
UI GreenMetric
World University Rankings
มหาวิทยาลัยแม่โจ้
MAEJO UNIVERSITY
MJU
MAEJO UNIVERSITY
THE OPERATION
GREEN UNIVERSITY REPORT
2023

The operation green university report 2023

Operated by

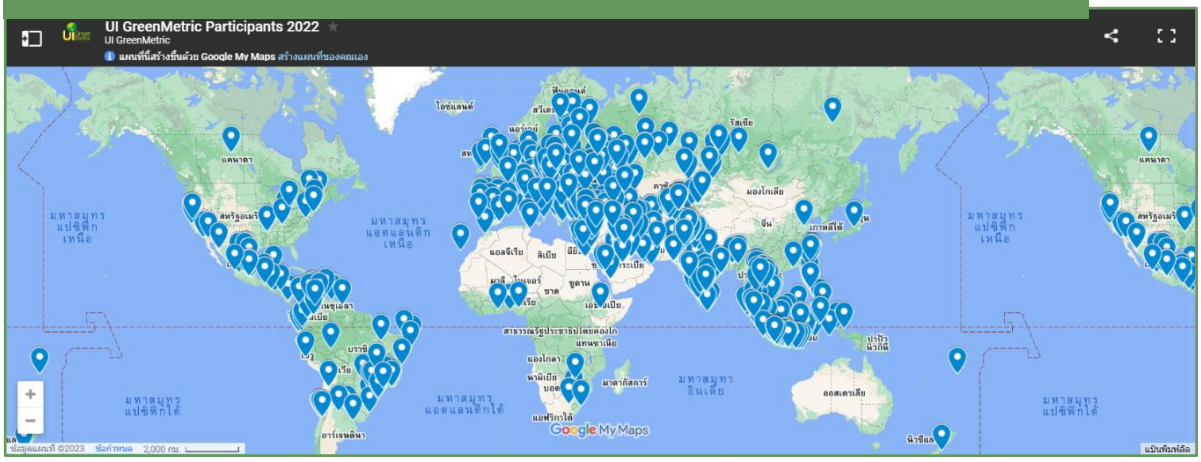
Green University Strategy Board

Executive Summary

Operation of Maejo University to join the Green University Ranking

The UI Green metric World University Ranking is a pivotal initiative facilitating global progress towards Green and Eco-friendly universities. Its assessment criteria are derived from inputs of universities worldwide, reflecting a shared commitment to a sustainable future. Maejo University made its debut on the list in 2013, securing the 194th position among global universities. In 2014, it ascended to the 10th spot in Thailand and has maintained its presence since. In 2022, the university achieved a national ranking of 11th and an international ranking of 157th out of 1,050 global institutions, a testament to its outstanding performance and growth.

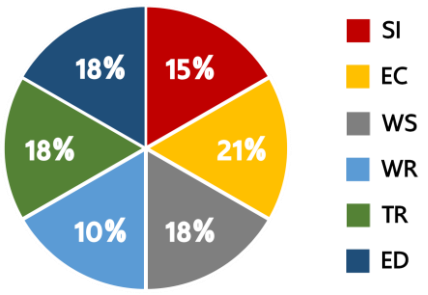
List of UI GreenMetric Participant in 2022 based on location (UI GreenMetric website)



Since more and more universities around the world apply for the ranking competition each year, more details and up-to-date assessment criteria are updated annually. Sustainable development issues (SDGs), global climate change planning and biodiversity planning have been added, and the situation prepared for the epidemic but still based on the same 6 key criteria and indicators.

In 2023, the criteria for consideration consisted of 6 main indicators as follows:

1. Setting and infrastructure (SI) - 15%
2. Energy and Climate Change (EC) - 21%
3. Waste (WS) - 18%
4. Water (WR) - 10%
5. Transportation (TR) - 18%
6. Education and research (ED) - 18%

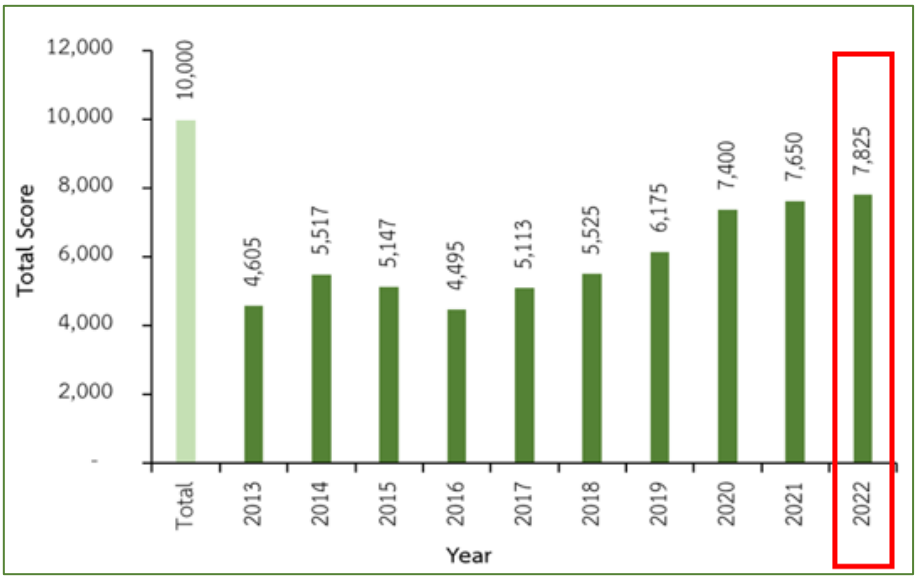


Overall score diagram

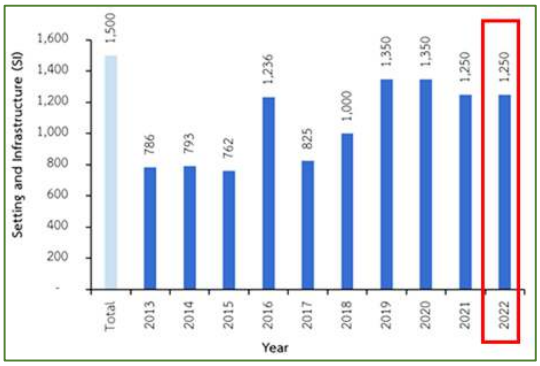
Self-assessment of University

The results of the assessment of scores according to the criteria of all 6 indicators of Maejo University from 2013-2022.

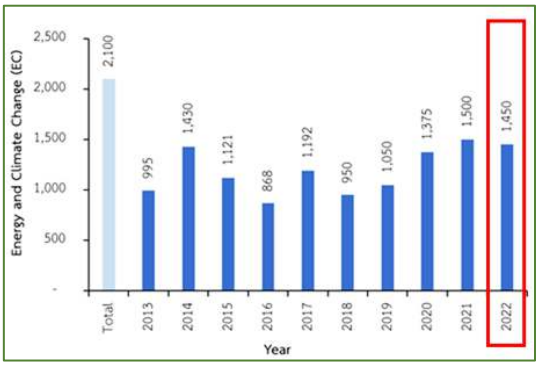
However, in 2017, a detailed method of calculating and evaluating key indicators and sub-measures for each topic was announced in order to understand the assessment methods. This should cause each university to plan for improvement, to develop more deficiencies in each area (refer to the World Green Universities Ranking Guide), and to make small improvements to each of the criteria and indicators each year. If you look at the past 3 years, it will be found that Maejo University has improved in global rankings. It was found that in 2018 it ranked 215 out of 719 universities, 2019 ranked 181 out of 780 universities and last year ranked 110 out of 912 universities worldwide. The country's ranking is sixth with a score of 7,400, a 74% increase from 2019's total score of 6,175 (61.75%). The best ranking in the world is Infrastructure category (Setting and infrastructure, SI) ranked No. 5 in the world and No. 1 in Thailand.



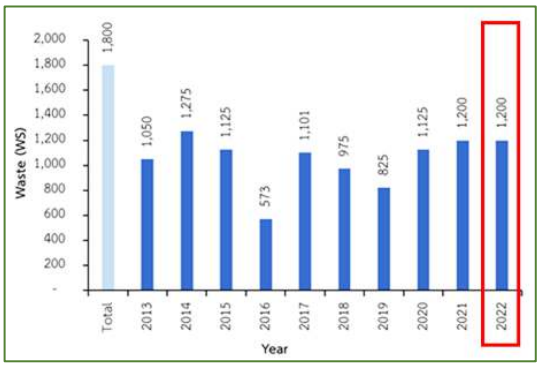
1500



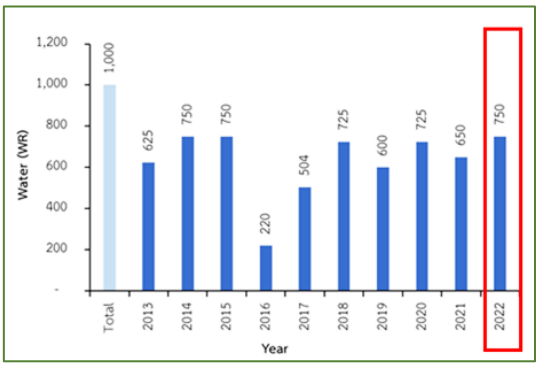
2100



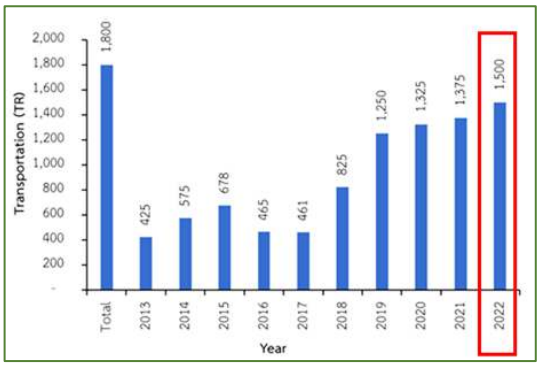
1800



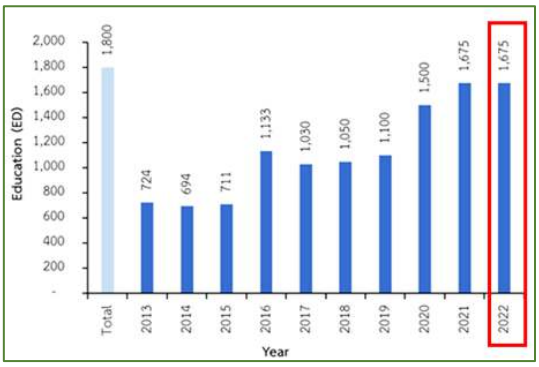
1000



1800



1800



Maejo University Green University Performance achieved from 2013 - 2022

Maejo University Green University Performance achieved in 2022 from each indicator

When evaluating the performance of individual categories, it became evident that majority of them had experienced nearly a twofold increase in their assessment scores during the last decade. It was found that 22 categories out of 51 achieved full score, while 15 indicators and 13 indicators reached more than 75% and 50% of overall score, respectively. However, we remain eager to enhance our performance and to sustain our current state of best performance. In its implementation, the working team has applied assessment criteria and assessment results to analyze and improve work practices in terms of data collection and development of project activities to be consistent with sustainability and environmental friendliness according to the context and consistently appropriate with the university.

In 2022, the team gathered data on operations and activities related to becoming a green university according to the assessment criteria of UI GreenMetric 2022. The results of 2022 (compare with year 2020 and 2021) are as follows:

Result	SI (1,500)	EC (2,100)	WS (1,800)	WR (1,000)	TR (1,800)	ED (1,800)	Total (10,000)
2020	1,350	1,375	1,125	725	1,325	1,500	7,400
2021	1,250	1,500	1,200	650	1,375	1,675	7,650
2022	**1,250**	**1,450**	**1,200**	**750**	**1,500**	**1,675**	**7,825**

UNIVERSITY PROFILE

Name	:	**Maejo University**
Established	:	**1934**
Country	:	**Thailand**

1. VERIFIED DATA

Category	Point	Maximum Point	Percentage
Setting and Infrastructure (SI)	1,250	1500	83.33 %
Energy and Climate Change (EC)	1,450	2100	69.05 %
Waste (WS)	1,200	1800	66.67 %
Water (WR)	750	1000	75.00 %
Transportation (TR)	1,500	1800	83.33 %
Education (ED)	1,675	1800	93.06 %
Total Score	7,825	10000	78.25 %

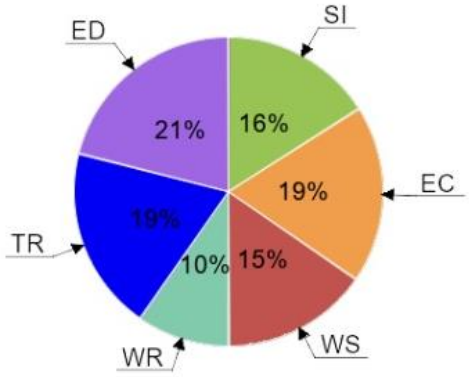


Figure 1.1 Overall Score Diagram

Performance in 2022

Questionnaire Data

University Profile

Username	: mju.ac.th
University Name	: Maejo University
University Leader	: President : Assoc. Prof. Weerapon Thongma, Ph.D

PIC Profile

PIC Name	: Asst. Prof. Dr. Mujalin Pholchan
PIC Position	: Secretary of MJU Green University Project
Email	: mujalin@mju.ac.th

Setting and Infrastructure

Question		Answer
1.1()	Type of higher education institution	[1] **Comprehensive**
1.2()	Climate	[2] **Tropical Wet and Dry**
1.3()	Number of campus site	3
1.4()	Campus setting	[2] **Suburban**
1.5()	Total campus area (m^2)	3374681
1.6()	Total campus ground floor area of buildings (m^2)	114543
1.7()	Total campus buildings area (m^2)	350670
1.8(SI.1)	The ratio of open space to total area.	[3] **> 80 - 90%**
1.9(SI.2)	Total area on campus covered in forest vegetation (please provide total area in square meters)	[3] **> 9 - 22%: 17 m^2**
1.10(SI.3)	Total area on campus covered in planted vegetation (please provide total area in square meters)	[5] **> 40%: 42 m^2**
1.11(SI.4)	Total area on campus for water absorption besided forest and planted vegetation (please provide total area in square meters)	[3] **> 10 - 20%: 19 m^2**
1.12()	Total number of regular students (part time and full time)	16998
1.13()	Total number of online students (part time and full time)	0
1.14()	Total number of academic and administrative staff	1310
1.15(SI.5)	The total open space area divided by total campus population.	[5] **> 70 m² / person**
1.16()	Total university's budget (in US Dollars)	63,468,502.51
1.17()	University's budget for sustainability effort (in US Dollars)	12,315,217

1.18(SI.6)	Percentage of University's budget for sustainability effort	[5] **> 15%**
1.19(SI.7)	Percentage of operation and maintenance activities of building in one year period	[5] **100%**
1.20(SI.8)	Campus facilities for disable and maternity care	[5] **Facilities exist in all buildings and are fully operated**
1.21(SI.9)	Security and safety facilites	[5] **Security infrastructure is available and fully functions and security responding time for accidents, crime, fire, and natural disasters is less than 10 minutes**
1.22(SI.10)	Health infrastructure facilities for students and academic and administrative staff wellbeing	[5] **Health infrastructure available (first aid, emergency room, clinic,hospital and certified personel), system and accessible for public**
1.23(SI.11)	Conservation: plant (flora), animal (fauna), and wildlife, genetic resources for food and agriculture secured in either medium or long-term conservation facilities	[5] **Conservation program fully implemented**

Energy and Climate Change

Question		Answer
2.1(EC.1)	Energy efficient appliances usage	[4] **> 50 - 75%**
2.2()	Total campus smart building area (m^2)	350670
2.3(EC.2)	Smart Building implementation (percentage of the total floor area of smart building to the total all floors building area (smart and non-smart buildings area).	[5] **> 75%**
2.4(EC.3)	Number of renewable energy sources in campus (solar power, bio diesel, wind power, etc)	[5] **> 3 sources**
2.5()	Renewable energy sources and their amount of the energy produced (in kilowatt-hour)	[2] **Bio Diesel**: **24115 kWh** [3] **Clean Biomass**: **144000 kWh** [4] **Solar Power**: **2066500 kWh** [5] **Wind Power**: **11870 kWh**
2.6()	Electricity usage per year (in kilo watt hour)	11333179
2.7(EC.4)	The total electricity usage divided by total campus population (kWh per person).	[4] **279 - 633 kWh**
2.8(EC.5)	The ratio of renewable energy production divided by total energy usage per year	[4] **> 2 - 25%**
2.9(EC.6)	Elements of green building implementation as reflected in all construction and renovation policies	[5] **> 3 elements**
2.10(EC.7)	Greenhouse gas emission reduction program	[5] **Program(s) aims to reduce all three scopes emissions (Scope 1, 2 and 3)**
2.11()	Please provide the total carbon footprint (CO_2 emission in the last 12 months, in metric tons)	9908

2.12(EC.8)	The total carbon footprint divided by total campus population (metric tons per person).	[3] **> 0.42 - 1.11 metric ton**
2.13(EC.9)	The number of innovative program(s) in Energy and Climate Change	[5] **More than 3 programs**
2.14(EC.10)	Impactful university program(s) on climate change	[5] **Provide training and educational materials for surrounding communities, at national level, and at regional and international level**

Waste

Question		Answer
3.1(WS.1)	3R (Reduce, Reuse, Recycle) program for university's waste	[5] **Extensive (> 75% waste)**
3.2(WS.2)	Program to reduce the use of paper and plastic on campus	[5] **more than 3 programs**
3.3()	Total volume organic waste produced (ton)	76.8
3.4()	Total volume organic waste treated (tons)	76.8
3.5(WS.3)	Organic waste treatment	[5] **Extensive (> 75% treated)**
3.6()	Total volume inorganic waste produced (tons)	20.87
3.7()	Total volume inorganic waste treated (tons)	20.87
3.8(WS.4)	Inorganic waste treatment	[5] **Extensive (> 75% treated)**
3.9()	Total volume toxic waste produced (tons)	5.553
3.10()	Total volume toxic waste treated (tons)	5.553
3.11(WS.5)	Toxic waste treatment	[5] **Extensive (> 75% treated) or campus produces a minimum amount of toxic waste**
3.12(WS.6)	Sewage disposal	[4] **Treated with secondary treatment***

Water

Question		Answer
4.1(WR.1)	Water conservation program and implementation	[5] **> 50% water conserved**
4.2(WR.2)	Water recycling program implementation	[5] **> 50% water recycled**
4.3(WR.3)	Water efficient appliance usage	[4] **> 25 - 50% of water efficient appliances installed**
4.4(WR.4)	Treated water consumed	[3] **> 25% - 50% treated water consumed**
4.5(WR.5)	Water pollution control in campus area	[5] **Policy and programs for water pollution control are fully implemented and monitored regularly**

Transportation		
Question		Answer
5.1()	Number of cars actively used and managed by University	89
5.2()	Number of cars entering the university daily	3076
5.3()	Number of motorcycles entering the university daily	3979
5.4(TR.1)	The total number of vehicles (cars and motorcycles) divided by total campus population.	[3] **> 0.125 - 0.5**
5.5(TR.2)	Shuttle service	[5] **Shuttle service is provided by university, regular, and environment friendly. Or shuttle use is not possible (not applicable)**
5.6()	Number of shuttles operated in your university	4
5.7()	Average number of passengers of each shuttle	15
5.8()	Total trips of shuttle services each day	176
5.9(TR.3)	Zero Emission Vehicles (ZEV) policy on campus	[5] **Zero Emission Vehicles are available, and provided by university for free**
5.10()	Average number of Zero Emission Vehicles (e.g. bicycles, cano, snowboard, electric car, etc.) on campus per day	486
5.11(TR.4)	The total number of Zero Emission Vehicles (ZEV) divided by total campus population.	[5] **> 0.02**
5.12()	Total ground parking area (m^2)	32042
5.13(TR.5)	Ratio of parking area to total campus area. Formula: ((5.12/1.5) x 100%)	[5] **< 1%**
5.14(TR.6)	Transportation program designed to limit or decrease the parking area on campus for the last 3 years (from 2020 to 2022)	[5] **Program resulting in more than 30% decrease in parking area or parking area reduction has reaches its limit.**
5.15(TR.7)	Number of transportation initiatives to decrease private vehicles on campus (e.g. car sharing, charging high parking fees, metro / tram / bus services and etc)	[5] **> 3 initiatives, or initiative no longer required**
5.16(TR.8)	Pedestrian path on campus	[5] **Pedestrian paths are available, designed for safety, convenience, and in some parts provided with disabled-friendly features**
5.17()	Approximate daily travel distance of a vehicle inside campus only (in Kilometers)	5652.20

Education and Research

Question		Answer
6.1()	Number of courses/subjects related to sustainability offered	822
6.2()	Total number of courses/subjects offered	3624
6.3(ED.1)	The ratio of sustainability courses to total courses/subjects	[5] **> 20%**
6.4()	Total research funds dedicated to sustainability research (in US Dollars) (average per annum over the last 3 years).	1,851,056.24
6.5()	Total research funds (in US Dollars) (average per annum over the last 3 years).	4,086,436.46
6.6(ED.2)	The ratio of sustainability research funding to total research funding	[5] **> 40%**
6.7(ED.3)	Number of scholarly publications on sustainability published. (average annualy for the past 3 years)	[4] **84 - 300**
6.8(ED.4)	Number of events related to sustainability. (average annualy for the past 3 years)	[5] **> 47**
6.9(ED5)	Number of activities organized by student organizations related to sustainability per year	[5] **> 10**
6.10(ED.6)	University-run sustainability website	[5] **Website is available, accessible, and updated regularly**
6.11()	Sustainability website address (URL) if available	https://green.mju.ac.th
6.12(ED.7)	Sustainability report	[5] **Sustainability report is published annually**
6.13()	Sustainability report link address (URL) if available	https://green.mju.ac.th
6.14(ED.8)	Number of cultural activities on campus	[5] **More than 3 events per year**
6.15(ED9)	Number of university program(s) with international collaborations	[5] **More than 3 Programs**
6.16(ED.10)	Number of sustainablity community services project organised and/or involving students	[5] **More than 3 Projects**
6.17(ED.11)	Number of sustainability-related startups	[2] **1 - 5 startups**

Table of Contents

Performance summary

1. Setting and Infrastructure (SI)

Number of Campus sites

Due to the year 2023, Maejo University area has changed physically, the university area has changed the area as follows.

Maejo University is an academic institution in Chiangmai with an area of 12,879 rai **(**20,606,400 m^2**)** and divided into 3 campuses:

1. Main campus (2,019.18 rai/3,374,680.54 m^2)
2. Phrae campus (2,000 rai/3,200,000 m^2)
3. Chumphon campus (2,005 rai/3,208,000 m^2)

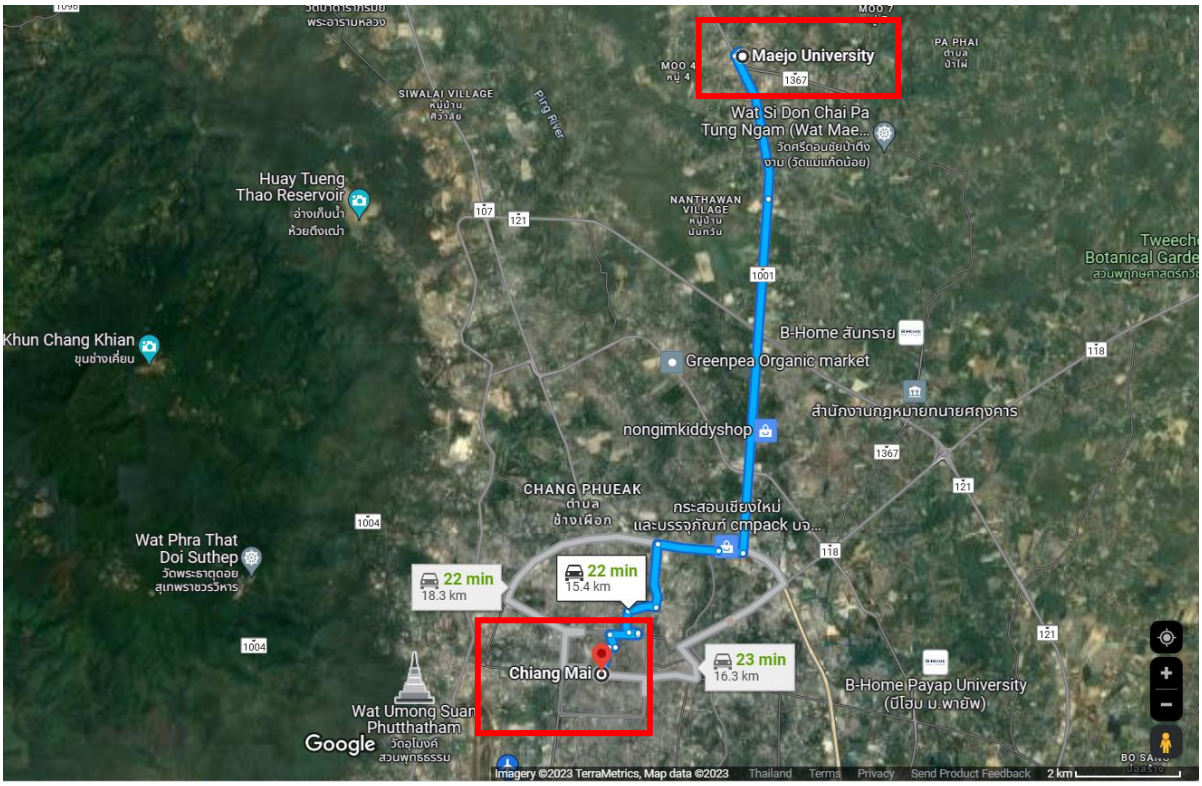
Main campus (2,019.18 rai/3,374,680.54 m^2)

MJU Phare campus (2,000 rai/3,200,000 m^2) consists of buildings, farms, gardens, and forests.

MJU Chumporn campus area (2,005 rai/3,208,000 m^2) consists of buildings, farms, beach, and forests.

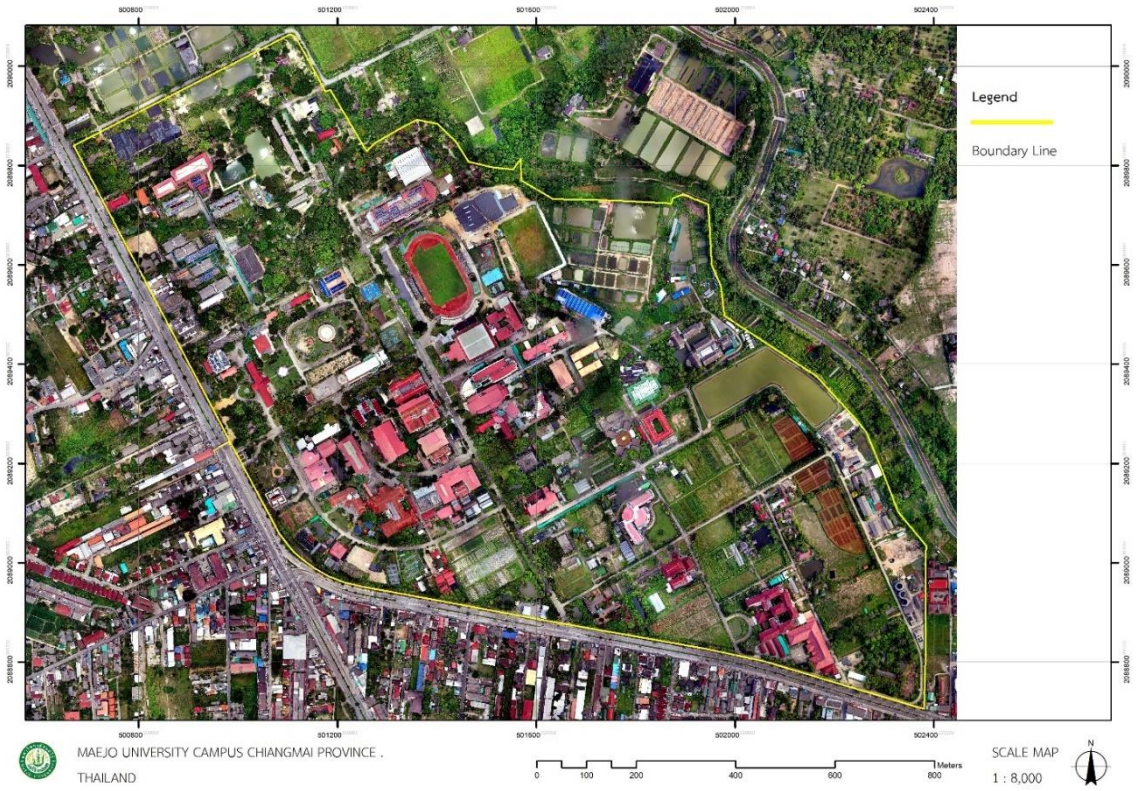
Campus setting

Maejo University is located in Sansai District, Chiang Mai Province, Thailand. It is in the suburb of Chiang Mai and approximately 15 km away from the city.



Total main campus areas (m^2)

Main campus (776.46 rai/1,242,331.79 m^2) and Faculty of Animal Science and Technology (293 rai/468,806.71 m^2) School of Renewable Energy (25.25 rai/40,401.42 m^2) Maejo Farm (1,014.46 rai/1,623,140.62 m^2)



Main campus Chiang Mai

Faculty of Animal Science and Technology

School of Renewable Energy

Maejo Farm

The area evaluated for UI green issues is composed of the main campus of Chiang Mai and an agricultural farm. The lands on the campus are as follows:

Area description	Total area (m^2)
Total main campus area - Main campus 776.46 rai - Faculty of Animal Science and Technology 293.00 rai - School of Renewable Energy 25.25 rai - Agricultural farm 1,014.46 rai Total : 2,019.18 rai **Total area** = {(776.46 + 1,014.46 + 25.25 + 293.00 rai) x 1,600} **= 3,374,680.54 m^2**	**3,374,680.54**

Total population

Student (full time) = 16,998
Staff = 1,310
Sum = 18,308

Proportion of total open space to university population

= (Total area - ground buildings) / total population.
= (3,374,680.54 - 114,542.85) / 18,308) = **178.07 square meter per persons**

Total campus buildings area (m^2)

The total campus buildings of Maejo University is 350,669.75 m^2.

Builidings on main campus area of Maejo university (Chiang Mai)

Order	Building's Name	Area of the building (m^2)	Number of Floor
	Central		
1	Thep Sat Sathit Building	1,200.00	2
2	Chutiwat Auditorium	170.00	1
3	Phaephuch Building	1,552.00	1
4	Wutthakard Building	631.00	2

Order	Building's Name	Area of the building (m^2)	Number of Floor
5	Maejo University Gymnasium Zone A	18,700.00	3
6	Maejo University Gymnasium Zone B	5,859.50	4
7	Inthanin Stadium's Stand	1,821.92	2
8	Waterworks building 2	0.00	0
9	Ruentham Building	607.25	2
10	Thai Agricultural Museum	640.00	2
11	70th year maejo building	13,421.87	5
12	Princess Maha Chakri Sirindhorn Building	12,637.25	3
13	Greenhouse building	1,827.00	1
14	80th year maejo building	10,200.00	5
15	New theory's agricultural center	124.00	1
16	Low Pressure water pumping building	30.00	1
17	High Pressure water pumping building	72.00	1
18	Chemical storage building	60.00	1
19	Phra Chuwng Krasetsilp Building	1,863.00	2
20	Dean office 1	860.00	2
21	Dean office 2	5,975.00	5
22	Dean office 3	1,496.00	2
23	Office of the President Parking Garage	-	0
24	Radio Communication club	28.00	1
25	UmNuay Yotsuk Building	16,262.60	5
26	Building and Facility Unit Office	465.00	1
27	Water Supply and Sanitation Office	354.60	1
28	Electrical office	328.00	2
29	The Maintenance Building and Facility Office	828.00	2
30	Transportation Office	280.00	1
31	Parking Garage	-	0
32	Total Wastewater Treatment System Building (Including Bathroom Building)	183.00	1
33	Ubolratana Rajakanya Swimmimg Pool	4,180.60	2
34	Terdkrasikorn Canteen	4,325.00	2
35	International students dormitory	1,048.40	2
36	Male dormitory 2	5,576.00	5
37	Male dormitory 3	1,200.00	2
38	Male dormitory 4	3,854.00	5

Order	Building's Name	Area of the building (m^2)	Number of Floor
39	Male dormitory 5	1,160.00	2
40	Male dormitory 6	3,854.00	5
41	Female dormitory 7	3,854.00	5
42	Female dormitory 8	6,651.00	5
43	Female dormitory 9	6,651.00	5
44	Female dormitory 10	7,175.00	7
45	Female dormitory 11	1,722.25	7
46	Suwanwajokkasikit Building	1,544.00	2
47	Patthanavisaitad Building	3,463.80	2
48	Prasert Na Nakorn Buildind	7,639.41	6
49	Wiphat Boonsri Wangsai Building	4,000.00	3
50	Phitthayalongkorn Building	2,782.00	3
51	25th year of Faculty of Business Administration Building	4,042.00	5
52	Thep Pongphanit Building	9,523.00	3
53	Princess Mother Memorial Building	6,853.56	5
54	60th-Year Maejo Building	18,500.00	6
55	Saowarat Nityawattana Building	3,694.22	2
56	Chulabhorn Building	9,146.00	4
57	Yangyong Sitthichai Building	4,880.00	4
58	75th-Year Maejo Building	5,562.50	3
59	Architecture and Environmental Design Building	5,469.65	4
60	Architecture and Environmental Design Building (New)	5,022.50	5
61	200th-Year Rattanakosin Building	11,429.00	2
62	Academic of Soil Science and Training Center of Advanced Soil and Fertilizer Building	4,000.00	5
63	Pomology Laboratory Building	480.00	1
64	Agronomy Office Building	162.00	1
65	Tissue Culture Building	135.00	1
66	Permpool Building	10,723.00	4
67	Laboratory and Plant Seeding Building	444.00	1
68	Seed Drying Building	128.00	1
69	Kumjorn Boonpang Building	885.00	2
70	Mushroom Learning Center	-	0
71	Tissue Building	947.00	2
72	Vegetable Laboratory Building	375.50	1

Order	Building's Name	Area of the building (m^2)	Number of Floor
73	Vegetable Storage Buildings	360.00	1
74	Vegetable plant Office	58.00	1
75	Plant-Vegetable Greenhouses	-	0
76	Plant-Vegetable Greenhouses	-	0
77	Economic mushroom production Learning Center	114.00	1
78	Planting Seeds and Propagating Ornamental Plants Greenhouses	288.00	1
79	Production of Ornamental Plants Technology Building	576.00	1
80	Orchids And Ornamental Plants Dome	708.75	1
81	Thai Orchids Building	500.00	1
82	Seedling Incubation Building	228.80	1
83	Flower Decoration Class Building	320.00	1
84	Rice Mill Building (old)	405.00	1
85	Earthworm Building	64.00	1
86	Sericulture Building 1	181.20	1
87	Sericulture Building 2	129.00	1
88	Thummasakmontri Building	1,644.00	3
89	Thummasakmontri Dormitory Building	1,448.00	3
90	The Office of Agricultural Research and Extension Maejo University Canteen	248.00	2
91	Mongkolcahisit Building	1,021.00	2
92	Comprehensive Production of Ornamental Plants and Flowers Center	-	0
93	Demonstration rice field	-	0
94	Energy Research Center 1	242.00	1
95	Energy Research Center 2	78.57	1
96	International Education and Training Center	6,000.00	3
97	Engineering Laboratory Building Classroom	17,175.00	6
98	Engineering Laboratory Building	2,187.00	1
99	Service Building and Showroom	350.00	1
100	Smithanon Building	9,350.00	6
101	Pilot factory building	2,632.00	1
102	Agricultural Produce Packaging Building	2,187.00	1
103	Rubber and Polymer Technology Building	2,262.00	1
104	Fishery Thchnology Building	2,390.00	3

Order	Building's Name	Area of the building (m^2)	Number of Floor
105	Fishery Thchnology Laboratory Building	3,980.50	2
106	Fishery Incubation Building	494.00	1
107	Fishery's Club Building	115.50	1
108	Fishery Food Production Building	105.00	1
109	Fishery Research Building	18.00	1
110	Fishery's Warehouse	155.40	1
111	Fishery Breeding Building	144.00	1
112	Fishery Aquarium Building	48.00	1
113	Renewable Energy Calssroom Building	11,360.59	4
114	Workshop Building	1,123.50	2
115	Renewable Energy Comphehensive Knowlwdge Center	1,071.56	1
116	Sport Complex	7,347	2
Total Building Area		**373,025.77**	-

Some buildings of Maejo university, Chiang Mai.

Some buildings of Maejo university, Chiang Mai.

The ratio of open space to total area

Area description	Total area
Total main campus ground floor area of buildings	114,542.85 m^2
The ratio of open space towards total area = {(3,374,680.54 - 114,542.85) / 3,374,680.54 x 100}	96.60%

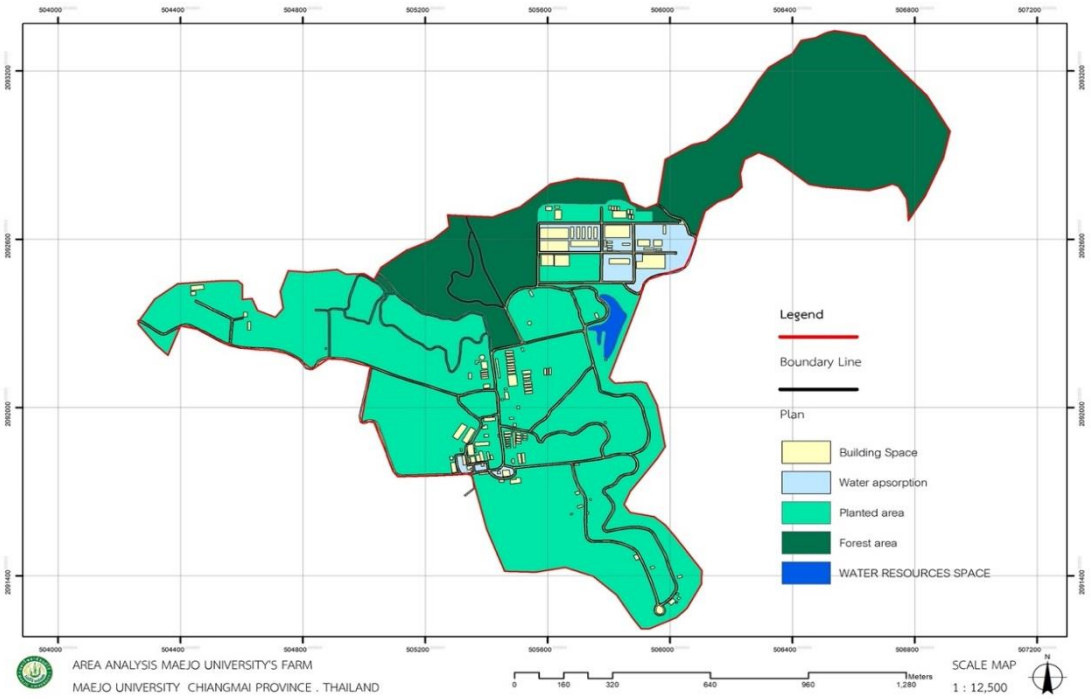
Open space area in main campus

Open space area in the university

Open space area in the university

Buildings and open space area (green color) on the main campus

Maejo University Main Campus				
No.	list	square meter area	Rai area	percentage (%)
1	Building Space	518,506.03	324.07	41.74
2	Water Apsorption	373,594.54	233.50	30.07
3	Planted Area	212,805.32	133.00	17.13
4	Forest Area	40,650.13	25.41	3.27
5	Water Resource Space	96,775.77	60.48	7.79
Total		1,242,331.79	776.46	100.00



Buildings and open space area (green color) in Maejo Farm

Maejo University Farm				
No.	list	square meter area	Rai area	percentage (%)
1	Building Space	137,040.60	85.65	8.44
2	Water Apsorption	50,272.02	31.42	3.10
3	Planted Area	894,901.02	559.31	55.13
4	Forest Area	529,437.60	330.90	32.62
5	Water Resource Space	11,489.35	7.18	0.71
Total		1,623,140.59	1,014.46	100.00

Buildings and open space areas (green color) in Faculty of Animal Science and Technology

Faculty of Animal Science and Technology				
No.	list	square meter area	Rai area	percentage (%)
1	Building Space	82,420.98	51.51	17.58
2	Water Apsorption	62,522.59	39.08	13.34
3	Planted Area	312,155.48	195.10	66.59
4	Forest Area	0.00	0.00	0.00
5	Water Resource Space	11,707.67	7.32	2.50
Total		**468,806.71**	**293.00**	**100.00**

Buildings and open space area (green color) in School of Renewable Energy

Faculty of Animal Science and Technology				
No.	list	square meter area	Rai area	percentage (%)
1	Building Space	17,665.90	11.04	43.73
2	Water Apsorption	16,226.18	10.14	40.16
3	Planted Area	4,323.65	2.70	10.70
4	Forest Area	0.00	0.00	0.00
5	Water Resource Space	2,185.68	1.37	5.41
Total		40,401.42	25.25	100.00

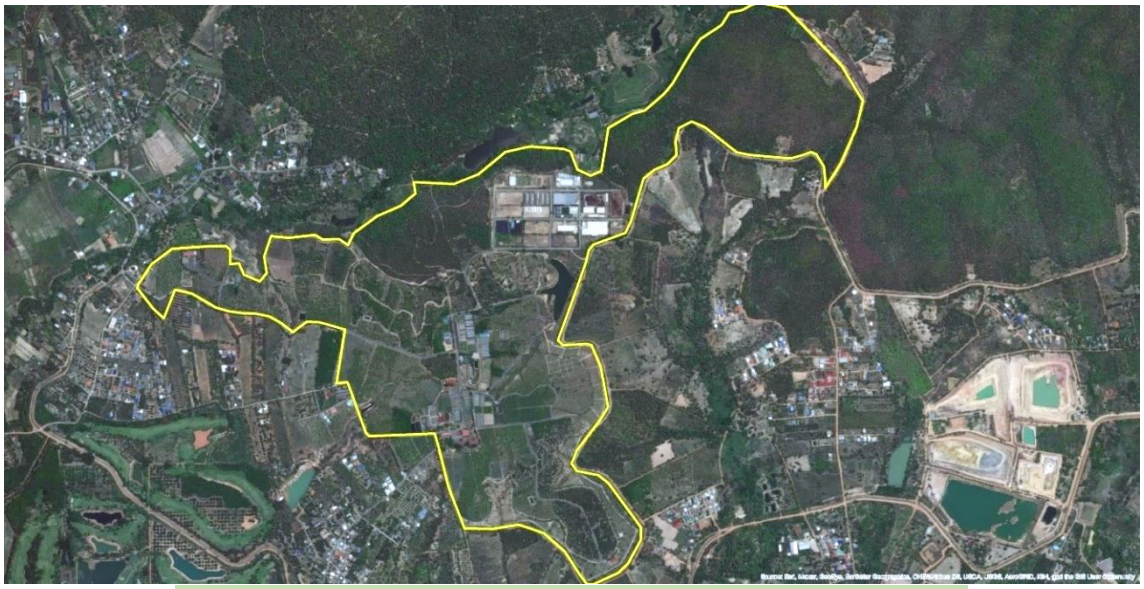
Total area on campus covered in forest vegetation

The forest in our main campus area is referred to the previous trees and old trees that are still conserved until now, although some areas were already developed.

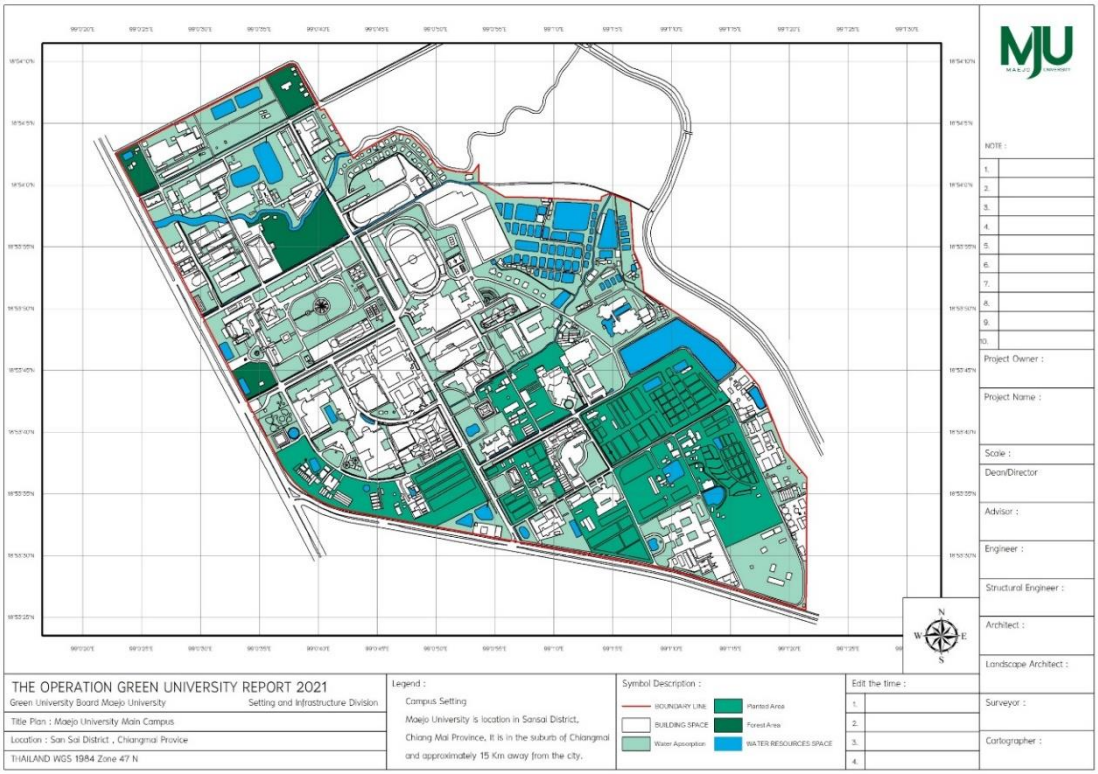
Area description	Total area
Total area on campus covered in forest vegetation (percentage) main campus = 40,650.13 m^2 farm = 529,437.60 m^2 **%total area campus covered in the forest is** {(40,650.13 + 529,437.60) / 3,374,680.54} x 100 = **16.89%**	**16.89%**

Some areas on the campus are covered with forest.

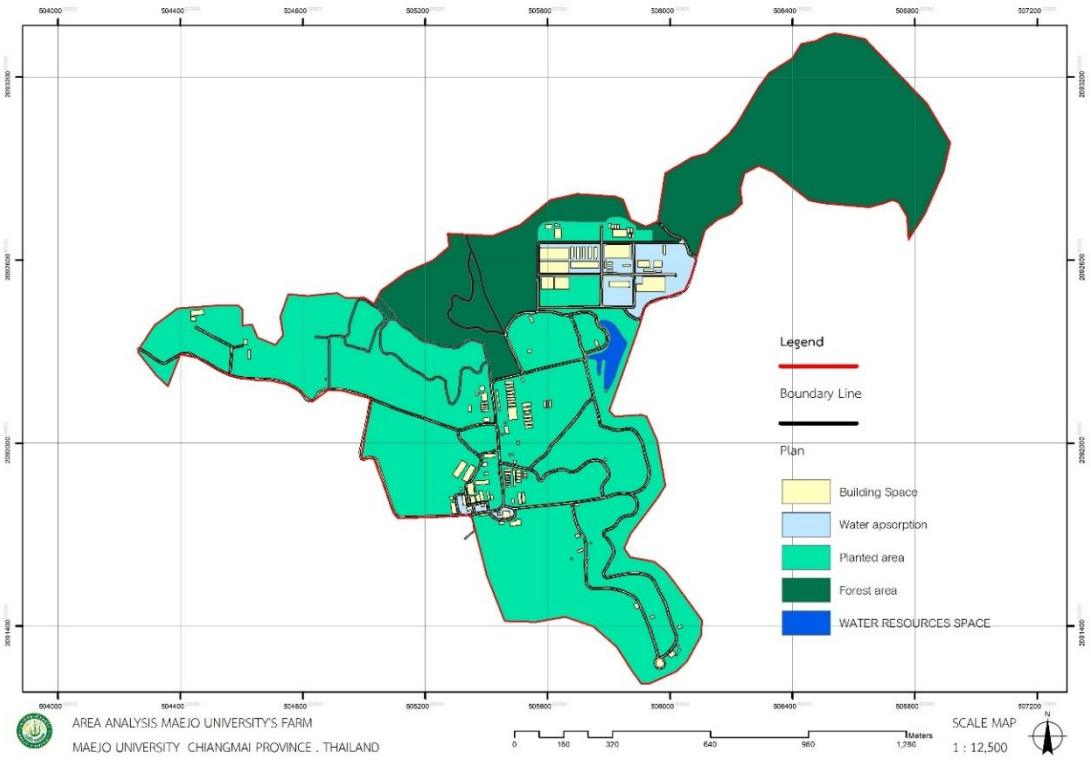
Some areas on the campus are covered with forest.



