
Title:	**Documentation of Development pathways of rainfed agriculture farmers in the uplands of Sariaya, Quezon**
Author:	**San Antonio, Paolo Angelo Paglinawan**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	Small farmers produce much of the developing world's food. Yet they are generally: much poorer than the rest of the population in these countries and are less food secure than even the urban poor. This study was conducted to identify the development pathways, as well as to identify the socio-economic profile and structures and processes which affect the livelihood strategies of the selected rainfed agriculture farmers in the selected barangays in Sariaya, Quezon. A total of 69 farmers-respondents were selected through proportionate random sampling. Livelihood strategies are the combination of activities that people choose to undertake in order to pursue their livelihood goals while development pathways are the common pattern of change in livelihood strategies. There were a number of reasons identified why the framers chose the livelihood strategies and development pathways. These include the lack of opportunities in non-farm activities, lack of water irrigation and the presence of organizations which help or influence them in their livelihood and practices.
Title:	**Land use and land cover change analysis in Boac Watershed, Marinduque using remote sensing and GIS**
Author:	**Santiago, Princess Mae Arguelles**
Adviser:	**Tiburan, Cristino L., Jr.**
Abstract/Executive Summary:	In the Philippines, the increased rate of industrialization and urbanization has resulted in many conversions of our resources into other land uses. These changes in the landscape have also led to the degradation and depletion of our natural resources. This particular study is made to assess the land use and land cover changes of Boac Watershed in Marinduque using remote sensing and GIS. Landsat images from different periods were initially acquired and were subjected to several image pre-processing techniques. Three supervised classification techniques were utilized to generate the land cover maps for 1988, 2001, and 2016. A total of six land cover classes were employed and these are agriculture or cultivated areas, barren, built-up, vegetated, water and unclassified (e.g., clouds, shadows). These classification accuracy and kappa coefficient for Minimum Distance, Mahalanobis Distance, and Maximum

	Likelihood algorithms were also evaluated. The highest overall classification accuracy for the study area was achieved by the Maximum Likelihood algorithm for the three periods with 86.48% for 1988, 87.27% for 2001, and 88.41% for 2016. Also, the maps generated using this classification method were utilized in analyzing land cover changes in the watershed. Overall, the vegetative area experienced the greatest decrease of 8% (1,706.28 ha) for the past 28 years. These were mostly converted to other classes such as agricultural areas and barren land. The agricultural areas has increased by 4.77% (1,107.37 ha) which also indicated that agriculture is the main livelihood in the area. The barren land, on the other hand, has slightly decreased for the first few years but has increased by 3.14% (669.72 ha) in the later years. The built-up area has decreased by 0.64% (136.50 ha) in 2001 and has not changed so much in 2016. The results of this study showed that there were significant land cover changes in Boac Watershed from 1998 to 2016. Hence the results can be utilized by various stakeholders and decisions to makers to further improve the management strategies in the watershed especially in targeting appropriate interventions in the area.
Title:	**GIS database of trees with 40 cm dbh and above at the forestry student park of the college of forestry and natural resources**
Author:	**Sazon, Vlademir Ramos**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	This manuscript highlights the results of the study on the development of a GIS database of forest trees with at least 40 cm dbh at the Forestry Student Park at the UPLB College of Forestry and Natural Resources. Specifically, this study was conducted to: 1. Provide a systematic identification and classification of different forest trees; 2. Characterize the different forest tree species; 3. Assess the health conditions of each forest tree species; and, 4. Provide major recommendations for future studies. The GIS database of the forest trees within the Forestry Student Park consisted of two parts. These include the inventory and characterization of all the forest tree species with 40 cm dbh and above, including their location. The characterization was made on the basis of the trees height, diameter at the breast was measured using a Haga altimeter, while the dbh was measured using a diameter tape. Using the four cardinal directions (North, West, South, and East), the crown area of trees was calculated through their four crown diameter. Finally, the volume of trees were calculated with reference to the dbh and height of the trees. The health condition was assessed by looking at their physical appearance. There were 114 forest trees with a dbh of 40 cm and above in the study site. These trees represent 6 families, with 12 species and 12 genera, with an unknown species considered as miscellaneous. Bigleaf mahogany (Swietenia macrophylla) was recorded as the species with the highest number of individuals totalling to 64. Meanwhile, Fabaceae family had the highest number of species which is four, while the Meliaceae family was

	found to have the highest number of individuals, which are 65. The largest species in terms of overall quality is African Tulip (Spathodea campanulata) which is found within the vicinity of the CFNR Administration building. Generally, the forest tree species were healthy, with a rate of 90.35% Only a few (0.88-7.02 per cent) was observed as diseased, suppressed and dead. The forest trees had a dbh ranging from 40 t0 152 cm. Most of them, however, fall within the range of 40-60 cm. The average dbh of all the trees was 67 cm. African Tulip was recorded as the tree with the largest dbh, 152 cm, followed by Big Leaf Mahogany, with a dbh of 144 cm. Most of the healthy trees had a height of ranging from 2.1 m to 35 m. Again, African Tulip was recorded as the tallest tree, with a height of 35 m. Consequently, African Tulip was also recorded with the largest volume, 63.51 m3. On the other hand, Supa (Sindora supa) had the largest crown area of 13.3m.
Title:	**Usage of normalized difference vegetation index (NDVI) to assess the impacts of typhoon Nina on the tree diversity of biodiversity plot 1 in Mt. Masaraga, Ligao City, Albay Bicol, Philippines**
Author:	**Soriano, Reymar Balleber Soriano**
Adviser:	**Cruz, Rex Victor O.**
Abstract/Executive Summary:	Typhoon disturbance on forest generally affects vegetation dynamics. Landsat images were used to evaluate changes in NDVI related to the loss of vegetation caused by Typhoon Nina on Mt. Masaraga. Remote sensing data of before and after typhoon conditions were based on the Landsat 8 images acquired in November 2016 and March 2017. Field data were based on the initial biodiversity profiling and after typhoon assessment of Biodiversity Plot 1. The study site is 100-meters by 200 meters designed with field subplots (n = 50). All trees in the sub plots with a diameter at breast height (dbh) above 5 cm were used. H (Shannon) was used to quantify tree species diversity within each subplot and the corresponding NDVI on the Landsat 8 images were extracted from each subplot. The NDVI values showed that before the typhoon, vegetation greenness was at its highest (0.6157) as compared to the NDVI values of after typhoon settings (0.6011). Shannon also provided that before typhoon conditions have higher tree diversity against after typhoon settings. This study also explored the relationship between NDVI and Shannon Diversity Index by applying linear regression analysis. The results of regression analysis showed that NDVI and Shannon have a weak positive linear correlation ($r2 = 0.19$ $p < 0.05$). It may not be a perfect linear relationship, but its variables are in significant effects. Data transformation was performed in order to increase the linear relationship between NDVI and Shannon. The combination of reciprocal NDVI (X) and original Shannon (Y) value produced the highest R square value. The results indicate that a significant relationship observed between NDVI and Shannon Diversity Index ratifies the usage of remote sensing for practical application in conservation.

Title:	**Willingness to pay of the visitors for the conservation and improvement of green spaces in Nuvali, Laguna, Philippines**
Author:	**Sotomango, Karen Austria**
Adviser:	**Valle, Pura Beatriz S.**
Abstract/Executive Summary:	This study was conducted to determine the willingness to pay (WTP) of visitors for the conservation and improvement of green spaces in the commercial areas of Nuvali,Laguna. Specifically, this study aims to: (a) describe the socio-economic characteristics of the visitors in Nuvali Santa Rosa (b) determine the perception of visitors with regards to the presence of green species in a commercial area © estimate the willingness to pay of the visitors for conserving and maintaining the green spaces in Nuvali and (d) assess the visitors affecting the willingness to pay of the visitors for the maintenance of green spaces in Nuvali. Face to face survey was conducted covering 150 respondents. Willingness to pay was gathered by directly asking the respondents using binary choice valuation method. Logistic regression analysis was employed for the WTP model to determine the factors affecting the WTP of the respondents. Descriptive statistics results showed that most of the respondents are female, college graduate, with income of less than 20,000 per month. The key features of Nuvali that attract most (>80%) of its visitors were the green spaces and parks. Green spaces in Nuvali were highly valued by the visitors, as manifested by its economic value amounting to P1.2 billion per year. Based on the assessment of the willingness to pay of the respondents, approximately 75 percent strongly agreed that our environment should be protected. Nevertheless, only 20 percent strongly agreed that they should pay for the maintenance of green spaces for the benefits of other people and the whole community. Analysis of the evaluation of bids showed that 68 percent of the respondents are willing to pay for the conservation of green spaces while 32 percent are zero bidders. The main reason cited by the zero bidders is that the owners of the green spaces are only the one who should pay for its conservation and maintenance. Logit regression results that WTP of the visitor was affected only by the bid price. Demographic characteristics of the visitors do not influence their WTP. The aggregate WTP for the conservation of green spaces in Nuvali was estimated at Php 1,196,569,754 per year, a much higher than the maintenance cost of the area which is about Php32,400,00 per year. The higher benefits placed by the visitors on the green spaces in Nuvali can be used to justify its conservation and maintenance to attract more visitors in their commercial establishments.

Title:	**Tree risk assessment in Bonifacio High Street, Taguig City, Philippines Tree risk assessment in Bonifacio High Street, Taguig City, Philippines**
Author:	**Subijano, Rysch Sotalbo**
Adviser:	**Valle, Pura Beatriz S.**
Abstract/Executive Summary:	A tree risk management was conducted at Bonifacio High Street in Bonifacio Global City, Taguig City, Philippines from June to July 2017 and February 2018. Bonifacio High Street (BHS) complex is an outdoor retail mall, interspersed with green spaces that were maintained by Professional Maintenance Group, Inc. The research study focused on the study of assessment of the condition of the trees in the study site. All tree species in the study site with at least 10cm in diameter were inventoried to determine the tree species composition and diversity. There were a total of 186 trees in BHS representing 21 tree species, seven (7) of which were native in the Philippines and one (1) had a vulnerable conservation status. The results of tree species diversity analyses showed that the site had a moderate diversity (H = 2.69) and very high evenness (J = 0.88), which make it prone to pest and disease infestation. Thus, species selection should incorporate other tree species, especially native and endangered species. The second objective of the study was to determine the hazard posed by the trees on urban occupants and infrastructures. This was done using the Basic Tree Risk Assessment (Level 2) form adopted from the International Society of Arboriculture. This assessment tool provides qualitative tree risk ratings from low, moderate, high to extreme. The evaluation of the health condition of trees covered the (a) crown and branches (b) trunk and © roots and root collar. The most common defects for each tree parts were dead twigs and branches in the crown, cankers, galls or burls in the trunk and buried root collar. The final risk ratings of all trees showed that the green spaces in BHS were in good condition, since 93% of trees received a low risk rating. Only 5% had a moderate risk rating of 2% had high risk rating, and no tree posed an extreme risk in the site. The 9 moderate risk and 3 high risk-trees belonged to species Albizia saman, Brachychiton acerifolius, and Saraca declinata while the rest of the tree species had low risk ratings. Out of the six green spaces in the site, mainly Pocket Parking (West-East), BHS West, BHS East, Central Parking, Central Events Area, and Central Square. Furthermore, landscape maintenance practices, such as stress management, hazard management, and aesthetic and sanitation maintenance activities, were documented through participant observation and hands-on experience. This was to determine if arboricultural treatments were properly implemented and were not the cause of tree defects. The findings of the study showed that improper pruning practices due to absence of appropriate tools and equipment caused decay on parts of the trunk that resulted in cankers, which was the most common defect on the trunk of trees. From the findings of the study, the following recommendations were formulated: (1) Conduct of annual tree risk assessment using tree defect diagnosis instruments by trained technical staff (2)

	immediate implementation of corrective actions on tree defects , prioritizing the trees with moderate to high risk ratings in Central Square (3) training of field operation personnel on arboriculture, especially on pruning and (4) planting of native and endangered tree species that are resistant to urban stresses.
Title: Author: Adviser: Abstract/Executive Summary:	**Analysis of the awareness and adaptation strategies to climate change among rainfed agriculture farmers in selected barangays of Nagcarlan, Laguna** **Suzon, Roland Muñoz** **Visco, Roberto G.** This study aimed to analyze the climate change awareness employed by rainfed agriculture farmers in selected barangays of Nagcarlan, Laguna. Two hundred sixty-four (264) farmer-respondents were surveyed using semi-structured questionnaire. This study specifically aimed to: 1) describe the socio-economic characteristics of respondents 2) evaluate the level of knowledge and perception of farmers toward climate change 3) determine the indigenous adaptation measures used to cope with climate change and 4) identify the relationship of climate change adaptation measures and the socio-economic profile of the farmers. The results of the study showed that most of the farmers (83%) are aware of the changing climate, as well as its indicators, causes and effects. The increase in temperature (89.04%) was the most observed indicator of climate change. Almost all (90.87%) of the respondents acquired their information about climate change through television. The most used technical adaptation strategy is the application of fertilizers (77.27%), while the additional participation to farming related activities (67.42%) is the most used non-technical adaptive strategy. Lack of participation among the stakeholders (2.39) was identified as the most serious problem encountered in the employment of the adaptive strategies. Correlation analysis shows that only the age of the stakeholders affects the implementation of technical adaptation strategies, while the income affects the decision of the farmers in implementing non-technical strategies.
Title: Author: Adviser: Abstract/Executive Summary:	**Establishment of rubber nursery, budwood garden and demonstration farm in Barangay Lumot-Mahipon, Cavinti, Laguna** **Tapangco, Carl Edison Magpayo** **Gascon, Antonio F.** The student spent over a month in Barangay Lumot-Mahipon, Cavinti, Laguna to be actually involved in the activities undertaken in the project Establishment of Rubber Nursery, Budwood Garden and Demonstration Farm in Cavinti, Laguna: A Science and Technology Community-Based (STCB) Approach headed by

	UPLB-CFNR/IRNR and funded by DOST-PCAARD. For the timeframe of midyear 2017, the student had an actual involvement on the pre-establishment, establishment, and maintenance activities on rubber nursery, budwood garden, and demonstration farm through observations and hands-on experience in the field. The student helped in establishing the rubber nursery, identified clones used in the project, measured the seedlings planted on the budwood garden, surveyed potential land for the establishment of demonstration farm, and completed seminar-training on high-quality rubber seedlings production. During the practicum, the student acquired knowledge and skills on the establishment of rubber nursery, budwood garden, and demonstration farm. Skills gained were specifically on rubber propagation, especially budding. From the participation during the training. It was observed that the seven clones used in the project were superior in terms of growth and development, and in the ability to produce latex compared to non budded rubber seedlings.
Title:	**Assessment of indoor landscape management in North Triangle Depot Commercial Corporation, Quezon City**
Author:	**Togado, Raiza Mae Lamarca**
Adviser:	**Valle, Pura Beatriz S.**
Abstract/Executive Summary:	Professional Maintenance Group Inc. is one of the landscape service providers of Ayala Corporation, specifically in North Triangle Depot Commercial Corporation (also known as TrinoMa). Indoor landscape management is the focus of this study targeting the landscape operations done by the service provider, challenges encountered, and social perception of the mall-goers in the indoor landscape management. The period of the practicum of the study was only one month and 6 days that is from June 16 to July 22, 2017. The activities that were observed, documented, and assessed were the indoor landscape maintenance operations. Survey was also done to assess the perception of the mall-goers who visit the location. Forty-five flora species were documented in the indoor gardens. These flora species are classified into palms, trees, ornamental plants, shrubs, grassess, and bamboos. All these flora species are found to be native in the Philippines as listed in Plant Resources of the South-East Asia, Merrill's Enumeration of Philippine Flowering Plants and Co's Digital Flora of the Philippines. PMGI-Trinoma indoor landscaping team consists of eleven personnel with five assigned in field operation in the maintenance of the indoor gardens. They have adequate facilities to support all their internal concerns and storage for tools, equipment, and planting materials. It has been recorded that they have complete tools used for manual indoor maintenance operations but lack in key equipment like chainsaws for pruning and cutting down hard tree branches. Upon gathering information and participating in actual operations, the documented maintenance activities are nutrient, pest, and water management, trimming, mulching, pruning of plants and trees that were done manually. It can be concluded that the management has poor tree maintenance in the said area

	because of lack of equipment specifically chainsaws. Permission of request to the local government of Quezon, City to purchase and register a chainsaw must be done immediately to avoid further damage that might be seen due to frequent hard-pruning of the trees using improper pruning tools like bolo. Results of the assessment revealed that the company has some problems in manpower occurring in the operations such as wearing Personal Protective Equipment (PPEs) and failure of the some field operations personnel to comply with their daily schedules in their assigned floor level to their supervisor resulting to failure to finish all necessary activities before the start of the mall hours leaving the indoor garden in some levels unattended since some of the personnel choose to comply first with the special project of PMGI-TriNoMa that coincide with the coverved time of study. Results from the survey revealed that the mall-goers, amidst their various purposes of their visits and opinions, are satisfied with overall landscape feature and maintenance of the indoor gardens. The mall goers enjoy visiting the indoor gardens due to positive and calming benefits that the gardens gave to the mall goers. Some of the mall-goers requested to put some flowering plants in the gardens to further improve the aesthetic value of the landscape. The information generated and reported in this manuscript serves as a guide in the design and development of urban greenspaces with the same commercial objectives.
Title:	**Visitor's willingness to pay for the conservation of the Mount Makiling Forest Reserve, Philippines**
Author:	**Torres, Keith Russel Tanyag**
Adviser:	**Calderon, Margaret M.**
Abstract/Executive Summary:	The Mount Makiling Forest Reserve (MMFR) hosts unique flora and fauna and provides various ecosystem services and was declared the 33rd Asean Heritage Park (AHP) in 2013. The Makiling Center for Mountain Ecosystems (MCME) has drawn up the MMFR Management Plan. However, the funds that MCME gets are not sufficient to fully finance the implementation of the plan. Visitors are major stakeholders of MMFR therefore, MCME planned to propose an increase in the entrance fee of the park. This study undertaken to provide MCME a basis in setting the appropriate entrance fee of the park. It estimated the value to visitors of the enhanced conservation of the MMFR using the contingent valuation method in single-bounded dichotomous choice format. Out of 102 survey respondents, 62.75% expressed willingness to pay (WTP), with a mean of Php 110.00 on top of the current entrance fee of Php 10.00. The only factor that was found to affect WTP of the visitors was the bid level, with the expected negative sign. If the visitors mean WTP will be added to the current entrance fee (a total of Php120.00/visitor/day), the potential revenues from the 2019-2025 can total of Php35,391,720. This is about Php32 million more than the revenue from the current entrance fee. This potential revenue source can be used to partly finance the activities of the plan, which requires Php258.76 million

