
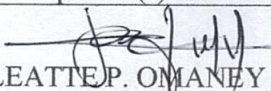




DEPARTMENT OF RESEARCH AND DEVELOPMENT

RESEARCH PROPOSAL FORM

BASIC INFORMATION	
Research Title:	WATERSHED CHARACTERIZATION FOR A SUSTAINABLE FRAMEWORK IN MITIGATING CLIMATE CHANGE AT TAU-CALAO FOREST RESERVE, SAN JOSE, MAYANTOC, TARLAC <input checked="" type="checkbox"/> Program <input type="checkbox"/> Project <input type="checkbox"/> Study
Sustainable Development Goal (SDG) Addressed	 <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Lead College:	COLLEGE OF AGRICULTURE AND FORESTRY
Collaborating College(s)	NA
Cooperating Agency(ies):	NA
Project Duration:	1 YEAR
Project Location:	CALAO, SAN JOSE, MAYANTOC, TARLAC
Total Budget Requested:	93,520
Other Sources:	
Proponent(s): MAIDAS ANSON, MINDA MONDIGUING, RAQUEL SIGUE, JULIUS RAE ALLAM	
 MILEATTE P. OMANEY Name and Signature: Specific Role of Researcher: Project Leader	Sex: Male <input type="checkbox"/> Female <input checked="" type="checkbox"/> Intersex <input type="checkbox"/> Agency & Address: TARLAC AGRICULTURAL UNIVERSITY/ MALACAMPA, CAMILING, TARLAC Email Address: omaneymileatte@tau.edu.ph Contact Number: 09102688199
<i>*add rows as needed</i>	
TECHNICAL DESCRIPTION	
<p>1. RATIONALE</p> <p>Watershed plays a multi-functional role in every community, serves as habitats to various plant and animal species, play ecological functions that keeps flooding and other natural disaster, and provide water for domestic, agricultural and industrial purposes. Now a days, our watersheds today suffer from severe soil erosion, erratic stream flow, diminishing groundwater resource, and declining land productivity as a result of past and present human activities such as forest fire, encroachment. The condition of the watershed is crucial in the overall health ecosystems and also even the economy is highly affected by what's being done within a watershed. For this, it is important that a management plan of the school reservation should be given emphasis. Thus, to achieve this, a thorough understanding of its features, components and behavior should be conducted.</p> <p>The school forest reservation has an area of 665 hectares by virtue of Presidential Decree 1156. It is located at Calao, San Jose, Mayantoc, Tarlac a 30 minutes' drive from the university. The reservation is being managed by the school and being used by students and faculty for instruction, research, production and extension.</p> <p>This watershed characterization will help the TAU management to formulate sustainable strategies for developing a framework in conservation, protection align in the mitigation of climate change. Climate change is a great challenge to humanity but often neglected with our so-called development. In the 2017 Global Risks Report of World Economic Forum (WEF) as cited by Climate Change Commission (CCC) (n.d.), the Philippines is ranked as the third most vulnerable country to climate change. Further, the report stressed the immense impact of climate change on annual losses in Gross Domestic Product (GDP), changes in rainfall patterns and distribution, droughts, threats to biodiversity and food security, sea level rise, public health risks, and endangerment of vulnerable groups such as women and indigenous peoples.</p>	



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2. OBJECTIVES

- a. Assess the environmental condition of the school reservation on geomorphological and biophysical features.
- b. Identify environmental issues, problems and opportunities
- c. Formulate a development framework for the sustainable and management of the forest reserve in mitigating climate change

3. REVIEW OF RELATED LITERATURE

Watershed management is the process of guiding and organizing land other resources uses in a watershed to provide desired goods and services without affecting soil and water resources (Brooks et.al 1991). Additionally, Beshah (2016) mentioned that development of advanced technologies and new approaches to sustain systems is worthwhile to accept, yet blending them with traditional knowledge that exists in target areas can make them more attractive and valuable for the intended purpose. The environmental and socio-economic impacts of such policies and regulations should be assessed before they are implemented.