Maejo Farm at Sansai District; Farm and Conservation Forest



Forest area on main campus (dark green color)



Forest area in Maejo farm (dark green color)

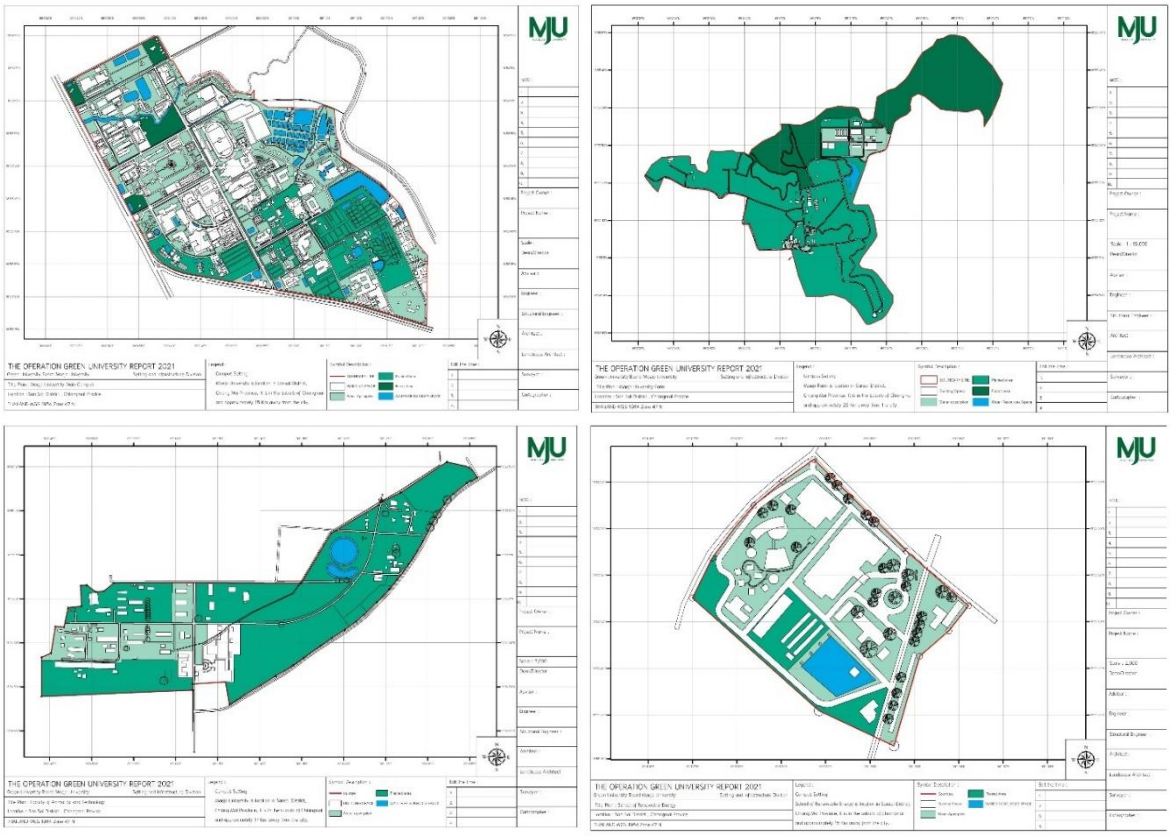
The population of big trees in main campus were recorded for tree care management. Those trees are one of important factors that can help us have carbon storage and decrease air pollution.

Total area on campus covered in planted vegetation

Area description	Total area
Total area on campus covered in planted vegetation (percentage) main campus = 212,805.32 m^2 farm = 894,901.02 m^2 Faculty of Animal Science and Technology = 312,155.48 m^2 School of Renewable Energy = 4,323.65 m^2 **%total area campus covered in in planted vegetation is** {1,424,185.47 / 3,374,680.54} x 100% = **42.20%**	**42.20%**

In our university area, both annual flowering and perennial plants are cultivated. The field crops and ornamental plants are cultivated for educational and research study purposes as well as for events and landscape. Thus our campus can support environment in case of air pollution and water absorption.

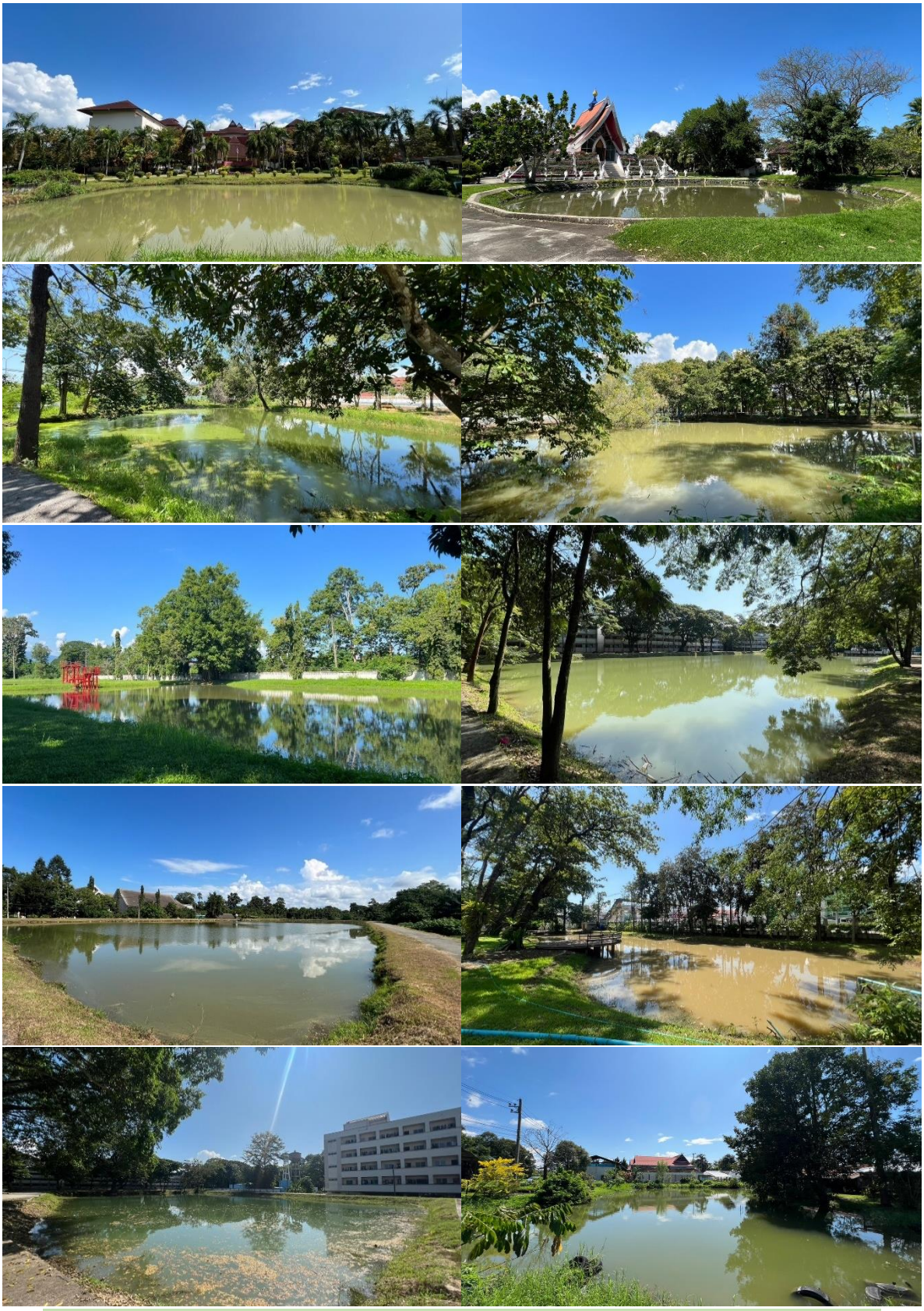
Planted vegetation areas



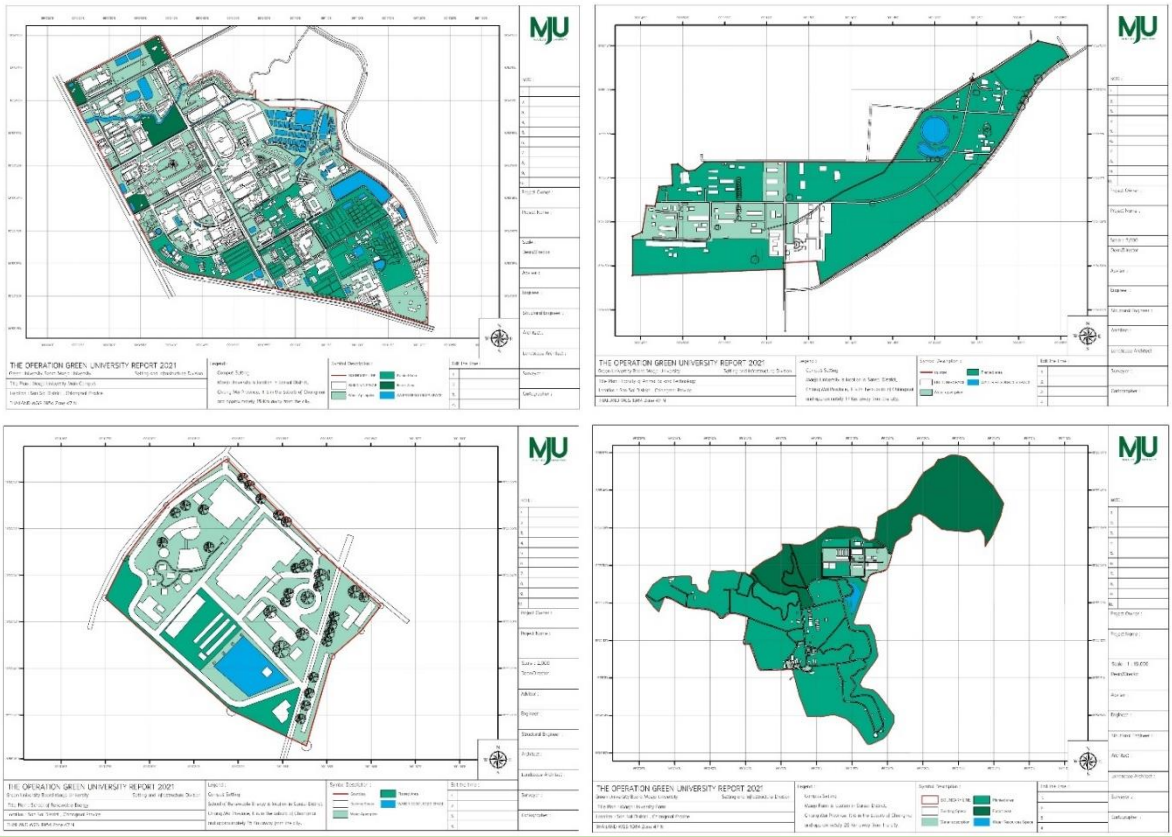
Planted vegetation area in the main campus, Maejo farm, Faculty of Animal Science and Technology and School of Renewable Energy (Malachite Green color)

Total area on campus for water absorption besides the forest and planted vegetation

Area description	Total area
Total area on campus for water absorption besides forest and planted vegetation (percentage) main campus = 373,594.54 m^2 farm = 50,272.02 m^2 Faculty of Animal Science and Technology = 62,522.59 m^2 School of Renewable Energy = 16,226.18 m^2 Total WATER RESOURCES SPACE = 122,158.47 m2 %total area campus covered in in planted vegetation is (624,773.80 / 3,374,680.54) x 100% = **18.51%**	18.51%



Water absorption, the area besides the forest and planted vegetation in our campus



Planted vegetation and absorption areas in main campus, Faculty of Animal Science and Technology, the School of Renewable Energy and Maejo farm (Turquoise Dust Green color).

University budget for sustainability effort (in US Dollars)

The average of total university budget per annum over the last 3 years in US Dollars. (2020 - 2022)

Budget	2020	2021	2022	Average
Baht	2,082,049,260	2,062,099,610	2,281,344,041	**2,141,830,970.33**
USD	66,631,972.99	61,099,247.70	62,674,286.84	**63,468,502.51**

Budget	2020	2021	2022	Average
Baht	417,299.31	638,010,846	170,598,304	**269,675,483.10**
USD	13,354,860.11	18,904,025.07	4,686,766.59	**12,315,217**

2020	2021	2022	Average
20.04%	30.94%	7.48%	**19.49%**

**1 USD = 36.40 bath, 19 October 2023)*

In 2022, Maejo University has an annual budget of **2,281,344,041** Baht (**62,674,286.84** USD$) and has invested 170,598,304 Baht (4,686,766.59 USD$) in sustainability which is 7.48 percent of the total budget (from 274 projects). The average of sustainability efforts per annum over the last 3 years in US Dollars is 19.49% (2022-2020 (SI6))

Project Summary and Budget for The Operation of Green University Budget Year 2022

	Budget
Total Sustainability	**170,598,304.00**
**1 USD = 36.40 bath, 19 October 2023)*	**4,686,766.59 USD**

Sustainability Projects	
1	Industrial Production of Organic Medical Cannabis Project
2	Improving the Quality of Life of Organic Farming Entrepreneurs in Chumphon Province Project
3	The 5th Year of the Development of Maejo University-Chumphon University Farm Area Toward International Organic Agriculture Standards (IFOAM) Certification Project
4	Technology Transfer for Producing High-Quality Vegetable Seedlings from Agricultural Waste Materials and Demonstration Plots for Creating Natural Refrigerators under the Organic Farming System to Improve the Quality of Life and Income for the Community Through Sustainable Organic Agriculture Project
5	Creating Food Recipes from Seasonal Organic Ingredients to Add Value to Tourism Products and Services, "Creative Food Design for Tourism: Eat Well & Drink Well" Project
6	Learning Base for Producing Organic Fertilizer with Maejo Engineering 1 under the Context of Khok Nong Na Model in Chumphon Province Project
7	Using Microorganisms for Organic Agriculture according to the Royal Initiative in the Area of Chiang Mai Province Project
8	Organic Fertilizer Production, Biological Pesticides and Kratom Production in the Organic Farming System Project
9	Creating Value-Added from Processing and Developing Organic Agricultural Products Project

Sustainability Projects	
10	Precisely Manage Disease Prevention with PCR on Farm Techniques and Innovations in Aquaculture and Livestock Farms to Produce Safe and Sustainable Organic Food Project
11	Creating Sets to Create Excellence in Organic Livestock and Develop Animal Products to Produce Safe Food Project
12	a Learning Base for Producing Organic Fertilizer without Turning the Pile Project
13	Organic Vegetable Production Learning Base Projects
14	a Plant Production Learning Base in the Form of Organic Agriculture at University Farm Project
15	a Learning Base for Training in Raising Organic Laying Hens and Demonstrating the Production of Organic Laying Hens Feeds Project
16	Technology Transferring for Growing Vegetables/Herbs according to Safe/Organic Agriculture Systems Project
17	Organic Fertilizer Production to Drive Organic Agriculture at Ban Wang Pong Project
18	Online Media Production for Promoting Souvenir Products and Organic Tourism at Hua Mueang Subdistrict, Song District in Phrae Province Project
19	Maejo University-Phrae Chalermprakiet University Organic Agricultural Products and Product Center Development Project
20	Prototype Organic Area of Maejo University Project
21	Upgrading Farmers and Building Competitiveness with Organic Agricultural Standards Project
22	Maejo University Organic Agriculture Center Project
23	Learning Center on Factors Supporting Organic Crop Production Project
24	Promoting and Developing Entrepreneurs in Beverages, Food, and Organic Products of Maejo University-Phrae Chalermprakiet Project
25	Training to Develop Agricultural Skills in Organic Vegetable Production and Sustainable Environmental Development under the Natural Agricultural System Learning Center, Faculty of Economics, Year 2023 Project
26	Organic Aquatic Animal Feeds from Local Ingredients to Focus on Organic Aquaculture Project
27	Organic Herbal Hemp Roots Project
28	"Fathers Grow and Children Build at Our Nong Han" to Drive the Organic Farming Community towards Becoming a Model Community for Sustainable Development Project
29	Maejo University Organic Agriculture Center Project
30	Big Cleaning Day and Green Office in 2023 Project
31	SAS-66 Academic Seminar on Green Politics: Building Partnerships and Participation in Development Governance Project

Sustainability Projects	
32	Driving Operations to Become a Green Office of the Faculty of Business Administration (Green Office_BAMJU) Project
33	Promoting and Upgrading Vegetables and Medicinal Plants to Drive Healthy Food Security according to the Identity of Nong Han Community to Become a Model Community for the Green Economy Project
34	Green Office towards Well-Being Maejo University-Chumphon in the Fiscal Year 2023 Project
35	Driving the Green University Operations (MJU Green University) Project
36	Driving the Green University Operations (MJU Green University) in 2023 Project
37	Green Faculty (Green Office) Project
38	Volunteering to Develop Morality and the Green Economy Department of Digital Economics and Cooperatives in the Year 2023 Project
39	Internal Audit for the Green Office of the Faculty of Economics Maejo University Departments for the Year 2023 Project
40	Sustainable Management of Green Libraries and Green Offices Project
41	Developing Amnuay Yotsuk Building to be a Green Office Project
42	A Study Tour on Green Office Management in Response to the University's Strategy to Be a Leading Green University in the Country Project
43	Green Office Project_1
44	Green Office Project_2
45	Green Office Projects_3
46	Green Office of Faculty of Architecture and Environmental Design Project (66-3.1.2)
47	Green Office of Faculty of Information and Communication Project
48	Green Office of Maejo University in the Fiscal Year 2023 Project
49	Green Office of College of Renewable Energy Project
50	Green Office of University Office in the Fiscal Year 2023 Project
51	Green Research Office and Green Office Project
52	Strengthening Communication Science: Research and Communication Clinics Towards a Green University Project
53	SAS-66 on Green Office: Fire Prevention Training Activities and Practice Fire Evacuation Operations and Prepare for Emergencies in the Year 2023 Project
54	SAS-66 on Create Knowledge and Understanding of Green Office for College of Administrative Sciences Students Project
55	Driving Operations to Be a Green Office of the Faculty of Business Administration (Green Office_BAMJU) Project

Sustainability Projects	
56	Green Office towards Well-Being of Maejo University-Chumphon in the Fiscal Year 2023 Project
57	Project "Keep Healthy with Maejo Nurses: Safe Food (MJU GREEN FOOD) Project
58	Chumphon MJU Green Youth Project
59	GE: Green Environment Project
60	Green Economy for All for the Year 2023 Project
61	Green Office: Liberal Arts United to Save the World Project
62	Driving Green University Operations (MJU Green University) Project
63	Driving Green University Operations (MJU Green University) for 2023 Project
64	Green Faculty (Green Office) Project
65	Sustainable Management of Green Libraries and Green Offices (Sustainable Management of Green Library and Green Office) Project
66	Developing Amnuay Yotsuk Building to be a Green Office (Green Office) Project
67	A Study Tour on Green Office Management in Response to the University's Strategy to Be a Leading Green University in the Country (Green University) Project
68	Promoting and Developing Smart and Digital Agricultural Technology and Green University Ranking Project
69	Green Research Office and Green Offices Project
70	Trainings to Provide Knowledge on the Sufficiency Economy Philosophy to Foreigners for Sustainability Project
71	Academic Services for Creative Work and Professional Development; Information - Mae Chaem Sustainable Career Development for the Year 2023 Project
72	Using Local Medicinal Plant Extracts from the Plant Genetic Conservation and Sustainable Use Project
73	Technology Transfer for Producing High-Quality Vegetable Seedlings from Agricultural Waste Materials and Demonstration Plots for Creating Natural Refrigerators under the Organic Farming System. to Improve the Quality of Life and Income for the Community Through Sustainable Organic Agriculture Project
74	Food Waste Disposal with Black Soldier Fly Maggots Towards Economic Sustainability Project
75	Sustainable Tourism Route Management for Fiscal Year 2023 Project
76	Using Local Plants for Sustainable Product Development Project
77	Upgrading the Elderly Group at Cholae Subdistrict, Mae Taeng District, Chiang Mai to Be Self-Reliant and Sustainable Project
78	Build Strength to Raise Quality of Life Sustainably with Social Returns according to the Sufficiency Economy Philosophy Project

Sustainability Projects	
79	Driving SDG 2 ZERO HUNGER Sustainably (Feel Full, Seniors for Juniors of Maejo University) Project
80	Driving and Promoting the Knowledge and Science of His Majesty King Rama IX to the Community and Society in a Sustainable Way Project
81	Returning Puff Ball Mushrooms to the Forest for Conservation and Sustainable Use of Local Plant Genetic Diversity Project
82	Projects for Precise Disease Prevention Management with PCR on Farm Techniques and Innovations in Aquaculture and Livestock Farms to Produce Safe and Sustainable Organic Food Project
83	Organizing the 3rd Meeting of the Sustainable University Network of Thailand (Traveling) in 2022 and the 4th Meeting of the Sustainable University Network of Thailand (SUN THAILAND) in 2022 Project
84	Landscape Innovation for Sustainable Urban Environmental Development and Conservation Project (66-2.6.5)
85	Renewable Energy Resource Management to Earn Income and Use It Sustainably Project
86	Managing Agricultural Waste and Business Operations in a Sustainable, Environmentally Friendly Manner Project
87	Graduate Developing Aiming at Creating Value for Tourist Attractions Towards Sustainability Program
88	Sustainable Royal Projects with Agricultural, Food, and Health Innovations
89	Continuously Develop Tourism and Service Businesses to Have Quality and Create Sustainable Value-Added and Distribute the Benefits Thoroughly Including Expanding the Production of High Potential Products and Services with Wisdom and Innovation. (Commercial Production of High-Quality Strawberries) Project
90	Developing Conservation Farming and Sustainable Trade Leading to Being a Source of Learning for Youth and the Public Project
91	Developing Community Tourism Activities as Creative Economy Concept for Sustainability Program
92	Doctor of Philosophy Curriculum Development in: Innovative Design for Sustainability Project (66-2.1.8)
93	Upgrading the Educational Operating Base in Tourism Innovation (Tourism Innovation Platform) Based on Wisdom Capital and Creative Economy Thinking Base under the Framework of Sustainable Development in the Fiscal Year 2023 Project
94	A Study Tour for Sustainable Tourism Management: A Study of Role Models Who Develop Tourism Destinations for Learning Project

Sustainability Projects	
95	Promote Community Strength and Sustainability Project
96	Creating Awareness of Laws Regarding Community Product Standards to Enhance Product Quality and Sustainable Development Project
97	Conserving and Restoring Watershed Forests to Maintain Their Abundance, Organize Appropriate Water Management Systems, and Thoroughly Connect Agricultural Areas, Prevent and Solve the Problem of Smog Pollution Sustainably in the Northern Region (Natural Resources and Environmental Management) Project
98	Training Projects to Develop Agricultural Skills in Organic Vegetable Production and Sustainable Environmental Development under the Natural Agricultural System Learning Center Faculty of Economics in the Year 2023
99	Project Series on "The Last Khiam (*Cotylelobium lanceolatum)* Forest and Conservation Propagate and Make Sustainable Use of the Khiam Tree"
100	100 "Fathers Plant, Children Build, Our Nong Han" to Drive the Organic Farming Community towards a Model Community for Sustainable Development Project
101	The 16th Anniversary, Founding Day of the Faculty of Architecture and Environmental Design, Maejo University, "Khon Ton Baep in Year 2" Project (66-2.7.4)
102	Environmental Conservation and Development Camp for the Academic Year 2023 Project
103	Landscape Innovation for Sustainable Urban Community Environmental Development and Conservation Project
104	A Field Trip Study for Students in the Agricultural and Environmental Economics in the Academic Year 2022 Project
105	Managing Agricultural Waste and Operations in a Sustainable, Environmentally Friendly Manner Project
106	Public Relations of the Faculty of Architecture and Environmental Design Project
107	Environmental Improvement and Development Project
108	Improving the Landscape and Environment Project
109	Environmental Protection to Cope with Climate Change Project
110	Promoting the Driving of Agricultural Strategies, Renewable Energy, and Environmental Development of Maejo University Project
111	Promoting Learning Activities and Environmental Practices for Schools Project
112	Creating Academic Cooperation and Exchange Knowledge on Management of Educational Institutions Knowledge on Carbon Credit Assessment in Agriculture, Environment and Forestry Project
113	Cooperative Education for Course 497: Agricultural and Environmental Economics for the Academic Year 2022 Project

Sustainability Projects	
114	Faculty of Architecture and Environmental Design Student Club Seminar for the Year 2023 Project
115	Green Office of the Faculty of Architecture and Environmental Design Project
116	Aquaponics Project: Growing Vegetables and Raising Fish Environmentally Friendly System
117	Conserving and Restoring Watershed Forests to Maintain Their Abundance, Organize Appropriate Water Management Systems, and Thoroughly Connect Agricultural Areas. Prevent and Solve the Problem of Smog Pollution Sustainably in the Northern Region (Natural Resources and Environmental Management Project) Project
118	Preserving the Environment and Promote Waste Separation in Organizations in the Fiscal Year 2023 Project
119	Training Projects on Agricultural and Environmental Knowledge and Environmental Development Volunteers Faculty of Economics
120	Cooperative Education Preparation Training Project in Agricultural and Environmental Economics in the Academic Year 2023
121	A Training Project to Develop Agricultural Skills in Organic Vegetable Production and Sustainable Environmental Development under the Natural Agricultural System Learning Center of the Faculty of Economics, in the Year 2023
122	Promoting the Use of Medicinal and Local Plants to Increase the Self-Reliance Potential of the Elderly in the Phiang Din Group Project
123	Food Security and Food Safety Project at Ban Din Por Phiang Project
124	Higher Education Arts and Culture Project No. 21 "Yol Saeng-Silp, Land of Happiness"
125	Project to Transfer Knowledge on the Conservation of Natural Resources, Soil, Water, and Forests according to the Sufficiency Economy Concept
126	A Training Project to Prepare for Fire Prevention and Suppression and Earthquake Faculty of Economics for the Fiscal Year 2023
127	SAS-66 Project to Study Economic Routes from Southern China and Border Security in the Mekong Basin and ASEAN Countries for Foreign Exchange Students of the College of Administrative Sciences
128	SAS-66 Project to Build Forest Fire Protection Lines and Water Slowdown Dams for Community Development Volunteers in the Academic Year 2022
129	Development of a Prototype Demonstration Plot for the Production of Nam Dok Mai Thong Thong Mangoes for Commercial Use in Phrao District, Chiang Mai Province Project
130	Maejo University-Chumphon Join in Continuing the Culture of the Lang Suan Basin Project
131	A Comparative Study of Tannins Found in the Stems, Leaves, and Peels of Golden Bananas for Use in Treating Wastewater from Aquaculture Project

Sustainability Projects	
132	A Comparative Study of Tannins Found in the Stems, Leaves, and Peels of Golden Bananas for Use in Treating Wastewater from Aquaculture Project
133	Technology Transfer Project for Designing and Installing Watering Systems for Landscaped Areas of Community Temples
134	Health Management and Field Visits to Holistically Explore Freshwater Aquaculture to Reduce Production Costs and Reduce Economic Damage Project
135	Eliminating Aedes Mosquito Larvae to Prevent Dengue Fever Project
136	Precise Disease Prevention Management Using PCR on Farm Techniques and Innovations in Aquaculture and Livestock Farms. to Produce Safe and Sustainable Organic Food Project
137	Creating Electrical Lighting Systems, and the Water System Around the Maejo Shrine, "Decorating the Garden for the Mother" Project
138	Transferring Knowledge on the Conservation of Natural Resources, Soil, Water, and Forest according to the Sufficiency Economy of His Majesty the King Project
139	Improving the UNT Agromet for Agricultural Water Management in Response to Climate Change Project
140	Planting and Restoring the Nan Watershed with Miang Tea and Inoculate with Edible Wild Mushrooms Project
141	Thai Agricultural Culture Museum Area Development Promoting Learning of Fisheries Skills and Aquatic Animal Production Innovations into Practice Project
142	Upgrading Water Management according to the Royal Initiative at San Pa Pao Subdistrict Model, San Sai District, Chiang Mai Province Project
143	Learning and Practicing on Fishing and Aquatic Resources and to Increase Foreign Language Skills Project
144	Exchanging Professional and Cultural Knowledge Through Watercolor Architectural Painting Activities in ASEAN 2023 Project (66-3.1.3)
145	Center of Excellence for Research and Academic Services Project: Cultivation of Seaweed, Phytoplankton, and Economic Aquatic Animals to Produce Safe Food according to the Well-Being @Chumphon (Fisheries and Marine Resources Group) Guidelines for the Year 2023 Project
146	Economics Volunteers to Conserve Forests and Conserve Water in the Year 2023 Project
147	Promoting 21st Century Learning Outside the Classroom to Develop Life Skills and Careers in Coastal Aquaculture according to Lifelong Learning Principles Project
148	Promoting Careers with Community Funds and Further Develop Products to Create Commercial Income under the Philosophy of Sufficiency Economy of the Curry Paste Group at San Sai District, Chiang Mai Province Project

Sustainability Projects	
149	Dream Weaving and Sharing Project for the Academic Year 2023
150	Project to Conserve and Restore Watershed Forests to Maintain Their Abundance, Organize Appropriate Water Management Systems, and Thoroughly Connect Agricultural Areas. Prevent and Solve the Problem of Smog Pollution Sustainably in the Northern Region (Natural Resources and Environmental Management Project)
151	Project for Organic Aquatic Animal Feed from Local Raw Materials to Focus on Organic Aquaculture
152	"Raising Young Innovators" for the Development of Agricultural Products and Online Marketing in the Pa Phai Subdistrict Community towards a Creative Economy (Youth Volunteers, Fiscal Year 2023) Project
153	SAS-66 Project to Build Forest Fire Protection Lines and Water Retarding Dams. Community Development Volunteer for the Academic Year 2022
154	Finding Target Markets and Calculating Break-Even Points for San Pa Pao Subdistrict Handicraft and Processing Enterprise Products Project
155	Developing a Prototype Local Plant Food Experiential Tourism Service Process to Promote a Career Development Model for the Elderly at San Pa Pao Subdistrict, San Sai District, Chiang Mai Province Project
156	Project to Increase the Academic Potential of Students in the Field of Agricultural Forestry (Intelligent Agroforestry) in the Field of Agricultural Forestry
157	Agriculture and Forestry Interpretation in English Project
158	Returning Puff Ball Mushrooms to the Forest for Conservation and Sustainable Use of Local Plant Genetic Diversity Project
159	Wild Mushroom Garden Model in the Miang Tea Garden Area Project
160	Transferring Knowledge on the Conservation of Natural Resources, Soil, Water, and Forests according to the Sufficiency Economy of His Majesty the King Project
161	Planting and Restoring the Nan Watershed with Miang Tea and Inoculate with Edible Wild Mushrooms Project
162	Auspicious Tree Cloth Projects for Charity and Forest Gardening Project
163	Auspicious Tree Cloth Projects for Charity and Forest Gardening Project
164	Agricultural Entrepreneurship Development with Innovative Technology for Production of Mycorrhizal Forest Mushroom Inoculum Project
165	Project to Increase Product Value and Develop Management Potential of the Coffee Community Enterprise Group Creating Forests at Ban Muser, Doi Mon Chong, Mon Chong Subdistrict, Omkoi District in Chiang Mai Province

Sustainability Projects	
166	Upgrading Water Management according to the Royal Initiative at San Pa Pao Subdistrict Model, San Sai District in Chiang Mai Province Project
167	Project to Create Academic Cooperation and Exchange Knowledge on Management of Educational Institutions Knowledge on Carbon Credit Assessment in Agriculture, Environment and Forestry
168	Building a Dam to Slow Down Moisture in the Ban Mae Sai Community Forest Project
169	Project to Conserve and Restore Terrestrial Ecosystems Indigo Plants in the Area at Ban Na Tong, in Phrae Province to Returned to the Natural Forest
170	Project to Conserve and Restore Watershed Forests to Maintain Their Abundance, Organize Appropriate Water Management Systems, and Thoroughly Connect Agricultural Areas, Prevent and Solve the Problem of Smog Pollution Sustainably in the Northern Region (Natural Resources and Environmental Management Project)
171	Project Series on "The Last Khiam (*Cotylelobium lanceolatum)* Forest and Conservation Propagate and Make Sustainable Use of the Khiam Tree"
172	"Keep Healthy with Maejo Nurses: Safe Food MJU GREEN FOOD" Project
173	Food Security and Food Safety at Ban Din Por Pieng Project
174	Project for Precise Disease Prevention Management Using PCR on Farm Techniques and Innovations in Aquaculture and Livestock Farms. to Produce Safe and Sustainable Organic Food
175	Project Sets to Create Excellence in Organic Livestock and Develop Animal Products to Produce Safe Food
176	Transferring Technology for Growing Vegetables/Herbs according to Safe/Organic Agriculture Systems Project
177	Commercial Safe Vegetable Production Project
178	Project to Develop Committees and Personnel in the Supervision of Raising and Using Animals and the Biosafety Committees
179	Maejo Safe, Keeping Away from Drugs and Vices in the Academic Year 2022 Project
180	Maejo Safe, Keeping Away from Drugs and Vices in the Academic Year 2023 Project
181	Upgrading Crop Production Processes and Increase the Value of Safe Sweet Potatoes Project
182	Improving Confidence and Safety in the Use of Treasury Management Information Systems Project
183	Center of Excellence for Research and Academic Services Project: Cultivation of Algae, Phytoplankton, and Economic Aquatic Animals to Produce Safe Food according to the Well-Being @Chumphon (Fisheries and Marine Resources Group) Guidelines for the Year 2023

Sustainability Projects	
184	Workshop Project on "Basic Knowledge About Radiation Safety and Agricultural Applications"
185	Training Students on Safety Standards in Scientific Laboratories and the Use of Advanced Scientific Equipment Project
186	Food Safety and Restaurant Sanitation Principles for the Year 2022 Project
187	Project to "Promote and Develop Prototypes for the Use of Renewable Energy Technology and IOT Systems in Conjunction with Biomass Material Management to Reduce Smog Problems, Help Raise the Level of the Grassroots Economy, and Accelerate the Development of Entrepreneurs."
188	Project to Develop Local Personnel in the Production of Renewable Energy Technology for Product Processing and Increasing the Efficiency of Agricultural Product Production
189	Renewable Energy and Energy Conservation Exhibition Project
190	Renewable Energy Resource Management Project to Earn Income and Use It Sustainably
191	Integrating Renewable Energy with the Preservation of Religion and Culture Project
192	Public Relations for the Curriculum of the College of Renewable Energy Project
193	Basic Adjustment for Renewable Energy College Students Project
194	Project for Processing Fish Products by Drying with Solar Energy and Using Waste Materials in the Community to Produce Alternative Energy.
195	Developing Leadership Potential of Students at the College of Renewable Energy Project
196	Improving English for Renewable Energy College Students Project
197	Project to Analyze and Monitor Student Data of the School of Renewable Energy
198	Promoting the Driving of the Agricultural Strategy, Renewable Energy, and Environmental Development of Maejo University Project
199	Promoting the Production of Agricultural Products and Energy to Generate Income for the School of Renewable Energy Project
200	Scholarship Supports for Students of the School of Renewable Energy Project
201	Project to Congratulate Graduates of the School of Renewable Energy
202	"Raising Young Innovators" for the Development of Agricultural Products and Online Marketing in the Pa Phai Subdistrict Community towards a Creative Economy (Youth Volunteers, Fiscal Year 2023)
203	SAS-66 Building Strong Communities Through Cooperation with All Sectors Project
204	SAS-66 Community Development Project Based on the Concept of The Boworn: HTS (House, Temple, and School or Educational Institution).
205	SAS-66 Creating a Learning Community for Local Community Management and Development Project

Sustainability Projects	
206	SAS-66 Project for Strengthening Community Enterprise Groups with Community Health Innovations
207	SAS-66 Project to Build Forest Fire Protection Lines and Water Retardation Dams. Community Development Volunteers for the Academic Year 2022
208	SAS-66 Project to Create Experiences in Learning About Society, Culture, and Community Resource Management
209	SAS-66 The 12th Administrative Science Community Weaving Relations of Friends Project
210	Improving the Quality of Cosmetic Products Using Local Raw Materials according to Community Standards at Phrao District Community in Chiang Mai Province Project
211	Promoting and Upgrading Vegetables and Medicinal Plants to Drive Healthy Food Security according to the Identity of the Nong Han Community to Become a Model Community for the Green Economy Project
212	Project to Promote the Cricket Farming Profession according to the Sufficiency Economy of the Royal Initiative of Communities in the Area of Mae Hor Phra Subdistrict, Mae Taeng District, in Chiang Mai Province
213	Activities to Create Knowledge and Understanding in Upgrading OTOP with Science, Technology, and Innovation under the Community Product Development Project in the Fiscal Year 2023 in Phrae Province
214	New Health Care in the Community Project
215	Project of Technology Transfer for Producing High-Quality Vegetable Seedlings from Agricultural Waste Materials and Demonstration Plots for Creating Natural Refrigerators under the Organic Farming System. to Improve the Quality of Life and Income for the Community Through Sustainable Organic Agriculture
216	Project for the Mechanism to Drive the Community Tourism Network in Chumphon Province
217	Technology Transfer Project for Designing and Installing Watering Systems for Landscaped Areas of Community Temples Project
218	Projects to Increase the Value of Community Products and Develop Community Potential in Marketing to Increase Economic Value
219	Projects to Drive and Promote the Knowledge of His Majesty King Rama IX to the Community and Society in a Sustainable Way.
220	Projects to Compete and Develop Skills in Community Development
221	Projects for Transferring Technology in Planting Seedlings and Germinating Vegetables. to Increase Income for the Community
222	Solar Drying Technology Projects at the Household and Community Enterprise Level

Sustainability Projects	
223	Landscape Innovation for Sustainable Urban Environmental Development and Conservation Project (66-2.6.5)
224	Integrating Learning with Local Communities in Preserving Arts, Culture and Local Wisdom Project
225	Processing Fish Products By Drying with Solar Energy and Using Waste Materials in the Community to Produce Alternative Energy Project
226	Workshop Project to Promote Physical Health for Communities in the Agricultural Innovation District Maejo Food and Health
227	Project to Develop the Learning Process for Developing Community Organization Management Mechanisms, a Case Study of Soila Credit Union Cooperative
228	Community Enterprise Management Development Project Based on the Concept of Social Business
229	Project to Develop Community Tourism Activities as Good Creative Economy Concept for Sustainability
230	Project to Develop the Academic Service Network for the Inter-University Community
231	Project to Develop Thinking Skills of Community Management Students
232	Project to Develop Research Skills for Master of Arts Students in Community Health Development for the Year 2023
233	Project to Develop Innovation in Proactive Education Management for Highland Agricultural Communities in Mae Hong Son Province in Tak Province.
234	Project to Develop Personality and Social Skills of Community Management Students
235	Eco Print to Eco-Design Product Development to Create Community Identity Project
236	Projects to Increase Product Value and Develop Management Potential of the Coffee Community Enterprise Group Creating Forests at Ban Muser, Doi Mon Jong, Mon Jong Subdistrict, Omkoi District, in Chiang Mai Province.
237	Maejo Volunteer and Community Development Project
238	Project to Upgrade Community Enterprises and New Entrepreneurs with Modern Agricultural Technology and Innovation
239	Project to Promote Improving the Quality of Life, Community Lifestyles, Communication, Health, and Lifelong Learning.
240	Promoting Community Strength and Sustainability Project
241	Project to Promote Careers with Community Funds and Further Develop Products to Generate Commercial Income under the Philosophy of Sufficiency Economy of the Curry Paste Group at San Sai District in Chiang Mai Province

Sustainability Projects	
242	Project to Create Awareness of Laws Regarding Community Product Standards to Enhance Product Quality and Sustainable Development
243	Building a Dam to Slow Down Moisture at the Ban Mae Sai Community Forest Project
244	Project to Create Health Tourism Attractions at the Thung Luang Community in Chumphon Province, to Support Future Tourism Changes
245	Project to Create Health Tourism Attractions at the Thung Luang Community in Chumphon Province, to Support Future Tourism Changes
246	Project to Create Health Tourism Attractions at the Thung Luang Community in Chumphon Province, to Support Future Tourism Changes
247	Training Project on Community Health Development Operations Using Participatory Action Research
248	"Fathers Plant and Children Build Our Nong Han" to Drive the Organic Farming Community toward Becoming a Model Community for Sustainable Development Project
249	Developing the Potential of Community Business Entrepreneurs in the Next Normal Era Project
250	Support Research That Focuses on Agribusiness/Organic Agriculture towards Go, Eco University That Can Be Used to Benefit the Community and Disseminate Research
251	Project to "Promote and Develop Prototypes for the Use of Renewable Energy Technology and IOT Systems Together with Biomass Material Management to Reduce Smog Problems, Help Raise the Level of the Grassroots Economy and Accelerate the Development of Entrepreneurs"
252	Project to Conserve and Restore Watershed Forests to Maintain Their Abundance, Organize Appropriate Water Management Systems, and Thoroughly Connect Agricultural Areas. Prevent and Solve the Problem of Smog Pollution Sustainably in the Northern Region (Natural Resources and Environmental Management Project)
253	Solid Waste Processing Project
254	Solid Waste Processing Project
255	Campaign Project to Promote Waste Reduction in Maejo University-Phrae Chalernprakiet
256	Project to Preserve the Environment and Promote Waste Separation in Organizations in the Fiscal Year 2023
257	Upgrading the Innovation Ecosystem to Enhance the Potential of Technology Business Entrepreneurs Advanced Agricultural and Food Innovation
258	Thai Horse to Develop Youth and Promote Ecotourism in Phrae Province Project

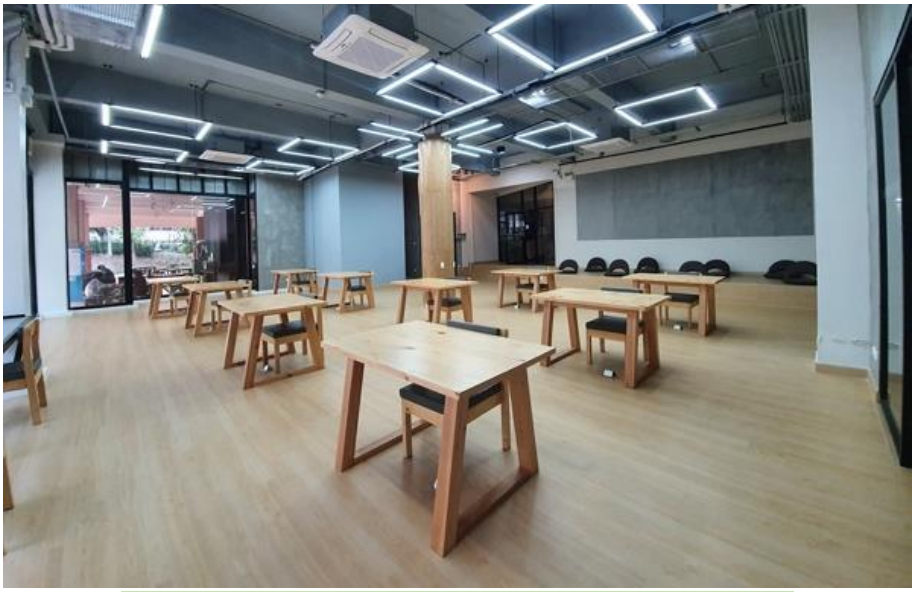
Sustainability Projects	
259	Project to "Transfer of Technology for Developing Products from Plants and Herbs in the Plant Genetic Conservation Project Area" Maejo University-Chumphon to Create Value-Added"
260	Bee Bank for Plant Genetic Conservation Project
261	Project for Collecting and Propagating Medicinal Orchids for Conservation and Learning Resources
262	Project to Study Appropriate Factors in the Nursery and Cultivation of Orchids for Conservation and Use
263	Project to Conserve, Collect, Develop, and Use Local Plant Genetics (Ma Kiang).
264	Landscape Innovation Project for Sustainable Urban Environmental Development and Conservation (66-2.6.5)
265	Project to Integrate Learning with Local Communities in Preserving Arts, Culture, and Local Wisdom
266	Project to Develop Conservation Farming and Sustainable Trade Leading to Being a Source of Learning for Youth and the Public
267	Project for the Coordination Center for the Ministry of Public Health - KMUTNB and Special Management Plans to Support the Plant Genetic Conservation Project. Maejo University
268	Lanna Local Medicinal Plants Collection, Conservation and Research Project (66-2.6.4)
269	Project to Conserve and Restore Terrestrial Ecosystems Indigo Plants in the Area of Ban Na Tong, Phrae Province to Return to the Natural Forest of Ban Na Tong.
270	Genetic Conservation and Integrated Use of Homs and Indigo Plants of Phrae Province Project
271	Genetic Conservation and Integrated Use of Homs and Indigo Plants of Phrae Province Project
272	Environmental Conservation and Promotion of Waste Separation in Organizations in the Fiscal Year 2023 Project
273	Creative Contest Activities: Tollway Contest Project under the Concept of "Cycling, Planting & Thinking"
274	Project of Creating Food Recipes from Seasonal Organic Ingredients to Add Value to Tourism Products and Services “Creative Food Design for Tourism: Eat Well & Drink Well”

Percentage of operation and maintenance activities of building in one year period

Maintenance of electrical and water systems

Roof Maintenance

Solar panel inspection and maintenance



Parts of building converted to a co-working space

Green office

Description:

1. All buildings are always maintained in a ready-to-use condition.
2. There is an annual maintenance of utility systems such as air conditioning systems, electrical systems, elevators, etc.
3. A big cleaning day for the university is established annually. Disinfectants (Silver-Nano) are sprayed in all buildings and the university's COVID-19 prevention measures are always in compliance.
4. Renovate the building to be a co-working space.
5. Environmental maintenance, care, and upkeep of both the interior and exterior of buildings are carried out following the Green Office guidelines. The Green Office assessment is conducted, and the department for environmental quality promotion awards the "G Green" accolade annually. Continuous efforts are made in this regard.

1	Total campus buildings area	338,459.66 m^2
2	Total operated building	338,459.66 m^2
Percentage buildings that operated and maintenance		100%

Additional evidence link:

https://erp.mju.ac.th/informationDetail.aspx?newsId=5189&lang=

https://erp.mju.ac.th/informationDetail.aspx?newsId=5439&lang=

Campus facliities for disable, special needs and or maternity care

Disabled parking

Wheelchair ramp

Accessible toilet

Disabled student counseling room

Description:

Maejo University cares about the well-being and lifestyle of all students, and personnel, both public utilities and public facilities, have been arranged to facilitate the disabled, the elderly, women and children and accessible for the public.

1. Disabled parking for disabled people to park their car which located at the nearest space building
2. Accessible toilet for disabled people
3. There is a counseling room at the guidance room and a service and support center for students with disabilities.

Security and safety facilities

CCTV camera system

The university CCTV system control room

CCTV cameras at different key points within the university

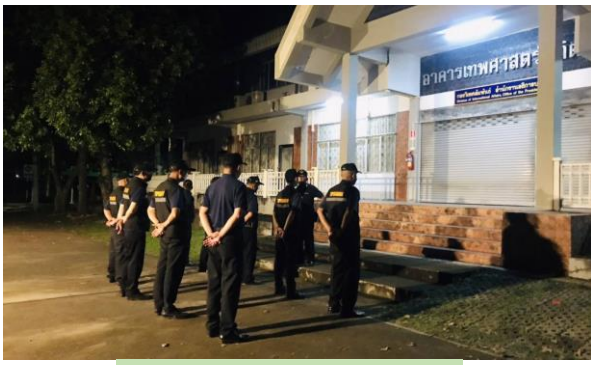
CCTV cameras at the intersections inside

CCTV cameras at intersections at the university's main gates the university

CCTV cameras in the building

CCTV cameras around the university's domitories areas

Security personnel patrols the university's area for safety



24 hours security

Station at the university gates

Security personnel patrols all important area including ATMs location

Fire extinguisher and building alarm equipment

CCTV cameras at different key points within the university

Fire extinguishers and building equipment

Fire extinguishers and equipment

Fire extinguishers and equipment

Fire extinguishers and equipment

Fire extinguishers and equipment

Graphic Annunciator informs the location of the incident in the building.