	to implement. Hence, MCME needs to find other funding sources to fully finance the implementation of MMFRs management plan in the context of being an AHP.
Title:	**Phytoremediation potential of three agroforestry species in copper contaminated soils in Marinduque, Philippines**
Author:	**Tulod, Adrian**
Adviser:	**Castillo, Arturo, SA**
Abstract/Executive Summary:	The choice of plants is a crucial aspect for the practical use of phytoremediation technique because not all species are capable of accumulating metals in their tissues and most hyper-accumulating metals in their tissues and most hyperaccumulators have small biomass and are slow growing. This pot experiment examined the phytoremediation potentials and copper toxicity responses of three agroforestry species growing in the copper contaminated site in Mogpog, Marinduque. Soil amendments such as VAM and zeolite were also tested to identify options fro the efficient use of phytoremediation. Results showed that the use of zeolite and VAM were not significant in the Overall performance of the three species indicating not only the species' tolerance but also theri practical applicability in remediating copper contaminated areas in the country. Interesting, both Vitex parviflora and Samanea saman have the ability to transport Cuat an average of 37.0 and 78.25 μg g^{-1} dry wt, respesctively, from roots to shoots beyond the toxicity threshold (20-30 μg g^{-1} dry wt) and appear to be suitable for phytoextraction in the absence of hyper-accumuulating tree species. All the three species, however, limited high levels of Cu translocation within the roots hence are highly suited fro phytostabilizatioin or for delimiting areas with copper toxicity. Moreover, Cu reduction in the soil ranged from 75.9-78.27% confirming previous observations that native species in mine tailing are most ideal species in heavy metals removal.
Title:	**Development of tree volume equations for the residual forests of Region 10, Philippines**
Author:	**Vargas, Patrick Gerard M.**
Adviser:	**Villanueva,Teodoro R.**
Abstract/Executive Summary:	The student spent over a month in Barangay Lumot-Mahipon, Cavinti, Laguna to be actually involved in the activities undertaken in the project Establishment of Rubber Nursery, Budwood Garden and Demonstration Farm in Cavinti, Laguna: A Science and Technology Community-Based (STCB) Approach headed by UPLB-CFNR/IRNR and funded by DOST-PCAARD. For the timeframe of midyear 2017, the student had an actual involvement on the pre-establishment, establishment, and maintenance activities on rubber nursery, budwood garden, and demonstration farm through observations and hands-on experience in the field. The

	student helped in establishing the rubber nursery, identified clones used in the project, measured the seedlings planted on the budwood garden, surveyed potential land for the establishment of demonstration farm, and completed seminar-training on high-quality rubber seedlings production. During the practicum, the student acquired knowledge and skills on the establishment of rubber nursery, budwood garden, and demonstration farm. Skills gained were specifically on rubber propagation, especially budding. From the participation during the training. It was observed that the seven clones used in the project were superior in terms of growth and development, and in the ability to produce latex compared to non budded rubber seedlings.
Title:	**Management activities in the Mt. Makiling Forest Reserve: an ASEAN Heritage Park**
Author:	**Villamil, Francis Hernandez**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	As of October 2013, the Mount Makiling Forest Reserve (MMFR) was proclaimed as the 33rd ASEAN (Association of Southeast Asian Nations) Heritage Park. Mount Makiling Forest Reserve Asean Heritage Park (MMFR-AHP) has been known for its beauty and ecological importance over a period of time and this is an important factor to consider ensuring its effective and sustainable management particularly in promoting eco-tourism. The aim of this practicum is to document and evaluate the current management activities being implemented in the MMFR-AHP. Specifically, the practicum focused on the activities of the Botanic Garden, Parks, and Ecotourism Division (BGPED) with the following objectives: a) to identify and assess the management activities/strategies used b) to participate in activities that the Makiling Center for Mountain Ecosystem (MCME) implements to deal with the problems that arise in MMFR-AHP and c) to formulate recommendations pertaining to the improvement of MMFR-AHP management. The practicum student participated in the various management activities of BGPED that are related to visitor management, trail maintenance, park interpretation, park facilities evaluation and database management. By participating in these activities, the practicum was expected to provide insights and recommendations for its improvement and efficient implementation. After the practicum , the student observed that, there is a need to develop the following strategies considered necessary for MMFR-AHP management: 1) maintenance of complete inventory of park facilities and recreational areas, tools and equipment 2) appropriate and timely maintenance, monitoring and safeguarding: 3) preventive maintenance 4) creation of an accounting system 5) development of module for Educators for Nature Tourism program (ENTs), and 6) determination of boundary zones in Makiling Botanic Garden through the aid of Geographical Information System (GIS).

Title:	**Temporal analysis of greenspaces in Metro Manila using the normalized difference vegetation index (NDVI)**
Author:	**Villar, Ian Joshua A.**
Adviser:	**Tiburan, Cristino L., Jr.**
Abstract/Executive Summary:	The Philippine population has increased rapidly over the years. The National Capital Region (NCR) alone is home to about 12.88 million citizens and considered as the densest city in the country. This has led the city as well to further expand its development by converting remaining areas into business and residential areas. Because of this, greenspaces in NCR continued to decrease over the years. Hence, this study was conducted to analyze the temporal changes of greenspaces in Metro Manila using the Normalized Difference Vegetation Index (NDVI). Initially, Landsat satellite images were acquired from March 3, 1988, to May 14, 1997, November 26, 2001, April 22, 2006 and February 13, 2016. Several pre-processing techniques such as radiometric calibration were applied to enhance the images before they were further analyzed. The NDVI was mainly utilized for the analysis since the study aimed to determine the area and percentage of greenspaces in Metro Manila. Moreover, the Otsu and Tsai thresholding methods were applied in the analysis to determine the extent of changes in the areas. Also, the Green Space per Capita (GSPC) for the different cities in Metro Manila were determined to assess whether they are able to comply with the World Health Organizations (WHO) requirement for minimum greenspace per person which is estimated around 9.2m2. The results of the change analysis using Otsu and Tsais thresholds revealed that only in 1997 to 2001 showed a large increase in the greenspaces of Metro Manila. This accounted for about 5.9% or a total area of 6,527.8 ha while the other three remaining periods revealed decrease in greenspaces - 1998 to 1997, 2001 to 2006 and 2006 to 2016 decreased by 6.95%, 3.24%, and 5.95%, respectively. On the other hand, the DVI results showed that from 1988 to 2016, most of the cities in Metro Manila did not meet the minimum WHO GSPC requirement. The results of the study can serve as baseline information for urban planners and a wake-up call for citizens living in Metro Manila for further improve and maintain their greenspaces to sustain a greener and healthier environment. This also demonstrates the utility of remote sensing and GIS in monitoring vegetation of a given area.

Title:	**Vulnerability analysis and priortizing adaptation strategies on the impacts of climate change in Wangchuck Centennial Park (WCP), Bhutan**
Author:	**Wangdi, Namgyel**
Adviser:	**Predo, Caneios D.**
Abstract/Executive Summary:	The study assessed the climate change vulnerability of households in three Gewogs, under three Dzongkhags in Wangchuck Centennial Park (WCP). A quantitative approach was employed using the Vulnerability Index (VI) framework. The result of the vulnerability analysis found that the overall vulnerability of the households in 0.43, where 80% of the households are classified under low vulnerable to the impacts of climate change and the remaining 20% of the households under moderately vulnerable households. The study also indicated that for both groups of households, the sensitivity index rated higher as compared to that of hazard exposure and the adaptive capacity. The most significant hazard exposure in the three Gewogs in terms of frequency was forest fires, with average occurrence of 6.5, followed by flooding at 5.74. This study also employed regression analysis to obtain relationships between vulnerability and the debt household, the vulnerability and number of dependent household members in the study area. The analysis showed that debt of household and the number of dependent household members as having a significant relationship with vulnerability. In terms of perception and awareness of climate change, the study showed that 80% of the households were knowledgeable on the issues of climate change, with majority of them having experienced increased trend in summer and winter temperatures in the last five years. The study employed the Expected Value Approach of Multi-Criteria Analysis in identifying and prioritizing adaptation interventions in the study area. From the list of interventions proposed by the respondents and the National Adaptation Programmes of Actions (NAPA), formulated by the Royal Government of Bhutan, four adaptation strategies were identified and prioritized by the households in the study area. (1) Disaster Management Strategy (2) Weather forecasting to serve farmers (3) Promoting community-based forest fire management and prevention (4) Rainwater harvesting.

2017

Title:	**GIS-assisted inventory of forest trees in Makiling Botanical Garden (case of 50-70 cm dbh)**
Author:	**Abello, Francis Joseph T.**
Adviser:	**Lapitan, Renato L., Jr.**
Abstract/Executive Summary:	The study was about a GIS assisted inventory of forest trees in Makiling Botanic Garden with a diameter class of 50-70 cm diameter at breast height. Each tree was surveyed and characterized based on different parameters. The diameter at breast height was measured using a tree calliper and if anomalies were found, based on the knowledge from Forest Biometry, rules are applied and followed. For total height, an instrument called Haga altimeter was used. Using a Suunto compass as a guide for the crown spread direction, the crown was measured using a meter tape. A checklist and a Global Positioning System were used to identify and obtain the location of the tree respectively. Sixty-eight species were recorded. After the adat collection data processing follows. The first step was to encode the gathered information in MS Excel 2007, then, the data was carefully manipulated using ArcMap10. The result was an overlay map showing the location of the earlier identified species. The da was then interpreted using various tables and charts. Further data analysis may determine the availability of lumber, leisure, aesthetics, and other benefits from the forest. Here are examples of other foreseen potential uses of the information. Crown volume can be used to calculate approximately the crown fuel of an area. The figures are important for forecasting fire behavior since these fuels are a fires basic source of energy. By determining what vegetative features exist on there, it may be possible to further locate probable recreation areas. Other areas with similar characteristics might be identified.
Title:	**Assessment of selected priority Integrated Watershed Management Plan (IWMP) and field validation of Small Water Impounding Systems (SWIS) in the Cordillera Administrative Region (CAR)**
Author:	**Alcantara, Hazel Joyce Parot**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	The Forest Management Bureau (FMB) is one of the staff bureaus of the Department of Environment and Natural Resources (DENR). As a staff bureau, FMB provides technical guidance to the central and field offices for the effective protection, development, and conservation of the country's forestlands and watershed areas. In addition, it assists in the interpretation of formulated policies, provides consultative and advisory services to the Regional offices in the implementation of its plans and programs. The FMB is

	composed of four (4) Divisions, namely: Forest Policy, Planning & Knowledge Management Division (FPPKMD), Forest Resources Management Division (FRMD), Forest Resources Conservation Division (FRCD), and Forest Investment Development Division (FIDD). Each division is subdivided into sections and this practicum report was conducted in one section of FRCD which is the Watershed Ecosystem and Management Section (WEMS). During the course of the practicum, the author was able to gain knowledge and experiences on the different activities of WEMS done in the office and in the field. The section focuses on the watershed ecosystem conservation, evaluation and updates of Integrated Watershed Management Plan (IWMP), and monitoring of government projects like Small Water Impounding System (SWIS). Office activities conducted were assessment and evaluation of two selected IWMP. The author was able to gain knowledge and experiences on implementing DENR Memorandum Circular (DMC) 2008-05 (Guidelines in the Preparation of Integrated Watershed Management Plans). The said DMC served as a guide in the assessment and evaluation of two selected IWMPs: Sta. Cruz watershed and Ylang-Ylang watershed in terms of watershed characterization, vulnerability assessment, and its implementation plan. In addition to these activities, updating of the Work Financial Plan (WFP) of the five (5) out of 143 proclaimed priority watersheds in the country was also undertaken. The five (5) IWMPs updated were (a). Sta. Cruz, (b). Mabacan River, (c). Bago River, (d). Pared River, and (e). Aringay River. Actual field exposure was done by visiting SWIS projects located in Cordillera Administrative Region (CAR) with the assistance of two FMB staff under WEMS. Seven (7) sites from four (4) Sitios and three (3) Barangays of Benguet, Mt. Provinces, Kalinga and Ifugao were documented and validated. Sampling was done for the selection of these SWIS sites. Activities undertaken during site validation involved photo documentation of SWIS areas/sites visited with Geographic Positioning System (GPS) reading (using Garmin) and geo-tagging (with the use of tablet). Other activities undertaken were interviews with People's Organization or corresponding contractors and beneficiary of the SWIS, and meetings with the Community Environment and Natural Resources Office (CENRO) and Provincial Environmental and Natural Resources (PENRO) officials and staff regarding the funds allotment to the project and checking if the SWIS project is functioning according to its main purpose.
Title:	**Case study on the operations of Designs Ligna Incorporated's (DLI) furniture division in San Pedro, Laguna**
Author:	**Alcantara, Lou Reginald B.**
Adviser:	**Castillo, Arturo Mark A., II.**
Abstract/Executive Summary:	For over forty years, the Designs Ligna Inc. has been providing high quality furniture to both local and international markets. It has established a well known name in the furniture industry. However, DLI has targeted the high-end target market that resulted to its

	products being high-priced. Moreover, different factors during operations has also affected the company which eventually led to diminishing sales of DLI. This study was conducted to assist the company and address this problem. The study specifically aimed to: a) determine the different primary and secondary activities of the company through Value-Chain Analysis framework; b) analyze different internal factors affecting the company; and d) recommend strategies that will help the company operate more efficiently and in-line with its long term goal. The study used Michael Porters Value Chain Analysis, as well as environmental analysis using Political-Legal, Economic, Industry, Social-Cultural, Technology factors. These frameworks were used to identify the companys SWOT. Porter's Value-Chain Analysis was used to determine the strengths and weaknesses of DLI while Environmental analysis for the opportunities and threats. In conclusion, DLI is recommended to re-establish a Marketing department. It should adopt new trends in technology for faster and efficient operations. DLI should institute new forms of promoting the company to its present market through the use of different modern media. Strengths include skilled workers equipped with vast experience, while opportunities include changing lifestyle of customers. These should always be taken into consideration and utilized for further competitive advantage. In contrast, weaknesses such as poor scheduling of procurement and delivery of finished products; and threats such as increasing number of competitors should be constantly improved and monitored. Resulting strategies from the SWOT analysis should always be updated depending on the current situation of the company. With these plans and strategies, DLI can retain its long-term competitiveness in the market.
Title: Author: Adviser: Abstract/Executive Summary:	**Estimation of forest biomass and carbon of selected large leaf mahogany (Swietenia microphylla) stands within the Molawin-Dampalit subwatershed, Mount Makiling Forest Reserve (MMFR)** **Algabre, Iris Ashley Cantos** **Villanueva, Teodoro R.** Various strategies are being used to reduce environmental degradation and mitigate climate change. The management of forest plantation is one strategy which has been identified as great potential in mitigating climate change through carbon sequestration. In order to contribute to the validation of this strategy, a study, as part of the practicum experience, was undertaken to estimate the forest biomass and carbon of selected large leaf Mahogany (Swietenia macrophylla) stands in Mt. Makiling Forest Reserve (MMFR) was conducted. It aimed to determine the amount of carbon (tons per hectare) accumulated in the biomass of the Mahogany stands. The practicum focused on three major carbon pools namely: aboveground (trees and herbaceous/understory vegetation), ground (necromass/litter and coarse wood debris), and belowground biomass (roots and soil). The study was conducted through actual field measurements and

	the use of allometric equations developed by Brown (1997). Results showed that selected large leaf Mahogany stands have a total biomass produced amounting to 808.10 tons per hectare. The aboveground holds the largest amount of biomass among the major pools followed by the belowground biomass while the smallest was the ground biomass with 645 tons/ha, 156.23 tons/ha and 6.87 tons/ha, respectively. The biomass production of the different carbon pools were: a) tree (642.08 tons/ha) b) roots (156.23 tons/ha) c) litter (5.77 tons/ha) d) understorey/herbaceous e) vegetation (2.92 tons/ha), and f) CWD (1.10 ton/ha). The amount of carbon stored in its biomass and the CO2 content of the Mahogany stands were computed resulting to 658.36 tons/ha and 2413.97 tons/ha, respectively. Results showed that belowground has the highest amount of C stored with 365.01 tons per hectare followed by the above ground biomass with 290.25 tons per hectare and lastly, the ground biomass with 3.10 tons per hectare. The belowground biomass has the highest amount of carbon deposits primarily contributed by its soil component. The amount of carbon stored in the different carbon pools were: a) soil (294.71 tons/ha) b) tree (288.94 tons/ha) c) roots (70.30 tons/ha) d) litter (2.60 tons/ha) e) understorey/herbaceous vegetation (1.31 tons/ha), and f) CWD (0.50 tons/ha). Based on the study, the large leaf Mahogany plantations are significant carbon sink in terms of its ability to sequester and store a high amount of carbon. The biomass and carbon contents of the large leaf Mahogany stands in MMFR are way higher compared to other secondary forests and some tree plantations located in the country. Thus, appropriate management and establishment of more plantations are necessary in order to improve and enhance the capability of forests to sequester and store more carbon.
Title:	**An assessment of institutional contributions to conservation farming village in La Libertad, Negros Oriental**
Author:	**Almario, Jerusha Cellan**
Adviser:	**Carandang, Wilfredo M.**
Abstract/Executive Summary:	Nowadays, most forests in the Philippines are being degraded and converted to agricultural land through time. Hence, massive flooding and soil erosion are being experienced. As a response, different institutions are continually developing projects and programs that will address this environmental problem and at the same time helping the socio-economic conditions of farmers to improve. One of this is the implementations of the Conservation Farming Village, a research and extension program of the University of the Philippines Los Baños, which has been implemented in La Libertad, Negros Oriental. During its implementation, developing linkages also happened. A study was conducted to determine how institutions affected the project. This study aimed to assess the contributions the institutions provided to the beneficiaries of CFV. By interviewing representatives and by providing questionnaires for them to answer, it was found out that the contributions they gave in the community are in line with their