According to Strage (2010), the watershed characterization and modeling system (WCMS) was developed to support decision making and the management of water resources at a statewide level in West Virginia. Specific hydrological analysis functions were combined within a customized GIS interface to provide decision support capabilities to both technical and non-technical users. Watershed analysis with GIS: The watershed characterization and modeling system software application.

Base on the guidelines of DENR-FMB on Watershed Characterization and Vulnerability Assessment using Geographic Information System and Remote Sensing. The preparation of a watershed characterization and vulnerability assessment is the first step in the sustainable management of our watershed resources. It provides watershed managers and decision-makers basis for development and conservation strategies to be implemented. The physical characterization of watersheds is divided between discussions of the different geo-morphometric parameters and the instruments and methodologies used to describe these parameters and water quality as well.

4. METHODOLOGY

The researcher will use a qualitative research approach define as, “an inquiry process of understanding a social or human problem, based on building a complex, holistic picture formed with words, reporting detailed views of informants, and conducted in a natural setting” (Creswell, 2003). This study will be conducted for 12 months. Details per objective are discussed as follows.

- a. Assess the environmental condition of the school reservation on geomorphological and biophysical features.

In order to assess the condition of the reservation on its geomorphological, secondary data gathering on administrative jurisdiction, land classification and cover will be conducted. Also slope, elevation and drainage will also be gathered to compute the relief and relative features of the reservation. After that, the researchers, will use the ARC GIS software to overlay maps gathered to illustrate and compute the geomorphological and biophysical features. On site observation will be conducted also to validate secondary data gathered.



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For the geomorphological features, the following parameters will be gathered and computed:

a.1 Basal length- axial length or the maximum basal length

a.2 Gravelius form factor- ratio of the average width to the axial length of the basin

$$G = \text{area} / \text{axial length}$$

a.3 Bifurcation ratio- ratio of the number of streams of any given order to the number of streams in the next order (Strahlers method)

$$B = N_1 / N_2$$

a.4 Elongation ratio- ratio between the diameter of a circle with the same area as the watershed and the axial length of the watershed

$$E_r = D / L_A$$

a.5 Circulatory ratio- ratio of circumference of a circle of the same area as the basin to the perimeter

$$\text{Circularity ratio} = C_c / \text{basin perimeter}$$

For the relief features, the following parameters will be gathered and computed:

a.6 Relief ratio- ratio of the total basin relief to the maximum basin length

$$\text{Relief ratio} = \text{HE} - \text{LE} / \text{basin length}$$

a.7 Relative relief- ratio of the maximum basin relief (highest elevation) to the perimeter basin

$$\text{Relative relief} = \text{Highest elevation} / \text{perimeter}$$

a. 8 Elevation- mean elevation is determined by measuring on a topographic map the area lying between successive pairs of contours or elevation ranges

$$\text{Mean elevation} = \text{max elevation} - \text{minimum elevation}$$

For Drainage texture, the following parameters will be gathered and computed

a.9 Drainage density= L/A

L is the total length of all perennial and intermittent streams

A is the area of a watershed

a.10 Drainage Texture= N/A

A= is the area of the watershed

N= Is the number of all perennial and intermittent streams

a.11 Length of overland flow= distance over which run off will flow before concentrating into permanent channels

$$FI = 1 / (2 * \text{drainage density})$$

For the biophysical features, the Biodiversity Assessment Monitoring System (BAMS) of Forest Management Bureau will be used. Sampling activity will be based on the different land cover of the reservation such as open forest, brushland, grassland and annual crop. A two (2) kilometer transect line will be established in different forest type. There will be 10 sampling quadrat per kilometer having a size of 20 meters x 20 meters will be established in alternating directions on the modified transect line with 250 meters regular interval as cited from the study of Coaracero and Malabrigo (2020). All tree species with a DBH of 10 cm and above will be accounted and measured. To account trees less than 10 cm at DBH and with a height of not less than one (1) meter, 5 meters by 5 meters will be established within the 20m x 20 m. A 1 meter by 1 meter subplot will be established within the 5 meters by 5 meters subplot to account the undergrowth species. The data to be collected are DBH, total height and the number of individuals of every species that will be found in the study area.