Graphic Annunciator informs the location of the incident in the building.

Install fire extinguishers and fire escape flags in various buildings.

Install fire extinguishers and fire escape flags in various buildings.

Fire exit sign

Fire escape routeign

Disaster Prevention and Mitigation Plan Training

Disaster Prevention and Mitigation Plan Training

Checking the readiness of the fire extinguisher

Fire evacuation drill

Assembly point

Fire evacuation drill

Disaster Prevention and Mitigation Drills

Lecturer team

The team of lecturers and participants participates in the training

เลขหนังสือรับที่ ๑๐ / ๒๕๖๕

เทศบาลเมืองแม่โจ้

เลขที่ ๑๕ หมู่ที่ ๑๒ ตำบลหนองหาร อำเภอสันทราย จังหวัดเชียงใหม่

ได้รับใบอนุญาตจากกรมสวัสดิการและคุ้มครองแรงงาน ใบอนุญาตเลขที่ ตพฝ.-ร ๔๖๙

ขอรับรองว่า

สำนักงานมหาวิทยาลัยแม่โจ้ กองพัฒนานักศึกษา

ได้ดำเนินการฝึกซ้อมดับเพลิงและฝึกซ้อมอพยพหนีไฟ

ตามกฎกระทรวงกำหนดมาตรฐานในการบริหาร จัดการ และดำเนินการด้านความปลอดภัย อาชีวอนามัย

และสภาพแวดล้อมในการทำงานเกี่ยวกับการป้องกันและระงับอัคคีภัย พ.ศ.๒๕๕๕

มีผู้เข้ารับการฝึกซ้อม ๒,๑๑๖ คน

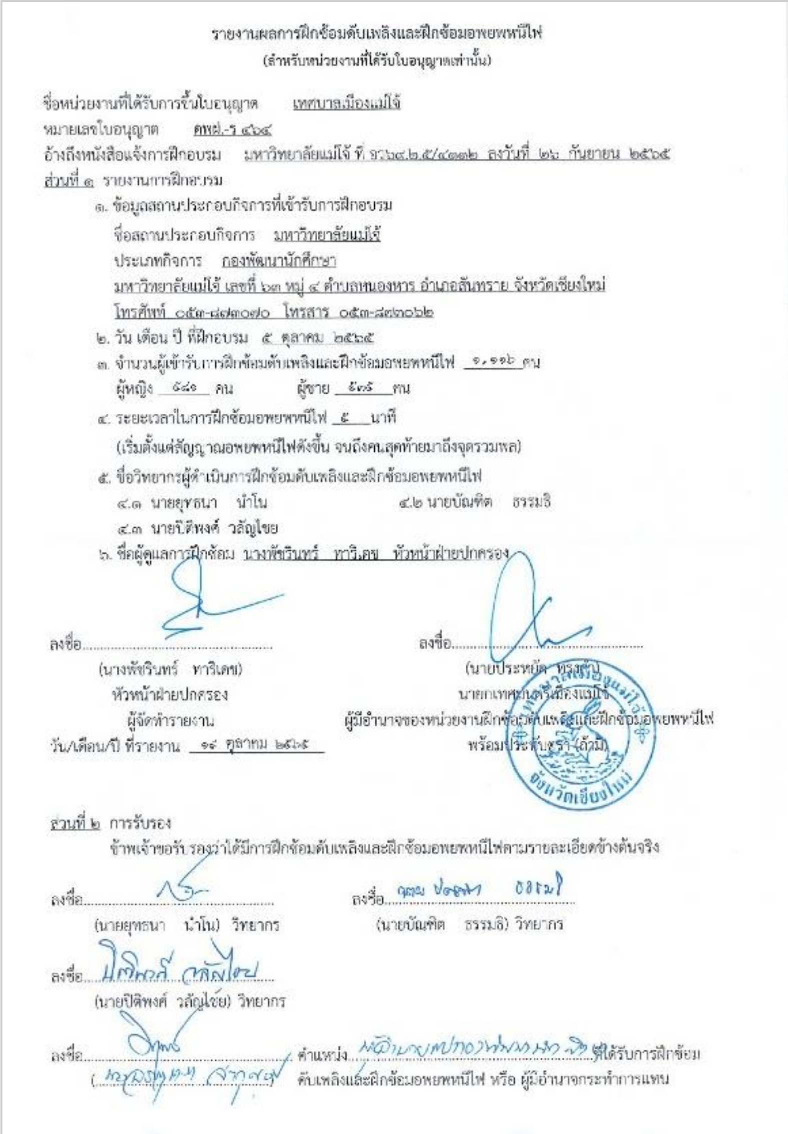
เมื่อวันที่ ๕ ตุลาคม ๒๕๖๕

ให้ไว้ ณ วันที่ ๕ ตุลาคม ๒๕๖๕

(นายประหยัด ทรงคำ)

นายกเทศมนตรีเมืองแม่โจ้

Certificate



รายงานผลการฝึกซ้อมดับเพลิงและฝึกซ้อมอพยพหนีไฟ
(สำหรับหน่วยงานที่ได้รับใบอนุญาตเท่านั้น)

ชื่อหน่วยงานที่ได้รับการขึ้นใบอนุญาต เทศบาลเมืองแม่โจ้
หมายเลขใบอนุญาต ฅพฝ.-ร ๔๖๔
อ้างถึงหนังสือแจ้งการฝึกอบรม มหาวิทยาลัยแม่โจ้ ที่ อว๖๙.๒.๕/๔๓๓๒ ลงวันที่ ๒๖ กันยายน ๒๕๖๕
ส่วนที่ ๑ รายงานการฝึกอบรม
๑. ข้อมูลสถานประกอบกิจการที่เข้ารับการฝึกอบรม
ชื่อสถานประกอบกิจการ มหาวิทยาลัยแม่โจ้
ประเภทกิจการ กองพัฒนานักศึกษา
มหาวิทยาลัยแม่โจ้ เลขที่ ๖๓ หมู่ ๔ ตำบลหนองหาร อำเภอสันทราย จังหวัดเชียงใหม่
โทรศัพท์ ๐๕๓-๘๗๓๐๗๐ โทรสาร ๐๕๓-๘๗๓๐๖๒
๒. วัน เดือน ปี ที่ฝึกอบรม ๕ ตุลาคม ๒๕๖๕
๓. จำนวนผู้เข้ารับการฝึกซ้อมดับเพลิงและฝึกซ้อมอพยพหนีไฟ ๑,๑๑๖ คน
ผู้หญิง ๕๘๑ คน ผู้ชาย ๕๓๕ คน
๔. ระยะเวลาในการฝึกซ้อมอพยพหนีไฟ ๕ นาที
(เริ่มตั้งแต่สัญญาณอพยพหนีไฟดังขึ้น จนถึงคนสุดท้ายมาถึงจุดรวมพล)
๕. ชื่อวิทยากรผู้ดำเนินการฝึกซ้อมดับเพลิงและฝึกซ้อมอพยพหนีไฟ
๔.๑ นายยุทธนา นำโน ๔.๒ นายบัณฑิต ธรรมอิ
๔.๓ นายปิติพงศ์ วลัญไชย
๖. ชื่อผู้ดูแลการฝึกซ้อม นางพัชรินทร์ ทาริเดช หัวหน้าฝ่ายปกครอง

ลงชื่อ.................................
(นางพัชรินทร์ ทาริเดช)
หัวหน้าฝ่ายปกครอง
ผู้จัดทำรายงาน
วัน/เดือน/ปี ที่รายงาน ๑๙ ตุลาคม ๒๕๖๕

ลงชื่อ.................................
(นายประหยัด ทรงคำ)
นายกเทศมนตรีเมืองแม่โจ้
ผู้มีอำนาจของหน่วยงานฝึกซ้อมดับเพลิงและฝึกซ้อมอพยพหนีไฟ
พร้อมประทับตรา (ถ้ามี)

ส่วนที่ ๒ การรับรอง
ข้าพเจ้าขอรับรองว่าได้มีการฝึกซ้อมดับเพลิงและฝึกซ้อมอพยพหนีไฟตามรายละเอียดข้างต้นจริง

ลงชื่อ.................................
(นายยุทธนา นำโน) วิทยากร

ลงชื่อ.................................
(นายบัณฑิต ธรรมอิ) วิทยากร

ลงชื่อ.................................
(นายปิติพงศ์ วลัญไชย) วิทยากร

ลงชื่อ................................. ตำแหน่ง................................. ที่ได้รับการฝึกซ้อมดับเพลิงและฝึกซ้อมอพยพหนีไฟ หรือ ผู้มีอำนาจกระทำการแทน
(.................................)

Report on the results of the training plan. It takes 4 minutes. (University office building)

Description :

1. CCTV at University's gate
2. Fire Hidrant at Maejo University
3. Preparation of plans and fire drill drills once a year

The university has a safety infrastructure and safety response times for accidents, crimes, fires and natural disasters in less than 10 minutes. As for the security of the buildings, student dormitories, sports fields, and other university facilities, security personnel are stationed at key points and CCTVs are installed to enhance security. Security personnel patrols around the university's area 24 hours to secure the bank located in the campus and the area with ATMs. If any abnormal events are found, they will be reported to the radio center. The radio center has staff stand by 24 hours. They will coordinate

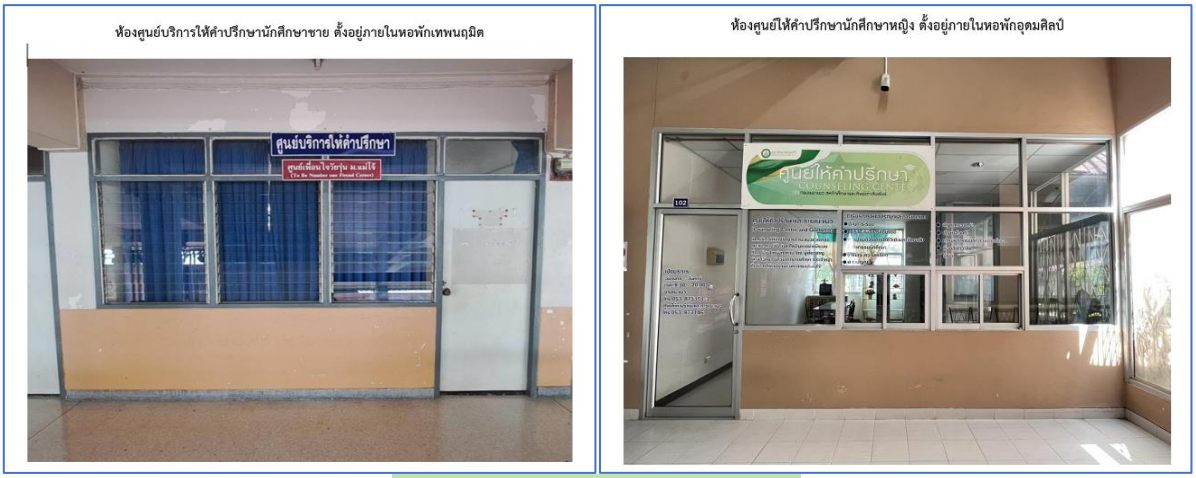
with related parties or external agencies such as Mae Jo Police Station to support the personnel or to suppress the incident immediately after the incident. They also help to take care of the safety of assets such as wallets, ATM cards that students or owners have left at the ATMs, which can be picked up at the Kasetsart Network Radio Control Center.

The university has a policy for various faculties to participate in the Green Office project, with some activities related to the environment and safety in the office. Disaster prevention and mitigation plan drills will be conducted at least once a year by external speakers. The goal of the drill is to use the safety response time in fire evacuation drills not more than 10 minutes/time.

https://stu2.mju.ac.th/wtms_newsDetail.aspx?nID=27839&lang=th-TH
https://secretary-science.mju.ac.th/wtms_newsDetail.aspx?nID=28297&lang=th-TH

Health infrastructure facilities for students, academics and administrative staffs' wellbeing

Health and nursing room



Consulting service center

Providing basic medical care Take your illness history, do a physical examination, measure your temperature, measure your blood pressure, etc.

outdoor stadium

Inthanin football court, tennis court, basketball court, five-a-side football court, basketball court and volleyball court.

King Rama IX Sports Center Building, Zone B

King Rama IX Sports Center Building, Zone B

Ubonratana Rajakanya Swimming Pool

campaign to reduce car use motorcycle by traveling by bicycle or walking

MJU Sport Complex

MJU Sport Complex

Description:

(Please describe the **Health infrastructure facilites** in your campus. The following is an example of the description. You can describe more related items if needed.)

1. The university provides health care services to students and staff, with the aim of promoting good health throughout their educational journey within the university. This is done with professional nurses offering basic healthcare services, facilitating the recovery of ill students so that they can receive convenient and prompt care within the university. This minimizes the need for students to seek external hospital care. Service utilization data is recorded, and appointments are made for those requiring ongoing treatment. In cases of severe illness or medical conditions beyond the capability of the university's healthcare professionals, students are referred to nearby hospitals for further treatment.

Additionally, the university has established accident insurance for all students to reduce the financial burden when students suffer injuries due to accidents and require hospitalization. It is recommended for students living far from the university to transfer their comprehensive health insurance to hospitals near the university. This ensures that students can receive medical care without incurring costs.

The university has implemented processes to improve healthcare services and reduce student illness. This includes maintaining illness records for statistical analysis to identify the causes of diseases and develop prevention strategies. The university is committed to ensuring student satisfaction with healthcare services and has an evaluation system in place to collect feedback, plan improvements, and meet the evolving needs of the students in the future.

2. The dormitory has prepared service centers for counseling within the student housing buildings. The counseling center for male students is located within the Thepnarumitr Dormitory, while the counseling center for female students is situated within the Ratama Dormitory. These facilities serve

as places to support students who are facing academic challenges, issues related to adjusting to university life, emotional concerns, stress, and various personal issues. They also provide guidance on career choices and furthering education at higher levels.

3. Outdoor stadium (Inthanin Football Stadium tennis court basketball court futsal stadium Takraw Stadium Volleyball Stadium) promotes physical activity. And connect the unity of students, teachers, academics, staff and people around Maejo University who come to use the service.

4. King Rama IX Sports Center Building, Zone B: Taking a student who has had accident from playing sports within the university to be treated at university's network hospital.

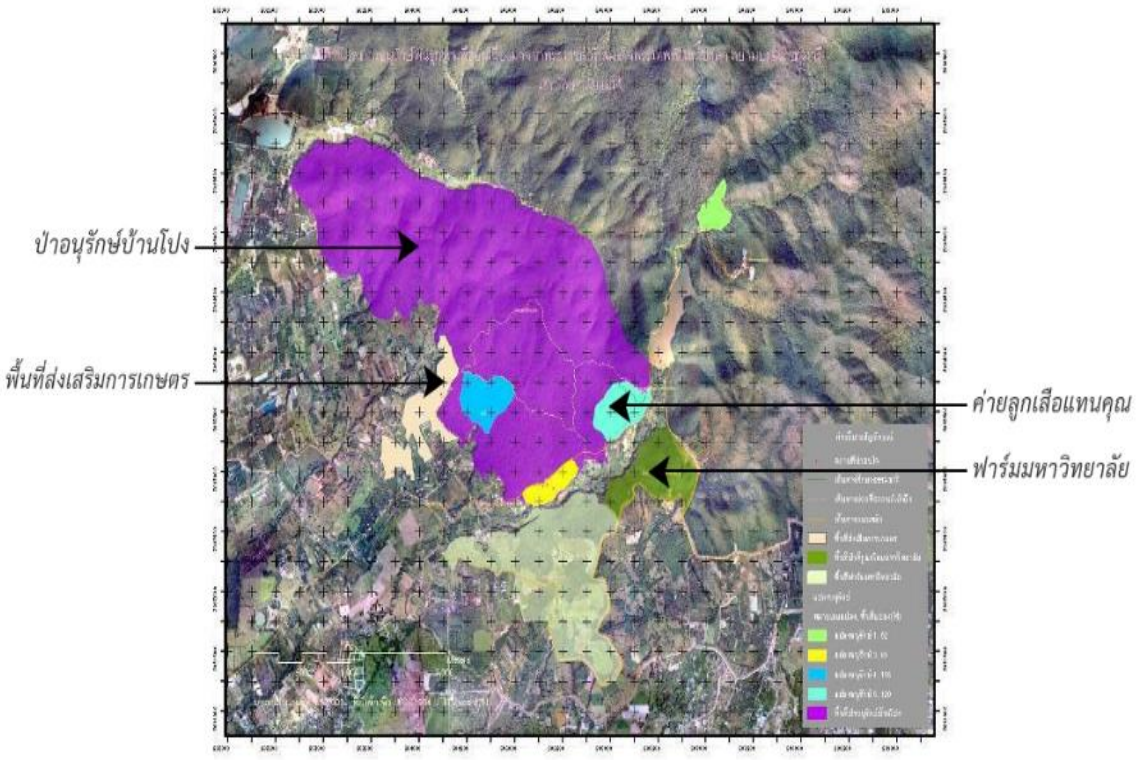
5. Ubonratana Rajakanya Swimming Pool International standard indoor pool International standard indoor swimming pool, size 50 meters, area 8,000 square meters.

6. Campaign to reduce car use motorcycle by traveling by bicycle or walking: Reduce the use of vehiclesthat use fuel. Reduce air and noise pollution problems traffic problems The use of bicycles is another option. Because it is a vehicle that does not use any fuel and also results in a healthy cyclist. does not create pollution in the emission of toxic fumes no noise pollution problem And it saves travel expenses. Including allowing all departments to participate in driving to become a green university of Maejo University.

7. MJU Sport Complex: Maejo University is working to build MJU Sport Complex, sports and recreation building, Maejo University. It is a large sports complex that will support a full range of sports activities.Promote healthy exercise for students and staff, including people in the surrounding communities to use the service. In line with the Maejo 100-year strategy, University of Life. for society and community It is expected to open for service within 2023.

The large MJU Sport Complex is a 4-storey building (including the basement) with a usable area of 14,920 square meters that can support a full range of sports activities for students, staff, and the surrounding people to use the service thoroughly. which this building is specially designed with the concept of connecting triangles by transcribing meaning from inthanin inflorescence Maejo University's flowers that looks like a clump together showing love, unity and harmony with consistent characteristics in both structural forms and architecture therefore used to design the structure of the building by building a Smart Building, designing and managing energy consumption Both wind power, water power, and electric power are the most cost-effective. and control the building using digital technology To step into a modern smart building It is considered the first energy-saving building in a sports building in Thai universities. Ready to push for a green building to support Green University

Conservation: plant, animal, and wildlife, genetic resources for food and agriculture secured in either medium or long-term conservation facilities



Map showing the operating areas of the Plant Genetic Conservation Project Maejo University Chiang Mai Province

Fish conservation pond

Vegetables plots

Animal conservation

Orchids

Fruit trees plot

Herbs

Description:

The university has conservation areas for both plants and animals for the benefit of preserving agricultural species for research and teaching and learning support both in the field and in online databases for academic services such as planting plots to collect and conserve food crops (rice, corn), local vegetables and economic vegetables (chilli, eggplant, lime, okra, long beans), local medicinal plants and fruit trees (longans, mangos). We also a conserves various orchid species as well.

In addition, the university also has projects related to the conservation of biological, physical and socio-cultural resources, namely: Plant Genetic Conservation Project under The Royal Highness Princess Maha Chakri Sirindhorn which aims to:

- Progressing the understanding of personnel and organization, and to introduce volunteers and companies to plant genetic conservation.
- To build links between various organization, including government agencies and private sections on virtue foundation.
- To create a plant genetics database system that can be communicated around the country.

Additional evidence link:

https://researchex.mju.ac.th/dbplant/

https://rspg.mju.ac.th/wtms_index.aspx?&lang=th-TH

https://www.facebook.com/SeedsOrganicMaejo/photos

https://www.youtube.com/watch?v=03ujJo9sTeY

Maejo University has worked in response to the royal initiative of the Plant Genetic Conservation Project under the Royal Initiative of Her Royal Highness Princess Maha Chakri Sirindhorn by allocating some areas of the Ban Pong Forest Conservation and Development Project to participate in the project since 1994 and expanding the project area to 3 areas as follows: Plant Genetic Conservation Project Maejo University-Chiang Mai, Plant Genetic Conservation Project Maejo University-Phrae Chalermprakiet, Plant Genetic Conservation Project Maejo University-Chumphon. Its objectives are to understand and see the importance of plant genetics, to share ideas and practice until the benefits of the Thai public, and to have a system of plant genetic information to be communicated throughout the country.

1. Maejo University-Chiang Mai Area, Chiang Mai Province

1. Conservation project collecting wisdom and propagating Lanna herbal plants can collect and conserve herbs. There are a total of 600 plants on an area of approximately 10 rai located in a conservation forest area and are utilized by communities in the area of Pong Village, Pa Phai Sub-District, Sansai District, Chiang Mai Province.

2. Project on the establishment of a botanical garden for collecting indigenous medicinal plants in the northern region at Maejo University farm area. A total of 34 species of medicinal plants can be gathered to be planted in the area.

Plant Species	Plant Species	Plant Species
1. *Morinda citrifolia* L.	13. *Zingiber officinale*	25. *Dregea volubilis*
2. *Curcuma longa*	14. *Polyscias fruticosa* (L.) Harms	26. *Nasturtium officinale*
3. *Azadirachta indica*	15. *Andrographis paniculata*	27. *Houttuynia cordata*
4. *Codiaeum variegatum*	16. *Cymbopogon citratus* Stapf.	28. *Jasminum sambac*
5. *Sesbania grandiflora* (L.)	17. *Phlogacanthus pulcherrimus* T.Anderson.	29. *Averrhoa carambola*
6. *Acacia concinna*	18. *Piper sarmentosum* Roxb.	30. *Annona squamosa*
7. *Artemisia lactiflora*	19. *Gymnema inodorum* (Lour.) Decne.	31. *Artocarpus heterophyllus*
8. *Citrus hystrix*	20. *Broussonetia kurzii*	32. *Sandoricum koetjape*
9. *Aloe vera*	21. *Phyllanthus emblica*	33. *Cleistocalyx nervosum*
10. *Boesenbergia rotunda*	22. *Oroxylum indicum*	34. *Solanum torvum*
11. *Zingiber cassumunar* Roxb.	23. *Eleutherococcus trifoliatus*	
12. *Piper nigrum*	24. *Morus alba*	



3. Conservation and utilization of Thai orchids under the Plant Genetic Conservation Project, Maejo University conducts breeding, nursery, and cultivation of Thai orchids, exploring and collecting Thai orchid species.



4. The project to study the genetic and physical characteristics of indigenous Thai melon varieties operates in the field of Vegetable Crops, Horticulture Course, Faculty of Agricultural Production to collect and study the physical characteristics of indigenous Thai melons to conserve and collect Thai melon varieties so that they do not disappear in the future.

2. Maejo University-Phrae Chalermprakiet Area, Phrae Province

1. Conservation of local plant diversity in the area of Maejo University-Phrae Chalermprakiet in honor of His Majesty the King has organized 3 sub-activities, which are projects that promote and support the conservation of local plant species and the transfer activities to the community and youth as follows:

- Activity 1: Cultivate local seedlings to conserve plant genetics, carry out activities in nursery plots by collecting seeds from plant saplings and cultivating rubber trees, 6,000 seedlings, Payom 2,000 seedlings, 1,500 seedlings, Wah 1,500 seedlings, Takhianthong 3,000 seedlings, Siao 500 seedlings and planting in 7 local plant test plots, namely Takhianthong, Yang Na, Phayom, Macha Mong, Yang Pluang, Rang and Yang. Hiang, total number of 245 trees.

- Activity 2: Management of fang planting plots in the area of Maejo University-Phrae Chalermprakiet, activities such as as weed control, fire prevention line, pet protection fence.

- Activity 3: Caring for and restoring forest plots in a degraded deciduous dipterocarp forest area of 3 rai in the conservation area of Maejo University-Phrae Chalermprakiet.

2. Conservation and Prototyping of Makiang Products in Maejo University-Phrae Chalermprakiet Area.

3. Conservation and Prototype Development of Makyong Products at Maejo University (Phrae Campus)

4. Youth Knowledge Transfer Activity on Diverse Plant Genetics

3. Maejo University-Chumphon, Chumphon Province

1. The Cultivation and Conservation Project, focusing on the conservation of the *Tetragonula pegdeni* Schwarz was intended to conserve the stingless bee in Maejo University- Chumphon area and to pass on the knowledge on raising and conserve the stingless bee (*Tetragonula pegdeni* Schwarz) and its products. which is a species that exists locally in the south.



2. Conservation and breeding project for sustainable conservation in Maejo University-Chumphon area and conserved forest area plant genetic conservation project of Maejo University - Chumphon



3. The project to collect local medicinal plants in the form of seeds, fruits, branches, tubers, roots for tissue culture can collect 40 types of herbs such as ginger, *Aeginetia indica*, Tiger orchid, Philodendron, Paphiopedilum, Butterfly Pea, Karanda, Sweet Pepper, Cape Gooseberry, etc

4. Sargassum *C. Agardh* Brown Algae Conservation Project, Maejo University - Chumphon

2. Energy and Climate Change (EC)

Energy-efficient appliances usage are replacing conventional

Description: One of Maejo University's most essential policies is to encourage using energy-efficient appliances in the university leading to Eco University. Over the year, the university's physical system and environment division has surveyed additional appliances: computers, monitors, printers, televisions, and Refrigerators. Maejo University also provided significant additional appliances with an emphasis on the energy star symbol and number five label, which is the label, in Thailand, displaying it is an energy-saving appliance. The percentage of energy-efficient appliances observed over the previous year was around 55 percent. The number of appliances that were surveyed is depicted in Table 2.1. Appendix 1 demonstrates the number of appliances categorized by factors.

Table 2.1 Number and percentage of energy-efficient appliances compared to all appliances on the campus.

Number of Lighting Appliances	Number of total light bulb	Number of Energy Efficient Appliances (LED)	Percentage of Energy Efficient Lighting Appliances
	62,326	32,032	51.39%
Number of Air Conditioners	Number of total A/C	Number of Energy Efficient Inverter A/C	Percentage of Energy Efficient A/C
	3,054	454	14.90%
Number of Monitors and Computers	Number of total monitors	Number of Energy - Saving certified monitors	Percentage of Energy Efficient Monitors
	2,868	2,638	91.81%
Number of Printers	Number of total printers	Number of Energy-Saving certified printers	Percentage of Energy Efficient printers
	388	136	35.05%
Number of TVs	Number of total TVs	Number of Energy – Saving certified TVs	Percentage of Energy Efficient TVs
	87	80	91.95%
Number of Refrigerators	Number of total Refrigerators	Number of Energy – Saving certified Refrigerators	Percentage of Energy Efficient Refrigerators
	81	39	48.15%
		Average Percentage	**55.54%**

[4] > 50-75%

Number of Light bulbs in MJU categorized by type.

LED	PLC	INC	HG	MH	SN	FL	T5	SL	SP	HS	MC	PAR	PAR	PL
32032	3911	426	511	370	49	4423	20003	80	101	93	63	122	41	101

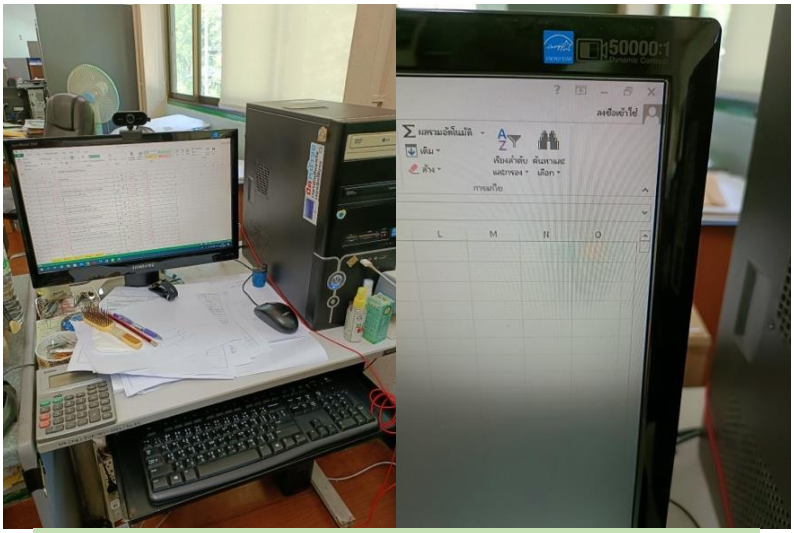
Note :
FL : Fluorescent
HG : Halogen
HS : High-pressure sodium
INC : Incandescent
LED : Light - emitting diode
MC : Mercury-vapor
MH : Metal halide
PAR : Parabolic aluminized reflector
PL : Compact Fluorescent (Outside Ballard)
PLC : Compact Fluorescent (Inside Ballard)
SL : Compact Fluorescent (Inside Ballard)
SN : Spotlight
SP : Superlux
T5 : T5 Fluorescent

Number of Computers, Printers, TVs, and Refrigerators

		Tourism	Nursing	Animal Clinic	Engineering	Orchid	Central	Plan	Fishery	Agri Production	Science	Liberal Arts	Architect	Econ.	MJU Farm	Inter Center	Animal Science	Library	Total
Computers	Energy - Certified	62	5	1	133	2	61	24	114	17	1114	457	105	222	1	29	82	204	2633
	Non Energy - Certified	12	0	0	51	0	5	6	25	0	20	3	1	1	0	10	42	59	235
Printers	Energy - Certified	8	0	0	21	0	0	0	0	0	0	0	0	0	4	0	84	19	136
	Non Energy - Certified	0	1	4	14	2	16	6	10	11	77	53	15	23	2	1	0	17	252
TVs	Energy - Certified	3	0	1	4	0	1	0	0	0	10	7	10	3	3	0	8	30	80
	Non Energy - Certified	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	6	7
Refrierators	Energy - Certified	5	1	2	0	0	0	1	6	3	11	2	1	2	3	2	0	0	39
	Non Energy - Certified	0	0	0	15	0	6	0	0	0	0	0	0	0	0	0	21	0	42

Pictures of Energy – Certified Appliances categorized by types of appliances.

Air conditioner with Number 5 Energy – Certified label.



Computer with Energy Start Energy – Certified label.

Printers with Energy Start Energy – Certified label.

Television with Number 5 Energy – Certified Label

Refrigerators with Number 5 Energy – Certified label.

Label No.5 Performance Criteria for Appliances

Air conditioner (Fixed Speed)

*** All the appliances at MJU are in No.5 standards. (Blue Shading Cell)**

Size of A/C	Performance (BTU/hour/W)			
	No.5	No.5 ★	No.5 ★★	No.5 ★★★
Not over 8,000 W (not over 27,296 BTU/hour)	12.85 – 13.84	13.85 – 14.84	14.85 – 15.84	≥15.85
over 8,000 W – 12,000 W (>27,296 – 40,944 BTU/hour)	12.40 – 13.39	13.40 – 14.39	14.40 – 15.39	≥15.40
over 12,000 W – 18,000 W (>27,296 – 40,944 BTU/hour)	10.00 – 10.99	11.00 – 11.99	12.00 – 12.99	≥13.00

Air conditioner (Inverter / Variable Speed)

Size of A/C	Performance (BTU/hour/W)			
	No.5	No.5 ★	No.5 ★★	No.5 ★★★
Not over 8,000 W (not over 27,296 BTU/hour)	15.00 – 17.49	17.50 – 19.99	20.00 – 22.49	≥22.50
over 8,000 W – 12,000 W (>27,296 – 40,944 BTU/hour)	14.00 – 16.49	16.50 – 18.99	19.00 – 21.49	≥21.50
over 12,000 W – 18,000 W (>27,296 – 40,944 BTU/hour)	14.00 – 16.49	16.50 – 18.99	19.00 – 21.49	≥21.50

Television

Size of TV	StandBy Power	% of Brightness	Performance (BTU/hour/W)			
			No.5	No.5 ★	No.5 ★★	No.5 ★★★
All of sizes	≤ 0.5	≥65%	15.00 – 17.49	17.50 – 19.99	20.00 – 22.49	≥22.50

Refrigerator

Type	Volume : AV	Performance (BTU/hour/W)			
		No.5	No.5 ★	No.5 ★★	No.5 ★★★
Refrigerator	< 100	≤ 0.53AV + 170	≤ 0.50AV + 162	≤ 0.48AV + 153	≤ 0.45AV + 145
	≥ 100	≤ 0.51AV + 137	≤ 0.48 + 129	≤ 0.45AV + 121	< 0.42AV + 112
Refrigerator with Frozen zone	<450L	≤ 0.52AV + 319	≤0.47AV+290	≤0.43AV+262	≤ 0.38AV+233
	≥450L	≤ 0.71AV + 147	≤0.66AV+137	≤ 0.62AV+128	≤ 0.57AV+118

Total main campus smart building area (m^2)

Description: Main requirements of smart buildings are

- Automation
  - BMS
  - APP
- Safety
  - Intruder Alarm System
  - Fire-Fighting
  - Video Surveillance
  - Anti - Flooding
- Energy
  - Monitoring
  - Management
- Water
  - Monitoring
  - Recovery
- Indoor Environment
  - Thermal comfort
  - Air quality

- Real-Time
- Passive System

- Lighting
  - LEDs
  - Sensors
  - Shielding
  - Natural light

To be considered a smart building, the building needs to acquire at least 5 features.

This year, Table 2.1 demonstrates all buildings at Maejo University (116 buildings that have been examined). The total area of all smart buildings is 373,025.77 m^2.

Table 2.2 List of Smart Buildings in MJU

Building's Name	Amount of floors	Building's Area (m^2)	B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4
Chutiwat Auditorium	1	461							✓		✓					✓				✓
water pumping building 2	1	32							✓		✓					✓				✓
Inthanin Stadium's Stand	2	1,821.92							✓		✓					✓				✓
New theory's agricultural center	2	124							✓		✓					✓				✓
Chemical storage building	1	60							✓		✓					✓				✓
Maejo University Gymnasium Zone A	2	18,648.39				✓	✓		✓		✓	✓					✓	✓		✓
Maejo University Gymnasium Zone B	4	5,859.50			✓	✓	✓		✓		✓	✓	✓	✓			✓	✓		✓
Princess Maha Chakri Sirindhorn Building	3	12,637.25				✓	✓		✓		✓	✓		✓		✓	✓	✓		✓
Thep Sat Sathit Building	2	2,803.50			✓		✓		✓		✓					✓	✓	✓		✓
Phaephuch Building	1	1,904.00							✓		✓					✓				✓
Phra Chuwng Krasetsilp Building	2	2,223.76							✓		✓					✓				✓
Thai Agricultural Museum	2	640							✓		✓					✓				✓
80th year Maejo Building	5	10,200.00			✓	✓	✓		✓		✓					✓	✓	✓		✓
70th year Maejo Building	5	13,421.87			✓	✓	✓		✓		✓			✓		✓	✓	✓		✓
Greenhouse building	1	1,827.00							✓		✓					✓				✓

Building's Name	Amount of floors	Building's Area (m^2)	B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4
Low Pressure water pumping building	1	30							✓		✓					✓				✓
High Pressure water pumping building	1	72							✓		✓					✓				✓
Electirc bus parking.	1	390							✓		✓					✓				✓
Radio communication club	1	28							✓		✓					✓				✓
Electrical office	2	328							✓		✓					✓				✓
Maintenance building and facility office	2	828							✓		✓					✓				✓
Transportation office	1	280							✓		✓					✓				✓
Ruean Dhamma Building	2	607.25							✓		✓			✓		✓	✓			✓
Office of president parking garage	1	-							✓		✓					✓				✓
Wutthakard Building	2	631			✓		✓		✓		✓			✓		✓	✓	✓		✓
Water supply and sanitation office	2	354.6							✓		✓					✓				✓
President's office 1	2	1,496.00			✓	✓	✓		✓		✓					✓	✓	✓	✓	✓
President's office 2	5	6,646.00			✓	✓	✓		✓		✓	✓				✓	✓	✓	✓	✓
President's office 3	2	893			✓	✓	✓		✓		✓	✓				✓	✓	✓	✓	✓
Total wastewater treatment system building (Including bathroom building)	1	183							✓		✓					✓				✓

Building's Name	Amount of floors	Building's Area (m^2)	B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4
Building and facility unit office	1	828							✓		✓					✓				✓
Um Nuay Yotsuk Building	4	16,262.60			✓	✓	✓		✓		✓	✓				✓	✓	✓		✓
Ubolratana Rajakanya swimmimg pool	2	4,180.60				✓	✓		✓		✓					✓	✓	✓		✓
Terdkrasikorn Canteen	2	4,325.00					✓		✓		✓					✓				✓
Male dormitory 2	5	5,968.00			✓		✓		✓		✓	✓					✓			✓
Male dormitory 3	2	1,200.00			✓		✓		✓		✓	✓				✓	✓			✓
Male dormitory 4	5	3,854.00			✓		✓		✓		✓	✓				✓	✓			✓
Male dormitory 5	2	1,160.00			✓		✓		✓		✓	✓				✓	✓			✓
International students dormitory	2	1,048.40			✓		✓		✓		✓	✓				✓	✓			✓
Female dormitory 10	7	7,175.00			✓	✓	✓		✓		✓	✓				✓	✓			✓
Female dormitory 11	7	14,500.00			✓	✓	✓		✓		✓	✓				✓	✓			✓
Female dormitory 6	5	3,854.00			✓		✓		✓		✓	✓				✓	✓			✓
Female dormitory 7	5	3,854.00			✓		✓		✓		✓	✓				✓	✓			✓
Female dormitory 8	5	6,651.00			✓		✓		✓		✓	✓				✓	✓	✓		✓
Female dormitory 9	5	6,651.00			✓		✓		✓		✓	✓				✓	✓	✓		✓
Fishery's Club Building	1	115.5				✓			✓		✓					✓	✓			✓
Fishery Food Production Building	1	105				✓			✓		✓					✓	✓			✓

Building's Name	Amount of floors	Building's Area (m^2)	B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4
Fishery Technology Building	3	3,661.64				✓	✓		✓		✓					✓	✓			✓
Fishery Technology Laboratory Building	2	3,980.50				✓	✓		✓		✓					✓	✓			✓
Fishery Breeding Building	1	144				✓			✓		✓					✓	✓			✓
Fishery's Warehouse	1	155.4				✓			✓		✓					✓				✓
Fishery Incubation Building	1	494				✓			✓		✓					✓				✓
Fishery Aquarium Building	1	48				✓			✓		✓					✓	✓			✓
Fishery Research Building	1	18				✓			✓		✓					✓	✓			✓
25th year of Faculty of Business Administration Building	6	4,042.00			✓	✓	✓		✓		✓					✓	✓			✓
Phitthayalongkorn Building	3	2,976.97			✓	✓	✓		✓		✓					✓	✓			✓
Economic mushroom production learning Center	1	114			✓				✓		✓					✓				✓
Mushroom learning Center		-			✓				✓		✓					✓				✓
Vegetables planting Greenhouse		-			✓				✓		✓					✓				✓
Vegetables planting Greenhouse		-			✓				✓		✓					✓				✓
Rice Mill Building	1	405			✓				✓		✓					✓				✓
Thai Orchids Building	1	500			✓				✓		✓					✓				✓

Building's Name	Amount of floors	Building's Area (m^2)	B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4
Kumjorn Boonpang Building	2	1,212.18			✓				✓		✓					✓				✓
Vegetables storage buildings	1	360			✓				✓		✓					✓				✓
Orchids and ornamental plants learning Building	1	320			✓				✓		✓					✓				✓
Orchids and ornamental plants exhibition Dome	1	708.75			✓				✓		✓					✓				✓
Production of Ornamental Plants Technology Building	1	576			✓				✓		✓					✓				✓
Tissue Building	2	947.01			✓				✓		✓					✓				✓
Vegetable Laboratory Building	1	375.5			✓				✓		✓					✓				✓
Tissue culture building	1	135			✓				✓		✓					✓				✓
Pomology Laboratory Building	1	480			✓				✓		✓					✓				✓
Agronomy Laboratory Building	1	444			✓				✓		✓					✓				✓
Permpool Building	4	10,723.00			✓	✓	✓		✓		✓	✓				✓	✓			✓
200 yaer Rattanakosin Building	2	1,551.15			✓				✓		✓					✓				✓
Academic of Soil Science and Training Center of Advanced Soil and Fertilizer Building	4	4,846.25			✓				✓		✓					✓				✓

Building's Name	Amount of floors	Building's Area (m^2)	B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4
Planting Seeds and Propagating Ornamental Plants Greenhouses	1	288			✓				✓		✓					✓				✓
Earthworm Building	1	64			✓				✓		✓					✓				✓
Vegetable plant Office	1	58			✓				✓		✓					✓				✓
Agronomy Office Building	1	162			✓				✓		✓					✓				✓
Suriculture Building 1	1	181.2			✓				✓		✓					✓				✓
Suriculture Building 2	1	129			✓				✓		✓					✓				✓
Seedling Incubation Building	1	228.8			✓				✓		✓					✓				✓
Seed drying silo	1	128			✓				✓		✓					✓				✓
Patthanavisaitad Building	2	3,463.80			✓	✓	✓		✓		✓					✓	✓			✓
Suwanwajokkasikit Building	2	2,211.44			✓		✓		✓		✓					✓	✓			✓
Chulabhorn Building	5	9,146.00			✓	✓			✓		✓					✓	✓			✓
60th year Maejo Building	6	25,409.25			✓	✓			✓		✓					✓	✓	✓		✓
Saowarat Nityawattana Building	2	3,694.22			✓				✓		✓					✓	✓			✓
Agricultural products' packaging Building	1	2,187.00				✓			✓		✓					✓				✓
Service Building and Showroom	1	350							✓		✓					✓				✓

Building's Name	Amount of floors	Building's Area (m^2)	B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4
Engineering Laboratory Building	2	3,803.00							✓		✓					✓	✓			✓
Rubber and Polymer Technology Building	1	2,262.00				✓			✓		✓					✓	✓			✓
Smithanon Building	6	9,739.66					✓		✓		✓					✓	✓			✓
Engineering Laboratory and Classroom Building	6	19,615.08			✓	✓	✓		✓		✓					✓	✓	✓		✓
Pilot factory building	2	2,632.00					✓				✓					✓	✓			✓
Prasert Na Nakorn Building	6	7,639.41			✓		✓		✓		✓					✓	✓			✓
Yangyong Sitthichai Building	4	4880.00			✓	✓			✓		✓					✓	✓	✓		✓
Architecture and Environmental Design Building	4	5,469.65			✓		✓		✓		✓					✓	✓			✓
Architecture and Environmental Design Building (New)	4	5,022.50			✓	✓	✓		✓		✓					✓	✓			✓
75th year Maejo Building	3	5,562.50			✓	✓	✓		✓		✓					✓	✓	✓		✓
Canteen	1	248							✓		✓					✓				✓
Thammasakmontri Building	3	1,801.50							✓		✓					✓				✓
Thammasakmontri Dormitory	3	1,448.00							✓		✓					✓				✓

Building's Name	Amount of floors	Building's Area (m^2)	B1	B2	S1	S2	S3	S4	E1	E2	A1	A2	I1	I2	I3	I4	L1	L2	L3	L4
Thep Pongphanit Building	3	9,523.00			✓	✓			✓		✓					✓	✓			✓
Renewable Energy Classroom Building	4	11,360.59			✓	✓			✓	✓	✓	✓					✓	✓	✓	✓
Workshop Building		1,123.50			✓				✓		✓					✓				✓
Renewable Energy Comphehensive Knowledge Center	2	1,071.56			✓	✓			✓	✓	✓	✓					✓	✓	✓	✓
Princess Mother Memorial Building	4	6,853.56			✓	✓			✓		✓					✓	✓			✓
Energy Research Center 1	1	242							✓		✓					✓	✓			✓
Energy Research Center 2	1	119							✓		✓					✓				✓
International Education and Training Center	4	7,128.51				✓	✓		✓		✓					✓	✓			✓
Comprehensive production of ornamental plants and flowers Center	1	-							✓		✓					✓				✓
Demonstration rice field	1	-							✓		✓					✓				✓
Mongkolcahisit Building	2	1,021.00							✓		✓					✓				✓
Wiphat Boonsri Wangsai Building	3	10,377.55			✓	✓	✓		✓		✓	✓				✓	✓	✓		✓

[2.3] Smart Building implementation

Description: According to Table 2.1, The area of the smart buildings in Maejo University has qualified at least 5 features, There are 87 buildings qualifying as smart buildings in Table 2.1, which is 355,622.99 m^2 of the area of smart buildings. Compared to all building areas in Maejo University, the percentage of smart building implementation is 81.19 percent approximately.

- The area of smart buildings in Table 2.1 is about 355,622.99 m^2
- The total building area of Maejo University in Appendix 2 is 373,025.77 m^2
- The percentage of smart building implementation = (355,622.99/373,025.77) x 100
  = 95.33 % of the total building area of Maejo University.

[2.4] Number of renewable energy sources on campus

Description: Maejo University has eventually pushed the use of renewable energy as an atonement energy source to generate both electricity and heat, Following the university's Green University and Green Office goals. Over the course of a decade, the university's renewable energy-producing capacity has steadily expanded. The University now uses five renewable energy sources such as.

- Solar Power
- Biogas
- Biodiesel
- Biomass
- Wind Power

Solar power (Solar rooftop and Solar Collectors) is the primary renewable energy source on campus. Solar rooftop and solar collectors have been put in the offices and student dormitories to reduce energy consumption from daily activities. The solar rooftop panels were installed at

- The Office of President => 110 kW
- School of Renewable Energy => 660 kW
- Udomslip Female Dormitory => 80 kW
- Faculty of Economics => 20 kW
- Intanin Stadium Stands => 40 kW

This year, The university completed the installation of a 300 kW solar rooftop plant at Umnuay Yodsuk building, which was finished in July. In addition, the solar collector panels are installed at

- All dormitories => 1,331 m^2
- International Education and Training Center => 85 m^2

Maejo University has also used biogas as renewable energy. the Faculty of Animal Science (650 m^3) has established a biogas plant, which utilizes livestock byproducts to generate electricity, while the School of Renewable Energy (3 m^3) has installed a biogas facility that uses residential raw waste to generate heat.

Biodiesel is another renewable energy source that Maejo University has used to manufacture oil from leftover cooking oil. The oil waste delivered from the canteen and cookery shop is converted by transesterification from the biodiesel station, 150-liter production capacity, that is located at the School of Renewable Energy; The biodiesel is used for trucks and tractors at the institution.

Furthermore, Maejo University has implanted the biomass and ORC (Organic Rankine Cycle) plants, each producing 20 kW of electricity, using refuse-derived fuel (RDF) as a fuel. Gases from biomass plant's gasification process are used to generate electricity, which is subsequently sent to a gas generator. The ORC plant, on the other hand, generates electricity by boiling water into superheated steam and operating steam turbine.

Finally, at the School of Renewable Energy, wind power is clean energy that is used for street lights and generates electricity. In the case of street lights, the wind turbine on the street light, which is powered by the wind, generates power for the battery. On the other hand, the wind turbine (16.5 kW) generates power for the buildings of the School of Renewable Energy, reducing energy consumption from the primary source.

The renewable energy sources at Maejo University.

- Biogas

Faculty of Animal Science

Biogas production system with the capacity of 650 m^3 for electricity generation.

School of Renewable Energy

Biogas production system with the capacity of 3 m^3.

- **Biodiesel**

School of Renewable Energy

Biodiesel plant with a 150-liter-per-batch capacity made from cooking oil waste and oil plants. The plant has been operated twice a month.

- Biomass and ORC

School of Renewable Energy

The biomass and ORC power plant with a 20 kW capacity have been built.

Biomass plant

ORC plant

- Solar Power

President's Office

Solar rooftop with a 110 kW installed capacity.

School of Renewable Energy

Solar rooftop with a 40 kW installed capacity at a parking lot.