	characteristics in nature. They gave those contributions and responses in that way since that was their characteristics and role in the society. Aside from that, the study showed that the contributions they gave positively affected the level of living farmers and the environment. When the soil and water conservations were applied in the area, soil erosion has been minimized according to farmers interviewed. Additionally, results showed that the farmers were satisfied based on the contributions the different institutions provided.
Title:	**Evaluating the role of green space in the mitigation of Urban Heat Island effect (UHI) in Los Baños, Laguna**
Author:	**Anghad, Marvin Mandapat**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	Nowadays, urbanization and industrialization rapidly occurs and develops. Due to the rapid change of urban landscape many environment-related problems occur, and one of this is the Urban Heat Island (UHI) effect. Urban Heat Island effect is a phenomenon that occurs in urbanized areas where the mean average air temperature is higher compared to the nearby rural areas, UHI is also linked to an emerging warm island representing the elevated temperatures of an urban area among a sea of cool lower temperatures of the surrounding landscapes (Oke, 1987). Urban Heat Island is caused by transformation of natural landscape to urban use, loss of vegetation, increase in engineered structures like buildings, roads, and pavements-population growth due to migration and increase in anthropogenic heat emission. In the case of Los Baños it is +3, which means that is 3°C warmer on the average in Los Baños compared to adjacent areas. Therefore, the use of green space as mitigating strategy is the main focus of this study. A total of 8 sites classified as green space and also sites are categorized as type 1 and type 2 urban green spaces. Then on each site the microclimatic parameters (Light intensity, Relative humidity, Air temperature and Ground Temperature) were measured. Light intensity is lower inside the green spaces compared to adjacent open areas, this is mainly attributed by the shading effect of the tree canopy because it blocks sunlight. The relative humidity is generally higher inside green spaces compared to adjacent areas. Ground temperature is relatively lower inside green spaces compared to adjacent open areas. Air temperature is relatively lower inside green space compared to adjacent open areas. Results showed that, in type 1 urban spaces, a very strong positive linear relationship between light and ground temperature was observed. There is also a strong positive linear relationship between light intensity and air temperature and a very strong negative relationship between light intensity and relative humidity. Correspondingly, there is a strong negative linear relationship between relative humidity and ground temperature. Furthermore, a very strong negative linear relationship between relative humidity and air temperature was observed. On the other hand, for type 2 urban green space, a very strong positive linear relationship

	between relative humidity and ground temperature. Moreover, there is a strong negative nonlinear relationship relative humidity and air temperature was also observed.
Title:	**Analysis of the level of knowledge, perception and adaptation strategies to climate change among the members of Parang ng Buho upland farmers association in Sta. Maria, Laguna, Philippines**
Author:	**Arboleda, Jose Luis C.**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	The Study was conducted in Barangay Parang Buho, Sta. Maria, and Laguna among the active members of the Parang ng Buho Upland Farmers Association. The study aim to assess the respondents' level of knowledge towards climate change and analyze their adaptive strategies by association to their knowledge towards climate change. The data were collected through personal interview of the correspondents using a semi-structured questionnaire. Spearman correlation and Charmers V association were used to analyze the relationship between respondents level of knowledge to their adaptation capacities. The perceived constraints on their adaptive capacity and perceived factors affected by climate change were also analyzed. The results show that most of the respondents have moderate to poor understanding of climate change. Moreover, the majority of the respondents only relied on their personal observation of the environment to source information and awareness on climate changes. It showed that the educational attainment, which the farmers have stated to be the limiting factor, has great influence on their capacity to adapt to climate changes. The adaptation strategies, or lack thereof, have great impact on the farms annual income, crops, planting techniques, soil, pest and typhoon. It is highly recommended that extension education on awareness and adaptation to climate change should be conducted in the farming communities for them to be well adapted to the changing climatic conditions and come up with better farm designs.
Title:	**Adoption and benefit cost analysis of vegetable-live trellis system in Nagcarlan, Laguna**
Author:	**Armamento, Anne Baylon**
Adviser:	**Predo, Canesio D.**
Abstract/Executive Summary:	The study aimed to assess the financial profitability vegetable-live trellis system using Kakawate (Gliricidia sepium (Jacq.) Walp) vis-a-vis the traditional vegetable trellis system in Nagcarlan, Laguna. It also identified the factors influencing farmers adoption decision of the vegetable-live trellis system. A total of 60 farmers were interviewed, 82% of whom were adopters of the vegetable-live trellis system. The logistic regression analysis revealed that farmers adoption of the vegetable-live trellis system was significant

	and positively related with household size, parcel size, and farm income. This suggests that the probability of adoption increases for farmers with bigger household size, have more land parcels, and higher farm income. On the other hand, mode of farm acquisition was inversely correlated with the farmers adoption to the vegetable-live trellis system. This implies that farmers who bought their lands are less likely to adopt vegetable-live trellis systems. Results of the benefit cost analysis showed that the vegetable-live trellis system had significantly higher financial profitability than the traditional vegetable trellis system. The vegetable-live trellis system had realized a net present value (NPV) of PhP 65,804 and a benefit cost ratio (BCR) of 1.8. This implies that the vegetable-live trellis system is a feasible and financially attractive land use option. Indeed, the profitability of the vegetable-live trellis system could explain the adoption of the majority of the respondents as can be seen from the survey results. On the other hand, the traditional vegetable trellis system produced a negative (Php -161,003) and a BCR of less than one (0.71), which is financially attractive than the vegetable live trellis system. Based on the findings of the study, there is a need to further enhance the profitability and promotion for wider adoption of the vegetable trellis system in the province of Laguna. The use of Kakawate as live trellis is expected to generate social benefits such as reduced soil erosion and carbon sequestration. Due to limited time and resources the study did not quantify this aspect. Hence, the study recommends that further research quantifying the soil conservation and carbon sequestration benefits of using live trellis systems in the vegetable production be conducted. In addition, further study needs to incorporate the price patterns of vegetables in the study area. Knowing the price patterns of this system will give higher possibility for the farmers to avail of price risk insurance. All of the above are expected to contribute to the improvement of land use policy in the upland areas.
Title:	**Hedgerow establishment on the 56 hectares legacy forest project of Tan Yan Kee Foundation, Inc. (TYKFYI) in Barangay Joson, Carranglan, Nueva Ecija**
Author:	**Bañares, Camilla Flor**
Adviser:	**Carandang, Wilfredo M.**
Abstract/Executive Summary:	The practice was done in the 56 ha Legacy Forest Project managed by the Tan Yan Kee Foundation, Inc. (TYKFI) located at Talavera Watershed Forest Reserve (TWFR) in Barangay Joson Carranglan, Nueva Ecija. The practicum was performed by the practicum students with the help of TYKFI staff. The objectives of the practicum were the following 1) to be able to use the theories and concepts gained from the university and apply it on the practicum 2) To be able to establish a contour farm/demonstration farm at the 56 ha Legacy Forest Project that is managed by Tan Yan Kee Foundation Inc. (TYKFI) and 3) To have hands-on experience in managing and establishing an agroforestry demonstration farm. The practicum students established a contour farm on the former MGP site. The activities mainly focuses on

	establishing of hedgerows.These activities were: 1) Establishment of boundary of the site 2) Establishment of the contour lines 3) Removals of weeds and other debris on the plot of the contour farm 4) Cultivation of the soil of the contour farm, 5) Planting species for the hedgerows like Ipil-ipil (Leucaena leucocephala) and Kakawate (Gliricidia sepium) and 6) Planting species for the alleys on the contour farm like Cassava (Manihot esculenta). Other activities that were done during the practicum were 1) Tree planting proper joint event of SKYFI and DENR of Nueva Ecija 2) Interview with the Certificate of Stewardship Contract (CSC) Holder 3) NPK and pH Soil Analysis lastly 4) Identification of plant species on the site. These activities were done as additional information for the practicum report of the TYKFI staff members.
Title:	**Documentation and supervision of various project sites of Cypress Bomanite Inc.**
Author:	**Baril, Joaquin Enrique Garcia, III**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	The practice was with Cypress Bomanite Inc., a landscaping contractor company which provides hardscape and softscape services. The practicum student specifically worked for the CBI Bomanite Co., which focuses on the softscape aspect of the corporation. The company caters to city governments. And big development companies (e.g. Megaworld, SMDC, etc.). The practice was aimed to expose the student to the aspects and technicalities of a landscape contractor company. It showed the practical world of landscaping. During the first part of the practicum, the student accompanied by Mr. Fred Tura and Mrs. Liezel Estansilao, two of the Project-in-Charge (PIC) members of the company, to observe the regular work that they do everyday. The practicum student was exposed to different sites in which supervision of landscape implementation and maintenance activities were done. The practicum student was exposed to start up projects where they inspected a proposed site where landscaping still needs to be done. Once activity included inventory of palms and trees. The only instruments used during the inventory was a steel meter tape. Tree height was estimated and diameter was measured. With the absence of other inventory instruments except for the tape the practicum student needed to be resourceful and flexible during the inventory. Forestry students conduct an inventory with complete instruments to produce accurate data to be in management. In this aspect, the practicum student was exposed to the limitations of the company. One of the services of the host company is landscape design, where resident landscape architects create designs for the greenspaces of certain sites. The client gives a floor plan, then the company creates a landscape design and implements it. The practicum student experienced the application of AutoCAD in these activities. Furthermore, the student was exposed to the different processes involved in preparing for a landscape project. For half of the practical activity, the student serves as a Junior Project in Charge for SM light residences in Mandaluyong

	City. The Practicum student encountered challenges because SM Light Residences is owned by SMDC which had very high expectations. The landscape for SM Light Residences was maintained by CMI Bomanite, Co., where the job of a PIC is to ensure high quality maintenance activities for the condominium. The practicum student inspected the site to check the health of the plants, and assess the aesthetics of the ornamental plants collectively. The student made necessary requests from the office for the condominium, checked the attendance and status of the company gardeners at the site. Moreover, the student was exposed to the reality of maintaining a condominium landscape. The student learned that there are many requests and job orders needed to bring materials to the site. The student realized that the gardeners should be taken care of. They should be paid on time, given necessary benefits for them to stay with the company and in return they will do their best on their tasks. Failure to address this may sacrifice the quality of service that the company provides, which can ultimately affect the impression of the clients to the company.
Title: Author: Adviser: Abstract/Executive Summary:	**Assessment of Quinali watershed using geographic information system and remote sensing** **Barquilla, Caryl Anne Macaraig** **Racelis, Diomedes A.** The Philippines watersheds are continually being degraded thus threatening the supply of water in the country. The government has recognized the need for effective monitoring and management to avert the declining condition of these watersheds. Geographic Information Systems (GIS) and remote sensing are the recent technologies in the Philippines used for assessing and monitoring watersheds. These technologies are applied to various fields of natural resources management. The study was conducted in Quinalo ""A"" Watershed (QAW) located on the Bicol River Basin. It focuses on how people can assess a watershed through Watershed Declination, Land Cover Classification and Soil Erosion Model. The study that was done evaluates the use of these technologies in generating quality data and assessing risk vulnerability on a certain watershed area. Data were gathered from the available offices, processed then analyzed. Results of the study have shown that Quinal watershed has a high susceptibility of potential risk of soil erosion. Further recommendations were given as a reference for future studies.

Title:	**GIS-aided floral diversity assessment in Mt. Makiling Forest Reserve**
Author:	**Barrientos, Oliver Calderon**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	The assessment of biodiversity is an important tool to maintain the balance in an ecosystem. This will also help maintain the quality of the different ecosystem services provided by the area. This study aims to assess the biodiversity present in PFLA 2 in which a recommendation could be form. In study, a full inventory was conducted in PFLA 2. There are a total of 312 trees inventoried which are composed of 62 species and 24 families. Moreover, the most dominant species and family are identified. This study also shows the species with the highest height and diameter at breast height (DBH). The computed Shannon-Wiener index and Simpson's index for the year 2016 is equal to 3.08645963 and 0.097802787 respectively (explain). These indices help in the identification of the different major threats to biodiversity in PFLA 2. Hence, assessing biodiversity helps in improving the condition of the environment, for it gives us concrete data wherein we can base our next actions.
Title:	**Geographic information system use and integration by local government units of Laguna, Philippines**
Author:	**Bathan, Jilian Princess Pingul**
Adviser:	**Bantayan, Nathaniel C.**
Abstract/Executive Summary:	Geographic Information System (GIS) is considered important by the local government units (LGUs) around the world because it improves their work in decision making, service delivery, and citizen management (Esri ,2005). Like the other countries, the whole Philippines should implement GIS in LGU operations, as well. Upgrading the surveying and mapping in the Philippines through GIS will make the data gathered by the local governments easily managed, understood and analyzed because the outputs that will be produced are computer generated. The study that was evaluated the use of GIS in Laguna, Philippines. A survey was formulated and then conducted in all municipalities of Laguna regarding their use of GIS. The same study was conducted ten years ago. The past and current surveys were compared and improvement in GIS implementation was seen in the majority of the municipalities. Most of the municipalities said that GIS improved their work as LGUs and have seen its benefits. GIS has proven to make the work easier in local government units by producing outputs easily analyzed and visualized which will then be used for different purposes and solving problems in locality.

Title:	**Exploring ecotourism in Lake Pandin, San Pablo City, Laguna, Philippines**
Author:	**Borero, Queenie Alcantara**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	The study was conducted to determine which ecotourism aspect of Pandin Lake contributes the greatest on the tourist attraction and perception of the site. Furthermore, the assessment on how the management of Lake Pandin was practiced by the Association of Bangkeros and Bangkeras. Primary and secondary data were used in the study. The primary data were obtained through personal interviews and survey with 30 tourists in Lake Pandin, San Pablo City using a pretested questionnaire. The secondary data used was the management plan made by the Laguna Lake Development Authority for Lake Pandin. Multi-criteria decision making was used to assess the six aspects that the lake offers. It ranked the aspect that significantly contributes to the ecotourism appeal of the site. Descriptive analysis was also used to determine the perception of tourists about the ecotourism of the site. The results of the study showed that the natural setting of the area makes Lake Pandin very appealing for ecotourism while the other five supporting elements are accessibility of the site, the food offerings in the area, the souvenirs and the activities such as balsa ride, swimming and fishing. Based on the results, the recommendations are provision of directional signage to improve accessibility, improvement in food and souvenir services and continuous implementation of safety regulations in the lake.
Title:	**Socio-economic profiling of farmers along the boundaries of Mount Makiling Forest Reserve, Laguna**
Author:	**Brillo, Frances Antonette Cervantes**
Adviser:	**Galang, Marco A.**
Abstract/Executive Summary:	Watershed consists of a broad range of factors and aspects to consider in order to ensure proper conservation and management. One of the fundamental scope of studying the potential capacity of a watershed lies in the socio-economic aspect of the area determining the demographic and economic capability of the watershed. Aside from providing a basic understanding of the demographic profile of the farmers, this study also helps in the analysis of the potential impacts of these farmers on the protection and conservation of Mount Makiling Forest Reserve. The study was conducted in the farmlands located along the boundaries of three subwatersheds in MMFR: Molawin-Dampalit, Cambantoc and Tigbi. A total of 14 farms were chosen as a subject. The gathered data showed the socio-demographic profile of the farmers and the corresponding farmland profile of the farms along with analysis of the data in relation to its effect on the productivity of MMFR.

Title:	**Industry analysis of the wood carving industry in Paete, Laguna**
Author:	**Caday, John Howelle B.**
Adviser:	**Castillo, Arturo Mark A., II,**
Abstract/Executive Summary:	The author used a simple random sampling from the official and registered woodcraft entrepreneurs listed in the Paete Municipal Hall Master list. Thirty four respondents were chosen to be the focus of the study. Primary data were gathered through personal interviews with the use of a questionnaire. Information about the operation, management, utilization, factors affecting the industry and problems they are facing were asked confidentially. Supporting details were obtained through the use of existing records such as published books, magazines, articles and annual reports. To further analyze the data, tabular presentations with descriptive analysis were utilized. Averages and percentages were also employed. Income statement and Balance used to check out for the financial data derived from the interviews. These were used to check out for the financial performance of the business. Financial ratios were applied to examine the profitability, liquidity and performance of the wood carving industry. The main operation process includes: drying of woods, pattern making, bandsawing, carving, sanding, varnishing, painting and assembling. The Paete Woodcraft industry was known to have an annual sale of P340,837.08 and a net income of P48,758.88. As computed, the net profit margin of the wood carving industry was 0.1431. The net profit margin explains the value of money the industry earns in every peso invested. The respondents also identified the problems they normally experienced during the production and operation. Availability of raw materials was the major problem they have given. Others were the following: rejected products, delay of delivery, attitude of the workers, high cost of raw materials and lack of capital. The possible solutions and recommendations suggested by the author were the following: (1) pleading the concerned government agency to established good relationship between the producers and government bodies, (2) assign workers to inspect and check the quality of delivered goods prior to utilization, (3) propose a policy on management and operation to solve the problems within the workers, (4) coordinate with a cooperative to impose interest loans to recover the opportunity cost of the money lost and (5) appeal for price control and price support. Through these results, one can deduce that the industry of wood carving in Paete, Laguna is a profitable business as proven by the annual sales of and net income. The Paete Woodcraft Industry does not only require capital investments but more than that needs technical skills within the laborers, efficient operations for the business and a well-organized managerial structure.

Title:	**A management system for watersheds dominated by spiked pepper (Piper aduncum L.) in Southern Mindanao, Philippines**
Author:	**Cardente, Thomas Labra , II**
Adviser:	**Villanueva, Teodoro R.**
Abstract/Executive Summary:	This study explored ways of harnessing the potentials of the spiked pepper tree (Piper aduncum) for the management of watersheds where it has proliferated. With Upper Buayan Watershed in Sarangani Province as study area, the methods employed were: (1) biophysical characterization using GIS, (2) determination of farmers' knowledge and perceptions on spiked pepper, (3) carbon stock assessment, (4) determination of soil chemical properties, (5) floral diversity assessment, (6) economic valuation of spiked pepper, and (7) cost-benefit analysis. Spiked pepper was found to have many ecological and economic benefits, far outweighing its supposed disadvantages as a species considered to be bio-invasive. Aside from its acceptability among farmers, it was found to have strong potentials for carbon sequestration, for improving soil nutrients after a short period, and for livelihood generation when its poles are sold as firewood or as tomato and asparagus pegs. Biodiversity-wise, spiked pepper stands to nurture a big number of endemic wildlings. Its bright prospects also came out for improving the cover of hilly lands susceptible to erosion during rains and to wildfires during dry months suppressing cogon and other weeds in grasslands and shortening the fallow period of upland cropping systems. Cost-benefit analysis of ten management system options arrived at, revealed that the most profitable is Agroforestry (NPV=Php33.8 trillion), followed by Rubber Plantation (Php 270.56 million). The least profitable is Grazing (NPV=Php 6 million). Spiked pepper's robust growth performance in grasslands and marginal areas makes it a highly potent species for restoration of denuded uplands, rehabilitation of erosion-impacted watershed, provision of alternative livelihood for upland dwellers, and deflecting small-wood gatherers that would otherwise turn to natural forest and to more valuable indigenous species. Its use can serve to propel the National Greening Program and help the country face its rural poverty, food security, and climate change problems. Gray areas in the other economic and ecological potentials of spiked pepper still exist. Thus, a number of recommendations are made to fill research gaps, address policy requirements, and fine-tune management systems.