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b. Identify environmental issues, problems and opportunities

Using the problem tree analysis, the environmental issues, problems and opportunities will be identified. Listing and observation on issues and problems through workshop with different stakeholders will be conducted. Also, interventions or strategies undertaken will be gathered.

c. Formulate a development framework for the sustainable and management of the forest reserve.

The input process output will be conducted through the workshop. The approach will start from the presentation of the situation (geomorphological, biophysical features results) of the reservation and open forum to validate issues and concern. Identified issues and problems with corresponding programs, projects and policies will be tabulated.

5. REFERENCES

- BESHAH M., P. BEHAILUI, E. PIETILÄI and K. S. TAPIO. 2016. Indigenous Practices of Water Management for Sustainable Services: Case of Borana and Konso, Ethiopia. Biodiversity Assessment Monitoring System (BAMS) of Forest Management Bureau
- BROOKS K., P. FLOLLIOT and J. MAGNER. 1991. Basic Concept in Watershed Management.
- CORACERO, E. E. AND MALABRIGO, P. L. JR. 2020. Diversity Assessment of Tree Species in Sitio Dicasalarin, Barangay Zabali, Baler, Aurora, Philippines. OpenJournal of Ecology, Pp. 10, 717-728
- DENR Memorandum Circular No. 2008-05. Guidelines in the Preparation of Integrated Watershed Management Plans.

6. POTENTIAL IMPACT

The overall goal of this study is to harmonize the reservation for the continuous provision of goods and services in mitigating climate change. The different features of the reservation that will be gathered is an indicative response of the watershed to its susceptibility to natural calamities such as erosion, floods and siltation of bodies of water.

7. LOGICAL FRAMEWORK

The final output of the study is to formulate a Sustainable Integrated Management Plan for the school reservation in instruction, research, production and extension of the management, faculty and students of the university. The geomorphological and biophysical features of the reservation will be determined in the first quarter. In this output, the management of the school reservation will be able to determine activities that will be incorporated to protect and conserve the area. Secondly, result of the problem tree analysis will be basis for identifying strategies in mitigating climate change. Activities that will be conducted are mapping, surveying, assessment and workshop to attain the goal of the study.

**DEPARTMENT OF RESEARCH AND DEVELOPMENT****8. MILESTONE**

The study will be on three phases. Phase 1 will be the watershed characterization of Calao Forest Reserve that will involve data gathering, mapping and survey. For the second phase, this will be conducted through workshop wherein all the gathered data will be used. On the last phase, it will be the preparation of management plan based on the output of phase 1 and 2.

Activity	Phases	Output
1. Watershed Characterization of Calao forest reserve	1 (6 months)	a. Geomorphological and Biophysical features of the reservation
2. Identification of environmental issues, problems and opportunities	2 (3 months)	b. SWOT
3. Formulate a development framework for the sustainable and management of the forest reserve.	3 (months)	c. Integrated Management Plan for the reservation

9. IPR/ RESEARCH OUTPUTS

Type of IPR	Nature	Name of Technology
<input checked="" type="checkbox"/> Utility Model <input type="checkbox"/> Patent <input type="checkbox"/> Copyright	<input checked="" type="checkbox"/> Process <input type="checkbox"/> Equipment <input type="checkbox"/> Others (Please specify): _____	

10. RESEARCH ETHICS CONSIDERATION

Classification	Applied for Certificate of Ethics Clearance?	Remarks
<input type="checkbox"/> Human <input type="checkbox"/> IACUC <input type="checkbox"/> Plant Use <input type="checkbox"/> Micro and Biotech Use	<input type="checkbox"/> Yes <input type="checkbox"/> No	