Solar rooftop with a 300 kW capacity on a renewable energy classroom building.

Solar panels on the roof of the School of Renewable Energy have a capacity of 660 kW.

A solar tracking station with a capacity of 20 kW has been erected.

Udomslip Female Dormitory (11th Dorm)

Solar rooftop with 80 kW installed capacity.

Faculty of Economics

Solar panels with 20-kW installed capacity at a parking lot.

Inthanin Stadium's Stand

Solar panels with 40-kW installed capacity at the stand.

Umnuay Yodsuk

Solar panels with 300-kW installed capacity on the roof.

- Solar Collectors

All Student Dormitories

Tanks atop the students' dorm and solar collectors with a 1331 m^2 installed capacity.

International Education and Training Center

The International Education and Training Center's roof is covered with solar collectors and an installed capacity of 84 m^2 tanks.

- Wind Power

School of Renewable Energy

For street lighting, 35 units of hybrid system of solar and wind turbines are used.

On the school of renewable energy, wind turbines with a total capacity of 16.5 kW generate electricity.

Renewable energy produced on campus per year

Description:

The production of renewable energy

Table 2.3 illustrates the productions of renewable energy compared in kWh/year. Biogas production systems with 653 m^3 capacity compensate 2,517.90 kWh/year electricity usage. as well as biomass and ORC power plant can replace 144,000 kWh/year. To consider the biodiesel production system, it has produced 3,132 liters of biodiesel/year which can secure 24,114.52 kWh/year electricity usage. Solar sources including solar power systems and solar collector systems are the most amount of the electricity production generating at 2,232,927.05 kWh/year. Furthermore, Wind power systems produce 11,869.80 kWh/year generating electricity and light. Therefore, the summarize of the renewable energy produced on campus is around 2,415,429.27 kWh/year. Table 2.4 shows the electricity production of solar power annually from September 2021 to August 2022. Appendix 3 eventually depicts the energy compensation calculation of the renewable energy sources on the campus.

Table 2.3 Electricity Compensation from renewable energy sources at Maejo University in 2022

Sources	Place(s) where the system is installed	Capacity of the system(s)	Electricity Compensation in kWh/year
Biogas	Biogas production system at the Faculty of Animal Science	650 m^3	1,751.40
	Biogas production system at School of Renewable Energy	3 m^3	766.50
	Total	653 m^3	2,517.90
Biodiesel	Biodiesel production system at School of Renewable Energy	150 Liters	24,114.52
Biomass and ORC	Biomass Power Plant at School of Renewable Energy	20 kW	57,600.00
	ORC Power Plant at School of Renewable Energy	20 kW	86,400.00
	Total	40 kW	144,000.00
Solar Power	President's Office	110 kW	116,860.00
	Inthanin Stadium's Stand	40 kW	36,601.00
	Solar Tracking Station at School of Renewable Energy	660 kW	618,736.00
	Udomslip Female Dormitory (11th Dorm)	80 kW	75,524.00
	Faculty of Economics	20 kW	18,409.00
	Umnuay Yodsuk	300 kW	388,684
	Total	1,210 kW	1,254,814.00
Solar Collector	All dormitories	1,313 sq.m.	910.779.72
	International Education and Training Center	84.60 sq.m.	58,683.33
	Total	1,397 sq.m.	969,463.05
Wind Power	Street Light system at School of Renewable Energy	35 x 100 w	10,731.00
	Wind Power Plant	10 x 1 kW	1,051.20
	Wind Power Plant	1 x3 kW	87.60
	Total	16.5 kW	11,869.80
Sum of Total			2,249,424.98

Energy Compensation Calculation of The Renewable Energy Sources

1. Biodiesel (150 liters capacity)
   - a. Percentage of Biodiesel Production in the system — 87 %
   - b. Biodiesel Density — 22.00 kg/m^3
   - c. Heating Value of Biodiesel — 33.72 MJ/kg
   - d. Wasted oil in each process — 150 liters
   - e. Biodiesel after processing — 150 x 0.87 = 130.50 liters
   - f. Frequency of Biodiesel production — 2 times/month
   - g. Total biodiesel Production — 130.50 x 2 = 261.00 liters/month
   - h. Total biodiesel Production per year — 261.00 x 12 = 3,132.00 liters /year
   - i. Total biodiesel Production by weight per year — 3,132 x 0.822 = 2,574.50 liter/year
   - j. Heating Value of Biodiesel production per year — 2,574.5 x 33.72 = 86,812.27 MJ/year
   - k. Energy Compensation per year — =86,812.27 / 3.6 = **24,114.52** kWh/year
2. Biogas
   - a. 3 m^3 capacity at School of Renewable Energy
     - i. Percentage of Biogas Production — 35.00 %
     - ii. Biogas Production per day — 1.05 m^3/day
     - iii. Biogas Production per year — 383.25 m^3/year
     - iv. Efficiency of Electricity Production per 1 m3 — 2.00 kWh/m^3
     - v. Electricity Production per year — 383.25 x 2 = 766.50 kWh/year
3. Wind Power
   - a. 100 W Wind Power Street Light — 35 items
     - i. Electricity Capactiy — 100 W
     - ii. Average wind velocity at Maejo University — 2.5 m/s
     - iii. Wind Power Production at 2 m/s — 35 W
     - iv. Rough Capacity Factor — 35 / 100 = 0.35
     - v. Annual Energy Production — 100x0.35x8760 = 306,600.00 Wh/year
     - vi. Annual Energy Production of all wind power street lights

       = 306,600 x 35 / 1000 = **10,731.00** kWh/year

b. 1,000 W Wind Power Turbine — 10 items

vii. Electricity Capactiy — 1,000 W

viii. Average wind velocity at Maejo University — 2.5 m/s

ix. Wind Power Production at 2 m/s — 120 W

x. Rough Capacity Factor — 120 / 1000 = 0.12

xi. Annual Energy Production — 100 x 0.12 x 8760 = 105,120 Wh/year

xii. Annual Energy Production of all wind power street lights

= 105,120 x 10 / 1000 = **1,051.20** kWh/year

c. 3,000 W Wind Power Turbine — 1 item

i. Electricity Capactiy — 3,000 W

ii. Average wind velocity at Maejo University — 2.5 m/s

iii. Wind Power Production at 2 m/s — 300 W

iv. Rough Capacity Factor — 300 / 3,000 = 0.10

v. Annual Energy Production — 100 x 0.10 x 8760 = 87,600 Wh/year

vi. Annual Energy Production of all wind power street lights

= 87,600 x 1 / 1000 = **87.60** kWh/year

4. Solar Collector

a. 1,313 m^2 Solar Collector system in every dormitory

i. Area of Solar Collectors — 1,313.00 m^2

ii. Average rate of heat production per day — 0.7 kW/m^2

iii. Average peak duration of a solar system — 5.23 hours/day

iv. Operation days per year — 180 days/year

v. Operation hours per year — 180 x 5.23 = 941.4 hours/year

vi. Heat rate of the system — 1,313 x 0.7 = 919.1 kW

vii. Heat compensation — 919.1 x 3600 x 941.4

= 3,114.87 MJ/year

viii. Heater's heat efficiency — 95 %

ix. Heat compensation compared to the heater's efficiency

= 3,114.87/0.95 = 3,278.81 MJ/year

x. Electricity Compensation — 3,278.81 / 3.6 = **910.779.72** kWh/year

b. 84.60 m^2 Solar Collector system in every dormitories

i.	Area of Solar Collectors	84.60 m^2
ii.	Average rate of heat production per day	0.7 kW/m^2
iii.	Average peak duration of solar system	5.23 hours/day
iv.	Operation days per year	180 days/year
v.	Operation hours per year	180 x 5.23 = 941.4 hours/year
vi.	Heat rate of the system	84.60 x 0.7 = 59.22 kW
vii.	Heat compensation	59.22 x 3600 x 941.4 = 200.70 MJ/year
viii.	Heater's heat efficiency	95 %
ix.	Heat compensation compared with the heater's efficiency	= 200.70/0.95 = 211.26 MJ/year
x.	Electricity Compensation	211.260 / 3.6 = **58,683.33** kWh/year

5. Biomass and ORC Power Plant

a. Biomass Power Plant

i.	Power Plant Capacity	20 kW
ii.	Working Day per year (Crop Harvesting Season)	120 days
iii.	Operation Hour per year	120 x 24 = 2,880 hours
iv.	Electricity Production per year	2,880 x 20 = **57,600** kWh/year

b. ORC Power Plant

i.	Power Plant Capacity	20 kW
ii.	Working Day per year	180 days
iii.	Operation Hour per year	180 x 24 = 4,320 hours
iv.	Electricity Production per year	4320 x 20 = **86,400** kWh/year

6. Solar Power

The annual electricity production of solar power which has been recorded by the database on the website is demonstrated on Table. 2.4

Table 2.4 Annually Electricity Production of Solar Power

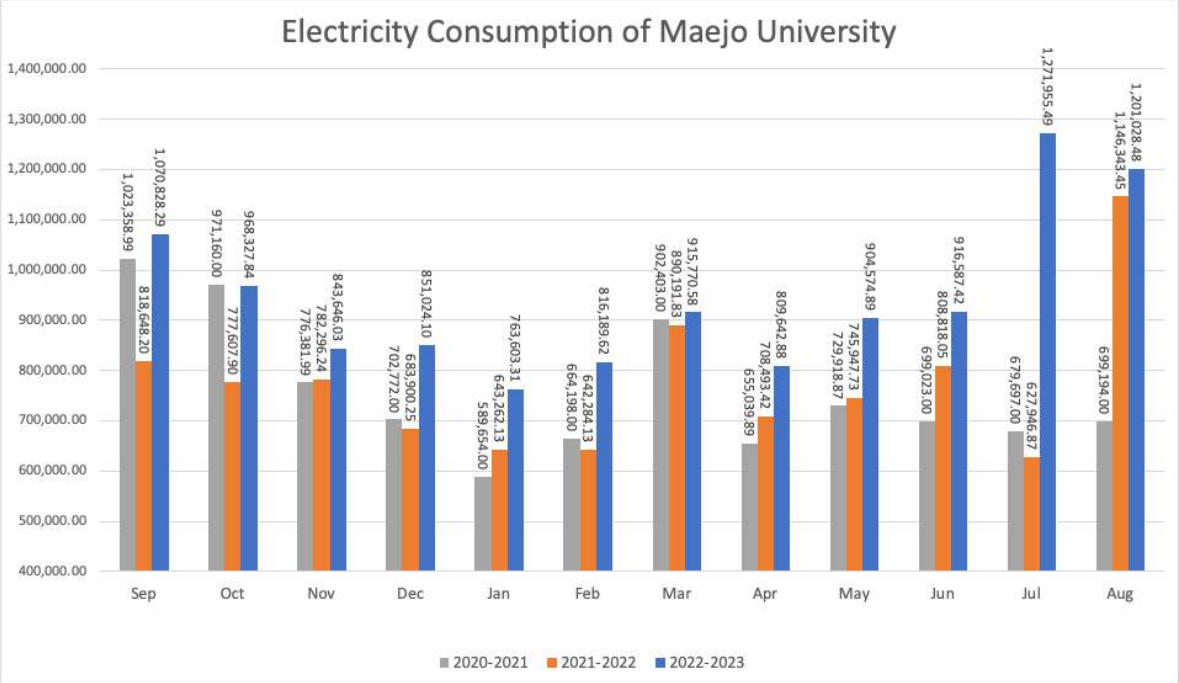
Summary of electricity generation by solar power plant on the campus						
Month	School of Renewable Energy [660 kW]	President's office [110 kW]	Umnuay Yodsuk [300 kW]	Faculty of Economics [20 kW]	Udomsilp Dormitory [80 kW]	Intanin Stadium's Stand [40 kW]
21-Sep	49206	9770	34010	1510	6744	2907
21-Oct	48012	8800	29878	1435	6591	3141
21-Nov	48904	9110	32096	1654	6745	3014
21-Dec	48260	9300	33730	1692	6601	3245
22-Jan	48989	9560	33984	1610	6517	2801
22-Feb	38740	9480	33921	1652	6491	2802
22-Mar	50526	11000	37883	1796	6342	2766
22-Apr	77472	10800	36892	1206	6088	3313
22-May	48997	10340	37442	1320	5981	3103
22-Jun	60723	9860	38695	1554	6025	3401
22-Jul	42287	9970	37305	1520	5684	3141
22-Aug	56619	8870	36858	1460	5715	2967
Total each plant	618736	116860	388684	18409	75524	36601
Total	1254814	kWh				

Electricity usage per year (in kilo watt hour)

Description:

Maejo University's annual electricity consumption is 11,333,178.93 kWh/year (from September 2022 to August 2023), which is approximately 20 percent more than the previous year (9,275,740.20 kWh). Maejo University opens every trimester every year. The first term begins in early August and concludes in October. The second term embarks in late November and finishes in March and the Summer term, when the number of students is less than the first and second term, starts in mid-April and ends in June. This year, the university has opened fully for academic activities and research. Moreover, the number of students entering the university increased by around 10% compared to the previous year. Therefore, the electricity consumption of Maejo University has increased for over two years.

Figure 1, the chart illustrates the electricity consumption over a three-year period at MJU, spanning from 2020-2021, 2021-2022, to 2022-2023. Notably, there was a fluctuation in energy usage between September 2022 and August 2023. In February 2022, there was a significant decrease of 816,189.62 kWh when compared to September 2022. Subsequently, in March 2023, consumption rose to 915,770.58 kWh before experiencing a 10% decline the following month. The period between April 2023 and June 2023 witnessed stable electricity use. However, in July and August, there was a sudden and substantial increase of approximately 70%, with consumption reaching 1,201,028.48 kWh.



The total electricity usage divided by total campus population (kWh per person)

In this section, it is desired to determine the amount of electricity used on a yearly basis per person working and studying inside the campus. The total electricity consumption divided by the total campus population is equal to 561.99 kWh/person.

- Electricity usage per year of MJU in 2022. = 11,333,178.93 kWh/year
- Campus population = 18,308 persons
- The total electricity usage divided by the campus population
  = 619.03 kWh/person

The ratio of renewable energy produce/production towards total energy usage per year

In 2023, Total electricity consumption is 11,333,178.93 kWh/year, and total renewable energy output is 2,249,424.98 kWh/year, or 18.15 percent of total electricity consumption. However, compared to the last year, the ratio of renewable energy production to total energy usage per year decreased by about 2%

- The total renewable energy production in MJU = 2,249,424.98 kWh/year
- Electricity usage per year of MJU in 2021 = 11,333,178.93 kWh/year
- The ratio of renewable energy produce/production towards total energy usage per year
  = 2,249,424.98 / (2,249,424.98 + 11,333,178.93) x 100
  = (0.1815 x 100) = 18.15 %

Elements of green building implementation as reflected in all construction and renovation policy

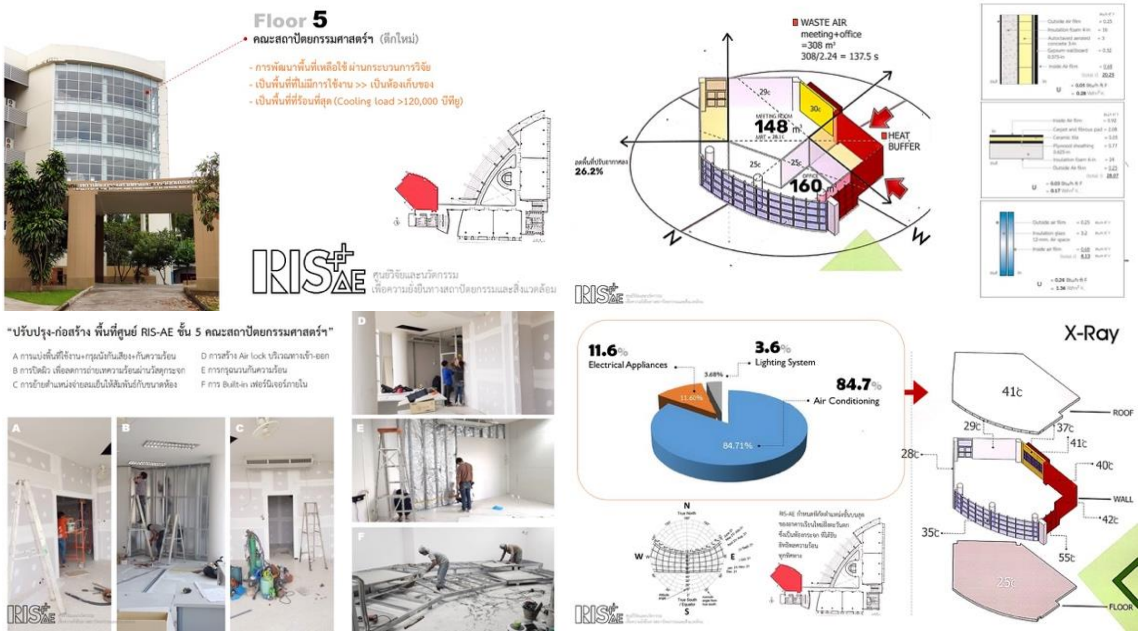
Descriptions :

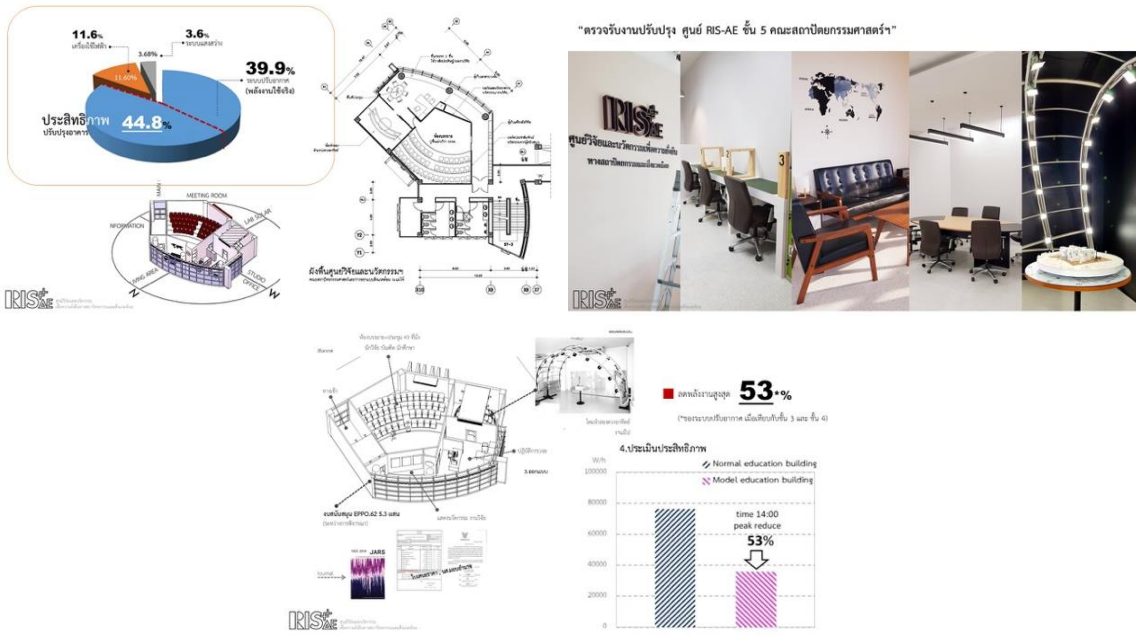
Based on the 2021 Green University Report, this year marks the completion of the construction of Maejo University's sports complex. This facility serves as a hub for community and national sports events, as well as sports training for Maejo University students and staff. Notably, the sports complex has been designed with a strong emphasis on adhering to Green Building standards. It incorporates natural ventilation to regulate interior temperatures and maximizes the use of daylight to illuminate the entire area of the sports complex.

The Thammasakmontri building is currently undergoing renovation with a strong emphasis on green building strategies. While construction is ongoing, the primary objective is to integrate sustainable features into the design. One of the key components of this design is to maximize natural lighting throughout the day, reducing the need for artificial lighting and saving energy costs. Additionally, the building incorporates highly effective insulation to minimize heat penetration, ensuring a comfortable indoor environment while reducing energy consumption. This commitment to eco-friendly building practices aligns with the university's dedication to sustainability and creating a greener future for its employees and students.

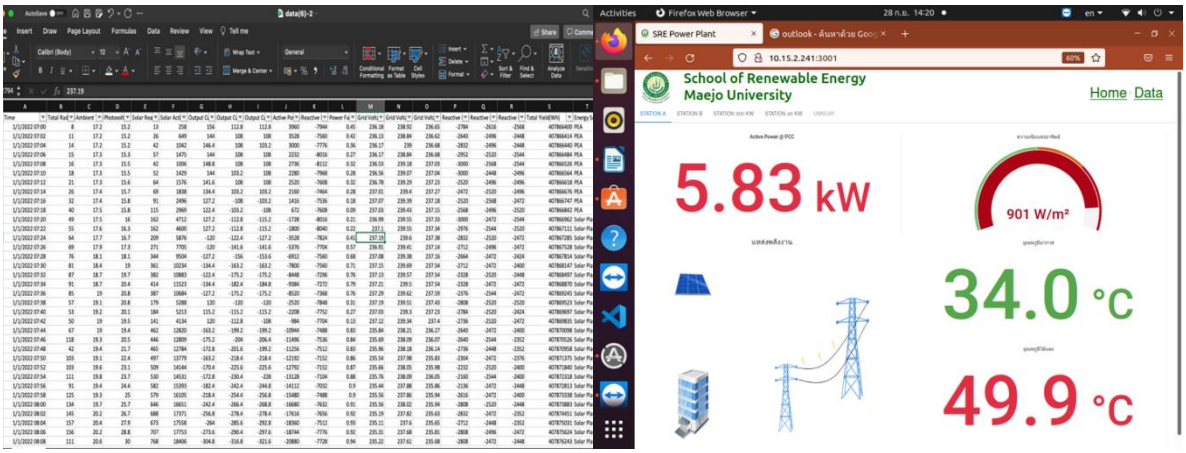
Furthermore, the university has transformed an empty library room into a collaborative workspace, aligning with its green building principles. This innovative conversion aims to minimize the reliance on electrical lighting by capitalizing on the abundance of natural light. This approach not only fosters an environmentally sustainable atmosphere but also encourages a more eco-conscious and energy-efficient way of working, showcasing the university's commitment to incorporating green building practices into its everyday operations.

The Architecture and Environmental Design Classroom within the Faculty of Architecture and Environmental Design has recently undergone energy-efficient upgrades. The earlier design, responsible for 65% of the overall energy consumption related to air conditioning, has been enhanced with the introduction of low heat-transfer insulation and a new architectural concept that considers the occupancy levels and usage patterns of the building. Consequently, when compared to the original design, these modifications have led to a remarkable 54% reduction in the air conditioning load.





The School of Renewable Energy has developed a fresh database that gathers data from both the solar plant's inverter and power meter. This software offers near real-time visibility into the system's status such as Power Generation on the solar plant, building's power consumption, Irradiation, and weather temperature. Furthermore, to analyze data pertaining to solar plants and power consumption, the system allows for the downloading of this information into an Excel file for analyzing the power generation and power consumption of the buildings at the school.



Greenhouse gas emission reduction program

Maejo University is a comprehensive agricultural university. So, the greenhouse gas emission programs taking care of the environment are essential for both the university and nearby communities. Maejo University has willingly proceeded the completed program throughout the year categorized by greenhouse gas emission sources into 3 scopes.

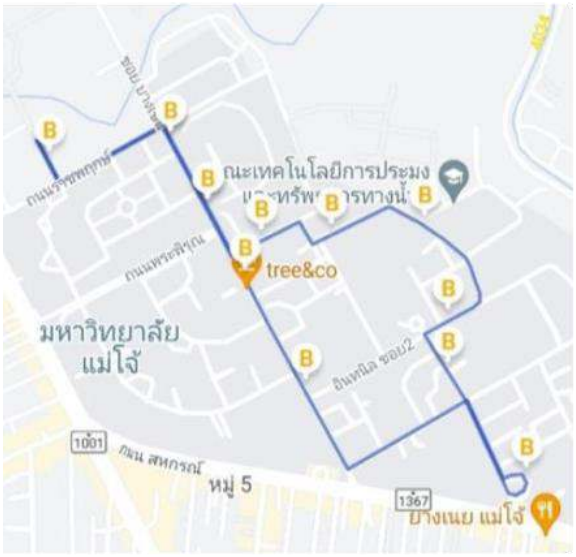
Scope 1:

- Mobile Combustion
- Car Free Day: Maejo University has continued to promote the Car Free Day project, which encourages students and staff to utilize bicycles as an alternative mode of transportation for short distances in all departments, reducing reliance on fossil fuel vehicles, and addressing pollution and traffic issues. This effort supports Maejo University's commitment to becoming a Green University. The pictures of this activity can be seen on this LINK

- Electric Vehicle for Transportations: Maejo University has introduced electric shuttle buses, which serve as a means of transportation within the campus for students and staff as part of the university's educational initiatives. The buses follow two designated routes, marked as the red and blue lines, to navigate the university grounds.

Red Line

Blue Line



- Fugitive Emissions
    - o Inspecting the condition of the air comfort system: The university places a strong emphasis on the annual inspection and upkeep of its air comfort systems, an essential practice for optimizing system efficiency and energy conservation. To ensure the highest standard of maintenance, the university has enlisted the expertise of a third-party service provider. This external party is responsible for the meticulous examination and cleaning of the university's air conditioning units. This proactive and outsourced approach guarantees that the systems operate at their best, creating a comfortable and eco-friendly environment for all.

Scope 2 :

- Purchased Electricity
  - Cleaning Air conditioners: Maejo University's commitment to maintaining its air conditioning systems in peak condition remains an annual practice. This year, the university has gone a step further by enlisting the services of a third-party specialist to carry out a thorough cleaning of all air conditioning units across the campus. This proactive approach ensures that every corner of the university benefits from clean and efficiently running air conditioners, fostering a comfortable and conducive environment for its students and staff.
  -

Scope 3:

- Waste

A waste separation system at MJU: The university has completed the construction of a waste separation system capable of handling up to 5 tons of waste per day. The project had an estimated budget of 14,540,000 Thai Baht, spread over six installments across 270 days. The final installment was concluded on October 9, 2023.

The waste separation system comprises:

1. Weighing System
2. Wet Waste Separation
3. Conveyor Belts
4. Metal Sorting Machine
5. Soil Screening Machine
6. RDF Compressor

This process achieves a 100% waste separation rate with the following breakdown:

- Recyclable Waste: 5% (250 kg/day)
- Organic Waste: 45% (2.25 tons/day)
- Incinerable Waste: 30% (1.5 tons/day)
- Residual Waste sent to landfill: 20% (1 ton/day)

Commuting

- **<u>Providing bicycles to students and personnel</u>:** As per the formal agreement established between Maejo University and Anywheel Co. Ltd., a unique opportunity has arisen for students to access bicycles conveniently located near the university's designated stop points. These bicycles are offered at an exclusive and cost-effective rate, catering specifically to the student community. This collaborative initiative promotes sustainable and eco-friendly transportation options, making it easier for students to navigate the campus and its surroundings while contributing to a greener and more environmentally conscious university environment.

Total carbon footprint (CO_2 emission in the last 12 months, in metric tons)

Data : - Electricity usage per year = 11,333,178.93 kWh/year
- Number of cars entering university = 3,076 cars/day
- Number of shuttle buses in the university = 0
- Number of motorcycles entering university = 3,977 motorcycles/day
- Number of trips for shuttle bus service each day = 0
- Approximate travel distance of vehicle each day inside the campus (car) = 0.80 km/day
- Approximate travel distance of vehicle each day inside the campus (shuttle bus) = 0 km/day
- Approximate travel distance of vehicle each day inside the campus (motorcycle) = 0.80 km/day

- **Electricity Usage Per Year**

CO_2 emission from electricity

= (11,333,178.93 / 1000) x 0.84

= 9,519.00 metric ton

- **Transportation per year (Car)**

CO_2 emission from car

= (Number of cars entering your University * 2 * approximate travel distance of a vehicle each day inside campus only (in kilometers) * 240/100) * 0.02

= (3,076 x 2 x 0.80 x 240/100) x 0.02

= 236.24 metric ton

- **Transportation per year (shuttle bus)**

CO_2 emission from shuttle bus.

= (Number of shuttle bus in your University * 2 * approximate travel distance of a vehicle each day inside campus only (in kilometers) * 240/100) * 0.01

= (0 x 2 x 0 x 240/100) x 0.01

= 0 metric ton

- **Transportation per year (Motorcycle)**

CO_2 emission from motorcycle

= (Number of motorcycles entering your University * 2 * approximate travel distance of a vehicle each day inside campus only (in kilometers) * 240/100) * 0.01

= (3,977 x 2 x 0.80 x 240/100) x 0.01

= 152.72 metric ton

Total Emission per year = 9,519.00 + 236.24 + 0 + 152.72 = 9,907.96 metric ton

The total carbon footprint divided by total campus population (metric ton per person)

The result from 2.11 that was calculated total carbon footprint per population of 0.55 metric ton / person.

Carbon Footprint Per Year

Total emissions divided total people

Data : - Population in MJU = 18,308 persons

- Total Emission per year = 9,907.96 metric ton

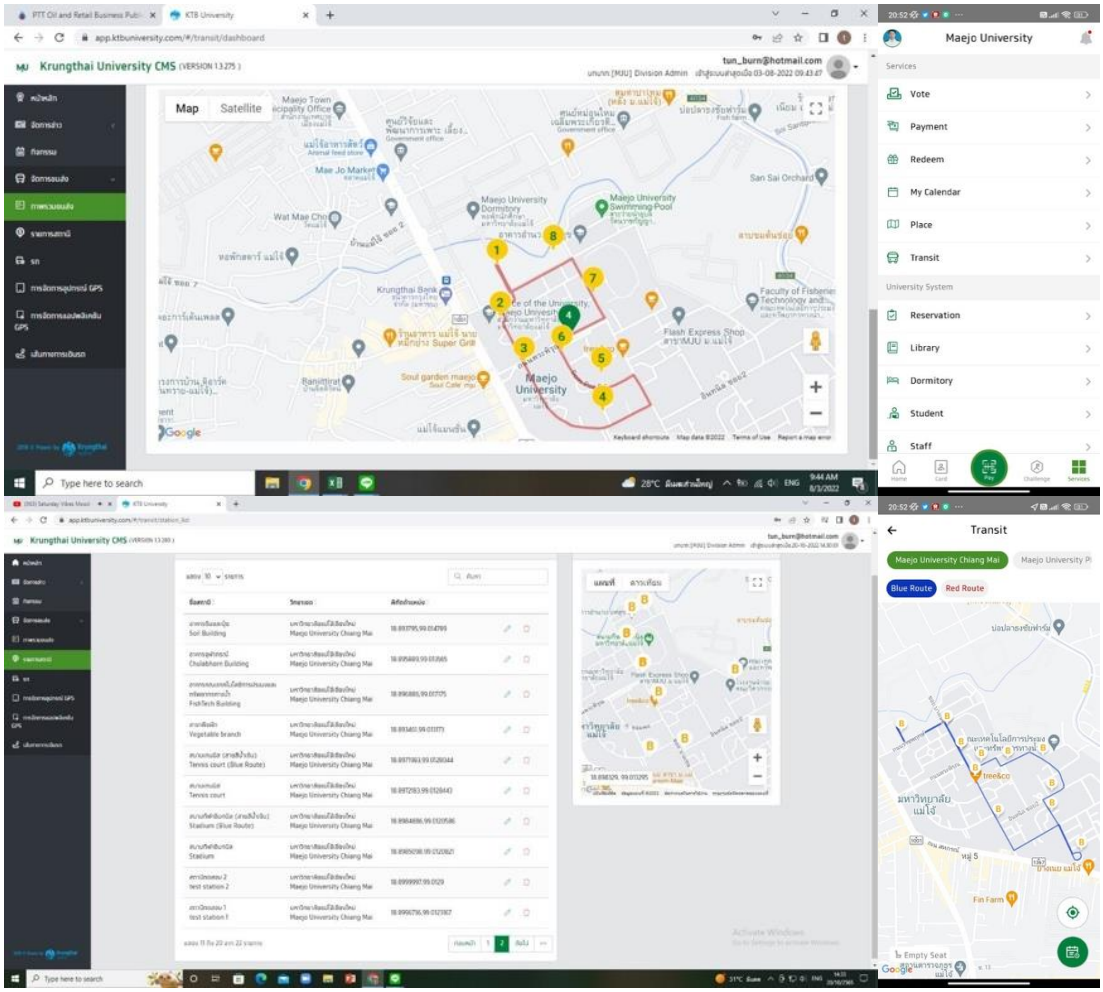
Total Carbon footprint per population = 0.55 metric ton / person

Number of innovative program(s) in energy and climate change

Description:

(Please describe innovative program(s) on your campus. The following is an example of the description. You can describe more related items if needed.)

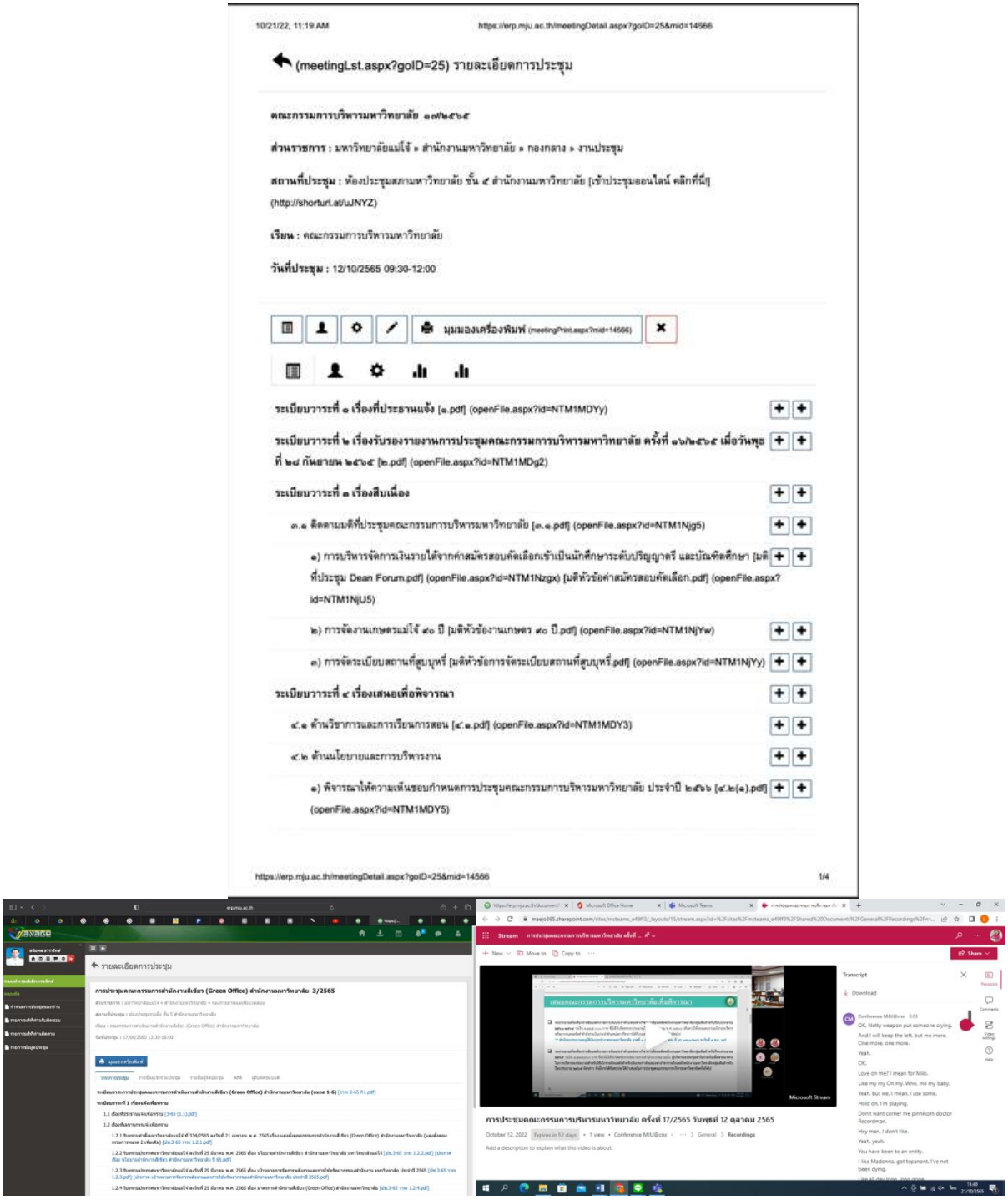
Innovative Transport App for Campus Commuters: Maejo University has rolled out a user-friendly web and mobile application designed to streamline transportation within the university campus. The app features detailed shuttle bus routes, real-time tracking of buses, and convenient bus stop locations, providing an enhanced commuting experience for students and staff.



Maejo University's Book Drop Service for Effortless Book Returns: The university's library has promoted its "Book Drop" initiative, offering instructors and students a convenient method to return borrowed books without the need to visit the library in person. These book return boxes are now available at every faculty within Maejo University.

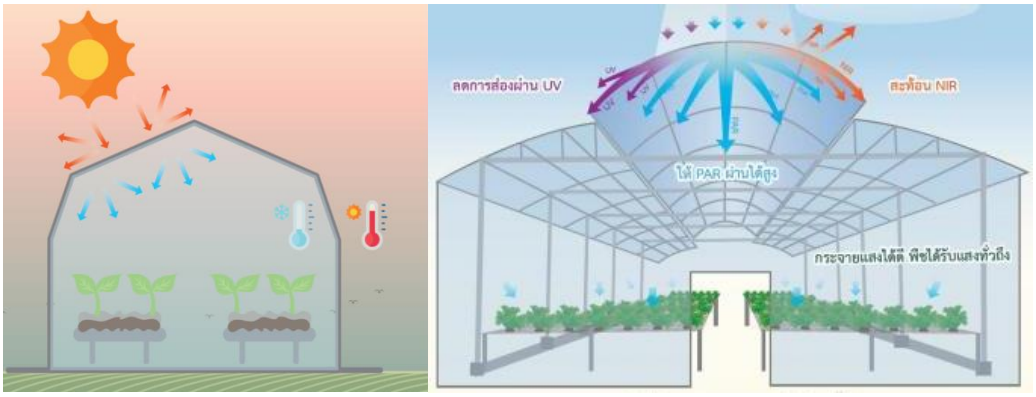
Smart Bicycle Parking Systems at Maejo University: Enhancing Convenience and Accessibility: Maejo University, in collaboration with Anywheel Co. Ltd., has implemented a bike parking system that not only locates bicycles after use but also monitors the availability of parking spaces, ensuring convenience and accessibility for users.

Expanding Boundaries: Maejo University's Global Initiatives for Online Meetings and Courses: Maejo University's commitment to leveraging online platforms for meetings and courses remains unwavering. This strategy, freed from pandemic constraints, continues to offer valuable benefits like efficient resource use, environmental sustainability, and global engagement in higher education. It signifies a lasting shift towards the future of learning and collaboration.

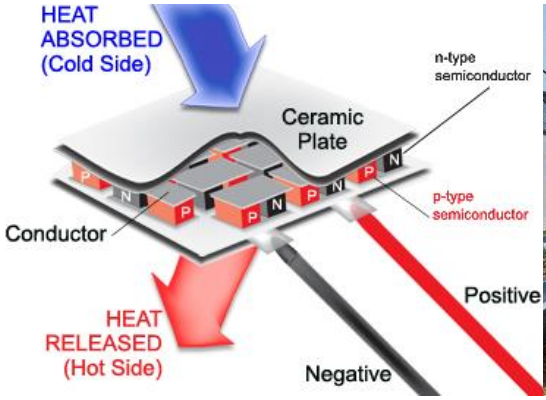


Development of Smart Electric Tractors for Agriculture: This project focuses on the development of small-sized tractors by replacing diesel fuel with electricity generated from solar cells stored in batteries. The motor used in this tractor has a capacity of 19 kW and operates with Lithium-ion batteries, providing an average of 3-4 hours of continuous use per charging cycle. The aim of developing this electric tractor is to serve as a prototype for farmers and entrepreneurs to adopt and expand its usage, reducing the use of fossil fuels and greenhouse gas emissions into the atmosphere. The total research budget for this project is 750,000 Baht or $21,428.57, with a research duration of one year.

The Development of Hybrid Materials for Light Filtering and Energy Harvesting for Greenhouse Plant Cultivation: This project focuses on developing hybrid materials for light filtering within the suitable wavelength range for greenhouse plant cultivation. The developed film is made from low-density polyethylene, transparent, highly flexible, UV-resistant, and effective in reducing the passage of infrared radiation. The benefit of this development is harnessing solar energy, which is clean and sustainable, to maximize agricultural product production.



Prototype of a Smart Closed-System Greenhouse with Temperature Reduction and Water Harvesting using Peltier Devices : This project aims to develop and create a smart closed-system greenhouse that incorporates Peltier or thermoelectric cooler plates. These plates have the dual capability of cooling and releasing heat. They are installed within the greenhouse, with the cooling side inside the greenhouse and the heating side outside the greenhouse. When electricity is supplied from solar panels to the Peltier device, the cooling side of the Peltier plate reduces the temperature inside the greenhouse, allowing for precise temperature control according to the needs of the herbal plants being cultivated. Simultaneously, the Peltier plates control moisture condensation, allowing the collection of condensed water to be utilized for a drip irrigation system for plant cultivation within the greenhouse. This project emphasizes the application of clean energy to reduce greenhouse gas emissions and promote sustainable energy use.



Development of Community-Based Biomass Management and Promotion of Appropriate Alternative Energy Technologies to Address Haze Issues: This project focuses on raising awareness and building understanding within communities in areas prone to open burning, particularly in the Chiang Mai province. Simultaneously, it promotes the adoption of alternative energy technologies to reduce open burning practices. The project encourages the efficient use of biomass stoves, the transformation of biomass into compacted fuel, and charcoal production. It also provides training to approximately 500 local participants, promoting more than 10 technologies. The project's outcomes aim to transform community behaviors, reducing open burning while simultaneously promoting the use of renewable energy sources, ultimately leading to improved air quality.

Development of Prototype Machines for Molding Bio-based Packaging from Biomass Using Solar Energy: This research project focuses on the development of machinery for transforming community forest waste, particularly leaves and wood, into products like dishes, glassware, and containers. The goal is to reduce the volume of biomass waste in community forests, which is a significant factor contributing to annual forest fires. Additionally, the project promotes economic activities and income generation by producing these bio-based products. The initiative has successfully introduced the technology to over 100 villages in the northern region of Thailand. The outcomes include addressing the haze issue, fostering a sense of love and protection for community forests, reducing open burning practices, and improving air quality for community members.

Impactful university program(s) on climate change

Description:

(*Please describe innovative program(s) on your campus. The following is an example of the description. You can describe more related items if needed.*)

Community

Providing the lecture from World Assembly 2023 project's students.

The faculty of Agricultural Production at Maejo University welcomed and provided lectures to 25 exchange students participating in the World Assembly 2023 project. The event took place on Wednesday, July 5, 2023, at the Soil and Fertilizer Research Building, Faculty of Agricultural Production. The lectures covered the topic of "Effects of Climate Change on Agricultural Systems in Northern Thailand," and were presented in various subtopics as follows:

- Associate Professor Dr. Suphithida Ongthong lectured on "Soil under Agriculture: Impacts and Mitigating Climate Change."
- Assistant Professor Dr. Sutheera Hemheuk presented on the "Effect of Climate Change on Forestry in Thailand."
- Dr. Wongpan Phromwongsang delivered a lecture on "Black Soldier Fly Addressing Biowaste and Mitigating Climate Change."

The pictures of this activity can be seen on this LINK.

The Coordinating Center for OHEC-MJU (Office of Higher Education Commission - Maejo University) conducted training and development in the learning process related to carbon credits for the course "Biodiversity Management and Area Development for Expanding Learning Outcomes."

On August 21-22, 2023, the Coordinating Center for OHEC-MJU conducted a training program on carbon credit learning for the course "Biodiversity Management and Area Development for Expanding Learning Outcomes" at Maejo University, Chiang Mai. The program was led by Dr. Tipasuda Tatrakoon, with Dr. Pattipan Sutthikulbutr overseeing it. The opening ceremony featured Assistant Professor Pawin Manochai, and lectures were delivered by Associate Professor Khanit Thanuthamcharoen and Mrs. Sirinthip Pacharoen. Practical activities involved local communities from Sakaam Forest Village in Doi Saket, Chiang Mai, and Pong Village in San Sai, Chiang Mai, along with participants from Chor Hea Sub-district Municipality in Phrae and Ban On Tai Sub-district Municipality in Chiang Mai, totaling 40 individuals. The pictures of this activity can be seen on this LINK.

National

Green Office Award

The President of Maejo University presented the G Green Award and certificates of honor to the departments that underwent evaluation for the Green Office program in the fiscal year 2022.

On September 27, 2023, Maejo University awarded four departments for their Green Office program performance in the fiscal year 2022. The results were as follows:

- Faculty of Agricultural Engineering: Excellent rating (Gold G).
- School of Renewable Energy: Excellent rating (Gold G).
- Faculty of **Liberal** Arts: Good rating (Silver G).
- Faculty of Animal Science and Technology: Good rating (Silver G).

These departments will continue as Green Offices. In 2026, the Faculty of Arts will aim to enhance its rating through an external evaluation. Other departments will be evaluated internally and externally every three years to maintain their environmentally friendly certifications, in line with the Department of Environmental Quality Promotion's standards.

The Green Office Steering Committee, chaired by Associate Professor Dr. Surachai Kangwal, officially presented the G Green Award and certificates during the event to recognize and encourage their ongoing efforts in environmental sustainability. The pictures of this activity can be seen on this LINK.

Maejo University's Faculty of Architecture and Environmental Design organized the "BAM Property Design Contest: Green Smart Concept" (Eco-Friendly Home Innovation).

On October 3, 2023, Dr. Chokanan Wanicharotsanasar, the Dean of the Faculty of Architecture and Environmental Design, along with the university administrators and architecture faculty members, joined Khun Chatchawal Kamnil, the Head of Property Development for the Northern Region, and the management of Bangkok Commercial Asset Management Public Company Limited (BAM) to organize the "BAM Property Design Contest: Green Smart Concept." The purpose of this project was to promote educational activities, provide scholarships to architecture students, and integrate their knowledge, skills, and creative thinking to design and enhance residential properties for BAM. These designs aimed to add value to the real estate properties for the benefit of the general public and serve as a model for interested individuals. The event took place in Room 202 at the Faculty of Architecture and Environmental Design. The pictures of this activity can e seen on this LINK.

International

Maejo University's research achievements were recognized with three global awards at the 16th International Invention and Innovation Show (INTARG 2023) held in the Republic of Poland.

Maejo University had two research projects recognized at the 16th International Invention and Innovation Show (INTARG 2023) in Poland, organized by Eurobusiness-Haller. These projects received three awards:

Gold Medal for "Herder Technology" to reduce coronavirus contamination in exported durians, led by Prof. Dr. Jaturapit Varuth. This innovative technology combines ozone and chemical spraying, ensuring safer fruit exports.

Gold Medal and Certificate of Appreciation for the "Air-to-Water Production System" by Assoc. Prof. Dr. Nikorn Homdoung and Assoc. Prof. Dr. Kittikorn Sasujit. This system extracts water from the air using ground cooling and solar energy, addressing water scarcity and promoting water-efficient crop cultivation.

These achievements have practical implications, improving durian export safety and providing water solutions for regions with limited resources in Thailand. The pictures of this activity can be seen on this LINK.

Maejo University International College participated in and delivered lectures on international cooperation at the "2023 China ASEAN Forum on Agricultural Vocational Education" held from September 17th to 19th, 2023, in Nanning, Guangxi, People's Republic of China.

Associate Professor Dr. Raphiphan Dangtongkee, Dean of the International College at Maejo University, participated in and delivered a lecture on international cooperation at the "2023 China ASEAN Forum on Agricultural Vocational Education," held from September 17th to 19th, 2023, in Nanning, Guangxi, People's Republic of China.

During the event, Dr. Raphiphan Dangtongkee emphasized the importance of international collaboration between Maejo University and ASEAN member institutions to enhance education and research in the field of organic agricultural management. The key points discussed during the presentation included:

The Significance of International Cooperation: Dr. Dangtongkee highlighted the importance of collaboration between Maejo University and ASEAN members in advancing education and research in organic agricultural management, possibly through mutual Memoranda of Understanding (MOUs).