Title:	**Possible settlement occurrence identification in Mt. Banahaw-San Cristobal with reference to Municipality of Majayjay, Laguna using GIS**
Author:	**Catelo, Fellice Gabrielle R.**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	The Mt.Banahaw-San Cristobal is the only protected area in Region IV-A CALABARZON. With this, it is imperative to take potential and effective measures to keep it protected from human-intervening practices like urbanization and settlement. The municipality of Majayjay, Laguna located at the foot of the mountain is used to determine the possible areas that could be fit for settlement. With the assumption that Majayjay is to be urbanized, urban sprawl is the phenomenon that called for the study. Urban sprawl is a result of urban growth from urbanization. It has various determinants but settlements are the one to be used for analysis. Biophysical characteristics are the basis for the determination of the area possible settlement occurrence. People decide on where to settle the base on the convenience the area could provide them - proximity to roads and water source, soil fertility and safety from natural disasters. With the use of GIS, it was determined that areas with the soil type of Luisiana clay loams as well as the ones with slope of 3-8%, are where settlements have and have been occurring. In addition, areas near the road networks and waterways are also resided in.These characteristics area of Majayjay and were compared to and found in Mt. Banahaw-San Cristobal. With this, it can be concluded that areas in Mt. Banahaw-San Cristobal with similar types of biophysical characteristics could be a candidate for settlement occurrence. That being said, these areas need to have extra attention to avoid further human interventions in the mountain.
Title:	**Impact assessment of El Nino on the production and marketing of agroforestry production in conservation farming villages (CFV) La Libertad, Negros Oriental**
Author:	**Catudio, Ma. Louiella Rose Ortega**
Adviser:	**Carandang, Wilfredo M.**
Abstract/Executive Summary:	This study aimed to access the impacts of El Niño on production and marketing of agroforestry products of three barangays under Conservation Farming Villages (CFV) in La Libertad, Negros Oriental including the present and future trends of El Niño and relate them to the production and marketing strategies of the barangays. Primary data were collected from 40% of the total population of both farmer volunteers and adopters which were randomly sampled. Using the interview method, socio-economic profile, farm production, and marketing strategies they were practicing were obtained. Also, personal interviews with the

	concerned LGUs and NGOs were done. The results showed that agroforestry practices and technologies applied by farmers were effective and efficient in times without El Niño. Unfortunately, with El Niño, practices and technologies were insignificant because a lack of water supply hindered the cultivation of the crops. Nevertheless, intensified livestock farming was done to compensate for the loss since livestock were less vulnerable than crops. Also, using the Independent t-Test, results revealed that at 95% level of significance the difference between Net Farm Earnings (NFE) in periods with and without El Niño for all barangays was statistically significant. Thus, the alternative hypothesis was accepted which stated that there was a significant difference between the NFE of each barangay in times with and without El Niño. Moreover, marketing strategies employed were found to be effective and efficient, in general. Although competition against the inorganic products were very high but because of the high demand for the products competition was inevitable. Furthermore, present drought was found to be not only because of El Niño but also because of the degraded Pacuan Watershed. As a response, rehabilitation and restoration of the watershed through a well thought watershed management plan is necessary. Lastly, decrease in rainfall and increased temperature across time based on the forecast, implies that improvement of both production and marketing strategies were a must to ensure the sustainability of their farming over time.
Title:	**Soil characterization of Tigbi Subwatershed, Mt. Makiling Forest Reserve, Laguna**
Author:	**Colendra, Jiela Mae Bianeza**
Adviser:	**Galang, Marco A.**
Abstract/Executive Summary:	This practicum report covers the soil characterization of Tigbi Subwatershed, Mt. Makiling Forest Reserve in Laguna. It was conducted with the aim of: (1) Assisting the Makiling Center for Mountain Ecosystems (MCME) personnel in soil sampling and vegetation survey (2) Characterizing the soil pH, texture, organic matter and NPK content of the soil in Tigbi watershed in support of MCMEs on-going research. Soil samples were taken at various elevation points 700, 600, 300, and 200masl in the Tigbi subwatershed namely Upper-middle, Middle, Lower-middle and Lower, respectively. Composite soil samples were collected in each of the three 10x10m subplot representing replications for a total of 12 samples for the whole characterization. Soil samples were analyzed in the Institute of Renewable and Natural Resources (IRNR) Soils Laboratory for texture, organic matter and Nitrogen. Available Phosphorus and exchangeable Potassium were determined in the soils laboratory of the Ecosystems Research and Development Bureau (ERDB). Data analysis and interpretation were done primarily through descriptive statistics. Results showed that the Tigbi subwatershed has clayey soil. The soil pH ranged from 5.3 to 6.1, which means that the study site has moderately acidic condition. The organic matter content, nitrogen and available phosphorus occurred in small amounts in the subwatershed with

	values ranging from 1.95-5.1%, 0.09-0.29% and 0.4-2.4ppm, respectively. Exchangeable K is medium to very high with amounts of 0.9-4.1 cmolc kg-1.
Title:	**Evaluation of landscape design and maintenance in Ninoy Aquino Parks and Wildlife Center, Quezon City, Philippines**
Author:	**Coronado, Clarisse Bihag**
Adviser:	**Valle, Pura Beatriz S.**
Abstract/Executive Summary:	Significant learnings and experience were acquired during the major practice in Ninoy Aquino Parks and Wildlife Center located in Quezon City that was done from June to July 2016. The first two weeks of the activity was mainly spent on the actual inventory of the trees. Tree inventory includes those with a diameter greater than or equal to 10 cm. Those trees less than10 cm were also identified, enumerated and tagged. Identification and evaluation of ornamental plants in the park was also done. While the actual observation and evaluation on the maintenance practices of the plants in the part especially watering, weeding and pruning practices was done during the last two weeks of the activity. Interviews are also gathered on some of the key persons such as park supervisors and maintenance staff regarding the landscape design of Ninoy Aquino Parks and Wildlife Center, the plants they are using in landscaping and the tools and equipment they are using in maintenance practices. Based on the results of the practicum report, the park is composed of diverse species of ornamental plants that are distributed around the park but most of the identified ornamental plants are exotic. The maintenance practices like weeding, watering, pruning, stacking, pest and disease management and application of fertilizer needs to be applied exogenously. Some of these maintenance practices were not properly performed by the maintenance laborers. Hardscape and softscape were also evaluated, based on the actual observation and interviews on the key persons, hardscapes in the park needs to be reconstructed, repainted or replaced. Softscape in the park like pocket garden and tree lawn should be established, vertical garden should have regular plant maintenance and construction of rooftop garden. The recommended improvements in the existing landscape were one using AutoCAD 201 and Adobe Photoshop CC software. Photo documentation on the different areas of the park were edited using these two softwares. For the further improvement of landscape in the park, proper selection of species, appropriate planting and landscape design ad systematic and highly efficient maintenance management can minimize the negative externalities of these plants which may result to public dissatisfaction.

Title:	**Supply and demand models for falcata (Paraserianthes falcataria L. Nielsen) and yemane (Gmelina arborea Roxb.) sawlogs in Caraga and Cagayan Valley Regions, Philippines**
Author:	**Cortiguerra, Emelynne Cuaresma**
Adviser:	**Cruz, Cerenilla A.**
Abstract/Executive Summary:	This study was undertaken to develop supply and demand models for falcata and yemane sawlogs in Caraga and Cagayan Valley Regions. Specifically, the study aimed to: (1) describe the sawlog production systems for facalta and yemane sawlogs in Caraga and Cagayan Valley Regions (2) identify factors affecting demand for and supply and yemane sawlogs in Caraga and Cagayan Valley Regions (3) determine demand and supply elasticities of the two species in the Caraga and Cagayan Valley Regions and (4) compare the supply and demand models for facalta and yemane sawlogs in Caraga and Cagayan Valley Regions. Cross-section data were used in the model construction. Five structural equations were developed: (1) supply of falcata sawlog in Caraga Region (2) demand for falcata sawlog in Caraga Region (3) supply of yemane sawlog in Caraga Region and (4) supply of yemane sawlog in Cagayan Valley Region and (5) demand for yemane sawlog in Cagayan Valley Region. In Caraga Region, the supply of falcata sawlogs was influenced by investment cost (INVEST), price of falcata pulpwood lagged one year (PFPW-1,), price of falcata sawlog lagged one year (PFSW-1), the price of labor (Plabor), and profit margin (PM). Meanwhile, the demand for falcata sawlog was influenced by plant capacity (CAP), price of falcata sawlogs (PFL), and the price of labor (Plabor). Equilibrium quantity for falcata sawlogs is 422.058 cu m per year and equilibrium price is P2, 870.50 per cum. Supply of yemane sawlogs in Caraga Region was influenced by the price of Yemane sawlogs lagged one year (PYSW-1), price of yemane pulpwood current year (PYPW), and cost of delivery (CDEL). On the other hand, supply of yemane sawlogs in Cagayan Valley Region was influenced by investment cost (INV) and loans (LOAN). The degree of responsiveness of supply/demand to its factors were measured using elasticity. Comparison of falcata sawlog and supply of yemane sawlogs in Caraga Region was done with both models being influenced by price of sawlogs lagged one year. PFSW-1 negatively influenced the supply of falcata sawlogs while PYSW-1 positively influenced the supply of yemane sawlogs. The regression of PFSW-1 was not significantly different from zero. On the other hand, PYSW-1 is significantly different from zero. Likewise, a comparison on demand for falcata sawlogs in Caraga Region and demand for yemane sawlogs in Cagayan Valley was done, however, there were no common variables as point comparison.

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Title:	**Documentation and assessment of landscape and maintenance activities of PMGI at Alabang Town Center**
Author:	**Dayrit, Alexandrea Pagtalunan**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	The practice was conducted at Alabang Town Center from June 15 to July 15, 2017, Monday to Sunday. The working hours depended on the activities conducted during the day. But most of the time, it was conducted every morning. A total of 200 hours was devoted to finishing the practicum. The major activities were part of the projects handled and maintained by the Professional Maintenance Group,. Inc (PMGI). The general objective of the practicum is to gain knowledge and insights in the different activities performed at the site. Specifically, it aims to (1) describe the different practicum activities (2) assess the green space management and landscape maintenance of the practicum site (3) stimulate the work environment for the student to gain exposure and experience and (4) recommend strategies that can improve the landscape maintenance of the practicum site as well as the conduct of the practicum. Arboricultural and landscape maintenance practices and activities were conducted in the practicum site. Planting activities in the organic garden, tree planting activity, drills, gathering of data, and documentation of indoor and outdoor plants were done. Lastly, the author assisted in conducting tree risk assessment. The inventory of trees was undertaken in the practicum site. The inventory includes the number of trees present in the site, and the identification, measurement, and defects of trees. This activity provided the author an opportunity to see how the workers of Professional Maintenance Group, Inc. performed to maintain the urban and environment of Alabang Town Center. One of the problems encountered during the practicum was changing of landscape supervisor regularly because the administration officers of ATC were strict in choosing the landscape supervisor. There was a time that landscape supervisor lasted in his job for only 1 month due to the high standards of ATC. However, this problem was overcome by the author through the held of the team leaders and workers of PMGI. Before the author and her co-practicum student ended their practicum, the new landscape supervisor was hired. Overall, the landscape maintenance activities at ATC were done by the workers regularly. However, the manner of execution of the activities must be improved since the condition and health of trees and landscape were dependent on the landscape maintenance activities conducted at the site. Moreover, it would be better if there will be an arborist, urban forester, or horticulturist hired as landscape supervisor in order to maintain the good landscape and share their knowledge and skills to the workers. The arboristm urban forester or horticulturist shall lead the implementation, management, and monitoring of the landscape maintenance activities in the site since they have the capability and knowledge.

Title:	**Vulnerability assessment to climate change of rainfed agricultural farmers in selected Barangays in Sariya, Quezon**
Author:	**Dela Cruz, Ednoriwin Trasporto**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	The study aims to assess the vulnerability of upland farmers to climate change in Sariaya Quezon. Specifically it aimed to: (1) Describe the socio-economic profile and characteristics of farmers, (2) Determine farmers awareness regarding climate change, (3) Describe the characteristics of vulnerable households and (4) Assess vulnerability of farmers using Vulnerability Index. Proportionate random sampling was conducted among all farmers in the selected barangays to select the respondents. A semi-structured questionnaire was used for data collection. In estimating vulnerability, the Vulnerability Index was used. Results showed that the respondents are mostly male (84%). Most of the farmers (31.11%) have an income ranging from Php21,000 to Php30,000 per year. Majority of the respondents (46.67%) have a hectare of land devoted for agricultural production. One- depends on agriculture for livelihood. Most of the farmers (64%) are aware of climate change, it causes and effects. All the farmers have relatively low exposure to hazards and sensitivity to climate change impact with a mean hazard index of 0.24 and a mean sensitivity index of 0.11. Their adaptive capacity is high with a mean value of 0.74. This results in an overall moderate vulnerability index of 0.36 for the farmers in the study area.
Title:	**Assessment and documentation of ecotourism activities under DENR-PENRO Palawan**
Author:	**Delos Reyes, Elli Tabile**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	Under DENR-PENRO Palawan, the practicum student assessed and documented ecotourism activities in some protected areas (PAs) through observation and personal interviews. He participated in the updating of general management plans of the PAs along with local stakeholders and academe to help characterize the prominent problems and craft management plans. It made the student realize how ecotourism unites the spheres of conservation, communities, and sustainable travel. However, the negative impacts of ecotourism were also observed (trampling of live corals and pollution). Thus, the student recommends that more studies, i.e. carrying capacity studies, should be done to effectively craft ecotourism management plans. Incorporating interpretation of the PA resources in the ecotourism activities should also be done to encourage tourists to be responsible and participate with conservation efforts.

Title:	**Zonal travel cost valuation of Ninoy Aquino Parks and Wildlife Center, Quezon City, Philippines**
Author:	**Dilig, Francis Miel Ruiz**
Adviser:	**Valle, Pura Beatriz S.**
Abstract/Executive Summary:	Public parks like Ninoy Aquino Parks and Wildlife Center (NAPWC), is considered to be popular nowadays for recreational activities. From a long history of NAPWC, it is considerably important to estimate the social and economic value of the park for its future protection to serve various generations. In terms of social value, the key motives of most visitors were aesthetics and biodiversity. It was in accordance with the most visited facilities of the park, such as the Wildlife Center and Picnic Area. The model used in this study to get the economic value was the Zonal Travel Cost Model that divided the areas surrounding the site into four identified zones based from the survey. This study estimated the value of the park by the recognition of the relationship between the visitors' rate and travel cost. The relationship was the farther the zone, the higher costs were needed for the population of the zone to visit the park thus, increasing the value of the park itself. The value of the park was around PhP 56,256,530 annually, just around PhP 4,688,044.17 monthly. Also, the study estimated the willingness to pay of all the zones was PhP 960, with a minimum of PhP 60 to a maximum of PhP 700, to visit the park. Lastly, the study computed the compound annual growth rate from the recorded number of visitors. 4% was the mean compound annual growth rate of all the months from the year 2011 to 2016. By a compound annual growth rate, the forecasted number of visitors was 520,242 by 2025. On the other hand, the compound annual growth rate of the annual revenue was 16.1%. The forecasted annual revenue by the year 2025 was around PhP26.43 million. This means that if the management shall want a constant increase in visitors by 4% annual revenue by 16.1% it should require a responsible management to conduct awareness programs regarding the park that shall help the increase of the number of visitors per month or year.
Title:	**Site-species suitability of Calophyllum inophyllum in Magsaysay, Palawan**
Author:	**Dolores, Teddy Joy Aidren Daquioag**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	Municipality of Magsaysay, Palawan has an approximate of 244 meters above sea level (masl). With this set of elevation, it is determined that the municipality is composed of mangrove forest, beach forest, and molave forest. Mt. Maringit-ringgit, one of the elevated areas in the municipality, covers the protection forest of the municipality. The hill is under the protection, management and conservation of the Municipality as well as Palawan Council for Sustainable Development (PCSD) and categorized as Restricted