**DEPARTMENT OF RESEARCH AND DEVELOPMENT****11. BUDGETARY REQUIREMENT****A. Personnel Services (PS)**

Unit	Item Description	Quantity	Unit Cost	Total Cost
		-	-	-
Sub-Total				

B. Maintenance and Other Operating Expenses (MOOE)

Unit	Item Description	Quantity	Unit Cost	Total Cost
	Travelling Expenses	-	-	3000.00
	Communication	-	-	18,000.00
	Capacity Building	-	-	20,000.00
	Office Supplies	-	-	22,720.00
	Workshops	-	-	29,800.00
Sub-Total				93,520.00

C. Capital Outlay (CO)

Unit	Item Description	Quantity	Unit Cost	Total Cost
		-	-	
Sub-Total				

D. Equipment Outlay (EO)

Unit	Item Description	Quantity	Unit Cost	Total Cost
		-	-	
Sub-Total				

Total Budgetary Requirement (A+B+C+D):

93,520.00

CERTIFICATION

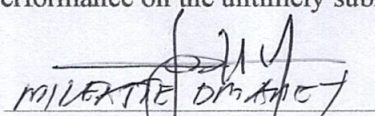
I hereby certify that the information given are true and correct and the research being conducted is authentic. I further signify my commitment to revise the paper as per evaluation results, submit all the documentary requirements, including monthly accomplishment report on time, secure research clearance certificate, complete the research within the specified timeframe, and present the research during the Annual Agency In-House Review.

Note: Documentary requirements to be submitted before and after the completion of the research:

- Research Clearance Certificate
- Research Status Monitoring Form
- Terminal Report with photodocs (soft & hard copy)

Note: Failure to submit the documentary requirements on a specified time may mean reimbursement of the grant in full or may affect the research rating performance on the untimely submission of report.

Date signed: DEC. 5, 2022


Millette D. Amey
Lead Researcher
(Signature over Printed Name)

Date signed: _____

Date signed: _____



Republic of the Philippines

TARLAC AGRICULTURAL UNIVERSITY

Camiling, Tarlac

DEPARTMENT OF RESEARCH AND DEVELOPMENT

<p><u>MAIDAS L. ANCON</u> Co-Researcher (Signature over Printed Name)</p>	<p><u>JULIUS RAE R. ALLAM</u> Co-Researcher (Signature over Printed Name)</p>
<p><u>RAQUEL F. BIANCHI-SIGUE</u> Co-Researcher (Signature over Printed Name)</p>	<p><u>MINDA M. MONDURONG</u> Co-Researcher (Signature over Printed Name)</p>

Note: Add signatories as needed

ENDORSEMENT

Date signed: Dec 6, 2022

Date signed: _____

Stefan Daniel Fuentes
STEFAN DANIEL FUENTES
College Research Coordinator
(Signature over Printed Name)

Edmar N. Franquera, Ph.D.
EDMAR N. FRANQUERA, Ph.D.
College Dean/ Head of the Office
(Signature over Printed Name)

PRE-EVALUATION

Criteria	Decision	
	Qualified	Not Qualified
Alignment to the Research Agenda of the University	<input type="checkbox"/>	<input type="checkbox"/>
Has Potential significance/ impact to the community	<input type="checkbox"/>	<input type="checkbox"/>
Alignment of proponent's specialization to the proposal	<input type="checkbox"/>	<input type="checkbox"/>

Recommended Evaluators: _____

Date signed: 07 DEC 2022

Maria Elena T. Caguioa
MARIA ELENA T. CAGUIOA, Ph.D.
Director for Research & Development
(Signature over Printed Name)

ACKNOWLEDGING RECEIPT

Processed by:

R&D Staff
(Signature over Printed Name)

Date Received: 12/07/2022

Proposal No: _____

Document No: RD-2022-3028