Student Exchange Programs: Creating opportunities for students to participate in exchange programs that focus on agricultural education and practical experience at the local level.

Supporting Skills and Education: Supporting international students in developing professional skills and local language proficiency.

Collaborative Research and Problem Solving: Promoting collaborative research to improve organic agriculture and address professional challenges. This involves conducting high-quality joint research.Dr. Dangtongkee also emphasized the importance of promoting cultural understanding and mutual support in activities that foster cross-cultural exchange among international students. The pictures of this activity can be seen on this LINK.

3. Waste (WS)

3R (Reduce, Reuse and Recycle) Program for University Waste

Maejo University Announcement on Green University and Green Office Policies

According to the Announcement of Maejo University dated August 29, 2019, on Green University and Green Office Policies 2019, to drive the university to become a green university and an eco-friendly green office as its target goal, the university would like to improve such policies and ask its organizations, personnel, students and concerned stakeholders to participate, realize and implement the environmental management under the green university policy framework of Maejo University as follows:

1. The University will comply with the policies, laws, orders, regulations, and announcements on the Environmental Management, as well as Green University and Green Office Policies. It will also manage to make use of energy management efficiently and worthwhile to achieve the university's goals and improve its quality to get a higher green university rank to become a sustainable university.

University policy for waste management

3.3 Waste management

3.3.1 Reduce the amount of waste, sorting waste and hazardous waste according to the principles of 3Rs such as reduce, reuse and recycle. Reduce the use of plastic and foams by 10 percent within the year 2020 and decrease to 20 percent in the year 2024.

3.3.2 Manage and develop systems that support waste reduction, waste separation and hazardous waste management from the source to the waste treatment system.

3.3.3 Control and develop an effective wastewater treatment system.

3.3.4 Promote research and development technology and innovation to use technology and innovation in waste water management, solid waste and hazardous waste.

3.3.5 Provide knowledge and promote activities that create discipline and awareness for staffs and students, in order to create a sustainable waste management culture in the community.

Green office policy and development

Example of 3R Program for University Waste (Maejo university): Waste station

Reduce plastic | Reduce and recycle for Food waste | Reduce paper | Reused paper | Reused plastic waste

Waste segregation for recycle

3R program for university waste (Maejo university): Reduce Reuse Recycle

3R program for university waste (Maejo university): Reduce Reuse Recycle

3R program for university waste (Maejo university):

The seminar on 3R concept, waste recycling and value added product from waste

3R program for university waste (Maejo university): 3R poster campaign

Description: 3R (Reduce, Reuse and Recycle) Program for University Waste

According to 100 year university roadmap, Maejo university aims to drive the university towards zero waste community. We developed and implemented 3R program (reduce reuse recycle) for MJU solid waste management according to the policy for Green university (https://green.mju.ac.th/) and the Green office (https://maejo.link?L=656j). In order to steer the direction of waste management in the university, MJU also joined several projects such as SUN (Sustainable University Network) Thailand (https://sunthailand.net/), SWAP (Sustainable solid Waste management and Policies) (https://www.swap-eplus.org/), SDGs (Sustainable Development Goals) (https://sdg.mju.ac.th/MainPage.aspx), SCD (Sustainable Community Development) (https://sdg.mju.ac.th/MainSCD.aspx) and Green Library (https://library.mju.ac.th/greenlibrary/)

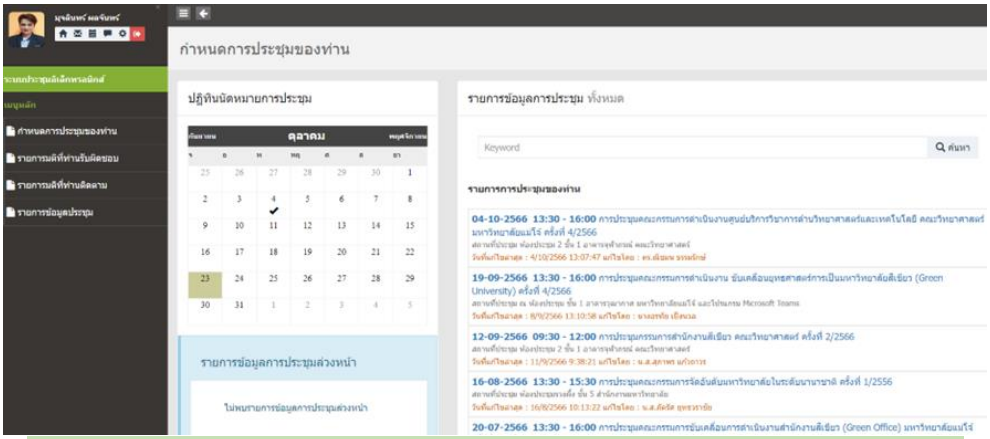
Regarding 3R (Reduce, Reuse and Recycle) Program for University Waste, we targeted on waste reduction for foam (food container), single-used plastics, food and organic waste and paper. We also aimed for reusing and recycling waste by raising awareness using different social platforms and posters, setting up workshops and activities to encourage and to get participation from staff and students to reuse and to segregate waste for recycling. All Faculties through the dean's meeting have committed to join and act for green office regulation and green university where the solid waste management is one of the key indicators. Each organization has separate bins for 4 different types of waste; general waste, organic waste, recycling and hazardous waste/E waste. These allow students staff and faculty to easily determine what they can and cannot recycle. All types recyclables such as paper, plastic, glass and aluminum are placed in the same container, making it easier for the sending to the recycling centre. All 100% of food waste also separated for feeding animals and compost, while 100% of yard waste was collected for aerated static composting systems. Apart from the allocation of sufficient and appropricate bins, all campaigns and actions for 3R program was implemented such as paper and plastic waste reduction, A4 papers reused for printing, E-meeting and

E-documents, Usind refilled mugs , bottles and tote bags,and food containers and green offee break for the meetings.

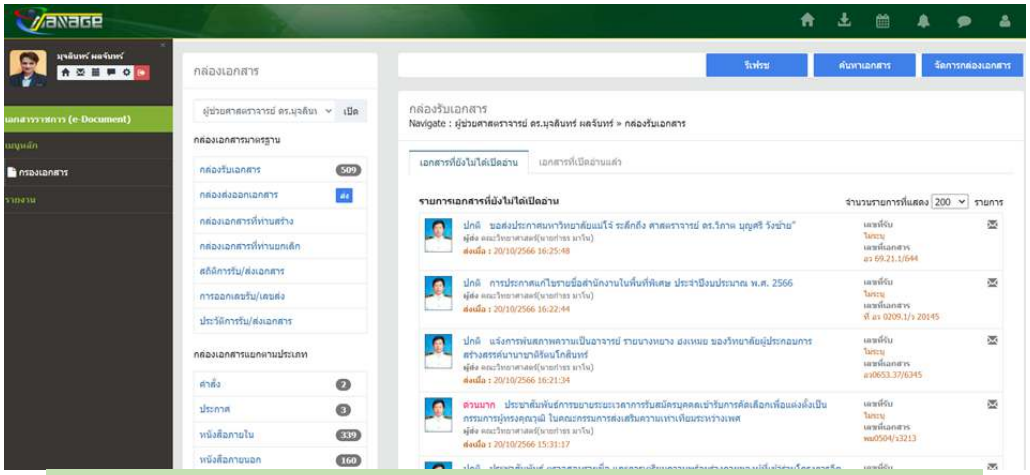
In the public area, moreover, the separated bins and recycle hub were allocated sufficiently. In this year, university organised the public event on clean and green food festival for staff, students and people from the communites. We set up the waste station to give knowledge and raise the awarness and participation on waste mangement and 3R. We also promoted and acted for E-waste management with the private company partner-AIS by setting the collection points and campaigns to separate E-waste items from the general bins. For new students (first year students), university developed 3R programm, waste segragation and university waste managemet policy during the MJU freshy welcoming days by having the session for MJU waste management. For former students, we organised the seminar on 3R concept, waste recycling and value added product from waste – MJU zero waste phase 2. These events allow students to understand and participate for waste segregation, waste reduction and reuse, separating bins and waste recycling.

In conclusion, we successfully achieved 100% of 3R (Reduce, Reuse and Recycle) Program for University Waste.

Program to Reduce the Use of Papers and Plastics on Campus



Example of paper reduction on campus: the E-meeing system



Example of paper reduction on campus: the E-document system

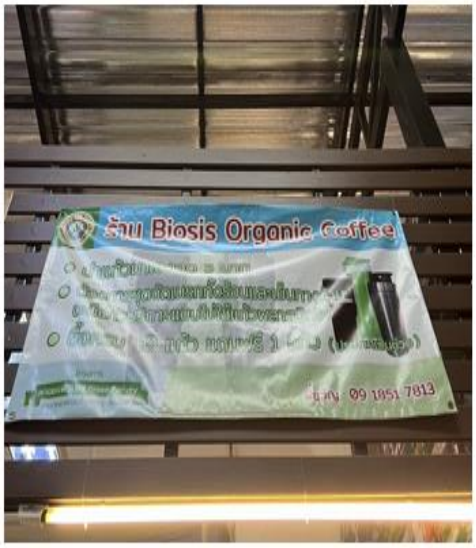
Example of plastic reduction on Campus: Refilled cups/bottles and no plastic holders/Tote bags

Example of plastic reduction on Campus: Green coffee break for the university meeting

Example of plastic reduction on Campus: Using reuse bags or less plastic packaging /organic products for souvenior

Example of Program to Paper Reduce on Campus :

Using 2 sides printing and using reuse papers.



Example of Program to plastic reduction on Campus : " Bring your own mug project". Students and staff can get discounts from food and drink shops after bringing their own containers.

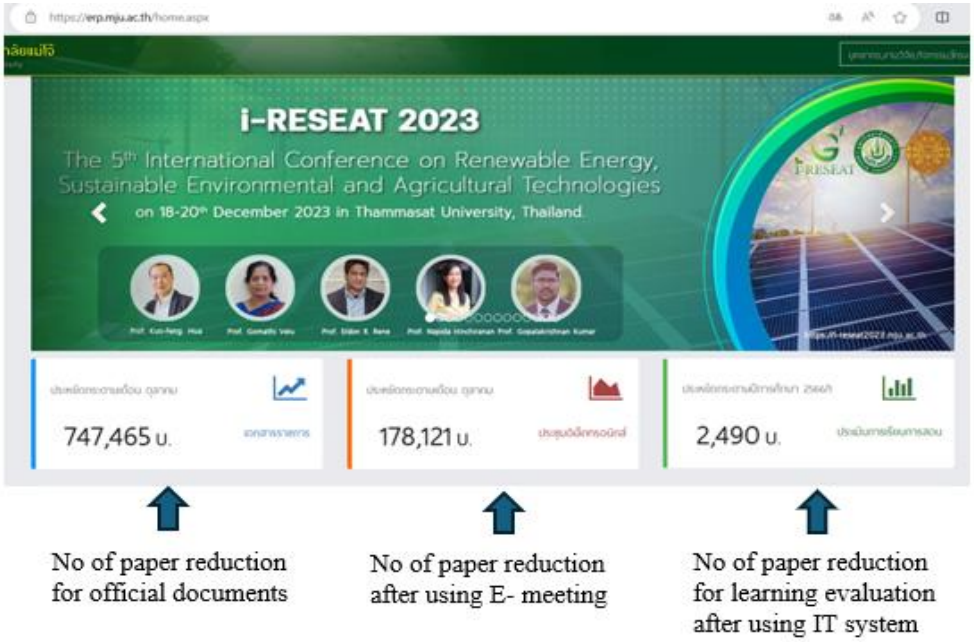
Example of Program to plastic reduction on Campus : Support staff and university to use Green Product (banana leave and Tong Tueng leave plates) developed by MJU staff as plastic replacements.

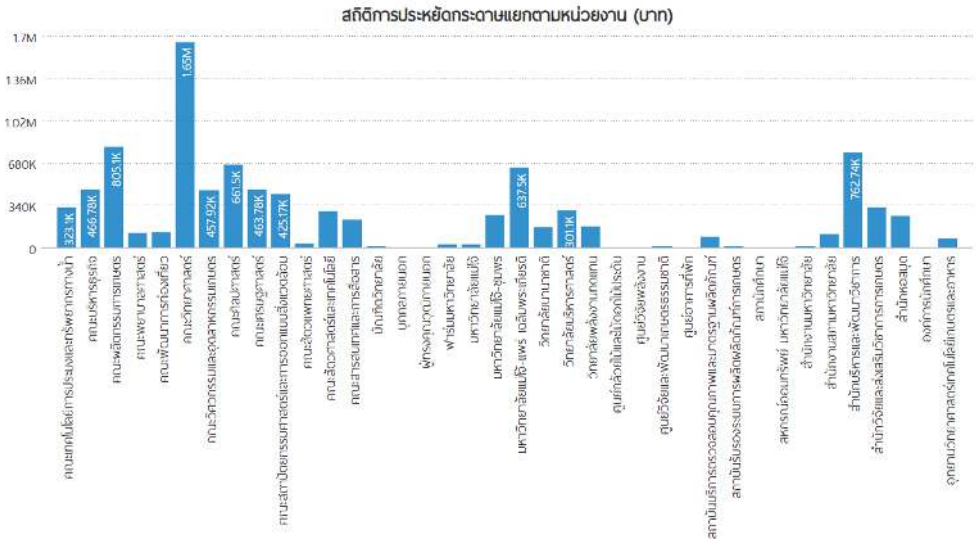
Description: Program to Reduce the Use of Paper and Plastic on Campus

Maejo university has launched, promoted and proceeded policies and activities for paper and plastic usage reductions in order to decrease paper and plastic consumptions in the campus.

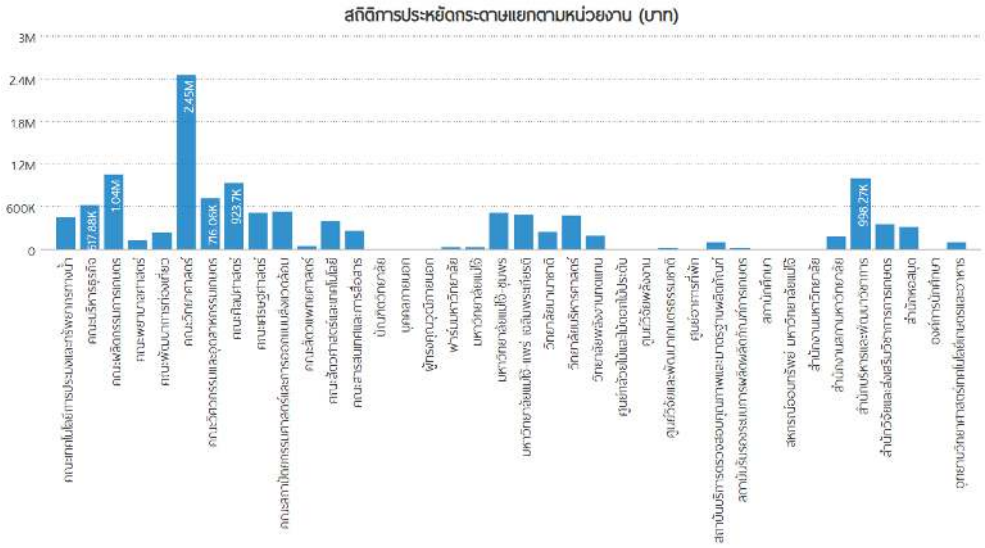
1. Maejo University has a policy of reducing foam and single used plastics since 2018. We support staff and students to use tote bags, refilled mugs / bottles items, food containers, biodegradable products such as plates made from leaves (MJU eco products), biodegradable straw for all university coffee shops.

2. Using 2-side of papers and reuse papers, always recheck your data before printing, use online system instead of hard copy are the policy for the green office that applied and implemented to all faculties and organizations in the campus.
3. Maejo university IT supports a paperless system to reduce paper in daily workplace such as E-Meeting, E-documents and E-evaluation. In year 2023 (January to October) , There were 389 meetings and using E-meeting could reduce the number of paper upto 595,863 papers. (Link: สถิติการลดใช้กระดาษ (mju.ac.th)). For using E-documents inside the campus, it could reduce up to 10,567,500 papers in year 2022 and 8,062,500 paper in year 2023 (link: https://erp.mju.ac.th/documentRptChart2.aspx). These can reduce a lot of paper use that mean MJU can reduce CO_2 emissions and save the world.





https://erp.mju.ac.th/documentRptChart.aspx (year 2022)



https://erp.mju.ac.th/documentRptChart.aspx (year 2023)

4. University promotes and supports the use of biological or degradable packaging and local products for coffee break sets providing for the meeting to avoid plastic waste. Reuse bags or less plactic packaging /Organic products are promoted as souvenirs. This shows the effort to reduce plastic waste and help the environment.
5. The campaign and activities of plastic waste reduction have been promoted and conducted such as bringing your own mug and containers and getting the discount promotions from food and drinks shop.
6. Eco-containers from natural products are developed by MJU researchers. They were distributed to all faculties to be used instead of plastic containers.

Summary of the success, we have implemented more than 3 programs to reduce the use of paper and plastic on campus. We have achieved the reduction of 81.3% of paper waste compared year 2013 and we can reduce 100% of foam containers and 70 % of plastic waste in university".

Total volume organic waste produced

Type of waste	amuount (ton/year)				
	total	reduced	reused	down-cycled	up-cycled
organic	76.8				
- food waste	36.8				
- yard waste; leaf, grasses , branches from trimming.	40				

Description:

Organic waste produced from Maejo university includes the leftover or remaining food generated from the university canteens, food shops and green bin from each department and yard waste from landscape management. For organic waste, a total of 36,800 kg of food waste was separated and collected from each canteen and food shop from each building for further treatment (as shown from the pictures below). This means that all food waste will not be discarded and combined with other waste (general waste, recycled or hazardous waste). Regarding yard waste, it is made up of grass clippings, leaves, stalks, twigs, branches, and general yard debris for the management of the grass and landscape area in the campus. All yard waste with the total amount of 40,000 kg/year from the public area (road, footpath, and public park) is routinely cleaned and collected by the contract cleaning company and transferred to the university composting area, while some green space area from each faculty is responsible by university gardeners.

Food waste is separated

Food waste is collected in the 200 L containers

Food waste separation and collection from all university canteen and food

Yard waste collections

Total volume organic waste treated

Type of waste	amuount (ton/year)				
	total	reduced	reused	down-cycled	up-cycled
organic	76.8	-	36.8	-	40
- food waste	36.8	-	36.8	-	-
- yard waste; leaf, grasses , branches from trimming.	40	-	-	-	40

Description: Total volume organic waste treated

In 2023, 100% (76,800 kg) of organic waste generated from Maejo university was separated and treated efficiently. 36,800 kg of food waste was collected and reused for animal feeding, while 40,000 kg of yard waste was transferred to MJU composting area for composting. The compost obtained from yard waste is used as soil supplementation for landscape areas development in the campus and packed for the distribution to staff, students, and others on special environmental events. Approximately, 40,000 kg of compost was produced each year as shown from the picture. Composting is the process of upcycling natural organic waste like yard waste into a higher value product such as fertilizer or soil supplement and it is one of the most adopted and successful methods to treat organic waste.

University composting area using the aerated static pile composting process.

Compost produced from MJU organic waste was used for soil amendments for the landscape areas in the campus.process.

Compost produced from MJU organic waste was used for distribution to staff, students and community.

Organic Waste Treatment

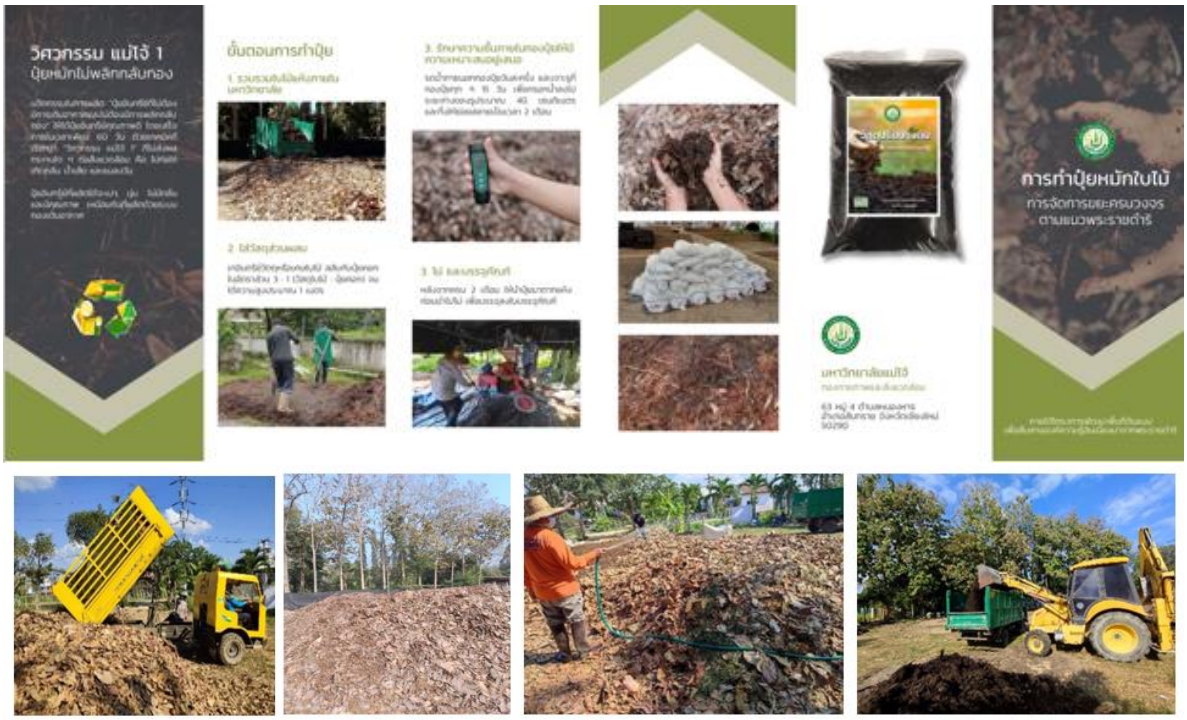
Campaign to separate food waste.

Organic Waste Treatment for food waste from office Green cone: Maejo

Organic Waste Treatment for food waste from canteen: Maejo

Food separating area | Food waste is separated | Food waste is collected in the 200 L containers | Animal feeding

Organic Waste Treatment for food waste from canteen: Maejo



Organic Waste Treatment for yard waste: Maejo University: Maejo University

Output from yard waste treatment: Composts

Description: Organic Waste Treatment

Sources of organic waste in the Maejo university are canteens, food shops and yard waste which are complete and well managed for reuse as animal feeding and upcycle for compost. The flow chart of food waste treatment shows in the picture. University also has a campaign to support the separation of food waste from other wastes and has the separation system and location for food waste collection. MJU managed food waste from canteens and food shops through the contract with a local farmer for animal feeding purposes. He daily collects food waste and transports to his pig farm nearby Maejo university. Apart from 100% food waste reduction, the output of this system also help the local community to have a better quality of life.

Also, some food waste produced from staff from the office was separated and treated using a green cone (composting bin). A total of 10 green cone were installed nearby each building under the green cone project which was initially supported under green office committee. This aimed to

encourage staff from each faculty to separate food waste from general waste. Everyday, all food waste from the office was separated and the cleaners collected and discarded the food waste to this green cone.

For yard waste, after collection of grass clippings, bushes, shrubs, and clippings from bushes and shrubs from landscape management on the campus area, these were transferred to MJU composting area. Yard waste was then biodegraded using the aerated static pile composting process that has been initiated and developed by Associated Professor Teerapong Sawangpunyangul and his teams. In 2023, nearly 40 tons of composts were produced. The quality of compost was determined before packing for further applications. The compost contained 26.1% of organic matter, 1.3% of total nitrogen, 1.68% of total phosphorus, and 0.26% of total potassium. The compost products were then used for landscape management on the campus area and distributed to MJU staff members. Link: https://www.facebook.com/CompostClassroom/?fref=photo)

Total volume inorganic waste treated

Type of waste	amuount (ton/year)				
	total	reduced	reused	down-cycled	up-cycled
inorganic non-toxic	20.87			20.87	
- paper and cardboard	17.37			17.37	
- plastic	3.49			3.49	
- glass	1.73			1.73	
- metals	3.77			3.77	

Description:

Total volume inorganic waste treated in the campus during October 2022-2023 **is about 20.88 ton by down-cycled process through local recycling company.** The inorganic waste generated from the campus was paper (17.37 ton), plastic (3.49 ton), glass (1.73 ton) and metals (3.77 ton) (Link; https://greenhouse.mju.ac.th/graphpiegarbage.php). The paper waste (paper and cardboard) is sorted

from its source, separated, and collected from each department, while other wastes were separated and collected from the office and the recycled bins. **All of them (100%) were sent for recycling.**

Paper waste separating and sorting

Paper waste on-site shredding

Paper waste after shredding are collected for recycling

Inorganic waste separation, sorting, and collecting for recycling.

Inorganic Waste Treatment

The master plan and the construction update of MJU solid waste management and recycling center

Weighting scale and conveyor were installed at the MJU recycling center

Paper waste separating and sorting

Paper waste on-site shredding

Paper waste after shredding are collected for recycling

Inorganic waste separation, sorting, and collecting for recycling.

Upcycling project for plastic bags: how to make knitting products from plastic bags

Distribution of eco-plates to all faculties to reduce paper and plastic waste

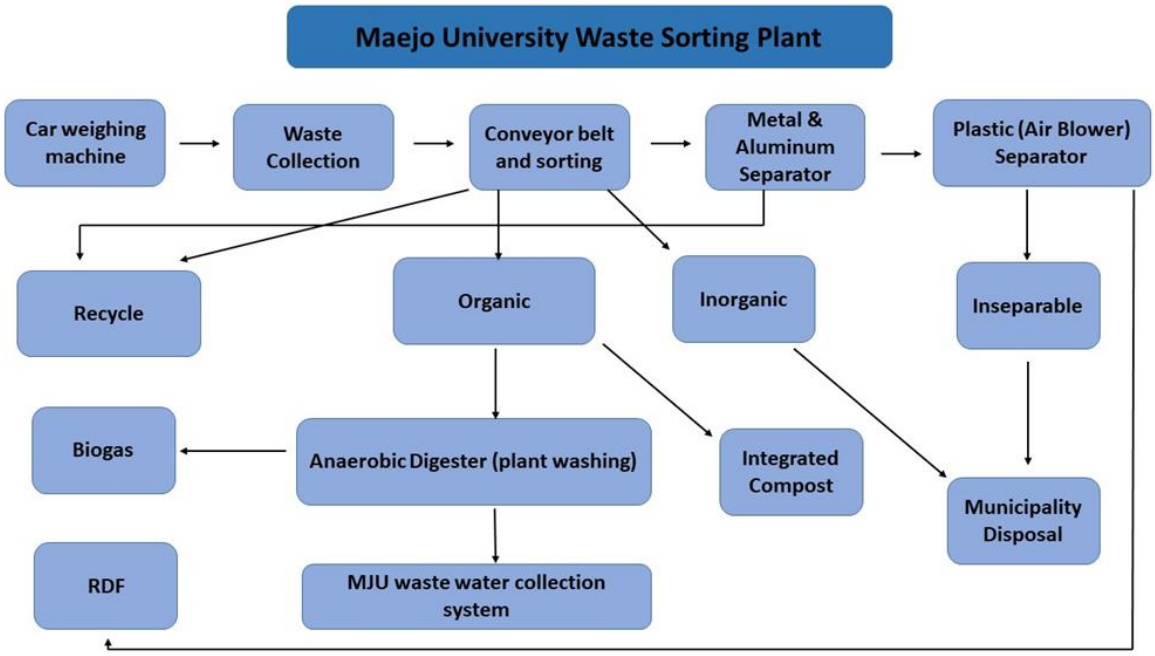
Distribution of paper slip collection box to all faculties

3R campaign

Discounts from coffee shop when using your own mugs

Description: MJU inorganic waste management

The strategy for inorganic waste handling at Maejo University for the long-term strategy is the development of MJU solid waste management and recycling center. This aims to increase the efficiency of MJU solid waste management, while waste sorting and waste minimization at its source are a priority which is done by all campaigns and activities. In the end, the waste will be recycled for down and upcycle and used for energy recovery. In the year 2023, MJU solid waste management and recycling center is under construction and 90% is in progress. The master plan and sorting flow diagram are shown below.



In the year 2023, MJU also carried out actions and launched activities for inorganic waste handling such as sorting from its source, 3Rs and big cleaning projects. Also, green office policies and actions have been driven for every faculty and building on the campus. **100% of all inorganic waste are recycled**. Here are examples of inorganic waste management.

Reduce

1. Maejo university IT supports a paperless system to reduce paper in daily workplace such as E-Meeting, E-documents and E-evaluation. In year 2023 (January to October) , There were 389 meetings and using E-meeting could reduce the number of paper upto 595,863 papers. (Link: สถิติการลดใช้กระดาษ (mju.ac.th)). For using E-documents inside the campus, it could reduce up to 10,567,500 papers in year 2022 and 8,062,500 paper in year 2023 (link: https://erp.mju.ac.th/documentRptChart2.aspx). These can reduce a lot of paper use that means MJU can reduce CO_2 emissions and save the world.
2. Maejo University has a policy of reducing foam and single used plastics since 2018. We support staff and students to use tote bags, refilled mugs / bottles items, food containers, biodegradable products such as plates made from leaves (MJU eco products), biodegradable straw for all university coffee shops.
3. University promotes and supports the use of biological or degradable packaging and local products for coffee break sets providing for the meeting to avoid plastic waste. Reuse bags or less plactic packaging /Organic products are promoted as souvenirs. This shows the effort to reduce plastic waste and help the environment.
4. The campaign and activities of plastic waste reduction have been promoted and conducted such as bringing your own mug and containers and getting the discount promotions from food and drinks shop.
5. Eco-containers from natural products are developed by MJU researchers. They were distributed to all faculties to be used instead of plastic containers.

Reuse

1. Each organization and faculty have a policy of using 2-side of papers and reuse papers and always recheck your data before printing.
2. Maejo University has a policy of reducing foam and single used plastics since 2018. We support staff and students to use tote bags, refilled mugs / bottles items, food containers, biodegradable products such as plates made from leaves (MJU eco products), biodegradable straw for all university coffee shops.

3. Get discounts from the coffee shop in the campus by using your own mugs or bottles.

Recycle

1. After inorganic waste (such as paper, cardboard, plastic, glass and metals) from recycling bins and from office collection point are sorted and separated, they are sold and send for recycling by the local recycling companies. The expired official documents were separated, collected and shredded before being sent for recycle. The money obtained was further used for waste management in the organization.
2. MJU also had a collection point for thin plastic lids and orphan plastic which was collected and sent to the green road project. We also organized upcycling plastic waste projects such as making coasters from plastic lids, and plastic pots for plantation and office decoration. This aims to encourage and raise awareness among staff and students for plastic waste recycling.
3. For milk cartons, aluminum rings, and used stockings, MJU central library was a host for these waste collections for donation.
4. MJU had the activity call "DIY from plastic waste", to encourage students and staff to separate and collect plastic bags for bag knitting. This is the first start to make upcycles for plastic bags.
5. Distribution of used paper slips collection box for all faculties to separate this waste from the general bin and sent it to green way project to make green way new books https://www.tollway.co.th/en/newsroom/social-activities/377/campaign-green-way-book

Total volume toxic waste produced

Type of waste	amuount (ton/year)				
	total	reduced	reused	down-cycled	up-cycled
toxic	**5.553**				
- electronics waste	0.003				
- lab. Chemicals waste	2.76				
- domestic hazardous waste such as fluorescence, battery, Spay bottles etc.	3.00				

Description: Total volume toxic waste produced_MJU

Maejo University produced a wide variety of hazardous waste, including chemical-contaminated materials, shattered glass, sharp objects, chemical receptacles, spray containers, electronic equipment, batteries, fluorescent light bulbs, and electronic waste. These waste materials originated from the university's laboratories, study areas, administrative offices, buildings, dormitories, as well as the electronic devices used by both staff and students.

In the year 2023, **MJU generated a total of 5.763 ton of toxic waste**, with 3 kg of E-waste (mobile phone, battery, power bank, headphone, charger), 2760 kg of lab-waste and 3000 kg of domestic hazardous waste (fluorescence light bulb, battery, Spay bottles etc.)

Examples of toxic waste on the MJU campus

Examples of toxic waste on the MJU campus

Total volume toxic waste produced

Type of waste	amuount (ton/year)				
	total	reduced	reused	down-cycled	up-cycled
toxic	**5.763**			**2.76**	**3.003**
- electronics waste	0.003				0.003
- lab. Chemicals waste	2.76			2.76	
- Hazardous waste Such as Fluorescence, battery, Spay bottles etc.	3.00				3.00

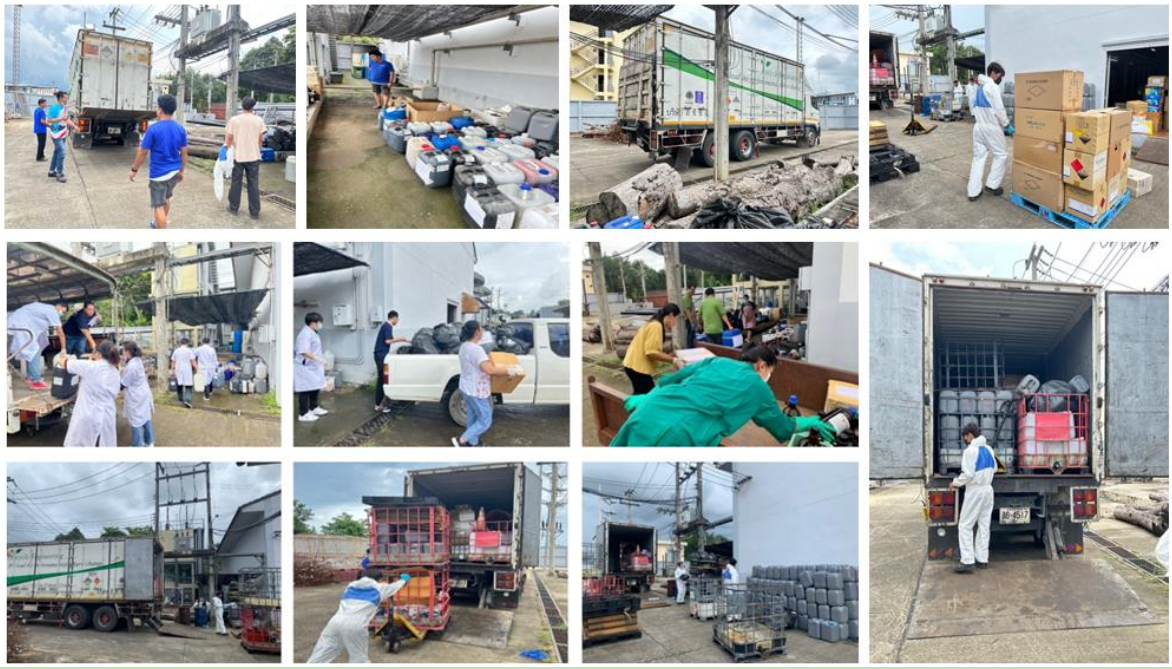
Description: Total volume toxic waste treated

Maejo University produced a diverse array of hazardous waste, encompassing chemical-contaminated materials, household hazardous waste, and electronic waste, which originated from the university's laboratories, study areas, administrative offices, buildings, dormitories, as well as the electronic devices used by both staff and students. To ensure efficient management, disposal, and environmentally responsible treatment of these materials, the university implemented numerous policies and procedures. The budgets for the handling of these hazardous wastes were established and ratified by the university's board council. Additionally, qualified staff members were designated for waste collection and oversight.

In the year 2023, 100% of MJU hazardous waste with the total amount of 5.763 tons was efficiently and well managed by authorized companies according to law and regulations.

All different waste is treated with different and suitable methods regarding their properties. Some materials such as metals or chemicals are separated and treated for up cycle and down cycle to be reused as natural resources, while others is treated to reduce its toxicity before discarding the environment.

Toxic Waste Treatment



Handling of chemically contaminated waste and chemical containers from laboratories. Collection from each building by MJU-certified lab technicians. Then all hazardous waste was transported, treated, and disposed through the contract with the certified hazardous waste company- Recycle Engineering Co., Ltd.

Dropping points of domestic hazardous waste in the campus






Handling of domestic hazardous waste from 10 MJU collection pints and red bins. All hazardous waste was transported, treated, and disposed through the contract with Maejo municipality.

บริษัท รีไซเคิลเอ็นจิเนียริ่ง จำกัด
RECYCLE ENGINEERING CO.,LTD.

Ref. No. MK1-23/405

Date September 21, 2023
Subject Disposal Service Report of Laboratory Waste
To Maejo University

According to Recycle Engineering Co., Ltd. provided the transportation and disposal service of Laboratory Waste for Maejo University on September 21, 2023 refer to manifest No. 23/2740. This is the report of disposal process as shown below in the table, Flow chart of Chemical Process Diagram and figures.

Table : Summary weight of waste.

Type of Waste	Waste Management	Quantities (Kg.)
Mixed Solvent	Analysis of physical and chemical primary properties is then pre-treating, separating recyclable parts and transporting the collected sediment by cement or hazardous waste incinerators.	426.6
Acid-Base	Analysis of the basic properties of acid-base is then naturalized to have a neutral pH value before collecting and disposing by cement or hazardous waste incinerators.	353.2
High-Toxic	Analysis of basic physical and chemical properties. After that, de-toxic is performed according to each type of chemical before collecting and disposing by cement kilns or hazardous waste kilns.	169.1
Heavy Metal	Analysis of primary physical and chemical properties afterwards improves the quality of waste by precipitation and transports it away by cement or hazardous waste incinerators.	366.9
Solid Waste	Preliminary analysis according to physical and chemical characteristics is then conducted as appropriate, conducting pre-treatment waste before collecting it for disposal by cement or hazardous waste incinerator.	39.9

Recycling is the best way to manage waste material

บริษัท รีไซเคิลเอ็นจิเนียริ่ง จำกัด
RECYCLE ENGINEERING CO.,LTD.

Type of Waste	Waste Management	Quantities (Kg.)
Unknown	The solution is sorted by physical and chemical characteristics, then sorted and grouped to determine the appropriate management guidelines. After that, pre-treatment, recycle and dispose of the sediment by cement or hazardous waste incinerator.	563.7
Contaminated Container	Complete the chemical transfer from the container. Then, empty containers are washed by storing waste from washing containers, collecting incinerators at cement factory kilns, and collecting empty containers to dispose of hazardous waste kilns.	838.7
Total		2,758.1

So I learned to know and thank you for giving me the opportunity to serve.

Your Sincerely,
Apichayapat Jomnongjit
Customer Service

Recycling is the best way to manage waste material

Results and method for lab-waste treatment

MJU did the mou with AIS to be the agency partner for E-waste collection point

Training workshop for students to understand E-waste and how to manage and recycle

E-waste collection bin by MOU with AIS

Description: Hazardous waste disposal and management at Maejo University.

Maejo University generated a broad range of toxic waste such as chemicals, contaminated waste, broken glass, sharp items, chemical containers, spray bottles, electronics devices, batteries, fluorescence light bulbs and e-waste. They came from laboratories, study rooms, working offices, buildings, dormitories, and electronic devices of staff and students. To manage, dispose and treat these toxic items efficiently and to promote environmental-friendly waste management, many policies and several procedures have been conducted regarding its properties. The budgets for handling these hazardous wastes were set and approved by university board council. Also, trained staff were assigned for waste collection and control.

In the year 2023, 100% of MJU toxic waste was efficiently and well managed by authorized companies according to law and regulations. Here are the details.

1. For domestic hazardous waste like, fluoresces light bulbs, batteries, spray bottles etc., are collected in the 10 household hazardous waste collection points located on the Maejo campus and red bin available in each faculties. These household hazardous wastes were collected and transported to be handled through the contract with Maejo municipality for disposal at Wongpanit Recycle Company (a certified contract company). This is part of the community hazardous waste management project, Chiangmai, Thailand.
2. For chemicals contaminated waste, used chemicals, and chemical containers from laboratories and research sections, only trained lab technicians who got a certificate in waste management are responsible for handling and setting the procedure of collection and storage of this waste before disposal. In the beginning, all waste will be checked and weighed, labeled, and recorded. Some types of waste are pretreated before storage. All the waste is placed and stored in a safe and isolated area before transferring to dispose of by a certified contracted company each year. In the year 2023, the amount of hazardous waste collected and sent for disposal by the Recycle engineering company, a certified company. According to Recycle Engineering Co., Ltd. provided the transportation and disposal service of Laboratory Waste for Maejo University on September 21, 2023 refer to manifest No. 23/2740. This is the report of disposal process as shown below in the table bellowed.

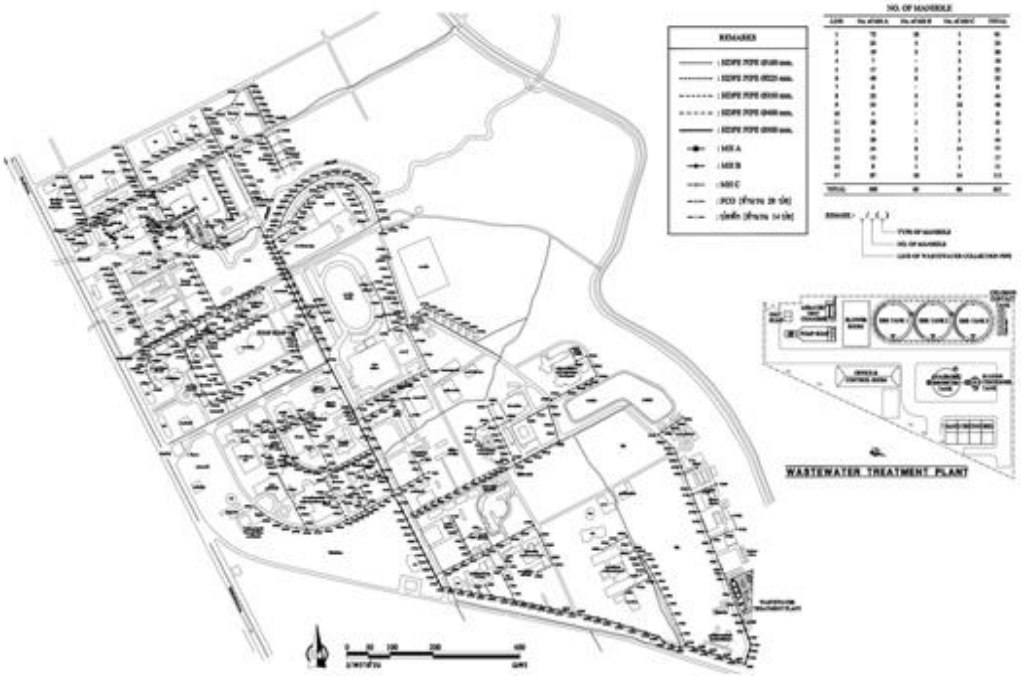
Type of Waste	Waste Management	Quantities (Kg.)
Mixed Solvent	Analysis of physical and chemical primary properties is then pre-treating, separating recyclable parts and transporting the collected sediment by cement or hazardous waste incinerators.	426.6
Acid-Base	Analysis of the basic properties of acid-base is then naturalized to have a neutral pH value before collecting and disposing by cement or hazardous waste incinerators.	353.2
High-Toxic	Analysis of basic physical and chemical properties. After that, de-toxic is performed according to each type of chemical before collecting and disposing by cement kilns or hazardous waste kilns.	169.1
Heavy Metal	Analysis of primary physical and chemical properties afterwards improves the quality of waste by precipitation and transports it away by cement or hazardous waste incinerators.	366.9
Solid Waste	Preliminary analysis according to physical and chemical characteristics is then conducted as appropriate, conducting pre-treatment waste before collecting it for disposal by cement or hazardous waste incinerator.	39.9
Unknown	The solution is sorted by physical and chemical characteristics, then sorted and grouped to determine the appropriate management guidelines. After that, pre-treatment, recycle and dispose of the sediment by cement or hazardous waste incinerator.	563.7
Contaminated Container	Complete the chemical transfer from the container. Then, empty containers are washed by storing waste from washing containers, collecting incinerators at cement factory kilns, and collecting empty containers to dispose of hazardous waste kilns.	838.7
Total		2,758.1

3. Since 2020, Maejo has signed a collaboration with AIS (mobile network company) for the installation of E-waste bins on campus. Also in the year 2023, MJU signed an MOU with AIS for being the agency for E-waste collection point through the E-Waste+ platform.

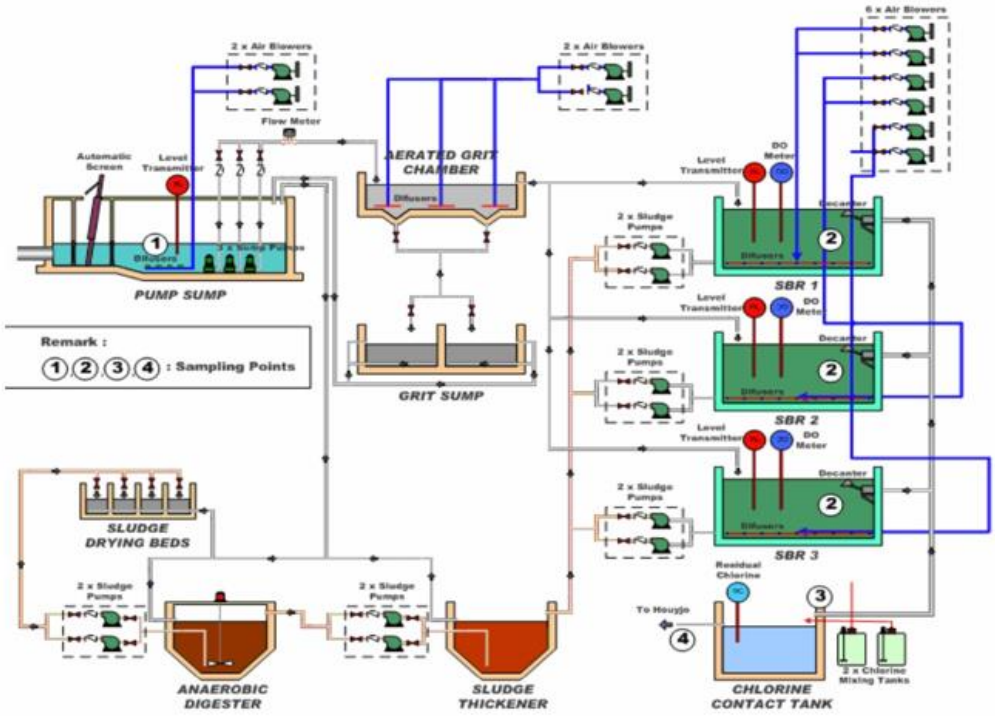
   Link: https://sustainability.ais.co.th/en/update/news/279/ais-redesigns-the-e-waste-ecosystem-with-blockchain-on-e-waste-for-the-first-time-in-the-southeast-asia-region-tgo-and-six-green-network-partners-have-joined-forces-to-power-a-sustainable-env

   This aim is to collect all the used and broken electronic devices including mobile phones and accessories and IT items for disposal and management. This E-waste was collected by MJU waste management staff to pack and send AIS team for recycling at an E-waste recycling company (under an AIS contract). MJU also promotes e- waste management campaigns via the university website, poster and workshop for students.