	Use Zone based from the Environmentally Critical Areas Network (ECAN). The study focused on the site-species suitability of a preferred species by local people. The practicum was conducted in Mt. Maringit-ringgit, Magsaysay, Palawan last June 29, 2017. Generally, the main objective of this practicum report is to conduct a suitability match of a species recommended for reforestation and/or forest rehabilitation and its associated species preferably native species to replace the exotic species which are the sources of water scarcity stated by the community. One of the preferred species by the community is the Calophyllum inophyllum. The area has generally matched 80 percent of the site requirements of the species. The most important factor lacking in the area is the data on soil characteristics. In generating the site-species suitability map, the shapefiles of slope, elevation and land cover are determined and used. Since the species is a beach forest species, associated native species such as Terminalia catappa and other Calophyllum species. In addition since Palawan is the ""last biodiversity frontier"", it is better to have native species rather than exotic species as it preserves the natives as well as the promotion of the usage of native species in reforestation and other planting activities.
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	preserves the natives as well as the promotion of the usage of native species in reforestation and other planting activities.
Title:	**Assessment of selected outdoor recreational practices of young Filipino millennials**
Author:	**Duazo, Ma. Cassandra Cariño**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	This study assessed selected outdoor recreational practices of young Filipino millennials by determining how frequently they abide by some of the many outdoor recreation principles. Moreover, the difference between sex, among universities and classifications are also examined to determine if there are relationship are none. Purposive sampling method was used to have a total of 600 respondents from the top three universities in 2016 namely University of the Philippines Diliman (UPD), De La Salle University (DLSU) and University of the Philippines Los Banos (UPLB). The data gathered were analyzed through descriptive statistics and comparison of means specially t-test, Analysis of Variance (ANOVA) and post-hoc tests. Results showed that twelve out of the thirty four outdoor practices are always abided by millenials. On the other hand, DLSU millenials are the frequent sustainable tourism principle-abiding travelers. Furthermore, it is recommended that promotion of outdoor recreational travel practices should be given emphasis because people nowadays, particularly the millenials, are appreciating the beauty of nature and the life it can offer.
Title:	**Visitors carrying capacity assessment of Makiling Botanic Gardens**
Author:	**Ducog, Hannah Grace Latoza**
Adviser:	**Racelis, Diomedes A.**
Abstract/Executive Summary:	The Makiling Botanic Gardens, located at the Makiling Forest Reserve, is one of the primary tourist spots at the University of the Philippines Los Baños, catering tourists from different parts of the country and from foreign countries, too. The facilities and services of MBG were assessed to analyze whether the management practices are effective on the supervising and administrating visitors. The visitor carrying capacity of Makiling Botanic Garden is low. The facilities in the area are not sufficient and efficient enough to handle the number of visitors and it would not satisfy them. In general, the main problem of MBG is the lack of budget to be able to maintain the facilities and employ more personnel for maintenance and other management positions. Also, they have to have a fixed schedule of maintenance of the whole area, specifically the trails to ensure the safety of the visitors, apply up-to-date technology, utilize social media for publicity, and make the area more accessible from the lower campus. The Visitor Experience Resource Protection (VERP) framework was used to

	assess its visitors carrying capacity. Upon comparison with Singapore Botanic Gardens, it was observed that MBG must improve its facilities and services to be co-equal with SBG and certain management practices could be adapted from SBG to further improve its effectiveness on visitor management, with respect to visitor satisfaction and environmental resilience.
Title:	**Morphological characterization of the Cambantoc River, Mount Makiling Forest Reserve, Laguna**
Author:	**Duerme, Abegail Villacorta**
Adviser:	**Galang, Marco A.**
Abstract/Executive Summary:	Experts concerned with managing watersheds should have a complete grasp of hydrology. Hydrologic cycle and other water processes are included in the science of managing and maintaining the watershed units. Water in watersheds is drained by its tributaries. The size, shape, and pattern of a watershed tributary impact its channeling capacity and overall hydrologic behavior. As such, it is important to characterize the drainage network of a watershed. This report. As such, it is important to characterize the drainage network of a watershed. This report covers the practicum activity in Cambantoc subwatershed, Mount Makiling Forest Reserve (MMFR) under the Makiling Center for Mountain Ecosystem (MCME). The Cambantoc River was assessed by measuring the cross-sectional area of 19 selected points along the stream from higher to lower elevation. The survey was conducted from June 27 to June 28. The activity was hampered by weather conditions as the practicum now coincides with the rainy season in the area. Results of the survey showed that the cross-sectional area of the main tributary of Cambantoc subwatershed ranges from 1044 cm2 to 18630 cm2. The average depth and width is 22.8 cm and 319.8 cm, respectively. No significant relationship was observed between elevation position and any of the morphological parameters measured (depth, width, cross-sectional area). During the survey, it was observed that there is no continuous streamflow in the whole length of channel and most of the portions have stagnant water. The results of this practicum activity can be used in the determination of the channeling capacity of the main tributary of Cambantoc subwatershed. Similarly, the same information will prove useful in some modelling exercises like Hydrologic Engineering Center - River Analysis System (HEC- RAS) where the river morphology is a very important parameter.

Title:	**Assessment of nipa-bakawan based aquasilviculture project of Binonoan Development Cooperatice (BIDECO) at Brgy. Binonoan, Infanta, Quezon**
Author:	**Elchico, Queenjade Lalap**
Adviser:	**Racelis, Diomedes A.**
Abstract/Executive Summary:	The study was conducted in May 2009 at Brgy. Binonoan, Infanta Quezon. The study focused on the POs participation in the nipa-bakawan based aquasilviculture project. Specifically, the study aimed to: 1) evaluate the POs participation on the livelihood project; 2) determine the POs perception on the CBFM-CARPs project and; 3) recommend strategies to improve the livelihood project of the POs. Primary and Secondary data were used in the study. The primary data were gathered through socioeconomic surveys, key informant interviews with the Barangay chairman, visit to POs livelihood project, and observations made during the meeting conducted by DENR official with the BIDECO members. Secondary data from the Barangay Binoan, Infanta, Quezon, and CENRO-REal were used for site characterization. The total respondents interviewed were 13 out of the 40 registered members of the BIDECO. These members were chosen based on their integrity and performance as vouched by their leader. The Binonoan Development Cooperative (BIDECO) is a registered organization under the Cooperative Development Authority. CBFMA was awarded to BIDECO, containing 17 has of mangrove. On the other hand, POs livelihood projects like raising of mud crabs, bangus, samaral and prawns with the planting of nipa and bakawan within the mangrove area gained positive response from the local community as far as improving socio-economic status is concerned. Based on the authors perspective and assessment, the people aspire to live in a better community because of the poverty in the area. They believe that through financial assistance from CARP-CBFM it will help improve their living conditions. This livelihood project will definitely socially desirable because aside from being environment-friendly, it also provides supplemental income to the local residents. Benefits derived from the aquasilviculture have not yet been quantified however there is an increase in the population of fish and crabs.
Title:	**Documentation and assessment of selected sites of the National Greening Program (NGP) in Barangay Cabuyao Sur, Padre Burgos**
Author:	**Escarez, Yessa Garcia**
Adviser:	**Racelis, Diomedes A.**
Abstract/Executive Summary:	The Philippines' forest cover experiences extensive deforestation and degradation, leading to diminishing forest resources. Forest degradation negatively affects the structure and function of forest which decreases the capability to supply goods and services. The

	National Greening Program (NGP) is a priority program of the government which is implemented by virtue of Executive Order No. 26 by President Benigno S. Aquino III. This program specifically aims to plant 1.5 billion trees in 1.5 million hectares of public lands for six years from 2011 to 2016. The study focused on the management strategies and maintenance activities assessment of NGP in Barangay Cabuyao, Padre Burgos. Through the use of photo documentation and observation, the study highlighted the management and maintenance problems such as road widening projects, seedlings trampled by animals, limited manpower and financial support and typhoons and other natural calamities in the area. These management and maintenance problems were discussed in line with the possible solutions to improve the NGP project in the area. The researcher suggests reviewing and enhancing the existing policies to make them effective that would address the issues and concerns of the involved agencies and institutions. Moreover, providing financial assistance on the management and activities of the project would be able to sustain reforestation projects not only in the region but also in the country.
Title:	**Management and ecotourism activities of Luntiang Republika Ecofarms, Brgy. Taywanak-Ilaya Alfonso, Cavite**
Author:	**Falcutila, Ellyza Faith Esturia**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	Luntiang Republika Ecofarms is a small-scale enterprise that practices sustainable farming. The fruits and vegetables they serve and sell along with the livestock they raise are all organic. Compared to a farm, an eofarm uses organic fertilizers and feeds like manure and compost for their planting stocks and livestock. Organic food is often fresher as it does not contain preservatives making it last longer and organically raised animals healthier because of the lesser use of antibiotics and other hormones inside the animal's body (Robinson, Segal & Segal, 2016). The practicum at Luntiang Republika Ecofarms, Alfonso, Cavite aimed to provide recommendations on improving ecotourism management of the practicum site. After the practicum, the ecofarm's existing attractions and services were documented, and gap assessment and recommendations based on successful ecotourism destinations were made. Furthermore, a biodiversity assessment of the plant and animal species present in the area was conducted to provide information for conservation measures that need to be done in the area. With the objective of promoting Luntiang Republika as a learning destination despite its small scale, Mr. Eduardo Cloefe, owner of the practicum site challenged the author when he asked. ""What can our eco farm offer with its one-hectare land' Hence, the suggestions made considered ways of utilizing all available land areas to better promote visitors' awareness and environmental conservation while achieving sustainable tourism at the same time. Making tourism sustainable by introducing the practice of ecotourism in the family-owned ecofarm is also strongly recommended as it offers many opportunities towards sustainability

	(Barki, 1996) and can be helpful in advocating sustainable farming and ecological tourism while still continuing to attract visitors and generate income. As a young ecofarm, with still room for improvement, it is a major step to promote sustainable ways of farming and tourism. The practicum site has a big potential to practice ecotourism and management. Despite the limitations it has, a successful and eco-friendly destination is about to rise from Brgy Taywanak-Ilaya, Alfonso Cavite.
Title:	**Characterization of agroforestry farming practices of rained agriculture farmers in Barangay Abo, Nagcarlan, Laguna, Philippines**
Author:	**Faundo, Kristine Noelle Perez**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	The practice was conducted from June to July 2017 in Barangay Abo, Nagcarlan, Laguna. The objectives of this practicum were: (1) gain knowledge and experiences through face-to-face interview and field work activities. (2) Characterize existing agroforestry system practices by the farmers in the area, (3) describe the socio-economic profile of the farmers in the area, and (4) provide recommendations for future practicum students. The activities done during the practicum were socio-economic survey and farm characterization. Data were gathered from 59 respondents through an interview using a semi-structured questionnaire. Most of the respondents (37%) have an annual income of Php 10,000-20,000 from farming, non-farm and off-farm activities. The main source of their income was from non farm and farming activities and these activities are mostly being done by the father and hired laborers (33.90%). Most of them belong to the age range of 39-52 years old. There were two farming practices present in the area: annual crop production and agroforestry. The latter was the common farming practice in Barangay Abo and it can be further categorized into multi-purpose trees, multipurpose trees with livestock, multipurpose trees with storey, trellis with multipurpose trees and trees with multipurpose trees with livestock. The annual crops in Barangay Abo area mostly sayote, tomato, beans, cabbage, banana, pumpkin, gabi, cucumber and other crops. In terms of perennial crops, they cultivate lansones, rambutan, guyabano, dragon fruit, mango, avocado, and pomelo. The usual arrangement of crops was in a block or strip manner. The practice gave the author an opportunity to experience new things. The student acquired additional knowledge and widened the understanding regarding agroforestry farming practices and learned the usual crops planted by the farmer-respondents in the area. It made the student exposed to field work activities that sharpened the skills as forestry student.

Title:	**Softscape maintenance assessment of the seven selected projects by David Mendoza Consuji Incorporated (DCMI) homes in Metro Manila**
Author:	**Felicilda, Noele Pacheo**
Adviser:	**Racelis, Diomedes A.**
Abstract/Executive Summary:	Landscaping is the art of putting different elements or components in a creative way to make use of an available space. Aesthetic quality of the landscape on the primary aim of the landscape assessment. There are two main elements which make up a ""landscape"". First is the Hardscape, which includes all facilities and equipment present in a landscape setting.Second is the Softscape which comprises all the trees, palms and other types of vegetation that make up the landscape. The study focuses on the softscape assessment of the 7 selected projects of DMCI Homes in Metro Manila. These seven projects were: Acacia Estates: Birchwood, Flair Towers, The Redwoods, Stellar Place, Zinnia Towers, Amaryllis and Accolade. Through the use of Picture documentation and Observation Records, the study highlighted the maintenance problems and malpractices on the sites. Each observation was grouped and classified under 8 categories: Presence of Weeds, Tree supports, Pruning and Topping, Dead Trees. Pest and Diseases, Dim Atriums. Proper Groundcover and shrub management and Nutrient Deficiencies. The said categories were discussed in line with the specific concerns seen on the selected project DMCI Homes including its alternative solutions and preventing measures that are pro-environment.
Title:	**Tree growth dynamics assessment of a reforestation project in Mt. Makiling**
Author:	**Gonzalvo, Karla Jane Pabella**
Adviser:	**Bantayan, Nathaniel C.**
Abstract/Executive Summary:	This practicum report provides an assessment, analysis and evaluation of the tree growth dynamics of a reforestation project in Mt. Makiling, Methods of analysis include statistical methods of analysis such as correlation, regression and anova table, A model equation is also derived to present the relationship between the parameter per year. Growth rate is also presented through figures. Results of the analysed data show the growth rate of the tree species planted are low, nonetheless, it is explained by the kind of species planted, that of which are antive or local and has a characteristic of being slow growing. It is also a factor that the reforestation projects locations are under a rainforest where its crown cover served as an aid for the newly planted seedlings to survive but has also become a hindrance for them to capture sunlight for their photosynthesis. Tree growth dynamics variations, on the other hand, are explained by the external factors that affect plant growth. The report finds that several external factors affect

	the growth of the trees and thus, affect their ability to maximize their potential to grow. Recommendations discussed in the report include spending plenty of time in doing the study, as well as to expand the study area establishing more sampling plots and lastly, to conduct a similar study in areas other than Mt. Makiling.
Title: Author: Adviser: Abstract/Executive Summary:	**Geographic database of trees with 70 cm and above diameter at breast height at Makiling botanic gardens (practicum report)** **Grimaldo, Vjorn Christian A.** **Visco, Roberto G.** The Study aimed to establish a database of the surveyed trees using Geographic Information System (GIS). The study was conducted at Making BOtanic Gardens. IT converged the fields of inventory, Surveying, Taxonomy and Geographic Information Systems. A full inventory was done which allowed recording of diameter at breast height, height, elevation and location of trees. The trees with 70 cm and above diameter measurement while Staff Hypsometer method for the height. Global Positioning System was also used to determine the location and elevation of the trees. A total of 83 individuals, 18 families and 37 species compose the trees surveyed. The dbh of the trees ranges from 70 cm to 12 cm while the height ranges from 9.2 m to 25 m. On the other hand, elevation of the trees ranges from 79 m asl to 125 m asl. The study also used Shannon Diversity Index to determine the species richness and relative abundance of the site. It has an index value of 3.1533. The Value is closed to commonly highest value which is 3.50. The area is also relatively abundant because it has an evenness value of 0.8733. After the inventory, the data gathered were presented using GIS. The software such as Microsoft Excel and ArcGIS were used. The output of this study will be very useful in forest resource management and guide for any studies to be conducted in the future.
Title: Author: Adviser: Abstract/Executive Summary:	**Landscape maintenance and other activities at various project sites under Bonifacio Estate Services Corporation and JSA Inc.** **Limangco, Margarita Jimenez** **Andrada, Rogelio T., II** In this practicum, various landscape maintenance and activities were tackled. It was supposed to be mainly at the Bonifacio Global City but since there have been problems and delays with the planning of the activities, the author decided to transfer to another company where she was able to visit various locations to observe and experience the different urban forestry practices. Under the supervision of Ayala Land Inc., the Bonifacio Estates Services Corporation (BESC) is the company administering the various services at the Bonifacio Global City. It is in charge of the provision of building permits, implementation of rules and the

	maintenance of the landscapes of the city. Since BESC handles approximately 240 hectares of land, they execute the work through the assistance of several contractors. There are designated service providers responsible for various departments. One of the providers under the JSA, Inc. This company has been the landscape contractor for the city for four years and counting. They are in charge of the grounds maintenance, landscape development and tree services. The student decided first to transfer to this company later on since this contractor offers more appropriate activities for this practicum. The activities in this practicum are conducted in several locations. Most of the accomplishments are related to landscape maintenance, tree inventory and hazard assessment. This also included weeding cultivation, hedge trimming, planting and pruning.
Title:	**A height prediction model of big leaf mahogany (Swietenia macrophylla) species on Permanent Field Laboratoy Area 3, Mount Makiling Forest Reserve Area**
Author:	**Luansing, Laica Mae Sarmiento**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	Knowing the height of a tree is necessary when it comes to the timber industry. Since Mount Makiling is a forest reserve, logging or harvesting its timber is not allowed. However, since it is also a learning laboratory area, getting or harvesting its timber the merchantable height of a tree must be practiced. In order to have a reliable prediction of the height of a tree, a model was created through simple linear regression, a prediction when a variable (y) is dependent on a second variable (x) based on the regression equation of a given set of data. The study was conducted on Permanent Field Laboratory Area 3 in Mount Makiling Forest Reserve. The large leaf Mahogany plantation was established in 1940 with an area of about .07 hectare. It has an elevation of 199 m above sea level (masl), characterized by moderately rolling terrain with a clay loam type of soil. Known as invasive species, Mahogany (Swietenia macrophylla) was chosen as the experimental unit on this study since its frequency and distribution are getting higher. This leads to the study of predicting the height of the tree using their diameter to help students avoid using the estimation process and have reliable height measurement. This study aims to predict the height of Mahogany tree on PFLA 3 using simple linear regression. Specifically, it aims to: (1) create a tree height-diameter table.

Title:	**Estimation of aboveground biomass of trees in Ninoy Aquino Parks and Wildlife Center, Quezon City, Philippines**
Author:	**Magno, Mary Angela Hofileña**
Adviser:	**Codilan, Analyn L.**
Abstract/Executive Summary:	Ninoy Aquino Parks and Wildlife Center (NAPWC) is a protected area proclaimed under the National Integrated Areas System (NIPAS) Act of 1992 managed by the Biodiversity Management Bureau. It is a 22.7-ha park consisting of a 3.8-ha man-made lagoon and five (5) major zones. Zone 1 (1.2 ha) consists of the museum, Ninoy Aquino monument, park entrance, and the promenade. Zone 2 (2.6 ha) includes the administration building and wildlife research and medical facilities. Zone 3 (2.7) covers the outdoor sports area, amphitheater, plaza, and shop houses and zone 4 (1.3 ha) comprises events venue and parking lot for administration. Finally zone 5 (9 ha) constitutes the eco-village, learning hub library, fishing area, boat ride, botanical garden, and picnic area. The objectives of this study are to determine the distribution of aboveground biomass density in Ninoy Aquino Parks and Wildlife Center (NAPWC) and to characterize the area according to the estimated aboveground biomass density and distribution. The results of the objectives will help access the capacity of the park to mitigate climate change. In order to do this, a complete inventory of all the trees inside the park was done in which parameters such as diameter at breast height (dbh), total height, merchantable height, crown length, and GPS location were measured. A 2-ha Permanent Monitoring Plant (PMP) was also established in order to annually assess and monitor the growth and development of trees inside the park. Then, the aboveground biomass of each tree was estimated and calculated using a general allometric equation developed by Brown in 1997 for tropical forests. The aboveground biomass density was also computed accordingly by dividing the aboveground biomass with the total area (in hectares) of the zone. Moreover, an aboveground biomass density map was developed using Geographic Information System (GIS) and optimized hotspot analysis to determine the most dense areas in terms of the aboveground biomass. Results of the inventory showed that for trees with dbh greater than or equal to 10 cm, Mahogany (Swietenia macrophylla) is the most dominant tree with 630 individuals over a total of 2743 tree species inventoried. On the other hand, for saplings, it was found that Balibitan (Cynometra ramiflora), is most dominant (11.44%). Moreover, results of the hotspot analysis revealed that zones 1,2,4 and the 2-ha permanent monitoring plot were the most dense areas in terms of the total estimated aboveground biomass with an average of 1,055.27 kg/ha, 789.59 kg/ha, 769.72 kg/ha, and 822.22kg/ha, respectively. Comparing the estimated aboveground biomass of native species. This is mainly because of the existence of large diameter exotic species, which range from 70 cm to 100 cm. These trees are Rain Tree (Samanea saman) and Fire Tree (Delonix regia). The total estimated aboveground biomass density of the park, which is 3,266,187.30 kg, implied that the trees inside the park can absorb

	up to 64,529.96 kg/ha of carbon emissions from the urban area. Furthermore it was recommended that native tree species be planted in some of the open areas to further increase the biomass and consequently the carbon sink potential of the park.
Title:	**Survey of strangler figs and their host trees at UPLB Lower Campus, College, Laguna**
Author:	**Magsino, Coleen Ponce**
Adviser:	**Palijon, Armando M.**
Abstract/Executive Summary:	Strangler figs or locally known as balete belong to the genus Ficus of the Moroceae family due to their destructive nature of killing their host trees and decimating many ancient walls and structures around the world. The study of strangler figs and their host tree species. Ten (10) species of strangler figs were identified from the 60 host trees. These are Baleteng tilos (Ficus pellucido-punctata Griff.), Pasapla (Ficus concinna Miq.), Baleteng liitian (Ficus microcarpa L.), Indian rubber (Ficus elastica Roxb.), Balete (Ficus balete Merr.), Benjamin fig (Ficus benjamina L.) Baleteng mabolo (Ficus cucurbitina King), Baletong ibon (Ficus sumantra Miq.), Marobutum (Ficus subcordata Blume, Bijidr) and Maladungo (Ficus glaberrima var. bracteata Corner, Grad). Among these strangler fig species, Baleteng mabolo (Ficus cucurbitina King) was found to have the highest number of infested trees with 16 while Balete (Ficus balete Merr.), Baleteng ibon (Ficus sumantra Miq.) and Marobutum (Ficus subcordata Blume, Bijdr) had the lowest number of infested trees with 1 host only tree. Ten (10) families represented by 14 species of host trees were observed. Fabaceae is the host tree family with the most number of individuals that are infested with strangler figs with 32. Among the host tree species, Rain Tree (Samanea saman) had the most number of infested individuals with 20. This is followed by Narra (Pterocarpus indicus) with 10 trees. Severity of the infestation on its tree host was determined. Nine (9) trees or 15% of the total number of infested trees were found to be under Severity 4 category, meaning , the tree is more than 75% infested/or covered with strangler figs. Most trees or 33.90% that were infested are under Severity 2, meaning the strangler figs are already sending roots down to the ground. Trees with dbh of more than 100 cm had the highest severity of infestation. This is because these trees have multiple defects like cavities and/or water pockets that provide good germination/growing medium for the strangler figs. The trees on campus are susceptible to infestation with strangler figs. It is therefore important that arboricultural interventions must be provided to prevent and control this type of pest. It is also recommended to conduct further studies on the identification of strangler fig species, their mode of invasion/infestation and also their relationship with frugivores inhabiting Mt. Makiling and the strangler fig species existing around the UPLB campus.

Title:	**Development pathways of selected smallholder rainfed agriculture farmers in selected upland communities in Silang, Cavite**
Author:	**Mangotara, Fatimah Manalocon**
Adviser:	**Visco, Roberto G.**
Abstract/Executive Summary:	The activity is generally aimed to determine the development pathways of the selected smallholder rainfed agriculture farmers in Silang, Cavite. Specifically, it was conducted to: (1) Describe the socio-economic profile of the farmers, (2) Determine the prevailing structures and processes involving the selected rainfed agriculture farmers and (3) Identify the development pathways taken by the selected rainfed agriculture farmers from 2007-2017. Purposive sampling was initially employed, however it was changed to opportunity sampling to save time due to various reasons. A semi-structured questionnaire was used for data collection. Data sorting and generation was done through Microsoft Excel. Results showed that most of the respondents were female (55%). The average age is 45.2 years old. The estimated annual income is dominated (45%) by respondents not indicating their earning due to personal reasons. Most of (75%) of the farms of the respondents are less than on hectare in size. These farms are irrigated mostly (60%) through a combination of water pump, creek and rainwater. 13 farmers practice multiple cropping while seven if them practic agroforestry. 11 farmers plant vegetables and fruit trees in their farms. Majority of (85%) of the farmers are not members of any organizations in their communities. Only one farmer mentioned that he knows that they have a no-tree cutting policy. Most (74%) of the respondents mention that there are available credit services being offered in their communities. Only the LGU - Municipal Agriculturist office in Silang and an unnamed NGO have been mentioned to have prohibited technical support services. Many (46%) stated that the Bayanihan system in farm development activities is dominant.
Title:	**Tree risk assessment along the avenues and street corridors of Bonifacio Global City, Taguig Metro Manila**
Author:	**Mendoza, Ruthie Alcantara**
Adviser:	**Valle, Pura Beatriz S.**
Abstract/Executive Summary:	Tree Risk Assessment (TRA) involves the process of inspecting and assessing trees for their possibility to harm people and damage property. The study site is composed of 11 avenues and 15 streets where trees were sampled systematically. The purpose of this study is to determine the risk rating of individual trees across the different tree species and to document the implemented arboricultural practices. Species present in this site were Pterocarpus indicus, Spathodea campanulata, Melaleuca quinquenervia, Delonix regia, Samanea saman, Ficus benjamina, Peltophorum pterocarpum, Cassia nodosa, Alstonia scholaris, Acacia auriculiformis,

	Brachychiton acerifolius, Calophyllum inophyllum, and Swietenia macrophylla. The data gathered for the TRA include DBH, location of trees, and structural defects. Out of 13 species identified, 6 native species were found while 7 species were exotic. In terms of species diversity, the obtained Simpson's Diversity Index is 0.78, which represents the probability that two randomly selected trees will belong to different species. It was found out that palawan cherry (Cassia nodosa) had the highest average risk rating of 6.14 out of the 13 species. a fire tree (Delonix regia) was found to have the individual highest risk rating which has been attributed to canker and dead branches. Canker was found to be the most common defect followed by tree leaning among every species in BGC. The results obtained can be used as an aid in proper species selection. Arboricultural practices implemented, water management and pruning are most commonly used. Native tree species are highly recommended to be planted in urban areas specially along the street corridors because it enhances the beauty of the area and is resistant to pests and diseases.
Title:	**Comparative tree biodiversity analyses of Permanent Field Laboratory Area 1 (PFLA 1) and Permanent Field Laboratory Area 2 (PFLA 2) of Mount Makiling Forest Reserve**
Author:	**Navarro, Angelito Allado**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	The Convention on Biological Diversity, or CDB (2007) defined biodiversity as the means the variability among the living organism from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part this includes diversity within species, between species and of ecosystem. It represents the variability within and among the ecosystem, species, or genetic material. Biodiversity assessment is needed in order to give value on the biodiversity of an area. According to the Food and Agriculture Organization of the United Nations, of FAO, (2002), ecological approaches are the common techniques used to assess diversity and the basis for the evaluation of the forest. Biodiversity assessment also increases the economic value of a forest. The study was conducted in Permanent Field Laboratory Area 1 (PFLA 1) and Permanent Field Laboratory Area 2 (PFLA 2). The study focused on the biodiversity of the two areas and the factors affecting it. A complete inventory of tree species, (diameter at breast height (DBH) of five (5) centimeters and above) were conducted in PFLA 1 and PFLA 2. The main objective of this study is to assess the biodiversity of Permanent Field Laboratory Area 1 (PFLA 1) and Permanent Field Laboratory Area 2 (PFLA 2). Specifically, the study aims: (1) to compare the biodiversity of PFLA 1 and PFLA 2, both for the year 2016 PFLA 1 for the year 2006 and PFLA 1 for the year 2006 and PFLA 2 for the year 2016 (2) to characterize the factors that may effect the biodiversity of both areas and (3) to recommend some conservation measures to maintain and further improve the quality of PFLA 1 and PFLA 2. The gathered data in the inventory were paralyzed by computing

	and comparing the Shannon Wiener Index (H) Simpson's index of Diversity (1-D), and Pielou's Index of Evenness (J). The most influential species in PFLA 1 and PFLA 2 were also analyzed by computing their importance value. In the comparison, PFLA 1 has a higher biodiversity than PFLA 2. While the comparison of biodiversity of PFLA 1 in 2006 and In 2016, there is a decrease. The situation is same with PFLA 2 where biodiversity in 2006 is much higher than 2016. This may due to different factors like climate change, human interventions, and invasive species. A recommendation was given to conserve the high biodiversity of the area and to get rid of the decreasing trend. Assisted natural regeneration, pruning, and thinning may be done to maintain and further improve the quality of PFLA 1 and PFLA 2.
Title: Author: Adviser: Abstract/Executive Summary:	**Biomass and carbon estimation of the closed forest in Molawin-Dampali Subwatershed, Mount Makiling Forest Reserve, Los Baños, Laguna** **Navidad, John Ryan Linao** **Villanueva, Teodoro R.** Proper management of forests requires monitoring of its functions including the rate by which it sequesters carbon. Aside from providing the student a practical experience in biomass and carbon estimation, this study could serve as a reference for planning and executing forest management in Mount Makiling Forest Reserve (MMFR). The study was conducted by MMFR. Specifically, the study was inside the closed canopy forest portions of the Molawin-Dampalit subwatershed with a total area of 1,665.33 ha. The study estimated the total biomass and carbon content in the closed forest of Molawin-Dampalit Subwatershed, Mount Makiling Forest Reserve, Los Baños, Laguna. Aboveground, ground, and below ground biomasses were considered. Three plots in closed forest areas were established, 5 x 40 m plots for DBH 5 30 cm, and 1 x 1 m plots for understorey vegetation, soil, and litter. Using allometric equations, it was estimated that a total of 823.51 ton/ha of carbon was stored in the close forest, of which, 280.63 ton/ha was accounted to aboveground biomass, 9.85 ton/ha for ground biomass, and 533.05 ton/ha for belowground biomass.
Title: Author: Adviser: Abstract/Executive Summary:	**Participation in the management programs and activities of the Makiling Botanic Gardens** **Nool, Krizzel Anne Calayag** **Andrada, Rogelio T., II** With the aim to support professional instruction and research related to forestry and plant sciences, the Makiling Botanic Graden (MBG)m was established on June 20, 1963 under Republic Act 3523. It is a facility managed by the Makiling Center for Mountain

	Ecosystems (MCME) under the University of the Philippines Los Baños College of Forestry and Natural Resources (UPLB-CFNR) which serves as an educational and recreational facility as well as an ecotourism spot for the general public. The general purpose of this practicum report is to immerse the student in the various management activities at the Makiling Botanic Gardens with the following specifics objectives: 1) To document and assess the programs and activities executed by the management in line with its goals and objectives 2) To engage in activities and programs implemented by the MBGs current administration and 3) To offer practical recommendations for the improvement of the management and services offered in MBG. The practicum student participated in various activities and projects implemented specifically on field exposures, trail assessment, and contributed outputs to MBG. Based on the assessment don, improvement that can be made include: 1) regular facility maintenance checks 2) semi-annual floral and faunal inventory inside the garden 3) monthly clean-up drives 4) putting up trash bins within and in nearby strategic locations 5) maintaining and monthly updating of a visitor database 6) maintaining and updating of training and information campaign module for both park interpreters and visitors and 7) addition of MBG staffs. With all these recommendations it is expected that MBG will meet its objective and goals with increased satisfaction of its visitors.
Title:	**Parks and outdoor recreation managemet activities at the Makiling Botanic Gardens, Makiling Center for Mountain Ecosystem**
Author:	**Origenes, Kate Louis Castillo**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	Over 200 hours were spent working as a practicum student at the Makiling Botanic Gardens from 13 June to 19 July 2016, Monday to Saturday, between 9 AM to 4 OM. Makiling Botanic Garden is a facilty inside the Mount Makiling Forest Reserve, which is managed by the Makiling Center for Mountain Ecosytems (MCME) of the College of Forestry and Natural Resources (CFNR). The whole practicum was devoted to conducting different hands-on activities that are part of the management and daily operations of the Makiling Botanic Gardens. Its general objective is to gain practical knowledge and apply skills in parks and outdoor recreation management by engaging in different site activities. Specifically, it aims to (1) describe and document the activities conducted during the whole practicum period and apply the theoretical concepts of parks and outdoor recreation management in assessing the existing management approaches of the Makiling Botanic Gardens. Major activities conducted include Educators for Nature Tourism (ENTs) Trainings garden nursery activities inventory of facilities and equipment in seminar/lecture rooms and survey of trails. Minor activities conducted include cleanup around Arbour Square updating database of visitors for the month of June and creation of database for the Zingeber plants in the nursery.

	Outputs include wite-up of the 5th ASEAN Plus Three Junior Science Odyssey (APT JSO) Tree planting Activity write-up of the Tree Planting Activity by the Australian Ambassador to the Philippines, HE Amanda Gorely design of signage on the prohibition of entry in the new discovered falls near the Philippine High School for the Arts informative videos on the Plant of the Month for June and July informative video on the Wigned seed dispersal plant labels in the entrance of Makiling Botanic Gardens informative label of the Heritage Toog Plantation in MMFR and MBG division heads photo installation. The existing management concluded that although some management techniques are still lacking in the park, the author can say that the existing management approach effectively caters to ensure satisfaction of users and avoids negative impacts on the recreation resources. The author was able to achieve her main objective to gain practical knowledge and apply skill in parks and outdoor recreation management by engaging in different activities. Recommendations were also given based on the whole practicum experience for the purpose of improving the overall functions of Makiling Botanic Gardens.
Title:	**GIS-assisted floral diversity assessment and conservation of the Permanent Field Laboratory Area 1 in Mount Makiling Forest Reserve**
Author:	**Palicpic, Ciaralou Agpalo**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	Biodiversity provides ecosystem services such as water, food, medicine, carbon sequestration and biomass fuels and even economics benefits to people. Rich biodiversity is synonymous with ecosystem health. Diverse communities have better stability, productivity, and even survival. The study focused on using diversity indices and calculating importance values of species as a method of diversity analysis in the Permanent Field Laboratory Area 1 in Mount Makiling Forest Reserve. The biodiversity indices can be considered as analogy to descriptive statistics in which the whole biological community is aggregated in one number which represents number of species and/or dominance of species in community. The diversity status and trend of only the floral component of the Permanent Field Laboratory Area 1 were assessed to find existing problems and provide solutions such as conservation measures to maintain or improve the site condition. Comparison of current and previous data will give us an idea as to what the trend of the floral diversity was, and help forecast the state of the site. However, the unknown identification of some tree species surveyed in the area led to a less systematic data gathered. Through complete tree inventory, a total of 325 individuals were surveyed. Paleontological Statistics (PAST) Software was used to generate diversity indices that will be used to describe species richness, evenness and dominance. The relative density, relative frequency and relative dominance were calculated to arrive at a value that will pretend the most influential species in the community, also known as the importance value. Furthermore, a

	Geographic Information System (GIS) Database Map was made that will be readily available to help in data storage and aid the management in decision making. The map can be used to monitor the different attributes of the trees in the site such as diameter, height and crown area. Based on the results, PFLA 1 has a very high floral diversity level according to the Fernando Biodiversity Scale. It has also a very highly even distribution of individuals. The species with the highest importance value is Swietenia macrophylla. This is an invasive alien species that can be a threat to the other species in the site. It has slowly replaced the native forest in the site based on the species composition of the previous tree inventory data. Thus, the management should implement policies that will closely monitor the introduction of exotic or invasive species. Also, annual tree inventory will help monitor and assess the changes brought by some disturbances. In addition, site restoration can be a feasible strategy because of the presence of many bagtikan regenerations in this site, which is an endemic species. There is still hope in the conservation of PFLA through proper endemic species preservation.
Title:	**Assessment of carbon measurements, crown parameters and their relationship among exotic tree species in Ninoy Aquino Parks and Wildlife Center, Quezon City, Philippines**
Author:	**Pamulaklakin, Nichole Anne Centeno**
Adviser:	**Valle, Pura Beatriz S.**
Abstract/Executive Summary:	One of the most critical phenomena faced by the world today is climate change which occurs due to global warming. Urbanization increases the chances of creating heat islands that contributes to global warming through greenhouse gas release specifically excessive carbon dioxide emission. Urban forestry is one of the feasible solutions to balance air's temperature in urban areas. This study was conducted at Ninoy Aquino Parks and Wildlife Center, a 16-hectare urban park in Quezon City, Philippines. The diameter at breast height (DBH), crown cover, and crown depth of all trees in the park, accounting to 2,680 trees, were measured by a team of eleven (11) BS Forestry students June to July 2016. There were 90 trees species documented (or inventoried), 68.9% (62 species) of which are native or indigenous in the Philippines and 31.1% (28 species) are exotic or introduced in the country. In terms of the number of individual trees, there are more exotic that native trees planted in the park, accounting to 60% (1562 trees) and 40% (1035 trees), respectively. Among all the species, the one that amounted to the highest value of aboveground biomass (AGB) and carbon sequestration potential (CSP) was Swietenia macrophylla, an exotic tree species, with a value of 594.68 tons and 982.12 tons respectively. Samanea saman, another exotic tree species, actually had the most reasonable capacity of CSP value. With only 93 recorded individual trees, it already amounted 530.04 tons of AGB and 875.36 tons of CSP. Among the native species, Pterocarpus indicus had the highest values with 523.18 tons of AGB and 864.04 tons of CSP. Crown cover and crown depth were computed and

	correlated with the AGB. The correlation analysis done for the crown cover and AGB resulted to exotic species having a very strong linear relationship (r=0.96) compared to native with only a strong linear relationship (r=0.69). As for the crown depth and AGB, the exotic and native species resulted to strong (r=0.74) and moderated linear relationship (r=0.55, respectively. In conclusion, exotic tree species in the park perform better than the native species. They have higher sequestrations rate, and stronger correlation of AGB with crown cover and crown depth. Their CSP can aid in reducing the concentration of greenhouse gasses in the atmosphere and the shade they provide can improve the microclimate in urban ecosystems. Exotic tree species can be considered more efficient to the plant in urban parks, but the incorporation of native tree species is still recommended to enhance the parks cultural value.
Title: Author: Adviser: Abstract/Executive Summary:	**Biological control potential of Penicillium sp.on leaf spot pathogens of Narra (Pterocarpus indicus Willd.)** **Pantalunan, Novet Joy Santos** **Manalo, Mutya Ma. Q.** Lasiodiplodia sp. and Pestalotia sp., identified to be two of the most common pathogens of leaf spots were isolated from the necrotic portions of Narra leaves. After a week of incubation, the isolated fungi from the leaf spots were sub cultured in agar slants. The same procedure was also performed to obtain pure cultures of Penicillium sp. that was originally obtained from an unknown slant. These pure cultures were further propagated in PDA plates that were used for the in vitro bioassay tests. To determine the potential of Penicillium sp. in controlling these fungal pathogens, the dual culture method was used. For ten days, the cultures were incubated under continuous light. The measurements of the growth of the fungi when they were solely grown were compared to their growth under dual culture. Results have exhibited that Penicillium sp. has a positive biocontrol potential. Pestalotia sp. as it had shown significant suppression of the pathogen's growth and proliferation. On the country, the growth of Lasiodiplodia sp. was not completely restrained by the antagonist fungus however; the pathogens usual fast growth as impeded by the presence of Penicillium sp.
Title: Author: Adviser: Abstract/Executive Summary:	**Analysis of effectiveness of protection strategies in Barobbob watershed, Nueva Vizcaya and La Mesa watershed, Quezon City, Philippines** **Perez, Maricon Reyes** **Cruz, Rex Victor O.** The study was conducted to determine the factors that influence the effectiveness of protection strategies applied to Barobbob watershed in Nueva Vizcaya and La Mesa watershed in Quezon