Sewage Disposal



Wastewater treatment plant layout



Schematic of the MJU wastewater treatment system


SBR systems


Quality monitoring

(a) (b) (c)

a) wastewater

b) wastewater from aeration tank

c) effluent (Treated water)

Sludge from wastewater treatment process used for soil amendment

Piping system to reuse treated water for garden and landscape

The ecological sanitation or ecosan used on the campus

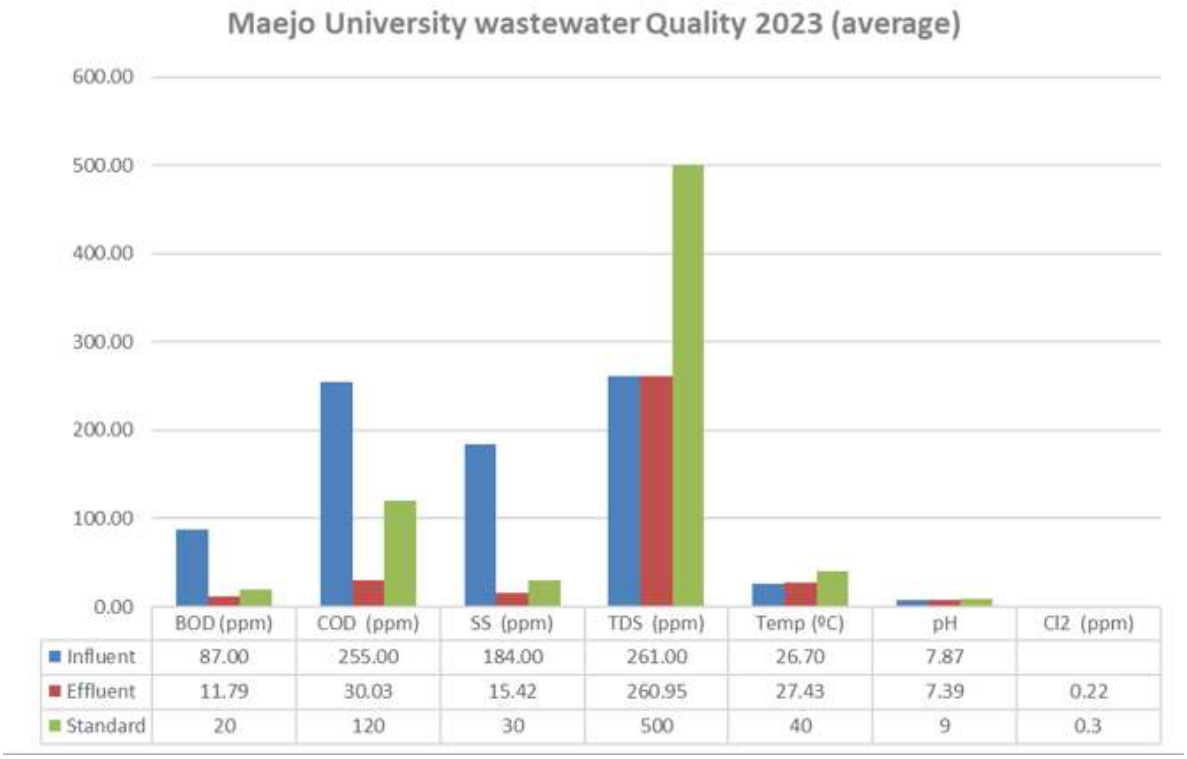
Description: Sewage disposal system and wastewater recycling program

1. Wastewater from all buildings from the Maejo University campus are collected using the separated sewer system and transported through a piping system to treat at the MJU Wastewater Treatment Plant. For the wastewater treatment system, Sequencing Batch Reactors (SBR) was used to treat approximately 1600 m^3 / d. with high performance of 85% treatment efficiency. The flow diagram of a wastewater treatment plant and piping system is shown in the picture and link;

https://erp.mju.ac.th/openFile.aspx?id=NDc3MDM1&method=inline

All routine treatment parameters such as BOD, COD, pH, DO, TKN, SS, etc. were sampled and analyzed by technicians. Also, the results of treatment performances were confirmed by a certified laboratory. The figure below shows the performance of the wastewater treatment system. The treatment efficiency is reported via this link;

https://erp.mju.ac.th/openFile.aspx?id=NTkzMjgz&method=inline
https://docs.google.com/spreadsheets/d/1nvefVUYQYay-E6l1weryOl8LWwlSOYU-2lU-JaOk4LQ/edit?usp=sharing

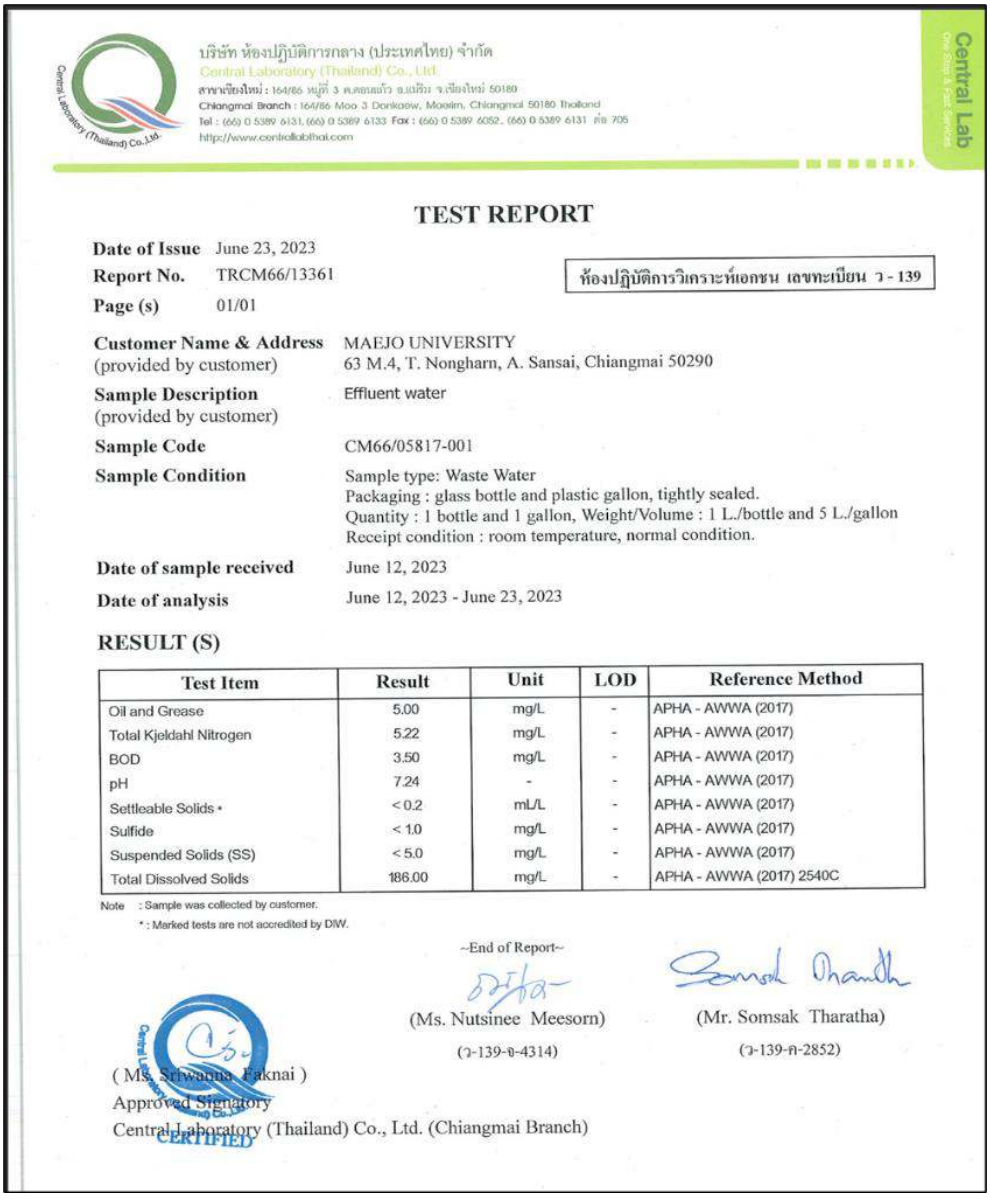


	BOD (ppm)	COD (ppm)	SS (ppm)	TDS (ppm)	Temp (°C)	pH	Cl2 (ppm)
Influent	87.00	255.00	184.00	261.00	26.70	7.87	
Effluent	11.79	30.03	15.42	260.95	27.43	7.39	0.22
Standard	20	120	30	500	40	9	0.3

Data collection of wastewater and treated wastewater quality of the wastewater treatment system (October 2022 to September 2023)

DATE	Wastewater into the system						Treadted wastewater (*Strandard)							Performance of system (%)
	BOD	COD	SS	TDS	Temp	pH	BOD 20*	COD 120*	SS 30*	TDS 500*	Temp 40*	pH 5.0-9.0*	Cl_2 0.3*	
5/10/08	84	121	129	229	28.1	7.69	14	48	8	257	25.9	7.41	0.25	83.33
7/10/08	79	87	14	238	29.1	7.31	9	24	9	294	29.9	7.24	0.21	88.61
12/10/08	86	227	12	282	28.9	7.06	13	83	8	290	27.9	7.45	0.23	84.88
14/10/08	92	203.7	59	297	28.6	7.28	11	19.6	12	328	27.4	6.96	0.21	88.04
19/10/08	87	184	72	261	26	7	14	21.3	13	243	28.4	6.94	0.18	83.91
21/10/08	72	311	238	244	26.1	7.31	12	36.4	16	261	29.7	7.72	0.24	83.33
26/10/08	109	255	184	261	26.7	7.87	13	22.6	17	284	28.1	7.48	0.2	88.07
28/10/08	89	267	137	217	26.9	7.63	11	45.5	11	241	27.3	7.72	0.19	87.64
2/11/08	87	217	79	184	27.1	7.96	9	17.5	16	238	29.7	7.82	0.27	89.66
4/11/08	91	137	61	176	27.8	7.68	12	19.4	18	214	30.1	7.29	0.21	86.81
9/11/08	82	286	103	226	25.6	7.63	9	36.4	9	259	29.8	7.72	0.19	89.02
11/11/08	104	108	92	231	25.6	7.29	11	17.5	18	253	31.3	7.82	0.25	89.42
16/11/08	63	196	86	267	26.4	7.51	10	22.6	7	284	28.1	7.48	0.23	84.13
18/11/08	71	147	64	207	28.3	7.19	12	29	17	217	26.3	7.83	0.27	83.10
23/11/08	69	196	86	214	28.2	7.51	11	25	15	241	30.2	7.63	0.19	84.06
25/11/08	87	213	96	226	27.6	7.31	14	19.2	12	259	29.6	7.51	0.2	83.91
30/11/08	104	198	69	265	27.1	7.81	12	22.6	21	284	30.4	7.48	0.24	88.46
2/12/08	89	197	131	215	26.3	7.44	12	27.3	16	236	29.3	7.64	0.21	86.52
7/12/08	72	174	86	214	28.2	7.51	10	25	19	241	26.5	7.63	0.18	86.11
9/12/08	91	214	131	207	26.3	7.44	11	32.6	14	231	27.1	7.61	0.22	87.91
14/12/08	87	196	121	308	26.8	7.84	10	29	25	276	27.2	7.87	0.2	88.51
16/12/08	81	186	92	216	26.3	7.69	15	19.8	18	247	25.3	7.48	0.25	81.48
21/12/08	84	193	83	274	28.7	8.01	15	36.7	21	296	25.6	7.46	0.19	82.14
23/12/08	72	168	84	187	26.1	7.31	14	41.2	11	216	26.1	7.41	0.19	80.56
28/12/08	79	159	14	238	26.1	7.31	12	26.4	19	294	25.3	7.24	0.27	84.81
4/1/09	83	215	214	214	26.1	7.87	12	28.1	14	251	30.2	7.59	0.21	85.54
6/1/09	89	186	172	247	26.3	7.28	11	22.6	15	263	30.4	7.48	0.15	87.64
11/1/09	72	162	96	226	27.6	7.31	9	19.2	12	259	26.7	7.51	0.2	87.50
13/1/09	104	187	86	216	26.3	7.69	13	45	26	247	27.3	7.48	0.18	87.50
18/1/09	76	151	83	274	28.7	8.01	11	36	25	296	26.4	7.46	0.19	85.53
20/1/09	75	196	126	214	26.4	7.88	10	25.6	18	239	25.9	7.54	0.2	86.67
25/1/09	81	168	84	187	26.1	7.31	10	27	15	216	26.5	7.41	0.19	87.65
27/1/09	69	137	72	229	23.7	7.69	13	48	21	257	25.9	7.41	0.22	81.16
1/2/09	69	169	56	241	28.1	7.05	11	36	17	268	25.4	7.04	0.21	84.06
3/2/09	78	164	63	320	27.7	6.06	11	25.7	16	270	25.8	6.13	0.18	85.90
8/2/09	71	168	84	187	26.1	7.31	10	27	15	216	26.1	7.41	0.2	85.92
10/2/09	62	137	72	229	23.7	7.69	11	48	21	257	25.9	7.41	0.2	82.26
15/2/09	107	193	56	241	25.9	7.05	12	36	17	268	25.4	7.04	0.21	88.79
22/2/09	102	207	95	198	26.3	7.52	12	36.9	15	281	25.1	7.39	0.19	88.24
24/2/09	86	164	63	320	26.1	6.06	11	25.7	16	270	26.3	6.13	0.21	87.21
1/3/09	86	187	59	297	28.6	7.28	13	18	12	328	27.4	7.0	0.21	84.88
3/3/09	79	184	72	261	26	7	12	25	13	243	28.4	6.9	0.18	84.81
8/3/09	72	214	238	244	26.1	6.9	13	37	16	261	29.7	7.7	0.24	81.94
10/3/09	92	169	184	261	26.7	7.2	14	28	17	284	28.1	7.5	0.2	84.78

15/3/09	85	173	137	217	26.9	7.3	12	31	11	241	27.3	7.7	0.19	85.88
17/3/09	71	197	96	173	25.8	7.1	13	28	18	241	25.9	7.4	0.21	81.69
22/3/09	83	201	12	282	28.9	7.5	12	42	8	290	27.9	7.5	0.23	85.54
24/3/09	95	119	129	229	23.7	6.9	12	39	8	257	25.9	7.4	0.25	87.37
29/3/09	79	184	14	238	29.1	7.3	11	41	9	294	26.8	7.2	0.27	86.08
31/3/09	72	195	12	282	28.9	7.1	11	53	8	290	28.1	7.5	0.23	84.72
5/4/09	69	163	69	265	27.1	7.81	7	22.6	11	284	30.4	7.48	0.24	89.86
7/4/09	63	179	103	226	25.6	7.63	8	36.4	9	259	29.8	7.72	0.19	87.30
12/4/09	71	201	131	215	26.3	7.44	12	26.4	18	236	29.3	7.64	0.21	83.10
19/4/09	64	196	86	267	26.4	7.51	9	22.6	7	284	28.1	7.48	0.19	85.94
21/4/09	73	187	69	198	28.9	7.83	11	23.8	18	224	26.8	7.59	0.17	84.93
26/4/09	86	112	83	274	28.7	8.01	12	36	25	296	26.7	7.46	0.23	86.05
28/4/09	65	196	126	214	26.4	7.88	12	25.6	18	239	27.8	7.54	0.27	81.54
3/5/09	76	203	81	226	27.6	7.31	11	19.2	17	259	26.7	7.2	0.25	85.53
5/5/09	71	196	86	242	27.3	7.1	13	26	26	225	27.4	7.1	0.27	81.69
10/5/09	84	211	94	263	27.1	7.45	10	41	21	294	27.9	7.1	0.21	88.10
12/5/09	72	184	72	176	27.8	7.68	13	19.4	19	214	26.7	6.9	0.24	81.94
19/5/09	68	195	65	229	28.1	7.69	11	48	18	257	25.9	7.4	0.24	83.82
24/5/09	71	148	83	238	29.1	7.31	13	24	23	294	28.6	7.4	0.21	81.69
26/5/09	66	121	129	229	28.1	7.69	11	48	8	257	25.9	7.41	0.25	83.33
31/5/09	73	87	14	238	29.1	7.31	13	24	9	294	29.9	7.24	0.21	82.19
2/6/09	76	293.2	131	207	26.3	7.44	11	41.5	14	231	27.1	7.61	0.22	85.53
7/6/09	91	196	121	308	26.8	7.84	10	19	10	276	27.2	7.87	0.2	89.01
9/6/09	87	173	92	216	26.3	7.69	15	22.6	7	247	25.3	7.48	0.25	82.76
14/6/09	79	112	83	274	28.7	8.01	15	36	25	296	25.6	7.46	0.19	81.01
16/6/09	85	171	14	238	26.1	7.31	13	24	12	294	25.3	7.24	0.27	84.71
21/6/09	104	267	98	215	26.9	8.01	13	27	21	241	27.5	6.4	0.21	87.50
22/6/09	76	217	103	261	26.7	7.87	11	22.6	18	284	27.2	7.6	0.25	85.53
28/6/09	84	203	81	226	27.6	7.31	15	19.2	17	259	26.7	7.2	0.25	82.14
30/6/09	76	196	86	242	27.3	7.1	13	26	26	225	27.4	7.1	0.27	82.89
5/7/09	101	207	95	198	26.3	7.52	11	36.9	15	281	25.1	7.39	0.19	89.11
7/7/09	87	164	63	320	26.1	6.06	13	25.7	16	270	26.3	6.13	0.21	85.06
12/7/09	79	187	59	297	28.6	7.28	13	18	12	328	27.4	7.0	0.21	83.54
14/7/09	74	184	72	261	26	7	12	25	13	243	28.4	6.9	0.18	83.78
19/7/09	81	214	238	244	26.1	6.9	11	37	16	261	29.7	7.7	0.19	86.42
21/7/09	69	169	184	261	26.7	7.2	13	28	17	284	28.1	7.5	0.2	81.16
26/7/09	87	173	137	217	26.9	7.3	11	31	11	241	27.3	7.7	0.19	87.36
4/8/09	81	194	69	198	28.9	7.83	11	23.8	18	224	26.8	7.59	0.21	86.42
9/8/09	76	173	52	232	26.3	7.61	10	36.7	17	259	26.7	7.83	0.17	86.84
11/8/09	89	207	129	229	23.7	7.69	12	48	8	257	25.9	7.41	0.23	86.52
16/8/09	92	196	86	214	28.2	7.51	11	25	15	241	26.4	7.63	0.18	88.04
18/8/09	84	186	86	242	27.3	7.1	11	26	21	225	28.6	7.13	0.17	86.90
23/8/09	73	108	92	231	25.6	7.29	13	17.5	18	253	31.3	7.82	0.26	82.19
25/8/09	84	214	96	173	25.8	7.81	12	28	18	241	25.9	7.41	0.31	85.71
30/8/09	97	235	184	261	26.7	7.87	12	22.6	17	284	24.7	7.48	0.19	87.63
1/9/09	71	173	92	216	26.3	7.69	13	22.6	7	247	27.3	7.48	0.25	81.69
6/9/09	69	112	83	274	28.7	8.01	11	36	25	296	26.4	7.46	0.19	84.06
8/9/09	73	241	126	214	26.4	7.88	13	25.6	18	239	25.9	7.54	0.22	82.19
13/9/09	76	168	84	187	26.1	7.31	14	27	15	216	26.5	7.41	0.19	81.58
15/9/09	68	121	129	229	23.7	7.69	11	48	8	257	25.9	7.41	0.25	83.82



บริษัท ห้องปฏิบัติการกลาง (ประเทศไทย) จำกัด
Central Laboratory (Thailand) Co., Ltd.
สาขาเชียงใหม่ : 164/86 หมู่ที่ 3 ตำบลหนองแก๋ว อำเภอแม่ริม จังหวัดเชียงใหม่ 50180
Chiangmai Branch : 164/86 Moo 3 Donkaew, Maerim, Chiangmai 50180 Thailand
Tel : (66) 0 5389 6131, (66) 0 5389 6133 Fax : (66) 0 5389 6052, (66) 0 5389 6131 ต่อ 705
http://www.centrallabthai.com

Central Lab

TEST REPORT

Date of Issue June 23, 2023
Report No. TRCM66/13361
Page (s) 01/01

ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว - 139

Customer Name & Address (provided by customer) MAEJO UNIVERSITY
63 M.4, T. Nongharn, A. Sansai, Chiangmai 50290

Sample Description (provided by customer) Effluent water

Sample Code CM66/05817-001

Sample Condition Sample type: Waste Water
Packaging : glass bottle and plastic gallon, tightly sealed.
Quantity : 1 bottle and 1 gallon, Weight/Volume : 1 L./bottle and 5 L./gallon
Receipt condition : room temperature, normal condition.

Date of sample received June 12, 2023

Date of analysis June 12, 2023 - June 23, 2023

RESULT (S)

Test Item	Result	Unit	LOD	Reference Method
Oil and Grease	5.00	mg/L	-	APHA - AWWA (2017)
Total Kjeldahl Nitrogen	5.22	mg/L	-	APHA - AWWA (2017)
BOD	3.50	mg/L	-	APHA - AWWA (2017)
pH	7.24	-	-	APHA - AWWA (2017)
Settleable Solids *	< 0.2	mL/L	-	APHA - AWWA (2017)
Sulfide	< 1.0	mg/L	-	APHA - AWWA (2017)
Suspended Solids (SS)	< 5.0	mg/L	-	APHA - AWWA (2017)
Total Dissolved Solids	186.00	mg/L	-	APHA - AWWA (2017) 2540C

Note : Sample was collected by customer.
* : Marked tests are not accredited by DIW.

~End of Report~

(Ms. Nutsinee Meesorn)
(ว-139-ข-4314)

(Mr. Somsak Tharatha)
(ว-139-ค-2852)

(Ms. Siriwanna Faknai)
Approved Signatory
Central Laboratory (Thailand) Co., Ltd. (Chiangmai Branch)

CERTIFIED

MJU planned, designed and constructed for the tertial treatment system for upcycle effluent from SBR to be used as water conservation and resources recovery. The effluent from the wastewater treatment plant is further improved, reused for landscape irrigation and agricultural purposes and upcycled for storage as water resource for MJU campus. During the construction of water treatment system, approximately 1000 m^3 / d. of the effluent or 62.5% in year 2023 was recycled by transferring through the piping system to storage in the pond before using. This storage treated water was reused for landscape irrigation and horticulture crop during the dry season on the campus through the PVC piping system. Moreover, this treated water also reused for the irrigation system for Boon Sri

garden with the total area of 20000 m^2. Sludge from the treatment plant was stabilized and dried before using as a soil amendment for agricultural and landscape purposes on the campus.

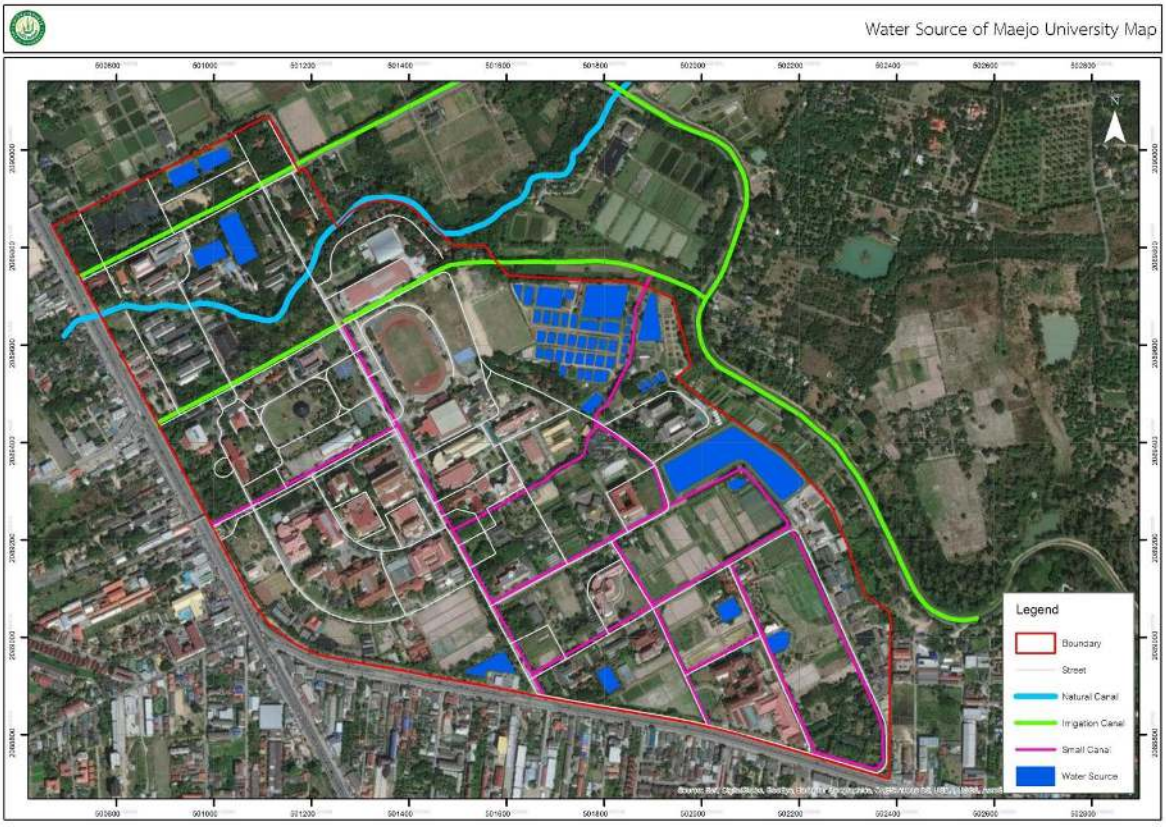
2. On the campus, a total of 303 ecological sanitation or "ecosan" toilets were installed and used since 2018. These covered 7 main buildings including the main canteen, sports complex, the 70-year study center, the 80-year study center, Agricultural Faculty, swimming pool, and Chootiwat Building. Nearly 50 m^3 of urinate was safely reused through piping systems with 5 main springer points for landscape management within the campus. Up to 50 m^3 of grey water was obtained.

This has proved that MJU has an efficient sanitary wastewater treatment system and is well managed for wastewater. 100% of wastewater from MJU is effectively treated, reused, and down cycled for landscape irrigation and planned for further upcycled for storage as water resource.

4. Water (WR)

Water Conservation Program Implementation

Maejo University has a 75,000-cubic meter raw water pond that supplies water resource for the water supply plant no 1; a 20,000-cubic meter pond that provides water resource for the water supply plant no 2; a 32,200-cubic meter pond that supplies water resource for the water supply plant no 3 and a 60,000-cubic meter pond that is used for agricultural purposes; as well as the Mae Faek-Mae Ngat Somboonshon Operation and Maintenance Project and natural canals running through the university campus. There are sufficient surface water resources for the water supply systems and agriculture.



Raw water pond that supplies water for water supply Plant no 1

Raw water pond that supplies water for water supply Plant no 2

Raw water pond that supplies water for water supply plant no 3

The natural canal

The water resources of Maejo university

No.	Location	Volume (m^3)
1	Lanna agriculture learning center	4,335
2	New theory agriculture learning center	4,470
3	Engineering Laboratory Building Classroom	1,196
4	Thummasakmontri Building 1	2,900
5	PTT Oil Station 1	2,912

No.	Location	Volume (m^3)
6	PTT Oil Station 2	1,372
7	Thummasakmontri Building 2	740
8	Water supply pond	7,560
9	Agricultural area	1,196
10	water supply plant	1,475
11	Fishery Technology Laboratory Building	4,302
12	Smithanon Building	73
13	Mekong giant catfish learning center 1	39,495
14	Mekong giant catfish learning center 2	22,824
15	Mekong giant catfish learning center 3	5,902
16	Mekong giant catfish learning center 4	1,528
17	Rest home	1,431
18	70th-year maejo building 1	2,457
19	70th-year maejo building 2	1,579
20	Production of Ornamental Plants Technology	832
21	Dean office 1	420
22	Dean office 2	800
23	Maejo shrine	240
24	Kaset-sanarn Pool 1	2,850
25	Kaset-sanarn Pool 2	2,850
26	Female dormitory 8	9,720
27	Female dormitory 8	17,124
28	Faculty of Animal Science and Technology 1	1,050
29	Faculty of Animal Science and Technology 2	900
30	Faculty of Animal Science and Technology 3	1,350
31	School of Renewable Energy 1	147
32	School of Renewable Energy 2	4,870
33	Cow farm	36,300
Total		187,200

Raw water pond at fishery technology laboratory building

Raw water pond at an engineering laboratory building

Raw water pond at Kaset-sanarn pools no 1 and no 2

Water Recycling Program Implementation

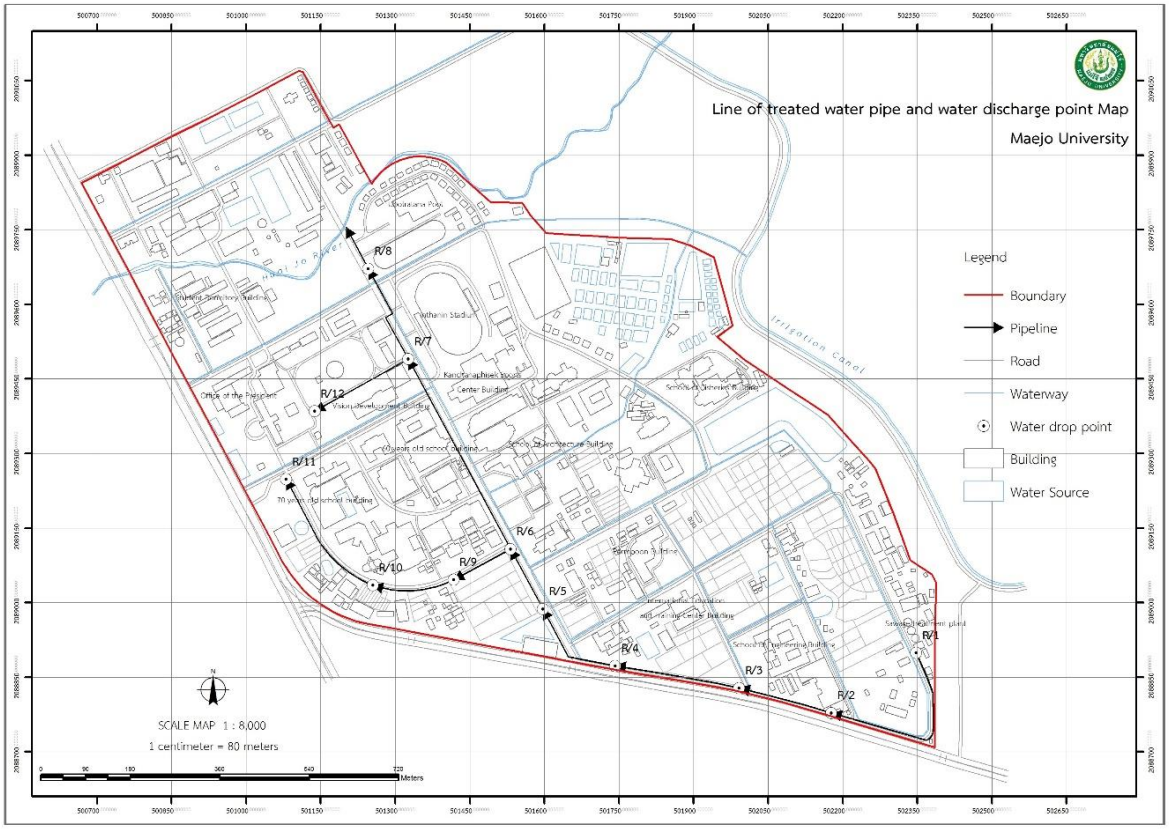
Maejo University has a piping system that collects wastewater from all buildings and transports to MJU wastewater treatment plant and subsequently collects and transfers the treated water to 12 distribution points as illustrated by the R1-R12 dots on the map. Three of the distribution points further transports the treated water to ponds for agricultural reservation, while seven points used as supply water for watering glass field and the university forest garden purpose. One additional point flows to the natural canal.

The treated water of Maejo University between October **2021** to September **2022** has a total volume of 438,262 m^3. All treated water was supplied into pile lines for agricultural use, such as landscape and garden.

The data of treated water in Maejo University.

Month - Year	Treated water (m^3)
Oct-22	37,896
Nov-22	36,985
Dec-22	37,294
Jan-23	35,248
Feb-23	32,743
Mar-23	36,759
Apr-23	31,973
May-23	33,762
Jun-23	35,763
Jul-23	39,677
Aug-23	35,671
Sep-23	40,286
Total	**434,057**

Maejo University wastewater treatment plant

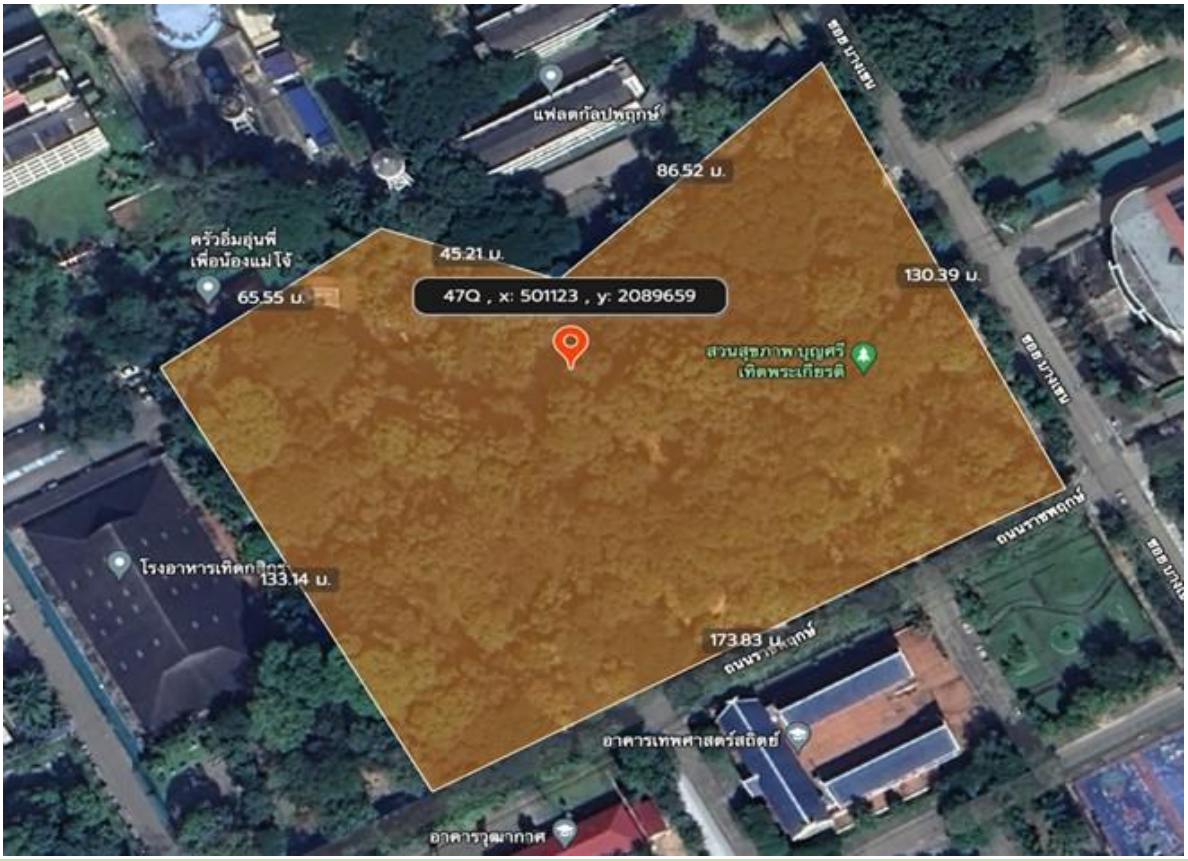


The map shows the point of treated wastewater release (R1 – R12)

Treated wastewater is released and collected to the pond for agriculture in flower cultivated areas

Treated wastewater is released and collected to the pond

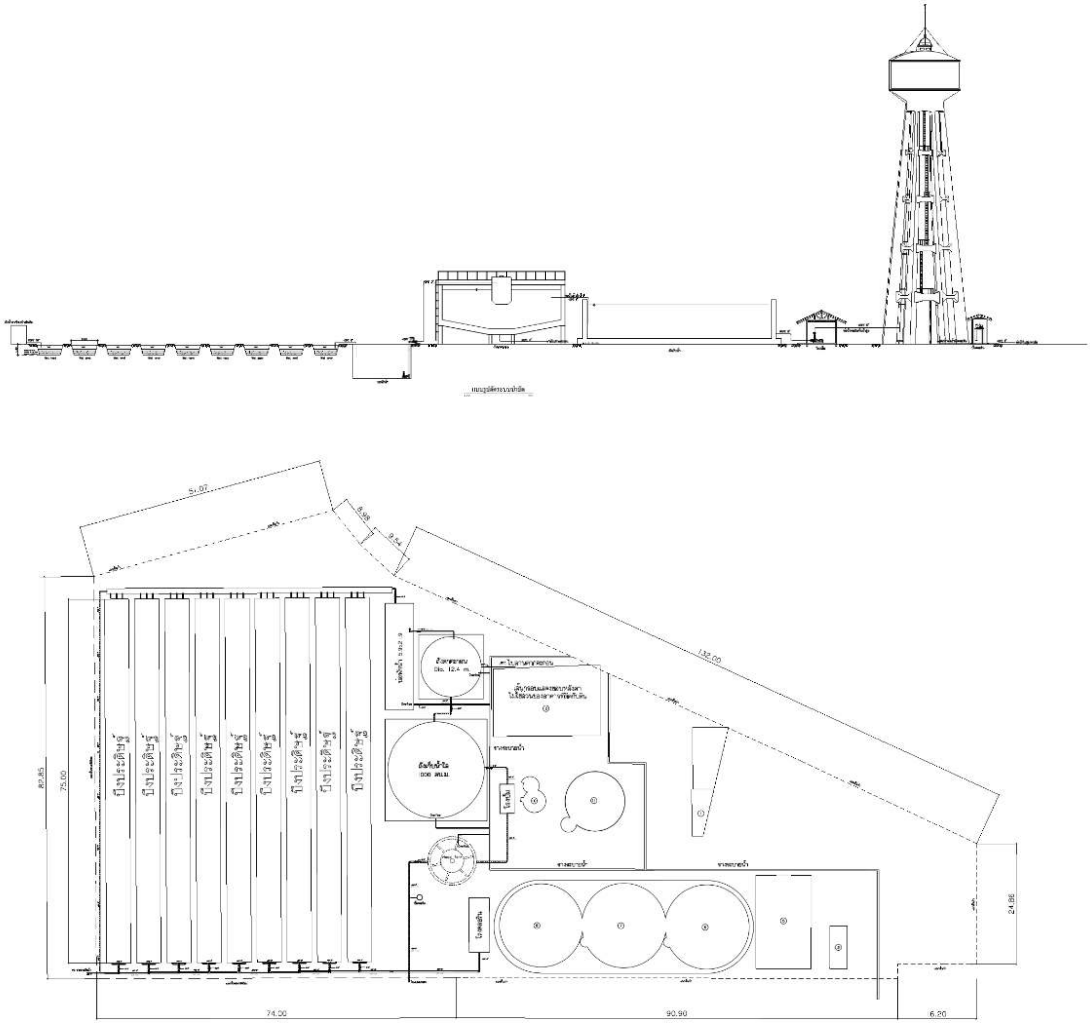
Treated wastewater is used for watering university landscape; i.g. grass fields by sprinkler system.



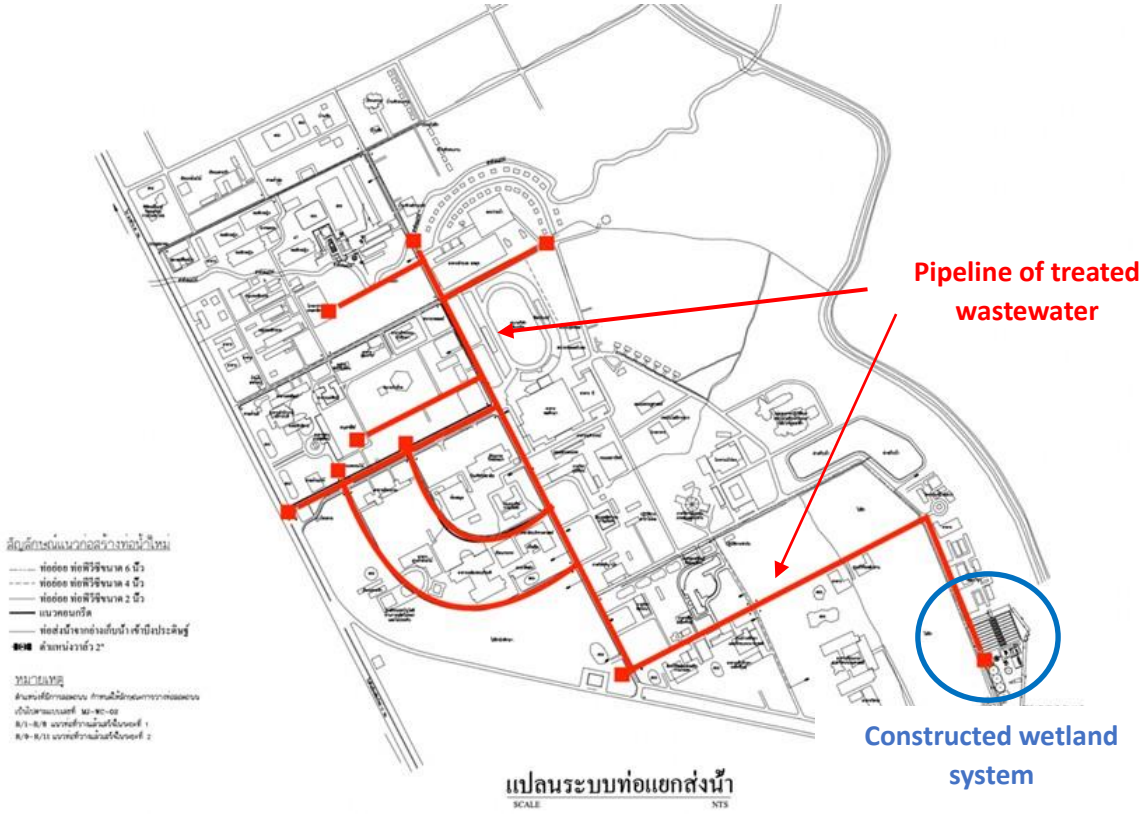
Boonsri Health Forest Park uses the treated wastewater from WWTP for watering plants about 12.5 hectares

Treated wastewater is transferred to Boonsri Health Forest Park by sprinkler system.

At the present, Maejo University is in the process of constructing the upcycling water treatment system by constructing a wetland system. The budget of this project is $486,300. The system can treat water at 1,800 m^3/day. After that, the treated water will be used throughout the university.



Plant layout of the upcycling water treatment system



The map shows the constructed wetland system and pipelines of treated wastewater used for university purpose

Construction of the wetland system (in progress and expected to be completed in February 2024)

Construction of the wetland system (in progress and expected to be completed in February 2024)

In addition, water from air conditioning systems is collected for watering plants and cleaning building floors.

Water collection from air conditioning systems at Office of the President building

Water collection from air conditioning systems at Maejo University Library for watering plants

Water collection from air conditioning systems at Engineering and Agro Indrustry Faculty for watering plants

Water Efficient Appliances Usage (e.g. hand washing taps, toilet flush, etc.)

Maejo University has a policy to save water. By requiring each unit to change the equipment to save water. When the original device is damaged will change to a new one that saves water. Water-saving devices installed in the university such as low flow tap, automatic taps, waterless urinals, automatic urinals, and low flush tank toilet.

Low flow taps and automatic taps

Waterless urinals and automatic urinals

Waterless urinals and automatic urinals

Low flush tank toilet

The quantity of appliances of each unit

Quantity												
Faculty of Agricultural Production												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	10	72	97	36	19	65	139	6	6	118	0	6
Sum	82		133		19	210			124		6	
Faculty of Science												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	0	0	157	51	0	132	125	0	66	41	12	2
Sum	0		208		0	257			107		14	
Faculty of Business Administration												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	80	0	1	0	0	0	66	0	27	11	0	0
Sum	80		1		0	66			38		0	
Faculty of Fisheries Technology and Aquatic Resources												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	10	0	5	27	0	0	52	0	4	16	0	1
Sum	10		32		0	52			20		1	
School of Tourism Development												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	15	0	0	6	0	0	23	0	7	3	0	0
Sum	15		6		0	23			10		0	
Faculty of Architecture and Environmental Design												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	0	0	0	95	0	0	92	0	0	36	0	5
Sum	0		95		0	92			36		5	
School of Administrative Studies												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	25	0	0	25	0	58	0	0	13	18	0	0
Sum	25		25		0	58			31		0	

School of Renewable Energy												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	0	0	0	122	0	0	148	0	0	4	21	35
Sum	0		122		0	148			4		56	

Faculty of Engineering and Agro-Industry												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	0	1	132	92	7	4	170	1	0	39	3	90
Sum	1		224		7	175			39		93	

Faculty of Economics												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	44	0	0	0	0	0	53	0	26	0	0	2
Sum	44		0		0	53			26		2	

Faculty of Liberal Arts												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	0	0	15	40	1	10	43	0	0	6	0	19
Sum	0		55		1	53			6		19	

Faculty of Information and Communication Maejo University												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	22	0	0	0	30	0	0	0	18	0	0	0
Sum	22		0		30	0			18		0	

Faculty of Animal Science and Technology													
Type	Handle Basin Faucet				Toilet				Urinal				
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type		
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level	pail flush
	109	0	6	6	0	97	4	3	35	20	2	6	23
Sum	109		12		0	104			55		31		

Maejo Farm												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	0	0	9	31	6	0	29	3	0	2	0	12
Sum	0		40		6	32			2		12	

Administrative building												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	347	0	61	103	36	19	523	0	244	51	2	15
Sum	347		164		36	542			295		17	

Maejo dormitory												
Type	Handle Basin Faucet				Toilet				Urinal			
	saving type		non-saving type		saving type	non-saving type			saving type		non-saving type	
	sensor	Press pop-up	cross	single level	double flush	flush valve	single flush	pail flush	sensor	Press pop-up	cross	single level
	0	3	285	611	0	188	314	159	0	60	0	0
Sum	3		896		0	661			60		0	

The number of appliance and percentage of water efficient appliance

Appliance	Total Number	Total number water efficient appliance	Percentage
Handle Basin Faucet	2,581	738	28.6%
Urinal	1,118	862	77.1%
Flush toilet	2,520	99	3.9%
		Average Percentage	**36.5%**

As shown in the table, it was found that the average percentage of water efficient appliance was 36.5%.

Consumption of treated water

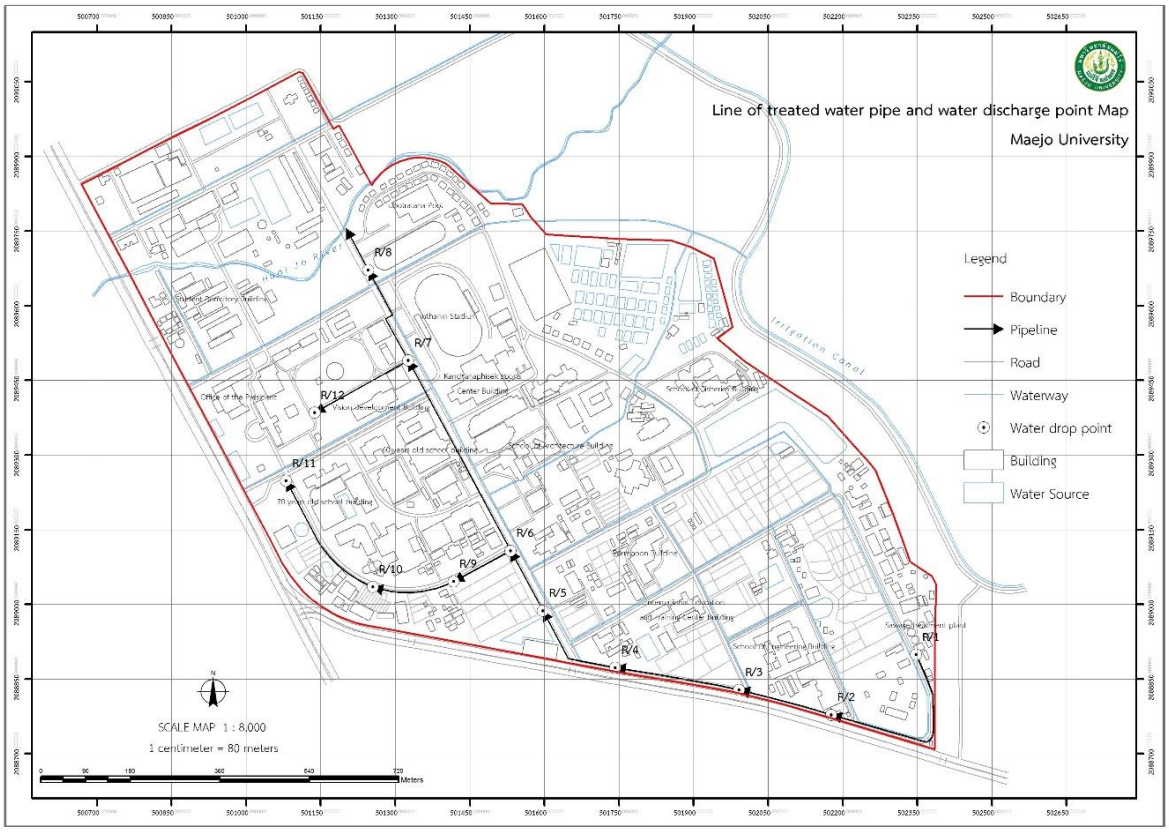
Maejo University has a 75,000-cubic meter raw water pond that supplies water for water supply Plant 1; a 20,000-cubic meter pond that provides water for water supply Plant 2; a 32,200-cubic meter pond that supplies water for water supply Plant3; a 60,000-cubic meter pond that is used for agricultural purposes. Altogether, the total amount of surface water is 187,200 cubic meters. Meanwhile, Maejo University is using a building water supply of 913,461 cubic meters this year.

The percentage of treated water consumed from water system treatment compared to all water sources was 47.5 %, as shown in the equation below. The treated water of Maejo University between October 2022 to September 2023 has a total volume of 434,057 m^3. All treated water was supplied into a pile line to the 12 points of treated wastewater released throughout the university area for utilization as show in topic 4.2 water recycling program implementation.

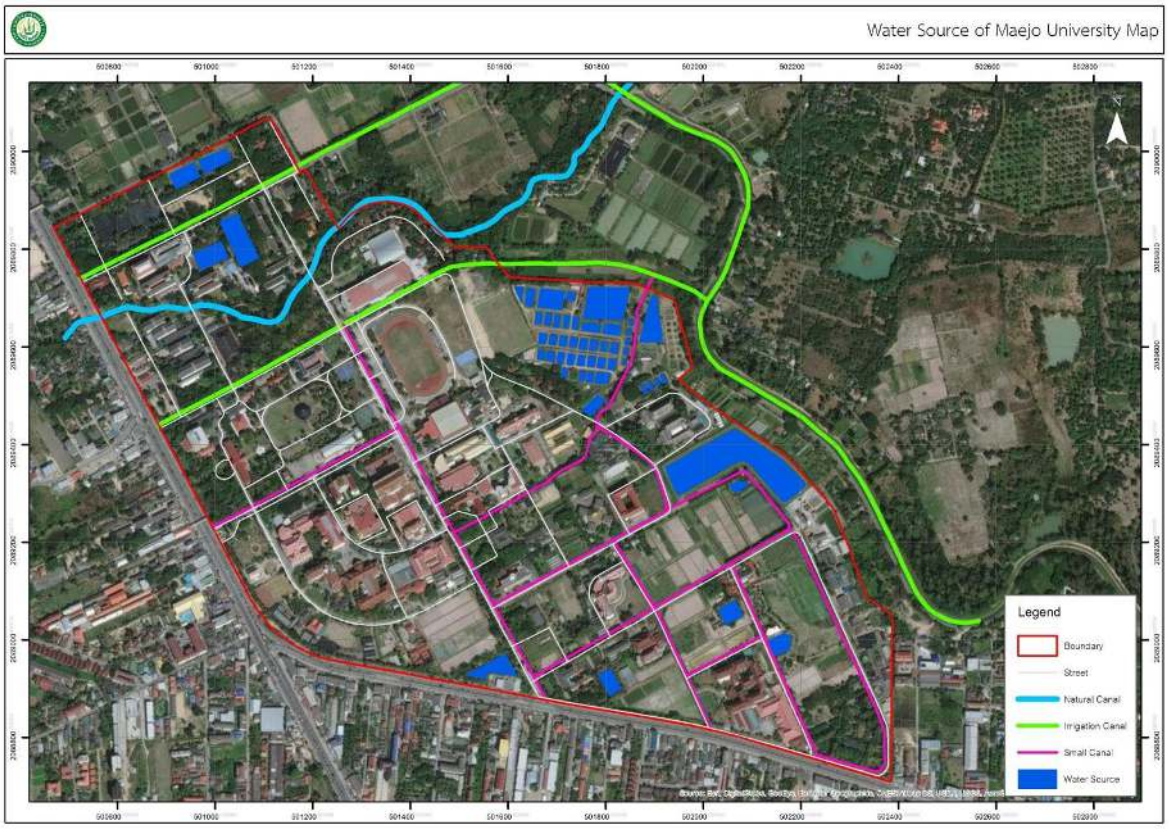
$$\frac{\text{An amount of treated water consumed } (438{,}262\ m^3)}{\text{An Amount of tap water supply } (856{,}989\ m^3) + \text{surface-water sources } (187{,}200\ m^3)}$$

The data of tap water supply and treated water in Maejo University.

Month - Year	Building water supply (m^3)	Treated water (m^3)
Oct-20	85,039	37,896
Nov-20	72,490	36,985
Dec-20	82,683	37,294
Jan-21	79,146	35,248
Feb-21	75,597	32,743
Mar-21	74,704	36,759
Apr-21	64,107	31,973
May-21	61,402	33,762
Jun-21	62,553	35,763
Jul-21	89,832	39,677
Aug-21	83,733	35,671
Sep-21	82,175	40,286
Total	**913,461**	**434,057**



The map shows the point of treated wastewater release (R1 – R12)

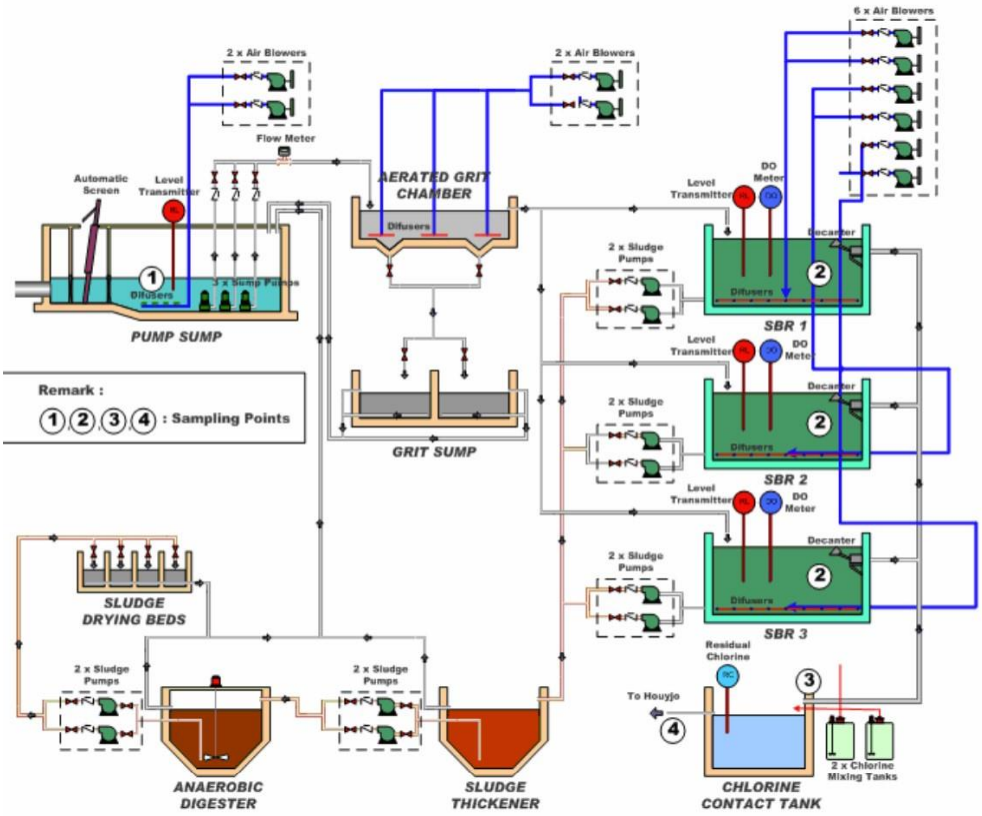


The map shows the water sources of Maejo Unversity

Water pollution control in campus area

Maejo University has a policy on water quality control after treatment. By referring to the quality of treated water with the standards of the Pollution Control Department. The sewage treatment system is Sequencing Batch Reactor (SBR) is a wastewater treatment system that uses aeration tanks. This system serves both aeration to decompose organic matter and serves to separate sludge by sedimentation within a single tank.

The treated wastewater system has the capacity to treat **2,000** cubic meters per day. The water after treatment will be sent to the pipes to agriculture such as lawns, trees, etc. The system operation is controlled by recording the controls daily and prepare a monthly performance report.



Schematic of the wastewater treatment system

Maejo university wastewater treatment plant

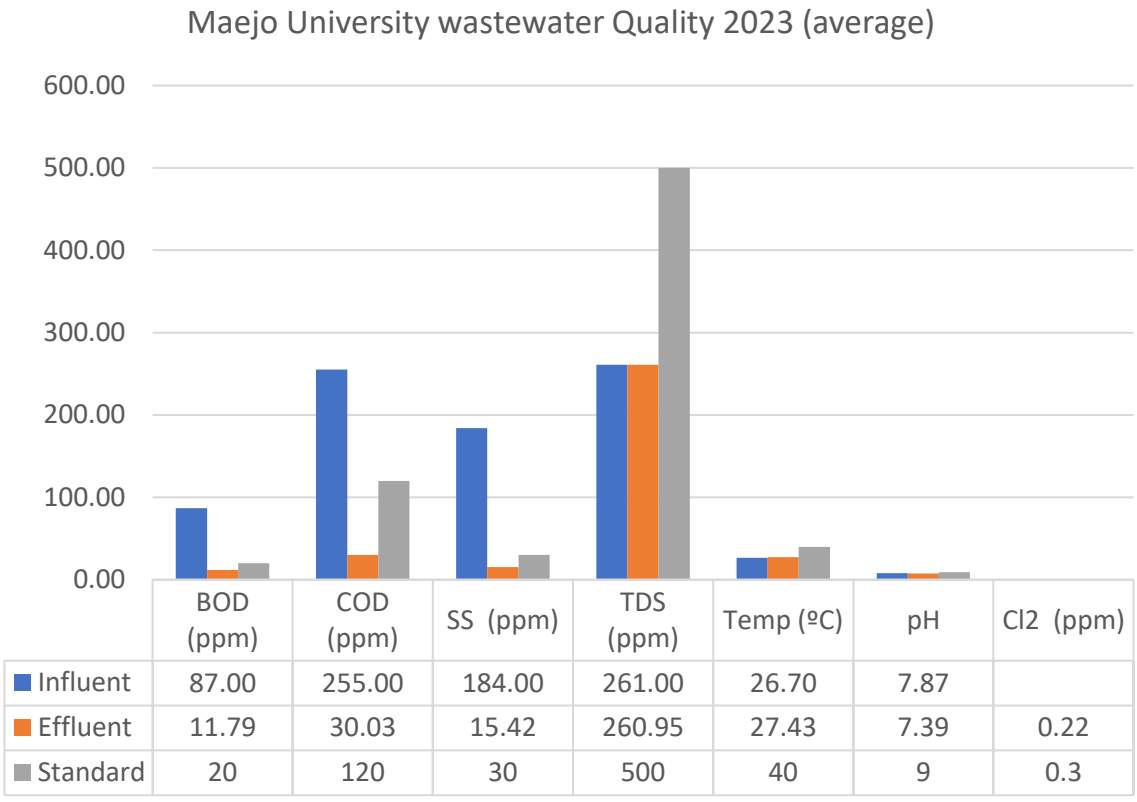
Wastewater treatment plant control room

Data collection of wastewater and treated wastewater of the wastewater treatment system in October 2022 to September 2023

DATE	Wastewater into the system						Treadted wastewater (*Strandard)							Performance of system (%)
	BOD	COD	SS	TDS	Temp	pH	BOD 20*	COD 120*	SS 30*	TDS 500*	Temp 40*	pH 5.0-9.0*	Cl_2 0.3*	
5/10/08	84	121	129	229	28.1	7.69	14	48	8	257	25.9	7.41	0.25	83.33
7/10/08	79	87	14	238	29.1	7.31	9	24	9	294	29.9	7.24	0.21	88.61
12/10/08	86	227	12	282	28.9	7.06	13	83	8	290	27.9	7.45	0.23	84.88
14/10/08	92	203.7	59	297	28.6	7.28	11	19.6	12	328	27.4	6.96	0.21	88.04
19/10/08	87	184	72	261	26	7	14	21.3	13	243	28.4	6.94	0.18	83.91
21/10/08	72	311	238	244	26.1	7.31	12	36.4	16	261	29.7	7.72	0.24	83.33
26/10/08	109	255	184	261	26.7	7.87	13	22.6	17	284	28.1	7.48	0.2	88.07
28/10/08	89	267	137	217	26.9	7.63	11	45.5	11	241	27.3	7.72	0.19	87.64
2/11/08	87	217	79	184	27.1	7.96	9	17.5	16	238	29.7	7.82	0.27	89.66
4/11/08	91	137	61	176	27.8	7.68	12	19.4	18	214	30.1	7.29	0.21	86.81
9/11/08	82	286	103	226	25.6	7.63	9	36.4	9	259	29.8	7.72	0.19	89.02
11/11/08	104	108	92	231	25.6	7.29	11	17.5	18	253	31.3	7.82	0.25	89.42
16/11/08	63	196	86	267	26.4	7.51	10	22.6	7	284	28.1	7.48	0.23	84.13
18/11/08	71	147	64	207	28.3	7.19	12	29	17	217	26.3	7.83	0.27	83.10
23/11/08	69	196	86	214	28.2	7.51	11	25	15	241	30.2	7.63	0.19	84.06
25/11/08	87	213	96	226	27.6	7.31	14	19.2	12	259	29.6	7.51	0.2	83.91
30/11/08	104	198	69	265	27.1	7.81	12	22.6	21	284	30.4	7.48	0.24	88.46
2/12/08	89	197	131	215	26.3	7.44	12	27.3	16	236	29.3	7.64	0.21	86.52
7/12/08	72	174	86	214	28.2	7.51	10	25	19	241	26.5	7.63	0.18	86.11
9/12/08	91	214	131	207	26.3	7.44	11	32.6	14	231	27.1	7.61	0.22	87.91
14/12/08	87	196	121	308	26.8	7.84	10	29	25	276	27.2	7.87	0.2	88.51
16/12/08	81	186	92	216	26.3	7.69	15	19.8	18	247	25.3	7.48	0.25	81.48
21/12/08	84	193	83	274	28.7	8.01	15	36.7	21	296	25.6	7.46	0.19	82.14
23/12/08	72	168	84	187	26.1	7.31	14	41.2	11	216	26.1	7.41	0.19	80.56
28/12/08	79	159	14	238	26.1	7.31	12	26.4	19	294	25.3	7.24	0.27	84.81
4/1/09	83	215	214	214	26.1	7.87	12	28.1	14	251	30.2	7.59	0.21	85.54
6/1/09	89	186	172	247	26.3	7.28	11	22.6	15	263	30.4	7.48	0.15	87.64
11/1/09	72	162	96	226	27.6	7.31	9	19.2	12	259	26.7	7.51	0.2	87.50
13/1/09	104	187	86	216	26.3	7.69	13	45	26	247	27.3	7.48	0.18	87.50
18/1/09	76	151	83	274	28.7	8.01	11	36	25	296	26.4	7.46	0.19	85.53
20/1/09	75	196	126	214	26.4	7.88	10	25.6	18	239	25.9	7.54	0.2	86.67
25/1/09	81	168	84	187	26.1	7.31	10	27	15	216	26.5	7.41	0.19	87.65
27/1/09	69	137	72	229	23.7	7.69	13	48	21	257	25.9	7.41	0.22	81.16
1/2/09	69	169	56	241	28.1	7.05	11	36	17	268	25.4	7.04	0.21	84.06
3/2/09	78	164	63	320	27.7	6.06	11	25.7	16	270	25.8	6.13	0.18	85.90
8/2/09	71	168	84	187	26.1	7.31	10	27	15	216	26.1	7.41	0.2	85.92
10/2/09	62	137	72	229	23.7	7.69	11	48	21	257	25.9	7.41	0.2	82.26
15/2/09	107	193	56	241	25.9	7.05	12	36	17	268	25.4	7.04	0.21	88.79
22/2/09	102	207	95	198	26.3	7.52	12	36.9	15	281	25.1	7.39	0.19	88.24
24/2/09	86	164	63	320	26.1	6.06	11	25.7	16	270	26.3	6.13	0.21	87.21
1/3/09	86	187	59	297	28.6	7.28	13	18	12	328	27.4	7.0	0.21	84.88
3/3/09	79	184	72	261	26	7	12	25	13	243	28.4	6.9	0.18	84.81
8/3/09	72	214	238	244	26.1	6.9	13	37	16	261	29.7	7.7	0.24	81.94
10/3/09	92	169	184	261	26.7	7.2	14	28	17	284	28.1	7.5	0.2	84.78

15/3/09	85	173	137	217	26.9	7.3	12	31	11	241	27.3	7.7	0.19	85.88
17/3/09	71	197	96	173	25.8	7.1	13	28	18	241	25.9	7.4	0.21	81.69
22/3/09	83	201	12	282	28.9	7.5	12	42	8	290	27.9	7.5	0.23	85.54
24/3/09	95	119	129	229	23.7	6.9	12	39	8	257	25.9	7.4	0.25	87.37
29/3/09	79	184	14	238	29.1	7.3	11	41	9	294	26.8	7.2	0.27	86.08
31/3/09	72	195	12	282	28.9	7.1	11	53	8	290	28.1	7.5	0.23	84.72
5/4/09	69	163	69	265	27.1	7.81	7	22.6	11	284	30.4	7.48	0.24	89.86
7/4/09	63	179	103	226	25.6	7.63	8	36.4	9	259	29.8	7.72	0.19	87.30
12/4/09	71	201	131	215	26.3	7.44	12	26.4	18	236	29.3	7.64	0.21	83.10
19/4/09	64	196	86	267	26.4	7.51	9	22.6	7	284	28.1	7.48	0.19	85.94
21/4/09	73	187	69	198	28.9	7.83	11	23.8	18	224	26.8	7.59	0.17	84.93
26/4/09	86	112	83	274	28.7	8.01	12	36	25	296	26.7	7.46	0.23	86.05
28/4/09	65	196	126	214	26.4	7.88	12	25.6	18	239	27.8	7.54	0.27	81.54
3/5/09	76	203	81	226	27.6	7.31	11	19.2	17	259	26.7	7.2	0.25	85.53
5/5/09	71	196	86	242	27.3	7.1	13	26	26	225	27.4	7.1	0.27	81.69
10/5/09	84	211	94	263	27.1	7.45	10	41	21	294	27.9	7.1	0.21	88.10
12/5/09	72	184	72	176	27.8	7.68	13	19.4	19	214	26.7	6.9	0.24	81.94
19/5/09	68	195	65	229	28.1	7.69	11	48	18	257	25.9	7.4	0.24	83.82
24/5/09	71	148	83	238	29.1	7.31	13	24	23	294	28.6	7.4	0.21	81.69
26/5/09	66	121	129	229	28.1	7.69	11	48	8	257	25.9	7.41	0.25	83.33
31/5/09	73	87	14	238	29.1	7.31	13	24	9	294	29.9	7.24	0.21	82.19
2/6/09	76	293.2	131	207	26.3	7.44	11	41.5	14	231	27.1	7.61	0.22	85.53
7/6/09	91	196	121	308	26.8	7.84	10	19	10	276	27.2	7.87	0.2	89.01
9/6/09	87	173	92	216	26.3	7.69	15	22.6	7	247	25.3	7.48	0.25	82.76
14/6/09	79	112	83	274	28.7	8.01	15	36	25	296	25.6	7.46	0.19	81.01
16/6/09	85	171	14	238	26.1	7.31	13	24	12	294	25.3	7.24	0.27	84.71
21/6/09	104	267	98	215	26.9	8.01	13	27	21	241	27.5	6.4	0.21	87.50
22/6/09	76	217	103	261	26.7	7.87	11	22.6	18	284	27.2	7.6	0.25	85.53
28/6/09	84	203	81	226	27.6	7.31	15	19.2	17	259	26.7	7.2	0.25	82.14
30/6/09	76	196	86	242	27.3	7.1	13	26	26	225	27.4	7.1	0.27	82.89
5/7/09	101	207	95	198	26.3	7.52	11	36.9	15	281	25.1	7.39	0.19	89.11
7/7/09	87	164	63	320	26.1	6.06	13	25.7	16	270	26.3	6.13	0.21	85.06
12/7/09	79	187	59	297	28.6	7.28	13	18	12	328	27.4	7.0	0.21	83.54
14/7/09	74	184	72	261	26	7	12	25	13	243	28.4	6.9	0.18	83.78
19/7/09	81	214	238	244	26.1	6.9	11	37	16	261	29.7	7.7	0.19	86.42
21/7/09	69	169	184	261	26.7	7.2	13	28	17	284	28.1	7.5	0.2	81.16
26/7/09	87	173	137	217	26.9	7.3	11	31	11	241	27.3	7.7	0.19	87.36
4/8/09	81	194	69	198	28.9	7.83	11	23.8	18	224	26.8	7.59	0.21	86.42
9/8/09	76	173	52	232	26.3	7.61	10	36.7	17	259	26.7	7.83	0.17	86.84

11/8/09	89	207	129	229	23.7	7.69	12	48	8	257	25.9	7.41	0.23	86.52
16/8/09	92	196	86	214	28.2	7.51	11	25	15	241	26.4	7.63	0.18	88.04
18/8/09	84	186	86	242	27.3	7.1	11	26	21	225	28.6	7.13	0.17	86.90
23/8/09	73	108	92	231	25.6	7.29	13	17.5	18	253	31.3	7.82	0.26	82.19
25/8/09	84	214	96	173	25.8	7.81	12	28	18	241	25.9	7.41	0.31	85.71
30/8/09	97	235	184	261	26.7	7.87	12	22.6	17	284	24.7	7.48	0.19	87.63
1/9/09	71	173	92	216	26.3	7.69	13	22.6	7	247	27.3	7.48	0.25	81.69
6/9/09	69	112	83	274	28.7	8.01	11	36	25	296	26.4	7.46	0.19	84.06
8/9/09	73	241	126	214	26.4	7.88	13	25.6	18	239	25.9	7.54	0.22	82.19
13/9/09	76	168	84	187	26.1	7.31	14	27	15	216	26.5	7.41	0.19	81.58
15/9/09	68	121	129	229	23.7	7.69	11	48	8	257	25.9	7.41	0.25	83.82
20/9/09	76	149	47.4	262.5	28.1	7.05	14	22.9	12.6	330.5	29.4	7.04	0.23	81.58
22/9/09	72	196	86	214	28.2	7.51	10	25	15	241	26.4	7.63	0.18	86.11
27/9/09	82	210.8	98	196	26.9	8.01	14	27	12	231	28.5	7.41	0.21	82.93
29/9/09	87	255	184	261	26.7	7.87	11	22.6	17	284	28.7	7.48	0.19	87.36
Average	80.68	184.81	95.61	237.04	26.95	7.45	11.79	30.03	15.42	260.95	27.43	7.39	0.22	85.20



	BOD (ppm)	COD (ppm)	SS (ppm)	TDS (ppm)	Temp (ºC)	pH	Cl2 (ppm)
Influent	87.00	255.00	184.00	261.00	26.70	7.87	
Effluent	11.79	30.03	15.42	260.95	27.43	7.39	0.22
Standard	20	120	30	500	40	9	0.3

บริษัท ห้องปฏิบัติการกลาง (ประเทศไทย) จำกัด
Central Laboratory (Thailand) Co., Ltd.
สาขาเชียงใหม่ : 164/86 หมู่ที่ 3 ต.ดอนแก้ว อ.แม่ริม จ.เชียงใหม่ 50180
Chiangmai Branch : 164/86 Moo 3 Donkaew, Maerim, Chiangmai 50180 Thailand
Tel : (66) 0 5389 6131, (66) 0 5389 6133 Fax : (66) 0 5389 6052, (66) 0 5389 6131 ต่อ 705
http://www.centrallabthai.com

Central Lab
One Stop & Fast Services

TEST REPORT

Date of Issue June 23, 2023
Report No. TRCM66/13361
Page (s) 01/01

ห้องปฏิบัติการวิเคราะห์เอกชน เลขทะเบียน ว - 139

Customer Name & Address (provided by customer) MAEJO UNIVERSITY
63 M.4, T. Nongharn, A. Sansai, Chiangmai 50290

Sample Description (provided by customer) Effluent water

Sample Code CM66/05817-001

Sample Condition Sample type: Waste Water
Packaging : glass bottle and plastic gallon, tightly sealed.
Quantity : 1 bottle and 1 gallon, Weight/Volume : 1 L./bottle and 5 L./gallon
Receipt condition : room temperature, normal condition.

Date of sample received June 12, 2023

Date of analysis June 12, 2023 - June 23, 2023

RESULT (S)

Test Item	Result	Unit	LOD	Reference Method
Oil and Grease	5.00	mg/L	-	APHA - AWWA (2017)
Total Kjeldahl Nitrogen	5.22	mg/L	-	APHA - AWWA (2017)
BOD	3.50	mg/L	-	APHA - AWWA (2017)
pH	7.24	-	-	APHA - AWWA (2017)
Settleable Solids *	< 0.2	mL/L	-	APHA - AWWA (2017)
Sulfide	< 1.0	mg/L	-	APHA - AWWA (2017)
Suspended Solids (SS)	< 5.0	mg/L	-	APHA - AWWA (2017)
Total Dissolved Solids	186.00	mg/L	-	APHA - AWWA (2017) 2540C

Note : Sample was collected by customer.
* : Marked tests are not accredited by DIW.

~End of Report~

(Ms. Nutsinee Meesorn)
(ว-139-จ-4314)

(Mr. Somsak Tharatha)
(ว-139-ค-2852)

(Ms. Sriwanna Faknai)
Approved Signatory
Central Laboratory (Thailand) Co., Ltd. (Chiangmai Branch)

CERTIFIED

5. Transportation (TR)

The total number of vehicles (cars and motorcycles with combustion engines) divided by the total campus' population

No.	Vehicle	Total Number
1	Car managed by the university	89
2	Cars entering the university	3,076
3	Motorcycles entering the university	3,977
	Total	**7,142**

[5.4] = 7,142 / 18,308 (population) = **0.4836**

[3] > 0.125 - 0.5

Description:

Number of cars actively used and managed by university

Number of cars actively used and managed by University = **89 vehicles**

Number of cars entering the university daily

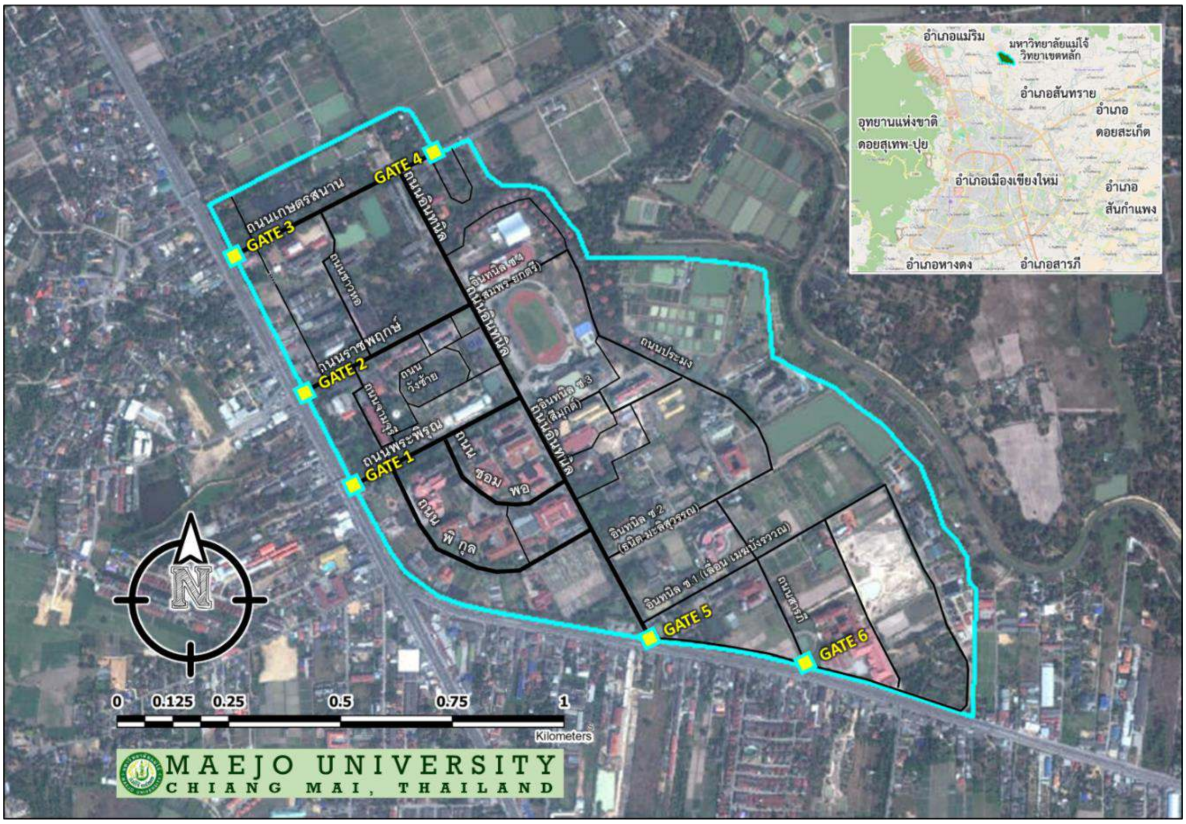
ADT = 3,076 PCUs per day (Motorbike = 0.33, Personal Car = 1.00, Bus/Truck = 1.50)

Number of cars = **3,076 cars**

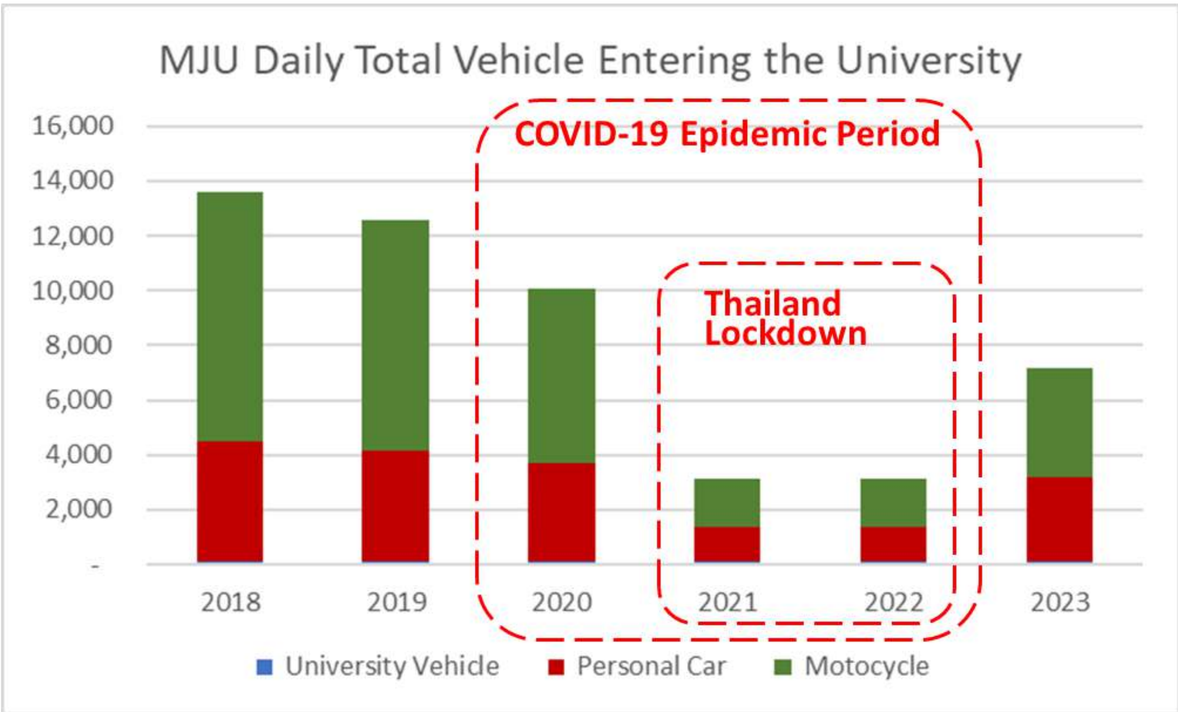
Number of motorcycles entering the university daily

ADT = 1,312 PCUs per day (Motorbike = 0.33, Personal Car = 1.00, Bus/Truck = 1.50)

Number of motorcycles = **3,977 motorcycles**



GATE 1
GATE 2
GATE 3
GATE 4
GATE 5
GATE 6
0 0.125 0.25 0.5 0.75 1
Kilometers
MAEJO UNIVERSITY
CHIANG MAI, THAILAND



MJU Daily Total Vehicle Entering the University
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
-
COVID-19 Epidemic Period
Thailand Lockdown
2018
2019
2020
2021
2022
2023
University Vehicle
Personal Car
Motocycle

Shuttle services

Description:

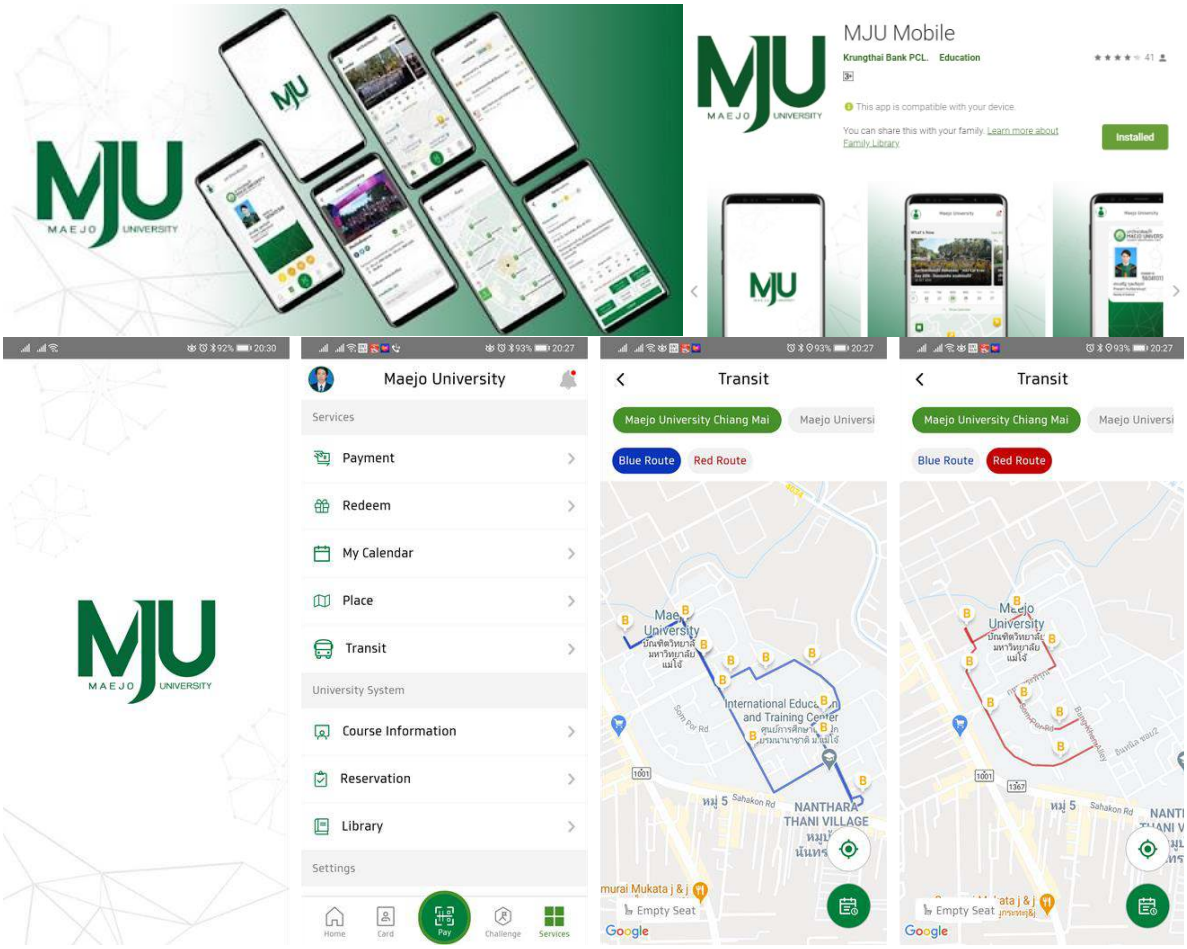
Shuttle Servies and Operation

Our EV shuttles were first operated since 2019 and the formal operation started on 12 May 2021.

Cost: FREE Service

Our EV shuttle services, and timetable are displayed on MJU Mobile application (Android and iOS)

See more: https://erp.mju.ac.th/informationDetail.aspx?newsId=3618



Peak Hour Operation (8:00-10:00, 1200:-13:00, and 15:00-16:00)

Route	Description	Trip	Route Dist (km)	round Trip	Head Way (min)	Travel Speed (km/hr)	Require Bus for Operation		Spare Bus	Total bus
1	ประตูบางเขน-บริหารศาสตร์-ชูติวัตน์-แฟลตอาจารย์	ไป-กลับ	1.2	2.4	10	10	1.4	= 2	1	3
2	ประตูบางเขน-เรียนรวม 70 ปี-วิสัยทัศน์-จุฬาภรณ์ฯ-ประมง-วิศวะ-ประตูบางเขน	ทางเดียว	3.2	3.2	5	10	3.8	= 4	1	5
						Summary		6		8

Off-Peak Hour Operation (8:00-10:00, 1200:-13:00, and 15:00-16:00)

Route	Description	Trip	Route Dist (km)	round Trip	Head Way (min)	Travel Speed (km/hr)	Require Bus for Operation		Spare Bus	Total bus
1	ประตูบางเขน-บริหารศาสตร์-ชูติวัตน์-แฟลตอาจารย์	ไป-กลับ	1.2	2.4	15	10	1.0	= 1	1	2
2	ประตูบางเขน-เรียนรวม 70 ปี-วิสัยทัศน์-จุฬาภรณ์ฯ-ประมง-วิศวะ-ประตูบางเขน	ทางเดียว	3.2	3.2	15	10	1.3	= 2	1	3
						Summary		3		5

Number of shuttles operating in the university

Number of shuttles = **4 Electric Vehicles** (2-18 seats EVs and 2-12 seats EVs)

Example of Shuttle Services

The average number of passengers of each shuttle

The average number of passengers of each shuttle = 15.0

Example of Passenger Load

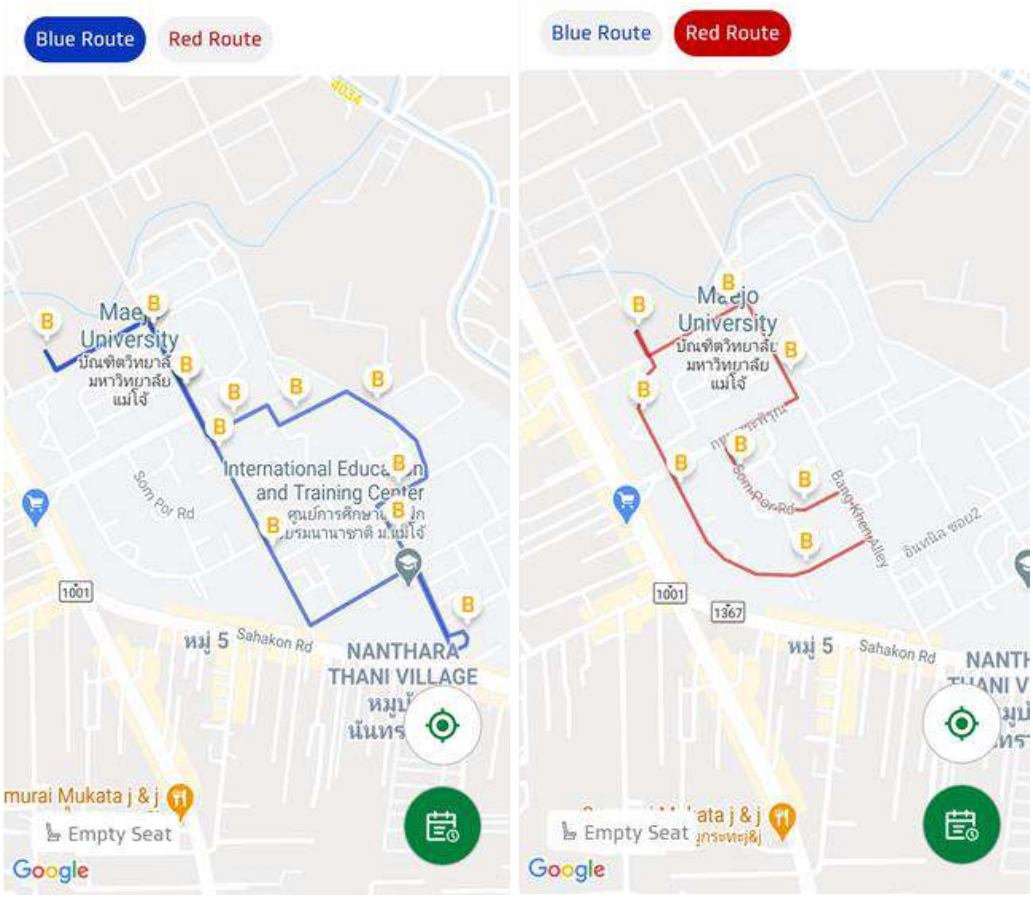
Total trips of each shuttle service each day

Total trips of shuttle services each day = **176 km**

Operation

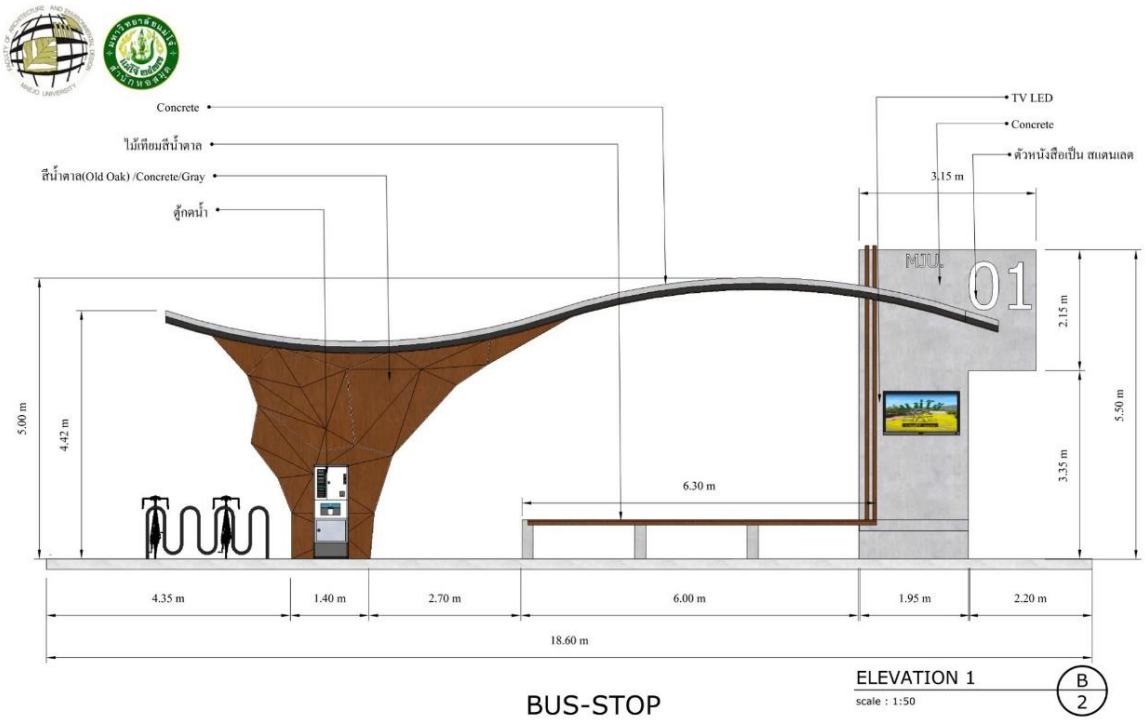
Peak Hour Operation (4-hour) = 24-round * 4.4 km = **105.6 km**

Off-Peak Hour Operation (4-hour) = 16-round * 4.4 km = **70.4 km**

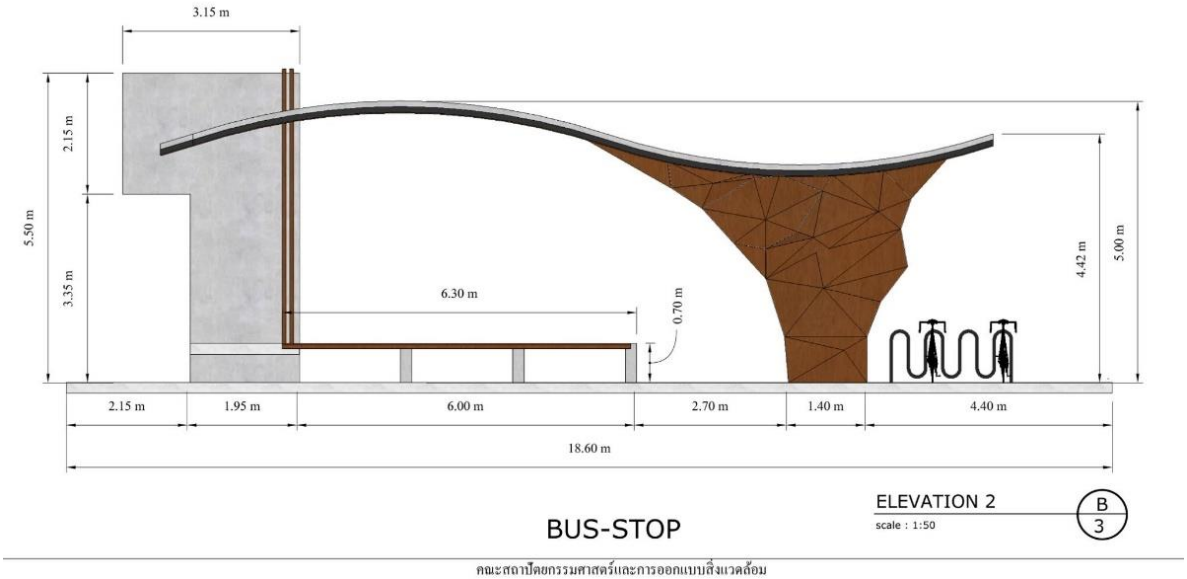


Shuttle Services Facility (Propose for Construction)

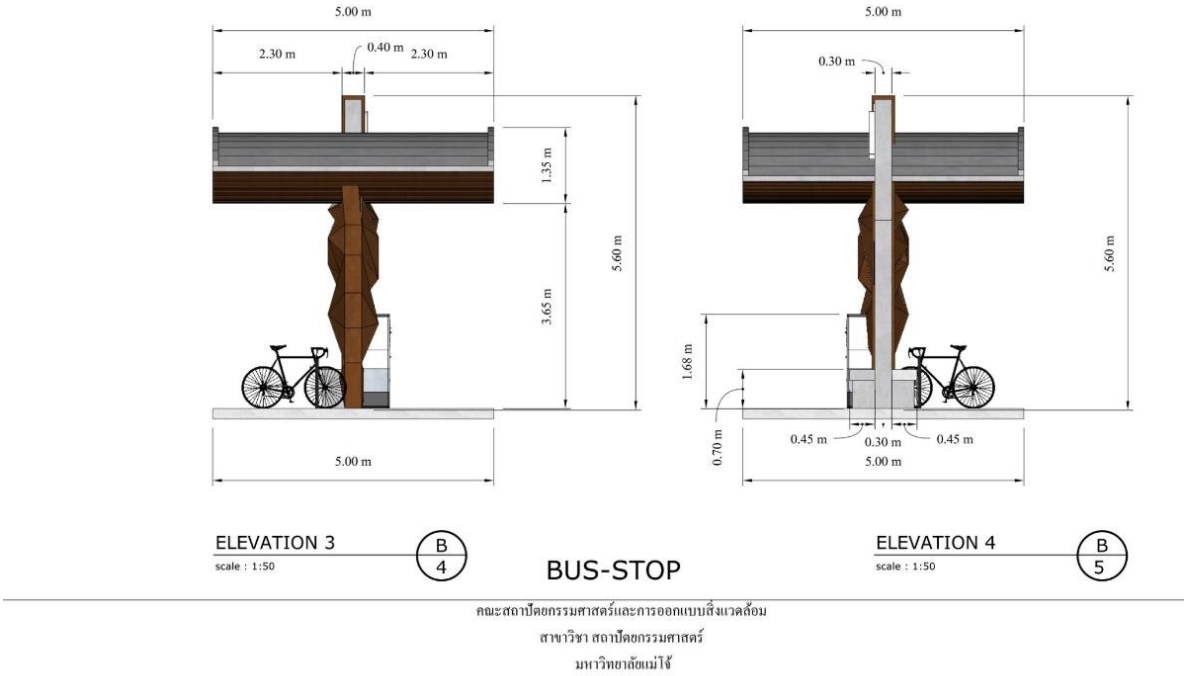
Bus Station Design Proposal in Maejo University (By Faculty of Architecture and Environmental Design)



คณะสถาปัตยกรรมศาสตร์และการออกแบบสิ่งแวดล้อม
สาขาวิชา สถาปัตยกรรมศาสตร์
มหาวิทยาลัยแม่โจ้



คณะสถาปัตยกรรมศาสตร์และการออกแบบสิ่งแวดล้อม
สาขาวิชา สถาปัตยกรรมศาสตร์
มหาวิทยาลัยแม่โจ้



Zero-Emission Vehicles (ZEV) policy on campus

[5] Zero-Emission Vehicles are available and provided by the university for free.