	City, Philippines. The gathered date were water analysis on pH and total suspended solid (TSS), field visits/observation, socio-economic survey using prepared questionnaires, focus group discussions with key informants, personal interviews and through GIS. Result of the study revealed that multi-agency management approach was applied in managing and protecting the watershed resources that primary focus on the maintenance of water quality for domestic purposes. Likewise, La Mesa watershed management implemented a centralized management system and regulatory protection strategies, whereas, Barobbob watershed demonstrated a co-management system and developmental protection strategy. The performance of the 3 determining factors namely, factors I (Physical/Site factors), II (Socio-economic factors) and II (Institutional factors) were considered in the ex-post analysis of protection Strategies implemented in the study sites. The improvement of the effectiveness protection strategy for a watershed was based on the individual factor performance. It required enhancement of associated measures under a factor with the lowest rating of accomplishment by the management and simultaneously satisfying the desire of stakeholder to focus on identified factor with the highest rating. Results revealed that for Borobbob watershed, Factor II has the highest importance based on stakeholder's perspective while Factor I with the least importance as per accomplishment rating by the management. In the case of La Mesa watershed, Factor I had the highest importance as per stakeholders' perspective but accomplishment rating by the management showed Factor II with the least importance. Hence, enabling and constraining factors that influenced the effectiveness of protection strategies therefore vary from one watershed to another, situational and are location specific.
Title: Author: Adviser: Abstract/Executive Summary:	**Comparative assessment of eucalyptus species and provenances at BFI, Bukidnon, Northern Mindanao, Philippines** **Pollisco, Mitzi, T. , 1962-, author.** **Umali, Mercedes Garcia** Seventh (7) year quantitative and qualitative traits of four (4) Eucalyptus species and provenances of the Bukidnon Forests, Inc. (BFI) were evaluated at Siloo, Dalirig, Manolo Fortich Bukidnon, were evaluated. The experimental materials were open- pollinated families of E. grandis, E. pellita, and E. urophylla, and a hybrid, E deglupta x E pellita. The traits evaluated were stem diameter, height, volume, specific gravity, fiber length, stem straightness, forking, circularity, crown health, branch angle, branch diameter and branch pruning characteristics. The experiment was laid out in Randomized Complete Block Design (RCBD) with three (3) blocks and the 15 seed lots were assigned in rows. Blocks I and III were located on a south-facing slope while Block II was located on a north-facing slope. The study revealed that the growing environment had a strong influence on growth and other traits of eucalypts. Significant to highly significant differences were found among all seedlots on the traits evaluated. Low to high heritabilities

	were observed on the traits of the open-pollinated species. Results of the phenotypic analyses would show a highly significant, strong and positive relationship between diameter and height of the open-pollinated species. The other traits had varied relationships. Genotypic correlation ranged from zero to 0.99, depending on traits correlated.
Title:	**Participatory land use allocation in Besitang Watershed, Langkat, North Sumatra, Indonesia**
Author:	**Rahmawaty**
Adviser:	**Villanueva Teodoro, R.**
Abstract/Executive Summary:	This study was conducted to develop a framework for participatory and improved land use decision-making in Besitang Watershed, Langkat, North Sumatra, Indonesia. Specifically, it aimed to: assess land use changes, estimate oil erosion under different land uses, analyze the actual and potential suitability of the lands for several annual, estate and silvicultural crops, and determine the current and potential land use suitability with stakeholder participation, and develop a spatial participatory land use allocation based on integrated approach to ensure sustainability. Socio-economic information and physical data were derived from interviews and field surveys. Collective opinion was derived from the workshop with stakeholders. Geographic Information System (GIS) and Analytical Hierarchy Process (AHP) were used for land use allocation. The Universal Soil Loss Equation (USLE) was used to determine soil erosion in each land system. Remarkable land use changes occurred from 1990 to 2006. Large portions of primary forest (82%) were converted to secondary forest, followed by conversion of mangrove forest into fish pond (30%). The mean soil erosion is classified as Class 2 and large areas are under suitable land uses based on erosion index. Land capability of Besitang Watershed ranges from Class II to VI. The majority of land is under the land capability Class III. Land systems with very steep slopes were not suitable for several annual and estate crops and silvicultural species. In general both annual and estate crops as well as silvicultural species are not suitable (N) in the lower stream of the watershed, due to drainage and flooding hazard. Alternative for Forestry in Besitang Watershed based on integrated approach has very high suitability (63%). Agriculture use has high (63%) to very high (37%) suitability. Settlement Area has low (23%) to moderate (77%) suitability. Fishery use has low (47%), moderate (18%), and high (35%) suitability. Industry has very low suitability in all decision zones (100%). Based on allocation for multiple-use Besitang Watershed hs very high potential suitability for forestry (63%) and agriculture (37%) land uses. The most significant contributions of integrated approach using GIS and AHP in facilitating land use decision-making were: as a tool for land use allocation and policy formulation, as well as for scientific investigations. This approach provides participatory involvement of stakeholders in land use allocation. This approach is efficient and reliable land use allocation for watershed management since it

	involves the physical components as well as participation of stakeholders to ensure sustainability.
Title:	**Perceived importance and satisfaction of park users to Luneta Park and facilities**
Author:	**Revilleza, Khristine Evangelista**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	This study examines the visitor-experience in Luneta Park and investigates the relationships among those experiences, perceived value, and satisfaction. Visitor's overall satisfaction was examined in terms of its relationship to visitors individual satisfaction on park attributes. Purposive sampling was used to obtain 300 respondents. Data were analyzed through descriptive statistics and correlations analysis. Results revealed that perceived importance and satisfaction on the park attributes are positive and significantly associated yet the performance of most important attributes considered by the respondents is not giving them satisfaction. However, it is observed that there is very high overall satisfaction from the respondents. Further, likelihood to recommend the park to others appeared to be extremely high. Although the findings show high levels of satisfaction, there is also a need to include other measurements of satisfaction and must seek attention that may result to be more responsive to the needs of park users.
Title:	**Plant diversity in Ilanin Watershed (Group 2A), Subic Zambales as component of Subic Bay Marine Exploratorium Inc. Ilanin Forest Management**
Author:	**Robles, Christian Felix**
Adviser:	**Manalo, Nestor A**
Abstract/Executive Summary:	The study aimed to assess the Ilanin Watershed's (Group 2a) plant diversity as part of the Subic Bay Marine Exploratorium Inc.'s management of the forest. It was conducted from April 25 to May 19, 2010, where 11 plots of 20m x 20m were established covering 4400 square meters of the area. The common name, scientific name, family name, and density of each species were identified. The plant diversity of each plot was measured by using Simpson's Index of diversity. Species status was classified whether threatened or vulnerable according to the IUCN red list of threatened species. There are 446 individuals counted while 55 species were identified in the inventory. The most abundant tree species found was Putat (Barrington racemose), followed by White Lauan (Shorea contorta), Red Lauan (Shorea negrosensis) and Apitong (Dipterocarpus gradiflourus) were identified as critically endangered. Big leaf Mahogany (Swietenia macrophylla), Magabuyo (Celtis luzonica), Is-is (Ficus ulmifolia), Dao (Dracontomelon dao), and Takip Asin (Macarangan grandifolia) were identified as vulnerable. Eight plots in the study showed high Simpson's index 1-D values which

	indicate that Group 2a is rich in plant diversity. The highest computed value is 0.97 (Plot 4) while the lowest is 0.15 (Plot 2). All the Calculated data were presented to the Ocean Adventure Management. It was highly recommended that sensitive areas, where these species can be found, be mapped to allow more points of considerations in upcoming projects. In line with this, it was suggested that such sensitive areas be totally preserved by continually closing access points and narrowing trails, including regular checks on human intrusion. It was also proposed that excessive vine problem is quickly addressed by the management, as well as the continuous inventory in the are to monitor forest health and diversity. Critical areas important in terrestrial and marine connectivity must also be maintained and protected, together with the flagship species location and nesting areas. These areas must be properly checked or restricted if possible and must have a proper inventory that shall be kept and monitored.
Title: Author: Adviser: Abstract/Executive Summary:	**Root growth potential of Kamagong (Diospyros discolor Willd.) in response to root and leaf pruning** **Salazar, Mart Lawrence Abesamis** **Carandang, Wilfredo M.** The study was conducted to evaluate the total number of new roots formed as a measure of root growth potential (RGP) as seedling performance attributes of Kamagong (Diospyros discolour Willd.), one of the priced native tree species of the Philippines. RGP was tested as a response to leaf pruning (pruning 0%) and 50 % of total leaf area) and root pruning (pruning the taproot 6.35 cm and 10.1 cm from the root collar) treatments. Effects of these treatments on stem height, length of taproot, root-collar diameter, sturdiness quotients, and seedling quality index were also measured and observed. The experiment was laid-out using a completely-randomized design (CRD) and measurements and observations were conducted for 30 days after transplanting. The length of the taproot was significantly affected only by root pruning, while seedling quality index was affected significantly by leaf pruning, root pruning and the interaction of the two pruning treatments. Results show that the RGP of Kamagong was not affected significantly by leaf pruning or root pruning, but was significantly affected by the interaction effect of leaf and root pruning. The correlation analysis of number of new roots and morphological measurements revealed a very weak positive correlation with each other, while root-collar diameter had a very weak negative correlation with number of new roots.

Title:	**Carbon determination using field techniques and modeling of smallholder tree farms in Leyte Island, Philippines**
Author:	**Sales, Renezita F.**
Abstract/Executive Summary:	The role of terrestrial ecosystem in mitigating the effects of climate change entails the assessment of carbon stock in various pools. This study predicted the carbon storage and sequestration potential of common tree farm species in Leyte Island, Philippines using models that were parameterized to smallholder farm conditions. Data gathered from field measurements was used to fit the Chapman-Richchards growth function to predict the volume and biomass increment of Gmelina arborea and Swietenia macrophylla tree farms until they reached their respective rotation ages. Predicated values, secondary sources and default values served as inputs to the CO2 Fix model to stimulate the carbon stocks and fluxes in the above-ground biomass, soil and products for three rotation periods. Results showed that biomass and carbon density values varied with age, type of species, site conditions and silvicultural treatments applied in the stand. Although farm age and no relation with its soil carbon storage, this pool had greater storage capacity than the above-ground biomass and roots. By fitting the Chapman-Richards funtions, results showed that the average maximum growth was attained after 10 years for G. arborea and 13 years for S. macrophylla. Volume growth started to slow down when the tree species reached almost half its rotation age. The same trend was observed from the biomass and carbon density of each farm. The maximum mean annual increment of bith farms was attained before the expected manimum growth year. Growth increment decreased as the species reached its rotation age. The total C storage capacity of a 15-year-old G. arborea tree farm was estimated of 64 MgC ha -1 while a 25-yearlold S. macrophylla was estimated at 159 MgC ha-1. The use of S. macrophylla as tree farm species was found to effectively store and sequester more carbon in the atmosphere, above-ground, soil and products as compared to farms planted with G. arborea.
Title:	**Environmental survey in response to drought incidence in Municipality of Araceli, Palawan Philippines**
Author:	**Salom, Ronalyn Vera**
Adviser:	**Valle, Pura Beatriz S.**
Abstract/Executive Summary:	The province of Palawan is known for its highly diverse flora and fauna and is called last ecological frontier. There are approximately 1,672 flora species in Palawan and was believed that there are more species which are yet to be identified. The major source of income of Palaweños are agriculture and fishing. This study was conducted at the municipality of Araceli located at the Northeastern part of mainland Palawan. According to the Aracelis Local Climate Change Action Plan, there had been cases of drought wherein the most severe was reported to be in 1998 and 2010. This

	study was conducted to document the environmental conditions that may contribute to the vulnerability of Araceli municipality to drought. This can be used as a reference to the development of the Local Climate Change Action Plan 2017-2022 of Arceli, Palawan. Drought is an extreme climatic event and is considered a natural hazard. The ability to cope with drought varies from one region or population to another. Considering the 6,512. 12 has. of grassland and pastureland, and 3,335 has. of agricultural lands in Arceli, it is important to ensure that these vast areas of land will still be productive even during a period of drought incidences, and recommended drought-tolerant land use and cop species for Arceli. The biological survey was limited to floral inventory through Rapid Biodiversity Assessment (RBA). The geophysical characterization included climatic data (amount of rainfall and temperature) and meteorogical characteristics in relation to drought incidence. For the socio-economic data, demography (population, livelihood, water source and the major crop production (types of crops, production in metric tons, area covered in hectares of the municipality were gathered. Furthermore, a road network assessment, using the RouteShoot application, was conducted to determine potential road accessibility to support the communitys livelihood. Results showed that the location of Arceli is exposed to prolonged drought occurrence and the recent incidences seriously affected the crop production, especially the yield of rice. The bio-geophysical and socio-economic conditions of the municipality and the availability of resources are the important factors to consider, for theses challenge the vulnerability and the adaptive capacity of the community to drought. The study recommended the practice of agroforestry to lessen the vulnerability of farmers to drought. The following drought-tolerant flora species were recommended for use in pasture lands, grasslands, agricultural and forest areas in the municipality: Pennisetum purpureum, Panicum maximum, Digitaria decumbens, Dicanthium aristatum, Cenchrus ciliaris, Chloris gayana, Calopogonium muconoides, Desmodium aristatum, Cenchrusa cilliaris, Chloris gayana, Calopogonium muconoides, Desmodium intortum, Acacia Senegal, Leucaena leucocephala, Cassia siamea, Azadirachta indica, Melia azedarach, Ziziphus mauritiana, Moringa oleifera, Terminalia arjuna, Psidium guajava, Syzygium cumini, Morinda coreia. Saccharum officinarum, Persea americana, Annona squamosa, Cola nitida, Vigna radiate, Vigna ungguiculata, Tamarindus indica, Artocarpus heterophyllus, Robinia psuedoacacia, Prosopis cineria, and Glirica sepium.- The identification of these suitable drought-tolerant species were based on the recommendations of Rosacia et al. (2007), MacDicken & Vergara (1990) and Nair (1993) however, these still need an in-depth validation through consultation of farmers, soil testing and characterization and suitability of species to the site.

Title:	**Recreation structures and maintenance procedures done at Camp N and maintenance of Greens & Patches at Nuvali Canlubang, Calamba City, Laguna**
Author:	**Santiago, Kiarra Anne Rivera**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	George D. Butler defined recreation as any form of experience or activity in which and individual engages from choice because of the personal enjoyment and satisfaction which brings directly to him. This concept emphasizes the personal nature of recreation and indicates why recreation activities are as diversifies as the interest of man. It represents the different activities individuals chose to do in their spare time to relieve stress. Recreational structures vary and has a wide vary of types that can be both used for indoor or outdoor recreation. Information about the structure must be known by the recreationist for additional knowledge and to know what benefits one may get from them if any. Maintenance of these structures must be known and elevated to know if the practices really maintain the structures in working or quality condition. Maintenance about the site must also be applied to help with the presentation to the customers or guest. They need to be kept clean and presentable for a memorable experience for the guests especially in the outdoors. The study was conducted at Camp N Greens & Patches. The Study focused on the recreational structures and maintenance practices done at the site. Photo documentation of the structures and practices were conducted at Camp N Green & Patches. The main objective of this study are to evaluate the different structures and maintenance at Camp N and the maintenance practices at Greens & Patches. Namely, this study aims: 1) provide photo documentation and description of recreation structures and maintenance procedures done at Camp 2) suggest other possible maintenance practices that may enhance the potential Greens & Patches and 3) answers the questions what do people prefer more outdoor recreation or indoor recreation by conducting a survey. In conclusion, Camp N maintenance procedures are effective and maintains the recreation structure functional and in good condition. Based on the survey results 94% of recreations structure functional and in good condition. Based on the survey results 94% of the recreationists also thinks that the facilities and structures are well maintained. The methods used by Green & Patches are also effective for the proper growth of the plants found there. A recommendation was given to improve the service that Camp N Greens & Patches offer to individuals.

Title:	**Plantation and green space management of Axeia group of companies**
Author:	**Sariga, Deborah Keren Amio**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	The author spent a month and a half doing practicum activities at AXEIA Group of Companies to gain experience on urban forestry and plantation management. AXEIA Group of Companies is one of the leading developers in the Philippines having 30 residential projects completed in their 32 years of service. In the early 1980s, the company acquired a 93.3-hectare forest land in Alaska, Oriental Mindoro and decided to invest in the Gmelina plantation. The activities performed by the student were mostly to help the management in the planning and monitoring of activities for the plantation and conducting greenspace assessment and greenspace management plan for the residential projects of the company. To help the management understand the plantation plan submitted by their consultant, the student produced a descriptive report on the said plan. The student also visited the plantation only for two days due to time constraints. Recommendations on how the main office could efficiently monitor the progress on the plantation with the given constraints were presented. As for greenspace assessment, the student was only able to visit four project sites. During the assessment, the student checked on the compliance of each project to the given open space requirement and made an inventory of the ornamental plants used in landscape.
Title:	**Soil characterization of the Pagbilao Mangrove Forest, Quezon, Philippines**
Author:	**Sarmiento, Paul Simon Adrian Lew Menor**
Adviser:	**Galang, Marco A.**
Abstract/Executive Summary:	Mangrove forests are an important forest ecosystem. They served as habitat and breeding ground for aquatic animals, facilitated land accretion through sediment trapping, and reduced impacts of storm and tidal surges. They also serve as a reservoir of carbon that offset climate change. However due to human-induced stresses like fishpond conversion, mangrove coverage in the Philippines has dwindled to critical extent. Restoration efforts are underway and should take into account characterization of the different mangrove forest in the country. Results showed significant differences in the sand, silt and clay fractions among different zones in the mangrove forest. The seaward zone registered a sandy loam textural type, the midward zone sandy clay, and the landward zone a sandy clay loam. Soil pH did not vary among different zones and generally ranges from strongly acidic to slightly basic (4.0 to 7.8). Some samples recorded very low soil pH values of 2.8 and 3.1 indicating the presence of acid sulfate soils, a condition that forms when a waterlogged soil is dried and exposed to air converting iron

	sulfides to sulfuric acid. Surprisingly, soil organic matter, carbon, and nitrogen were all recorded low. Available phosphorus is low due to P-fixation in waterlogged conditions. Exchangeable potassium was characterized as very high. Results of this study will be useful in understanding the dynamics of substrate-mangrove forest composition.
Title: Author: Adviser: Abstract/Executive Summary:	**Above ground biomass estimation of permanent field laboratory area 3 in Mount Makiling Forest Reserve** **Sasi, Adrian Pablo Villanueva** **Lapitan, Renato L.** The tropical forest ecosystem has a potential to store carbon through its food making process. It serves as a reservoir of carbon for a long period of time. The study was performed in Permanent Field Laboratory Area 3 in Mount Makiling Forest Reserve to determine the carbon stock potential of all tree species using allometric equations, and provide a full tree inventory of the area of the year 2016.Through tree inventory, a total of 309 woody species was obtained by inventory from PFLA 3 belonging to 15 different families. Meliacieae has the highest number of recorded species dominated by Mahogany (Swietenia macrophylla). And diameter at breast height ranges from 0.55 cm to 115 cm. This study estimates the above-ground biomass of the area by using DBH and formula developed by Sandra Brown (1997). Based on the results, a total of 531,474.2803 kg for tree biomass, 265,737.1402 kg for carbon content, and 974,272.0769 kg for the total carbon sequestrated was obtained. Furthermore, the Permanent Field Laboratory Area 3 as a Mahogany Plantation has a capacity to sequester carbon for it is considered that plantation forests have a major potential to sequester atmospheric carbon. Thus, it is essential to implement a sustainable management plan for Permanent Field Laboratory Areas to increase the carbon storage and sequestration capacity of the forest.
Title: Author: Adviser: Abstract/Executive Summary:	**Selection of mother trees using light detection and ranging (lidar) in Molawin-Dampalit Subwatershed, Mt. Makiling ASEAN Heritage Park, Philippines** **Siao, Renzel Yana Mendoza** **Bantayan, Nathaniel C.** Light Detection and Ranging (LiDAR) is a remote sensing method that has a wide range of applications due to its time-efficient and cost-effective functions. In this study, the use of LiDAR in identifying mother trees was tested. Mother trees are phenotypically superior trees that are good sources of high quality seeds. Using ArcGIS, the trees in Makiling Center for Mountain Ecosystems (MCME) 2-ha inventory at Molawin Dampalit Subwatershed were classified as mother tree or not mother tree. The

	classification was based on diameter at breast height (DBH) and uncompacted live crown ratio (ULCR), which are only some of the several criteria in selecting mother trees. The LiDAR point cloud data in the study site was obtained from Philippine LiDAR FREXLS project. Through LAStools, 20 LiDAR metrics, including canopy cover and density, and height percentiles and bicentiles, were derived for each classified tree. The LiDAR metrics and mother tree classification were used respectively as independent and dependent variables for the logistic regression analysis. The logit model constructed using STATA only included three significant variables (LiDAR metrics) and had a low coefficient of determination (R = 0.1283). The accuracy test of the model resulted in 14.24% completeness, 21.24% correctness, 9.62% quality. Similarly, the Receiver Operating Characteristic (ROC) analysis of the model resulted in one fairly acceptable and two unacceptable AUC (area under the curve) values. Therefore, the model was found unsuitable in selecting mother trees using LiDAR. Further studies were recommended with improvements in methodology, such as more comprehensive criteria in selecting mother trees, use of additional LiDAR metrics, and validation of the model in different forest stands.
Title:	**Assessment of seed distribution, dissemination and diffusion pathways of priority tree plantation species in the Philippines**
Author:	**Siladan, Marcelino U.**
Adviser:	**Tolentino, Enriques L., Jr.**
Abstract/Executive Summary:	The study was conducted to understand and document the state of the country's seeds sources, the origins of the priority forest tree seeds, the systems of seed distribution, dissemination and diffusion of priority tree plantation in the Philippines. It also tried to characterize and analyze the major forest tree seed sources, seed producers and dealers of priority plantation species and their system of seed collection/acquisition system, processing, handling, storage and distribution practices. In the process, the seed quality and quantity supplied by the seeds sources were evaluated as well as the phenotypic characteristics of the seed trees where the seeds were collected. Based on the results, a modification of the guideline for plus tree selection was proposed. Data were collected using document reviews, field surveys and interviews. The study also revealed that a considerable number of seed sources surveyed are distributed in the three major islands of the country, located mostly in Mindanao. While there are seed sources that are easy to access, a limited number can be considered phenotypically good quality due to absence of roguing. The study also revealed 5 major categories of the tree seed producers, distributors and suppliers' and four (4) major seed pathway linkages from the origins and primary seeds sources to the various end-users. Likewise, the study also revealed five industrial tree plantation (ITP) species with the most number of seed sources surveyed, namely: yemane (Gmelina arborea Roxb.) mahogany (Swietenia macrophylla King) mangium (Acacia mangium Willd.) bagras (Eucalyptus deglupta Blume.) and narra

	(Pterocarpus indicus Willd.). The origins and movement pathways of seeds of these species provided to be difficult to trace due to poor documentation or complete absence of records of trees planted many years ago. Evaluation done on the seed trees of seeds stands revealed a mixture of straight, semi-straight and crooked trees. Pollen from bad trees continues to contaminate the good trees thus seed collected from the plus trees are not 100% of good phenotype. On this basis, a revision to the existing plus trees selection guideline is put forward. Results of the seed collection, processing and storage and testing practices of the seed sources revealed the need of improvements in the area of tools and equipment, which affects seed quality. Results and recommendations of the study will serve as among the basis for addressing concerns on seed quality to support forestation and future tree improvement initiatives in the country.
Title:	**Green space maintenance and practices by Cypress Bomanite Inc. projects**
Author:	**Smagula, J. Ancil Sotiangco**
Adviser:	**Andrada, Rogelio T., II**
Abstract/Executive Summary:	The student started his practicum in June 2016 at Cypress Bomanite, which is located at 537 EDSA Cubao, Quezon City. Cypress Bomanite offers an array of products and services for construction and landscaping for clients in the Philippines. The company is known for their colorful HardScape flooring products. The student chose Cypress Bomanite for his practicum because this company is well known for their landscaping projects. The student was confident that he will learn a lot from this company in landscaping installation and maintenance. He also knew that he could gain knowledge and enough experience in his field and future endeavors. The practicum was conducted in order to help the student apply the knowledge that he gained in the university regarding Urban Forestry through hands-on experience. Also, the student's practical experience is vital in helping him gain insight on the work that he has to do after his education in the university. This practicum, likewise, is intended to further improve the Urban Forestry course though the student's recommendation and insights. The student spent 200 working hours at Cypress Bomanite. It started on June 13 and ended July 19, 2016. The practicum focuses on the maintenance and arboriculture application in condominiums and other residential areas. The student was able to work in six different sites namely, Grand Hyatt Residences, Tropica Garden City Condominiums, SM Jazz Makati, SM Marilaol, Santa Rosa, and Magnolia Robinsons, which was his major site for it was under his supervision. For the entirety of the practicum, the student visited a nursery located in Santa Rosa, conducted an inventory of Royal Palms, Date Palms, Narra, and Buri trees, inspected Tree Bowling for the Marikina site, and supervised his given site, which is Magnolia Robinsons. Together with the staff of Cypress Bomanite, he also delivered fertilizers and other consumables to the different condominiums and residential areas that were under the

	construction contract of the company. After going through the practicum, the student recommended for Cypress Bomanite to invest in vehicles and maintenance equipment to avoid delays and extending the deadline. Meanwhile, for the students of BS Forestry, the student recommended that they always follow safety precautions while on the field. For the College of Forestry, students recommend that they invest in instruments in order for the students to have a better experience when doing a task.
Title: Author: Adviser: Abstract/Executive Summary:	**Documentation of dominant exotic species in Acero Park, Magsaysay, Palawan** **Tamondong, Ma. Mariella Gonzales** **Visco, Roberto G.** Acero Park is proclaimed as a protected watershed"" in the municipality of Magsaysay, Palawan. It serves as the primary source of water of the three barangays namely Igabas, Lacaren and Emilod. Also, it is considered as the largest tract of forest left in Magsaysay which constitutes more than half of the total forest land in the said municipality. Moreover, it serves as a natural habitat for wildlife. The practicum was conducted from June 29, 2017 until July 12, 2017. During the practicum, the activities were tree identification, opportunistic survey of two dominant exotic species which are Mahogany (Swietenia macrophylla) and Gmelina (Gmelina arborea), and the selecting of possible mother trees for future regeneration. The data that have been gathered were: diameter at breast height (dbh), height, GPS readings (location) and the number of exotic species in the site. The criteria for selecting the surveyed exotic species was that it should have a dbh at least ten centimeters (10 cm). As a result, the total exotic tree species surveyed in the site was five hundred thirty-five (535). S. macrophylla with one hundred twelve (112) individuals and G. arborea with four hundred twenty-two (422) individuals.
Title: Author: Adviser: Abstract/Executive Summary:	**Carbon storage determination of trees with DBH≥cm in permanent field laboratory area 1 in Mt. Makiling Forest Reserve** **Tamoria, Maria Angela Javilinar** **Lapitan, Renato L.** The objective of the study is to determine the biomass and carbon content of trees present in Permanent Field Laboratory Area 1 (PFLA 1). The study was conducted in Permanent Field Laboratory Area 1 in Mount Makiling Forest Reserve (MMFR), University of the Philippines Los Baños, Laguna. The data collection and data processing was divided into two parts first the full inventory of the trees with a minimum DBH of 5 cm. the total height, crown area and the location of the trees were also measured and recorded. Various field instruments from the instrument room

	of the Institute of Renewable and Natural Resources were used in measuring the said parameters. Second is the collection and gathering of the past inventory records conducted by MCME or students who conducted their study on the same site. It was followed by the calculation of the tree biomass and carbon content, through the use of allometric equations, of the different species present in the area. The location of trees were plotted using the ArcMap and the tree biomass and carbon content were presented through the use of bar graphs. The results show that among the species recorded, Bagtikan has the highest biomass and carbon stored and the family Fabaceae has t24172he highest biomass and carbon stored among the different families present in the area.
Title: Author: Adviser: Abstract/Executive Summary:	**Biomass and carbon stock assessment of para rubber (Hevea brasiliensis) plantation in Mt. Makiling Forest Reserve** **Tandang, Allan Patricio Quilloy** **Lapitan, Renato L.** The carbon stock assessment was conducted in the College of Forestry and Natural Resources (CFNR) Rubber Plantation. The study aimed to estimate the total amount of forest biomass and carbon within the plantation among the different carbon pools. To collect the data needed in this study, three sample plots were established within the CFNR rubber plantation. The biomass and carbon values were estimated using the equations of Brown (1997) and Lasco and Pulhin (1999) carbon percentage factors respectively. The plantation had an average biomass of 461.61 ton/ha and total biomass of 7385.72 ton. CFNR Rubber Plantation was assessed as an important carbon sink because of its carbon sequestration potential. The outcome of the study validated the claim that forest plantations have great potentials to ameliorate the possible impacts of climate change. Therefore, appropriate management strategies should be implemented in the area.
Title: Author: Adviser: Abstract/Executive Summary:	**Effects of pruning, thinning and intercropping on the biomass, yield and soil properties of jatropha (Jatropha curcas L.) based agroforestry system** **Totaan, Darwin Elizaga** **Castillo, Arturo, SA** This study aimed to evaluate the effects of pruning, thinning and intercropping on the biomass, yield and soil properties of Jatropha-based agroforestry system. The study made use of Randomized Complete Block Design with the following treatments: JCI-pure agronomic crop (bush sitao/corn) JC2-pure Jatropha (with no pruning and thinning on Jatropha JC5-application of pruning with intercropping on Jatropha and JC6-application of pruning and thinning with intercropping on Jatropha. The findings revealed that

	the average number of branches, diameter of branch and basal diameter of a three-year-old Jatropha were significantly increased with the application of pruning, thinning and intercropping (JC6) having 25,75.28 mm and 136.39mm, respectively. However, no significant result was observed on the length of Jatropha applied with various cultural practices. On per plant basis, yield components of Jatropha increased significantly with the applications of the treatment JC6 particularly on the total number and weight of fruit having 59 and 0.608 kg plant-1, respectively Furthermore, seed yield was improved with 0.160kg plant-1. However, JC6 was lower in terms of seed yield with 199.40 kg ha-1 compared to JC5 with 280.42 kg ha-1. The decrease of seed yield in JC6 was attributed to the reduction of plant density due to the application of thinning. The above-ground biomass, dry matter yield and number of pod of bush sitao did not reveal any significant results except for the pod yield wherein JC6 obtained the highest yield on per plant basis with 0.146 kg plant-1. No significant result was observed on the above-ground biomass and corn ear yield in all the cultural practices applied on per plant analysis. Nevertheless, above-ground biomass, dry matter yield, ear yield of corn was comparatively higher in monocropping than intercropping. Nutrient contents of Jatropha were not affected by the cultural practices. On the other hand a significant increase in calcium and magnesium contents of bush sitao during the dry cropping as well as for the potassium content of corn during the wet cropping. The applied cultural practices have no significant effect on the depth and amount of soil erosion at each portion of the 15% slope study site (downslope, midslope and upslope). The different cultural practices did not cause significant effect on the temporal variation of soil fertility status of the area during the dry and wet cropping seasons. In terms of the profitability analysis on the cultural practices, JC6 obtained the highest positive annual net income (P333,769.13), the return of investment (315.86%) and benefit-cost ratio (3.159).
Title:	**Estimation of biomass and carbon stock assessment of built up areas within Molawin-Dampalit Subwatershed, Mount Makiling Forest Reserve**
Author:	**Victoria, Kristel Suiza**
Adviser:	**Lapitan, Renato L.**
Abstract/Executive Summary:	The study assessed the biomass and carbon stock in the different carbon pools of the built-up land cover inside the Molawin-Dampalit subwatershed in Mt. Makiling. It will play a vital role in the issue of climate change mitigation because ecosystems in tropical forest will serve as a carbon sink through the process of photosynthesis. Actual field measurements in this study used allometric equations formulated by Brown (1997). Three sample plots were instituted and the inventory lasted for more than a month. The results will be much needed for baseline information in preparation for future studies pertaining to the land cover evaluated. The order of the carbon sinks according to its total biomass density is as follows: tree biomass (614.83 ton/ha) > roots (103.46 ton/ha)

	> litter (5.84 ton/ha) > understory/herbaceous (4.55 ton/ha). On the other hand, the order of carbon densities per carbon pool is as follows: soil (307.05 ton/ha) > tree biomass (276.67 ton/ha) > roots (45.24ton/ha) > litter (2.63 ton/ha) > understory/herbaceous (2.05 ton/ha). The families that supplied the largest amount of biomass and carbon are Anacardiaceae, Oxalidaceae, Meliaceae, Phyllantaceae, Dipterocarpaceae, Fabaceae, Euphorbiaceae, Araucariaceae, and Lamiaceae. In terms of its species variation, Mahogany showed the highest accumulated biomass and carbon. Based on the results, there were several factors that can affect the amount of carbon stored in an area such as amount of biomass production, variation in height and diameter of the tree, species age, composition and density. Also, the results in this report are much higher than the values presented in other studies. The study highlights the potential of the built-up land cover for carbon sequestration and storage. It also proves that though the site is in an urban setting, it can be useful for climate change mitigation.
Title:	**Estimation of diameter at breast height and crown diameter through lidar-derived chm: the case of mahogany plantation (Swietenia macrophylla) in Gerona, Tarlac, Philippines**
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Abstract/Executive Summary:	In forestry, silviculture refers to the actual application of controlled practices that aims to enhance the establishment of growth, composition, health and quality of forest in order to fulfil the multiple needs and demands of landowners and society on a sustainable basis. (Adams et al. 2004) This study aims to apply estimated LiDAR derived data, specifically DBH and crown diameter in the field of silviculture. Diameter-at-Breast Height (DBH) and crown diameter estimation are both essential in different allometric equations in terms of appraising vital forestry indices basal area, biomass, carbon stock, stem volume and can also be used for establishing a standardization in implementing silvicultural practices in a plantation. Through LiDAR Technology, immediate attainment of various forest parameters, except DBH and crown diameter are made possible through the observation of behavior and characteristics of point cloud which are considered to be unique in different classes of a forest type. Moreover, widespread ground truth data gathering and tree inventory was administered by the FREXLS Phil LIDAR II on a two-hectare sample plot located in Gerona, Tarlac Mahogany Plantation. Forest parameters such as coordinates, height, and canopy cover were calculated and the type of species enduring in the plantation site are identified in order to administer comparison and correlation to LiDAR derivatives. Crown diameter is obtained through individually digitizing the canopy cover of selected sample trees while linear regression analysis was used to get LiDAR-derived DBH by incorporating field-derived DBH and 11 best combinations of parameters in DBH Estimation at 20m, 10m, and 5m grid resolutions and validation is done through a statistical analysis (r2).

	The study shows that there is a positive linear relationship between DBH and crown diameter that strongly suggests that the estimation of the mentioned parameters can be applied in silviculture. The relationship between the two derivatives is very close to being linear, with an r2 value higher than 0.8.