Maejo University still provided free bicycles subsided and operated by their own

- In 2020-2021, the university provided new 236 bicycles for free service and distributed to the faculties and offices
- In 2022, the university plans to sign a Memorandum of Understanding (MOU) with AnyWheel (Thailand) for 150 bike-sharing services in Maejo University area
- In 2023, the university signed a Memorandum of Understanding (MOU) with AnyWheel (Thailand) for 250 bike-sharing services in Maejo University area

Average number of Zero Emission Vehicles (ZEV) on campus per day

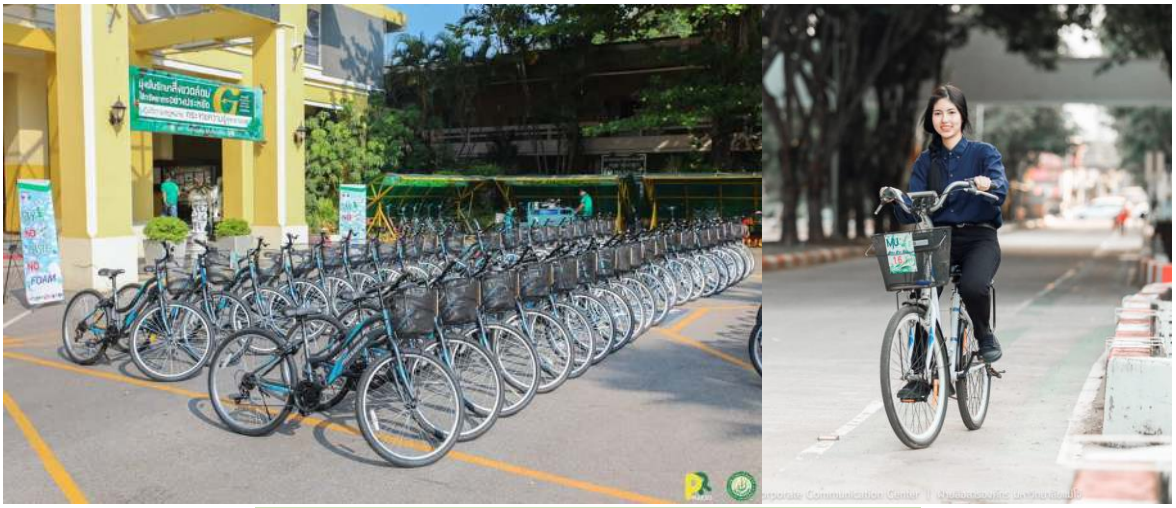
Average number of ZEVs = **486 ZEVs per day**

- **236 ZEVs (Free bicycles)** operated by the university
- **250 ZEVs (Shared Bicycle)** operated by AnyWheel (Thailand) MOU with Maejo University
- **100 ZEVs (Electric Scooter)** demonstrating operated by AnyWheel (Thailand) with a Charged fee

The total number of Zero-Emission Vehicles (ZEV) divided by the total campus population

(486) / (18,308) = 0.027

[5] > 0.02



236 University bicycles distributed to faculties

250 shared bicycles from AnyWheel

236 University bicycles distributed to faculties

Total ground parking area (m^2)

Total ground parking area = **32,041.60 m^2**

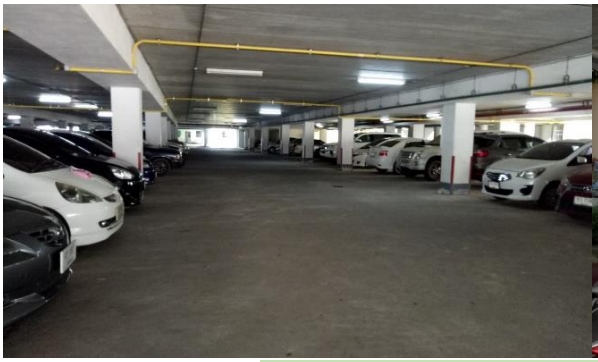
No.	Parking Types	Area (sq.m.)
1	Softscape with Compacted Soil	1,435.02
2	Softscape with Concrete Block	2,869.13
3	Hardscape with Asphalt Pavement	300.00
4	Hardscape with Concrete Pavement	10,144.20
5	In Building Parking or Structure	17,293.25
	Total Parking	**32,041.60**

Softscape Parking with Compacted Soil

Softscape Parking with Concrete Block

Hardscape Parking with Asphalt Pavement

Hardscape Parking with Concrete Pavement



In Building Parking or Structure

Total ground parking area (m^2)

The ratio of the ground parking area to total campus area (TR.5)

(32,041.60) / (3,374,680.54) * 100% = **0.9495%**

[5] < 1%

Description:

No.	Parking Types	Area (sq.m.)
1	Softscape with Compacted Soil	1,435.02
2	Softscape with Concrete Block	2,869.13
3	Hardscape with Asphalt Pavement	300.00
4	Hardscape with Concrete Pavement	10,144.20
5	In Building Parking or Structure	17,293.25
	Total Parking	**32,041.60**

Total main campus area: **3,374,680.54 m^2**

Total parking area = **32,041.60 m^2**

Ratio = **0.9495%**

Program to limit or decrease the parking area on campus for the last 3 years (from 2020

[5] The program resulted in more than 30% decrease in parking area or parking area reduction reaching its limit

Total Restrict Parking Area from 2020-2022 = **39.76% decreased parking area on campus**

Description:

Population

Year	No.	Program to limit the Parking	Reduced Area (m^2)	Percentage (%)
2020	2	the south of the Office of the President (2)	2,800	8.27%
2021	4	the east of the Main Stadium (4)	1,800	4.88%
2021	5	the east of the Main Stadium (5)	1,820	4.93%
2021	6	the east of the Main Stadium (6)	1,440	3.90%
2022	7	the east of the Main Stadium (7)	5,700	17.78%
2023	8	The west of the International Square (8)	1,660	5.18%
		Total	15,220	44.94%

In summary, The committees of Maejo university master plan (2020-2023) approved the parking restriction area = **15,220 m^2** (approx. = **44.94% decrease parking area on campus**)

Additional evidence

The committees of Maejo university master plan (2018-2020) approved the parking restriction area around the Office of the President as follows;

- 2018, The parking area ① in the south of the Office of President reduced : **1,200 m^2** (approx. = **3.54%**)
- 2019, The parking area ③ in the south of the Office of President reduced : **1,200 m^2** (approx. = **3.25%**)
- 2020, The parking area ② in the south of the Office of President reduced : **2,800 m^2** (approx. = **8.27%**)

The restricted parking area (2018-2020)

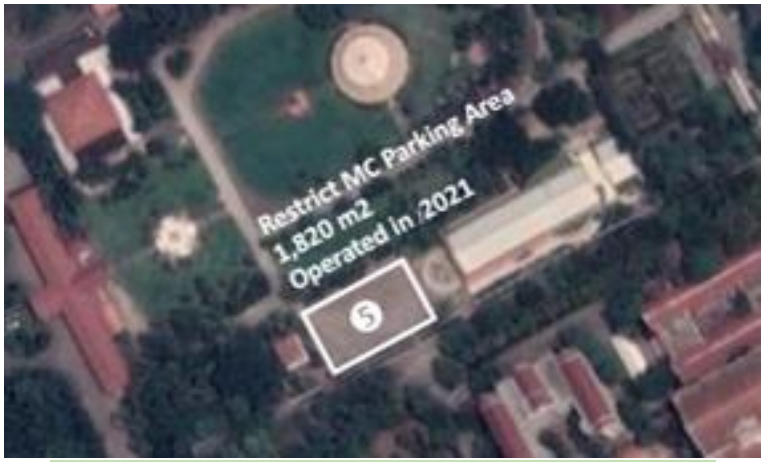
The committees of Maejo university master plan (2021) approved the parking restriction area around the Office of President as follows;

- 2021, The parking area ④ in the east of the Main Stadium reduced : **1,800 m²** (approx. = **4.88%**)

The restricted parking area ④

The committees of Maejo university master plan (2021) approved the parking restriction area around the Office of the President as follows;

- 2021, The parking area ⑤ in the east of the Main Stadium reduced : **1,820 m^2** (approx. = **4.93%**)
- 2021, The parking area ⑥ in the east of the Main Stadium reduced : **1,440 m^2** (approx. = **3.90%**)



The restricted parking area ⑤

The restricted parking area ⑥

The committees of Maejo university master plan (2022) approved the parking restriction area around the Office of the President as follows;

- 2022, The parking area ⑦ in the east of the Main Stadium reduced : **5,700 m²** (approx. = **17.78%**)

The restricted parking area ⑦

The committees of Maejo university master plan (2023) approved the parking restriction area around the International Square as follows;

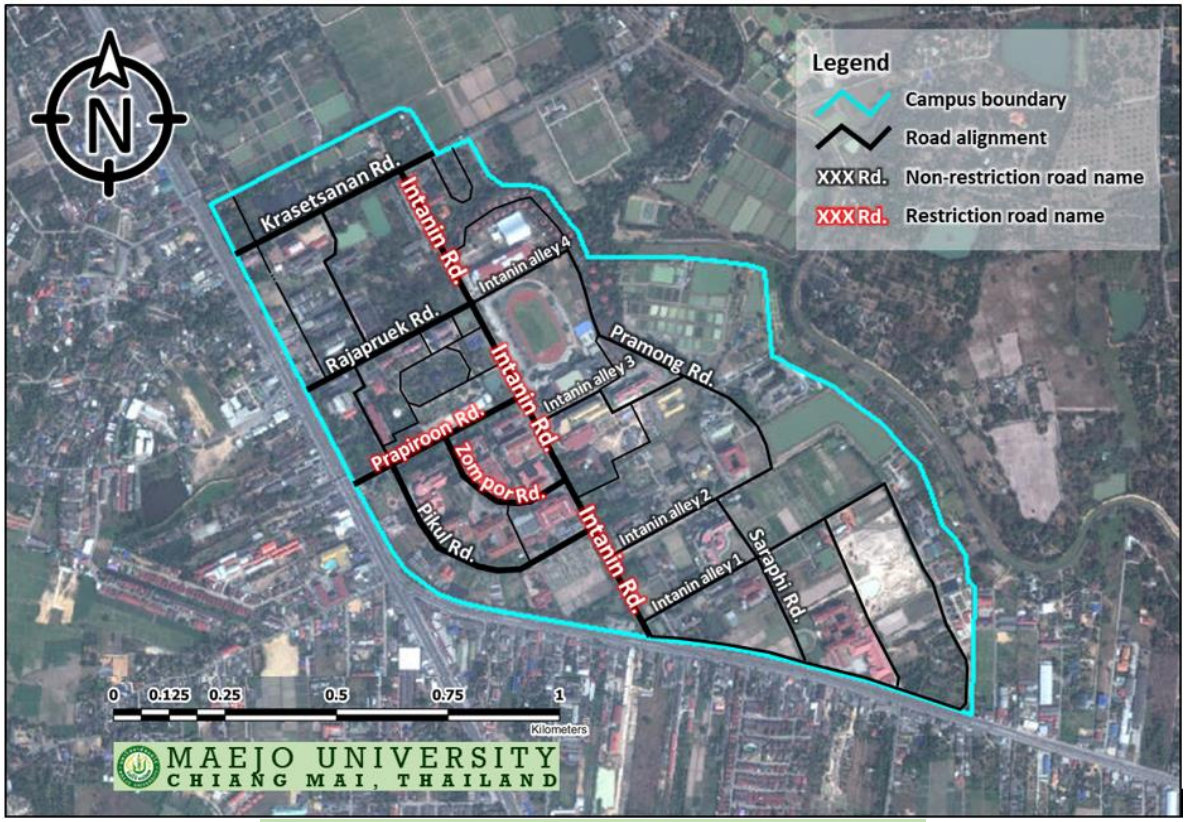
- 2023, The parking area ⑧ in the west of the International Square reduced : **1,660 m²** (approx. = **5.18%**)

The restricted parking area ⑦

On-street parking area restriction policy

From 2018, The committees of Maejo university master plan approved the traffic and parking restriction area to control the number of motor-vehicles traveling in the campus and to reduce the previous on-street parking in Intanin road, Prapiroon road, and Zompor road as shown below;

The result found that the present parking area reduced : **40,902.43 m^2** to **34,744.03 m^2** (approx. = **15.06%**)



Maejo university on-street parking restriction area

On-street parking restriction on Zompor Rd.

On-street parking restriction in front of the main library building and the central academic

On-street parking restriction on Intanin Rd.library building and the central academic building

Number of initiatives to decrease private vehicles on campus

[5] > 3 initiatives or initiative is no longer required

Result = 7 transportation initiatives + 2 planning initiatives to decrease private vehicles on campus

Description:

At present, the project to decrease the traveling private vehicles on the university campus is being implemented consists of 7 projects as follows,

(1) Free bicycle service on the campus

(2) On-street parking restrictions on the main inner-road

(3) MJU Transit (EV Shuttle) inside campus

(4) MJU Car Free Day 2023

(5) MJU Cycling Club (MJUCC)

(6) Gate Restriction and Vehicle Registration System

(7) Smart Bike-Sharing (Bicycle and EV Scooter) by AnyWheel (Thailand)

And there are 2 projects that are currently being presented as outlined to the university follows,

(8) MJU Smart Gate Project

(9) MJU Smart Parking Project

(1) free bike service operated and subsidized by the university as detailed in [5.9] and restricted bicycle lane in the main road network in the university

(2) parking restriction area around the Office of President (since 2018) and parking restriction on on-street parking as detailed in [5.14] aim to reduce vehicle entering to in the central of university (Education Zone)

(3) MJU Transit operated for free inside the university area aim to change travel behavior from private vehicle to public transit in the campus

See more: http://www.green.mju.ac.th/?p=2443 and http://www.green.mju.ac.th/?page_id=2492

(4) MJU Car Free Day (22 September 2022)

See more: https://green.mju.ac.th/?p=7941&lang=en

(5) MJU Cycling Club (MJUCC) : the community club of cycling society in the university

The previous activities and details as following ; https://www.facebook.com/pg/MJU-Cycling-Club-MJUCC-190221161338516/about/?ref=page_internal

(6) Gate Restriction under COVID-19 situation (2020-2021), Control on Road Safety and Reducing Traffic Policy in Campus (2022)

(7) Smart Bike-Sharing for Traffic Restriction and Control By MOU between MJU and AnyWheel (Thailand) (Start in 2022)

(8) Smart Gate Project for Traffic Restriction and Control (Proposal 2022)

(9) Smart Parking Project for Traffic Restriction and Control (Proposal 2022)

Pedestrian path on campus

[5] Pedestrian paths are available, designed for safety, convenience, and in some parts provided withdisabled-friendly features.

Description:

The pedestrian path on the main road of the campus (Intanin Rd.) has separated from road, leveling up platform, enough space, channelized control at intersection, in some path provided with disabled-friendly features, and surrounding with nature.

The most path, Ramps are provided with disabled-friendly features

The most path, Ramps are provided with disabled-friendly features

The pedestrian path on the minor road of the campus has separated from road, leveling up platform, enough space, covered by metal sheet roof structure, and surrounding with nature library building and the central academic building

The pedestrian path on the minor road of the campus has separated from road, leveling up platform, enough space, covered by metal sheet roof structure, and surrounding with nature library building and the central academic building

The pedestrian path on some area has separated from road with guard rail library building and the central academic building

Information, direction signs and map installed at major activites area and intersection

The approximate daily travel distance of a vehicle inside your campus only (in Kilometers)

Approximate VKT in the university = **5,652.20 km/day**

The approximate daily travel distance of vehicle (VKT) inside the campus was calculated from the transportation 4-step model and calibrated with traffic surveying data as follows;

Vehicle type	Vehicle Kilometer of Travel (VKT)
Motorbike	3,187.13 km/day
Personal Car	2,465.07 km/day
Bus and Truck	0 km/day
Total	**5,652.20 km/day**

6. Education and Research (ED)

Number of Courses/Subjects Related to Sustainability Offered

= 822 course

Sample of activities in many courses related to green and sustainability

Total number of courses/subjects offered

= 3,624 course

The ratio of sustainability courses to total courses/subjects

Description

Number of courses/modules related to environment and sustainability offered in 2023 = **822** courses Number of total course in 2023 = **3624** ;
(http://www.education.mju.ac.th/www/programStructure)

The ratio of sustainability courses to total courses/subjects = $\frac{822 \times 100}{3624}$ = **22.68 %**

[1] ≤ 1%
[2] > 1 - 5%
[3] > 5 - 10%
[4] > 10 - 20%
[5] > 20%

No.	Course Code	Course Name (Thai)	Course Name (English)
1	กค302	การเกษตรกับสิ่งแวดล้อม	Agriculture and the Environment
2	กค311	เทคโนโลยีการใช้สารเคมีทางการเกษตรอย่างปลอดภัย	Safety Technology in the Use of Agrochemicals
3	กค401	การจัดการวัสดุเกษตรอย่างปลอดภัยและมีประสิทธิภาพ	Safety and Efficient Handling
4	กค412	การผลิตพืชอาหารปลอดภัย	Safety Practices in Food Crop Production
5	กช101	สังคมวิทยาเมืองและชนบท	Rural and Urban Sociology
6	กช201	นิเวศวิทยา สิ่งแวดล้อม กับการพัฒนาชุมชน	Environment Ecology on Community Development
7	กช204	ระบบเมืองและสภาพแวดล้อมทางกายภาพ	Urban System and Physical Environment
8	กช212	นโยบายสาธารณะเพื่อการบริหารจัดการชุมชน	Public Policy for Community Administrative Management
9	กช232	ระบบเมืองและสภาพแวดล้อมทางกายภาพ	Urban System and the Physical Environment

No.	Course Code	Course Name (Thai)	Course Name (English)
10	กช251	สิทธิชุมชนในการจัดการทรัพยากรธรรมชาติและสิ่งแวดล้อม	Community Rights in Natural Resources and Environmental Management
11	กช316	กระบวนการกลายเป็นเมืองและการเปลี่ยนแปลงทางสังคม	Urbanization and Social Change
12	กช321	เศรษฐกิจพอเพียงและการพัฒนาที่ยั่งยืน	Sufficiency Economy and Sustainable Development
13	กช323	การจัดการสิ่งแวดล้อมเพื่อชุมชน	Environmental Management for Communities
14	กช324	ระบบเกษตรทางเลือกเพื่อการพัฒนาชุมชน	Alternative Agriculture System for Community Development
15	กช326	ธุรกิจและสิ่งแวดล้อม	Business and Environment
16	กช336	การจัดการท่องเที่ยวในชุมชน	Tourism Management in a Community
17	กช339	การจัดการท่องเที่ยวในชุมชน	Tourism Management in a Community
8	กช353	การจัดการทรัพยากรธรรมชาติและสิ่งแวดล้อมชุมชน	Community Natural Resources and Environmental Management
19	กช355	เกษตรทางเลือกเพื่อพัฒนาชุมชน	Alternative Agriculture for Community Development
20	กช425	การจัดการที่ดินและทรัพยากรโดยชุมชน	Community Management of Land and Natural Resources
21	กช461	กฎหมายว่าด้วยการอนุรักษ์ทรัพยากรธรรมชาติ	Laws of Natural Resources Conservation
22	กฏ301	กีฏวิทยาทางการเกษตร	Agricultural Entomology
23	กฏ320	แมลงศัตรูสำคัญทางเศรษฐกิจ	Economic Entomology
24	กฏ430	นิเวศวิทยาของแมลง	Insect Ecology
25	กฏ451	การจัดการแมลงศัตรูพืช	Insect Pest Management
26	กฏ470	การปลูกหม่อน-เลี้ยงไหม	Sericulture
27	กฏ514	แมลงพาหะนำโรคมาสู่พืช	Insect Transmission of Plant Pathogens
28	กฏ540	พิษวิทยาของสารฆ่าแมลง	Insecticide Toxicology
29	กด501	ระเบียบวิธีวิจัยทางการใช้ที่ดินและการจัดการทรัพยากรธรรมชาติอย่างยั่งยืน	Research Methods in Sustainable Land Use

No.	Course Code	Course Name (Thai)	Course Name (English)
30	กด512	การใช้ที่ดินและการจัดการทรัพยากรธรรมชาติในระดับลุ่มน้ำย่อย	Land Use and Natural Resource Management at Sub-Watershed Level
31	กด561	อุตุนิยมวิทยาและอุทกวิทยาประยุกต์	Applied Meteo-Hydrology
32	กด562	การประเมินผลกระทบสิ่งแวดล้อม สังคม และสุขภาพ	Environment, Social and Health Impact Assessment
33	กด565	หัวข้อเลือกสรรในด้านการใช้ที่ดินและการจัดการทรัพยากรธรรมชาติอย่างยั่งยืน	Selected Topics in Sustainable Land Use and Natural Resource Management
34	กด695	การค้นคว้าอิสระ	Independent study
35	กต354	การตลาดเพื่อสังคม	Social Marketing
36	กท336	กฎหมายอนุรักษ์ธรรมชาติและสิ่งแวดล้อม	Conservation of Nature and Environment Law
37	กท412	ท้องถิ่นกับการจัดการทรัพยากรธรรมชาติและภัยพิบัติ	Local with Natural Resources Management and Environment
38	กท510	การจัดการการท่องเที่ยวเชิงบูรณาการ	Integrated Tourism Management
39	กท511	การจัดการแหล่งท่องเที่ยวเพื่อคุณภาพชีวิต	Wellness Tourism Destination Management
40	กท512	การจัดการท่องเที่ยวเชิงเกษตรขั้นสูง	Advanced Agro-Tourism Management
41	กท540	การตลาดท่องเที่ยวสีเขียว	Green Marketing Tourism
42	กท550	การจัดการทรัพยากรมนุษย์สำหรับงานบริการ	Human Resource Management for Services
43	กท710	ทฤษฎีการจัดการเชิงกลยุทธ์เพื่อการจัดการการท่องเที่ยว	Strategic Management Theories for Tourism Management
44	กท712	การจัดการทรัพยากรธรรมชาติและสิ่งแวดล้อมสำหรับการท่องเที่ยว	Environmental and Natural Resources Management for Tourism
45	กบ260	กฎหมายเกี่ยวกับการท่องเที่ยว	Laws for Tourism
46	กบ300	การจัดการทรัพยากรมนุษย์เพื่อการบริการ	Human Resource Management for Services
47	กบ331	การจัดการการท่องเที่ยวอย่างยั่งยืน	Sustainable Tourism Management
48	กบ332	การขนส่งและโลจิสติกส์เพื่อการท่องเที่ยว	Transportation and Logistics for Tourism Industry
49	กบ335	การวางแผนและโครงการจัดการการท่องเที่ยวเชิงบูรณาการ	Planning and Project Management Integrated Tourism

No.	Course Code	Course Name (Thai)	Course Name (English)
50	กป432	การดูนกเบื้องต้น	Introduction to Bird Watching
51	กป101	พื้นฐานการเกษตร	Basics of Agriculture
52	กป202	หลักวนวัฒนวิทยา	Principle of Silviculture
53	กป203	นิเวศวิทยาของพืช	Plant Ecology
54	กป211	การจัดการด้านการเกษตร	Agricultural Management
55	กป212	ปฐพีศาสตร์ประยุกต์	Applied Soil Science
56	กป222	ป่าและการป่าไม้	Forest and Forestry
57	กป321	การจัดการระบบเกษตรป่าไม้	Agroforestry System Management
58	กป323	การศึกษาเชิงวิเคราะห์ระบบเกษตรป่าไม้	An Analytical Study of Agroforestry System Conservation
59	กป324	นิเวศวิทยาเกษตรป่าไม้	Ecology of Agroforestry
60	กป325	การจัดการป่าชุมชน	Community Forest Management
61	กป374	การจัดการเกษตรพื้นที่สูง	Highland Agriculture Management
62	กป413	การจัดการสัตว์ป่าในระบบเกษตรป่าไม้	Wildlife Management in Agroforestry System
63	กป423	เกษตรป่าไม้ภูมิทัศน์	Landscape Agroforestry
64	กป424	การเกษตรป่าไม้แบบยั่งยืน	Sustainable Agroforestry
65	กป426	กฎหมายและนโยบายสำหรับเกษตรและป่าไม้	Law and Policy for Agriculture and Forestry
66	กป451	อุทกวิทยาป่าไม้	Forest Hydrology
67	กอ501	ระเบียบวิธีวิจัยทางการจัดการเกษตรอินทรีย์	Research Methodology in Organic Agriculture Management
68	กอ502	ระบบมาตรฐานเกษตรอินทรีย์	Organic Standard System
69	กอ503	การจัดการนวัตกรรมและเทคโนโลยีสำหรับธุรกิจเกษตรอินทรีย์	Organic Agribusiness Innovation and Technology Management
70	กอ504	นวัตกรรมการแปรรูปและการสร้างตราสินค้าผลิตภัณฑ์เกษตรอินทรีย์	Processing Innovation and Branding of Organic Products
71	กอ512	การเลี้ยงผึ้งในระบบเกษตรอินทรีย์	Beekeeping in Organic Farming
72	กอ513	การผลิตปศุสัตว์อินทรีย์และการทำฟาร์มสัตว์น้ำอินทรีย์	Organic Livestock Production and Organic Aquaculture Farming
73	กอ514	วิทยาการและเทคโนโลยีเมล็ดพันธุ์อินทรีย์	Organic Seed Science and Technology
74	กอ521	การจัดการฟาร์มเกษตรอินทรีย์แบบยั่งยืน	Sustainable Organic Farming Management

No.	Course Code	Course Name (Thai)	Course Name (English)
75	กอ522	การจัดการบัญชีและการเงินสำหรับธุรกิจเกษตรอินทรีย์	Accounting and Financial Management for Organic Agribusiness
76	กอ523	กลยุทธ์การพัฒนาธุรกิจเกษตรอินทรีย์	Strategies for Organic Agribusiness Development
77	กอ524	การเป็นผู้ประกอบการในธุรกิจการเกษตรอินทรีย์	Entrepreneurship in Organic Agriculture
78	กอ701	ระเบียบวิธีวิจัยทางการจัดการเกษตรอินทรีย์ขั้นสูง	Research Methodology in Advanced Organic Agriculture
79	กอ702	ปัจจัยการผลิตสำหรับการเกษตรอินทรีย์	Organic Inputs for Organic Production
80	กอ703	ฟาร์มอินทรีย์และเทคโนโลยีการแปรรูปผลิตภัณฑ์	Organic Farming and Processing Technology
81	กอ704	นวัตกรรมและเกษตรความแม่นยำสูง	Innovative and High Precision Agriculture
82	กอ711	กฎระเบียบ และข้อบังคับด้านเกษตรอินทรีย์	Organic Agriculture and Standard Regulation
83	กอ714	การจัดการการเลี้ยงผึ้งในระบบเกษตรอินทรีย์	Beekeeping in Organic Farming Management
84	กอ721	การจัดการธุรกิจในฟาร์มสมัยใหม่	Modern Farm Business Management
85	คพ437	ระบบสารสนเทศทางภูมิศาสตร์ทางการเกษตรบนอุปกรณ์เคลื่อนที่	Geographic Information Systems for Agriculture on Mobile
86	คพ445	การเข้ารหัสและความปลอดภัยในเครือข่าย	Cryptography and Network Security
87	คม300	การใช้สเปกโทรเมทรีพิสูจน์เอกลักษณ์สารเคมี	Spectrometric Identification of Chemical Compounds
88	คม323	ชีวเคมี 1	Biochemistry 1
89	คม332	ปฏิบัติการเคมีอินทรีย์ 1	Inorganic Chemistry Laboratory 1
90	คม333	เคมีอินทรีย์ 2	Inorganic Chemistry 2
91	คม351	การใช้สเปกโทรเมตรีในการพิสูจน์สารประกอบอินทรีย์	Spectrometric Identification of Organic Compound
92	คม412	เคมีสิ่งแวดล้อม	Environmental Chemistry
93	คม430	หัวข้อพิเศษทางเคมีอินทรีย์	Special Topics in Inorganic Chemistry
94	คม431	เคมีอินทรีย์ขั้นสูง	Advanced Inorganic Chemistry
95	คม434	โครงสร้างและการประยุกต์ใช้สารประกอบอินทรีย์	Structure and Applications of Inorganic Compounds

No.	Course Code	Course Name (Thai)	Course Name (English)
96	คม444	เคมีอุตสาหกรรม	Industrial Chemistry
97	คม450	หัวข้อพิเศษทางเคมีอินทรีย์	Special Topics in Organic Chemistry
98	คม500	เคมีประยุกต์สมัยใหม่	Modern Applied Chemistry
99	คม501	ระเบียบวิธีวิจัยทางเคมีประยุกต์	Research Methodology
100	คม530	เคมีอนินทรีย์ประยุกต์	Applied Inorganic Chemistry
101	คม531	เคมีอนินทรีย์ขั้นสูง	Advanced Inorganic Chemistry
102	คม554	การเตรียมสารอินทรีย์ที่เป็นยารักษาโรค	Organic Drug Synthesis
103		การสังเคราะห์สารอินทรีย์ที่เป็นยารักษาโรค	Organic Drug Synthesis
104	คม734	หัวข้อที่น่าสนใจทางทางเคมีอนินทรีย์	Topics of Current Interests in Inorganic Chemistry
105	คม751	ปฏิกิริยาและการสังเคราะห์ทางเคมีอินทรีย์ขั้นสูง	Advanced Organic Reactions and Syntheses
106	คม755	เคมีผลิตภัณฑ์ธรรมชาติทางทะเล	Marine Natural Products
107	คม756	เคมีสีเขียว	Green Chemistry
108	คม757	หัวข้อที่น่าสนใจทางเคมีอินทรีย์	Topics of Current Interests in Organic Chemistry
109	คอ221	เคมีอนินทรีย์ทางอุตสาหกรรม	Industrial Inorganic Chemistry
110	คอ314	มาตรฐานระบบจัดการและความปลอดภัยในโรงงานอุตสาหกรรม	Management System Standard and Safety for Industry
111	คอ321	กระบวนการทางเคมีอุตสาหกรรม	Industrial Chemistry Process
112	คอ322	ปฏิบัติการกระบวนการทางเคมีอุตสาหกรรม	Industrial Chemistry Process Laboratory
113	จป211	นิเวศวิทยาชายฝั่ง	Coastal Ecology
114	จป311	การจัดการสิ่งแวดล้อมทางการประมง	Fishery Environment Management
115	จป314	การจัดการของเสียทางการประมง	Fishery Waste Management
116	จป315	การจัดการระบบมาตรฐานทางการประมง	Fishery Standard System Management
117	จป411	ประชากรปลา	Fish Population
118	จป412	การวิเคราะห์ผลกระทบสิ่งแวดล้อมด้านทรัพยากรทางน้ำ	Environmental Impact Assessment of Aquatic Resources
119	จป414	เทคโนโลยีภูมิสารสนเทศกับการจัดการทรัพยากรทางน้ำ	Geo-Informatics Technology for Aquatic Resources Management
120		ภูมิสารสนเทศกับการจัดการทรัพยากรทางน้ำ	Geo-Informatics Technology to Aquatic Resources
121	จป415	เครื่องมือประมงกับการจัดการประมงอย่างยั่งยืน	Fishing Gears for Sustainable Fishing Resources

No.	Course Code	Course Name (Thai)	Course Name (English)
122	จป511	การจัดการทรัพยากรประมงและสิงแวดล้อมทางน้ำเชิงบูรณาการ	Integrated Management in Fisheries Resources and Aquatic Environmental
123	จป541	การจัดการทรัพยากรประมงและสิงแวดล้อมทางน้ำเชิงบูรณาการ	Integrated Management in Fisheries Resources and Aquatic Environment
124	ชป211	ชีววิทยาของปลา	Biology of Fishes
125		มีนวิทยา	Ichthyology
126	ชป231	การดำน้ำเพื่อการอนุรักษ์ทรัพยากรธรรมชาติทางทะเล	Scuba Diving for Marine Natural Resources Conservation
127	ชป232	นิเวศวิทยาแหล่งน้ำ	Aquatic Ecology
128	ชป241	ทรัพยากรสัตว์น้ำและความหลากหลายทางชีวภาพ	Aquatic Resources and Biodiversity
129	ชป311	สัตว์น้ำไม่มีกระดูกสันหลังที่มีความสำคัญทางเศรษฐกิจ	Economic Aquatic Invertebrates
130	ชป312	สรีรวิทยาสัตว์น้ำ	Physiology of Aquatic Animals
131	ชป322	โรคและปรสิตสัตว์น้ำ	Diseases and Parasites of Aquatic Animals
132		โรคสัตว์น้ำ	Aquatic Animal Diseases
133	ชป332	สัตว์พื้นท้องน้ำ	Benthic Fauna
134	ชป411	พรรณไม้น้ำ	Aquatic Plants
135	ชป525	นิเวศวิทยาของปลา	Ecology of Fish
136	ชป571	เทคนิคทางชีววิทยาของการประมง	Biological Techniques in Fisheries
137	ชย101	หลักชีววิทยา	Principle of Biology
138	ชย102	ปฏิบัติการหลักชีววิทยา	Principle of Biology Laboratory
139	ชย200	นิเวศวิทยา	Ecology
140	ชย201	ชีววิทยาพื้นบ้าน	Ethnobiology
141	ชย210	หลักพฤกษศาสตร์	Principle of Botany
142	ชย301	วิวัฒนาการและความหลากหลายทางชีวภาพ	Evolution and Biodiversity
143	ชย303	พิษวิทยาในสิงแวดล้อม	Environmental Toxicology
144	ชย320	พฤติกรรมของสัตว์เกษตร	Agricultural Animal Behavior
145	ชย340	ไซยาโนแบคทีเรียและการใช้ประโยชน์	Cyanobacteria and Utilizations
146	ชย350	หลักสรีรวิทยา	Principle of Physiology
147	ชย400	การแปรรูปผลิตภัณฑ์ท้องถิน	Local Product Processing
148	ชย430	เทคโนโลยีโมเลกุลและการประยุกต์	Molecular Technology and Applications

No.	Course Code	Course Name (Thai)	Course Name (English)
149	ชย431	เทคโนโลยีพลาสมาสำหรับชีววิทยาเชิงเกษตร	Plasma Technology for Agricultural Biology
150	ชย432	เทคโนโลยีการปรับปรุงพันธุ์พืช	Plant Breeding Technology
151	ชว100	ชีววิทยาทั่วไป	General Biology
152	ชว310	สรีรวิทยาของพืช	Plant Physiology
153		สรีรวิทยาของพืชประยุกต์	Applied Plant Physiology
154	ชว350	เทคโนโลยีชีวภาพ	Biotechnology
155		เทคโนโลยีชีวภาพ 1	Biotechnology 1
156	ชว351	เทคโนโลยีชีวภาพ 2	Biotechnology 2
157	ชว354	การควบคุมคุณภาพทางเทคโนโลยีชีวภาพ	Biotechnological Quality Control
158	ชว404	การใช้ประโยชน์จากทรัพยากรชีวภาพ	Bioresources Utilization
159	ชว405	ไลเคนเบื้องต้น	Preliminary Lichen
160	ชว413	สรีรวิทยาประยุกต์สำหรับการเพาะเลี้ยงเนื้อเยื่อพืช	Applied Physiology for Plant Tissue Culture
161	ชว414	เทคโนโลยีชีวภาพผักและผลไม้	Fruit and Vegetable Biotechnology
162	ชว416	เทคโนโลยีชีวภาพของสาหร่าย	Algal Biotechnology
163	ชว420	การเพาะเลี้ยงเนื้อเยื่อสัตว์	Animal Tissue Culture
164	ชว424	วิทยาศาสตร์สัตว์ทดลอง	Science of Experimental Animal
165	ชว434	ชีววิทยาของยีสต์และการประยุกต์	Yeast Biology and Application
166	ชว435	สารชีวภาพจากจุลินทรีย์	Microbial Bio-products
167	ชว453	เทคโนโลยีชีวภาพทางอาหาร	Food Biotechnology
168	ชว461	การวิเคราะห์ระบบนิเวศ	Ecological System Analysis
169		หลักการทางวิทยาศาสตร์สิ่งแวดล้อม	Principles of Environmental Science
170	ชว462	จุลชีววิทยาของสิ่งแวดล้อม	Environmental Microbiology
171		จุลชีววิทยาสิ่งแวดล้อม	Environmental Microbiology
172	ชว464	ระบบการจัดการสิ่งแวดล้อมและอาชีวอนามัยเบื้องต้น	Introduction to Environmental Management System
173	ชว466	การประเมินผลกระทบสิ่งแวดล้อมและความเสี่ยง	Environmental Impact and Risk Assessment
174	ชว472	อณูชีววิทยาทางเทคโนโลยีชีวภาพประยุกต์	Applied Molecular Biotechnology
175	ดป312	ปฐพีศาสตร์เบื้องต้น	Introduction to Soil Science
176	ดป423	การใช้ปุ๋ยเพื่อการเกษตรที่ยั่งยืนและสิ่งแวดล้อม	Fertilizer Usage for Sustainable Agriculture and Environment
177		เทคโนโลยีการใช้ปุ๋ย	Fertilizer Technology and Usage
178	ดป424	ปุ๋ยอินทรีย์และปุ๋ยชีวภาพ	Organic Fertilizer and Bio Fertilizer
179	ดป426	วัสดุปรับปรุงดิน	Soil Amendments

No.	Course Code	Course Name (Thai)	Course Name (English)
180	ดป433	ดินปลูกข้าวและการจัดการ	Paddy Soil and Management
181	ดป436	ดินเขตร้อน	Tropical Soils
182	ดป444	การประเมินที่ดินและประยุกต์ใช้ข้อสนเทศทางดิน	Land Evaluation and Application of Soil Information
183	ดป445	การประยุกต์ใช้แผนที่และภาพถ่ายทางอากาศเพื่อการเกษตรและสิ่งแวดล้อม	Application of Maps and Aerial Photos for Agricultural
184	ดป451	จุลชีววิทยาของดิน	Soil Microbiology
185	ดป452	พิษวิทยาในระบบนิเวศของดิน	Soil Ecotoxicology
186	ดป473	การจัดการดินที่เป็นปัญหาเพื่อการเกษตรและสิ่งแวดล้อม	Managements of Problem Soils for Agriculture and Environment
187	ดป474	การจัดการดินและน้ำเพื่อระบบการเกษตรที่ยั่งยืน	Soil and Water Management for Sustainable Agricultural Systems
188	ดป475	การอนุรักษ์ดินและน้ำเบื้องต้น	Introduction to Soil and Water Conservation
189	ดป481	พิษวิทยาในระบบนิเวศของดิน	Soil Ecotoxicology
190	ดป484	วิธีการวิเคราะห์วัสดุการเกษตร	Analytical Agricultural Materails
191	ดป485	การผลิตพืชภายใต้การเปลี่ยนแปลงสภาวะภูมิอากาศโลก	Plant Production Under Global Climate Change
192	ดป532	ดินปลูกข้าวและการจัดการ	Soil for Rice Cultivation and their Management
193	ดป533	ดินและธาตุอาหารพืช	Soil and Plant Nutrition
194	ดป534	เคมีของดิน	Soil Chemistry
195	ดป535	ชีวกิจกรรมในดิน	Bio-Approach in Soil sphere
196		ธาตุอาหารพืช	Plant Nutrition and Plant
197	ดป537	เคมีของดิน	Soil Chemistry
198	ดป538	ชีวเคมีของสิ่งแวดล้อมในดิน	Biochemistry in Soil Environment
199	ดป541	ดินและธาตุอาหารพืช	Soil and Plant Nutrition
200	ดป543	การสำรวจระยะไกล เพื่อการเกษตรและสิ่งแวดล้อม	Remote Sensing for Agriculture and Environment
201	ดป552	การสำรวจระยะไกล เพื่อการเกษตรและสิ่งแวดล้อม	Remote Sensing for Agriculture and Environment
202	ดป553	การเกษตรที่เป็นมิตรสภาพภูมิอากาศ	Climate Smart Agriculture
203	ดป561	การจัดการทรัพยากรดินอย่างยั่งยืน	Sustainable Management of Soil Resource
204	ดป573	ดินที่เป็นปัญหาและการจัดการ	Problem Soils
205	ดป581	พิษวิทยาในดิน	Soil Toxicology

No.	Course Code	Course Name (Thai)	Course Name (English)
206	ดป582	นิเวศวิทยาของดิน	Soil Ecology
207	ดป583	ปฐพีเคมีสิ่งแวดล้อม	Environment Soil Chemistry
208	ดป641	เทคโนโลยีสารสนเทศทางภูมิศาสตร์ประยุกต์ขั้นสูง	Advanced GIS Application
209	ดป651	จุลชีววิทยาของดินขั้นสูง	Advanced Soil Microbiology
210		เทคโนโลยีสารสนเทศทางภูมิศาสตร์ประยุกต์ขั้นสูง	Advanced GIS Application
211	ตล371	การตลาดเพื่อสังคมและสิ่งแวดล้อม	Social Marketing and Environment
212	ตล461	โครงการและกิจกรรมทางการตลาดเชิงนวัตกรรม	Innovative Marketing Project and Activity
213	ทก460	ผักและผลไม้สดพร้อมบริโภค	Minimally Processed Fruits and Vegetables
214	ทก461	ผักและผลไม้สดพร้อมบริโภค	Minimally Processed Fruits and Vegetables
215	ทก463	การจัดการหลังการเก็บเกี่ยวผลิตผลเกษตรอินทรีย์	Postharvest Handling of Organic Agricultural Produces
216	ทก466	การจัดการธุรกิจเทคโนโลยีหลังการเก็บเกี่ยว	Postharvest Technology Business Management
217	ทก530	การวิเคราะห์คุณภาพผลิตผลเกษตรหลังการเก็บเกี่ยวขั้นสูง	Advanced Postharvest Quality Analysis
218	ทก560	ผักและผลไม้ตัดแต่งสด	Fresh cut Fruits and Vegetables
219	ทก560	ผักและผลไม้ตัดแต่งสด	Fresh cut Fruits and Vegetables
220	ทช112	เทคโนโลยีชีวภาพทางอุตสาหกรรมเกษตร 1	Agro-Industrial Biotechnology 1
221	ทช212	เทคโนโลยีชีวภาพทางอุตสาหกรรมเกษตร 2	Agro-Industrial Biotechnology 2
222	ทช331	เทคโนโลยีชีวภาพเพื่อการผลิตอาหาร	Food Production Biotechnology
223	ทช333	การควบคุมและประกันคุณภาพทางเทคโนโลยีชีวภาพ	Quality Control and Assurance in Biotechnology
224	ทช352	เทคโนโลยีชีวภาพทางด้านผลิตภัณฑ์ธรรมชาติและสมุนไพรเบื้องต้น	Introductory Biotechnology in Natural and Herbal Products
225	ทช361	พันธุศาสตร์โมเลกุล	Molecular Genetics
226	ทช371	เทคโนโลยีชีวภาพสิ่งแวดล้อม	Environmental Biotechnology
227	ทช441	เทคโนโลยีชีวภาพกับผลิตภัณฑ์จากสัตว์	Biotechnology in Animal Products
228	ทช451	สรีรวิทยาของพืชในสภาพปลอดเชื้อ	Plant Physiology in Aseptic Condition

No.	Course Code	Course Name (Thai)	Course Name (English)
229	ทช481	จริยธรรมและกฎหมายทางเทคโนโลยีชีวภาพ	Ethics and Law in Biotechnology
230	ทช500	กระบวนทัศน์ทางด้านเทคโนโลยีชีวภาพ	Aspects of Biotechnology
231	ทช502	เทคนิคทางเทคโนโลยีชีวภาพทางห้องปฏิบัติการ	Biotechnological Techniques for Laboratory
232	ทช503	เทคนิคทางเทคโนโลยีชีวภาพทางอุตสาหกรรมและสิ่งแวดล้อม	Biotechnological Techniques for Industry and Environment
233	ทช504	ชีววิทยาโมเลกุลขั้นสูง	Advanced Molecular Biology
234	ทช511	การพัฒนาของพืช	Plant Development
235		ปฏิบัติการเทคโนโลยีชีวภาพทางสิ่งแวดล้อม	Environmental Biltechnology Laboratory
236	ทช512	สรีรนิเวศวิทยาของพืช	Plant Ecophysiology
237	ทช513	นิเวศวิทยาอุตสาหกรรม	Industrial Ecology
238	ทช530	เทคโนโลยีชีวภาพทางจุลินทรีย์	Microbial Biotechnology
239	ทช560	เทคโนโลยีชีวภาพทางสิ่งแวดล้อม	Environmental Biotechnology
240	ทช561	การพัฒนาของพืช	Plant Development
241		ปฏิบัติการเทคโนโลยีชีวภาพทางสิ่งแวดล้อม	Environmental Biotechnology Laboratory
242	ทช562	การฟื้นฟูสิ่งแวดล้อมทางชีววิทยา	Environmental Bioremediation
243		สรีรนิเวศวิทยาของพืช	Plant Ecophysiology
244	ทช563	ระบบการจัดการสิ่งแวดล้อม	Environmental Management System
245	ทช710	นิเวศวิทยาอุตสาหกรรม	Industrial Ecology
246	ทช711	เทคนิคการวิเคราะห์ทางสิ่งแวดล้อม	Environmental Analytical Techniques
247	ทช750	วิศวกรรมวิถีเมแทบอลิซึมในพืชขั้นสูง	Advanced Plant Metabolic Engineering
248	ทช761	เทคนิคการวิเคราะห์ทางสิ่งแวดล้อม	Environmental Analytical Techniques
249	ทท241	สุขภาวะและความปลอดภัยของการท่องเที่ยว	Health and Tourist Safety
250	ทท270	การจัดการท่องเที่ยวโดยชุมชน	Community – Based Tourism Management
251	ทท322	การพาณิชย์อิเล็กทรอนิกส์เพื่ออุตสาหกรรมการท่องเที่ยว	Electronic Commerce for Tourism Industry
252	ทท371	การจัดการการท่องเที่ยวเชิงนิเวศ	Ecotourism Management
253	ทท372	การพัฒนาและส่งเสริมการท่องเที่ยววิถีเกษตร	Development and Promotion of Agro-Tourism
254	ทท411	สัมมนาทางการท่องเที่ยว	Seminar in Tourism

No.	Course Code	Course Name (Thai)	Course Name (English)
255	ทท445	การจัดการธุรกิจการท่องเที่ยวอย่างมีความรับผิดชอบ	Responsible Tourism Business Management
256	ทน280	โภชนศาสตร์ของอาหารและสุขภาพ	Food Nutrition and Health
257	ทน310	จุลชีววิทยาสำหรับอุตสาหกรรมอาหาร	Food Microbiology for Food Industry
258	ทน330	การประยุกต์ใช้กฎหมายและระบบประกันคุณภาพในอุตสาหกรรมอาหาร	Application of Law and Quality Assurance System in Food Industry
259	ทน331	การสุขาภิบาลและเทคโนโลยีสะอาดในโรงงานอุตสาหกรรมอาหาร	Sanitation and Clean Technology in Food Industry
260	ทน382	เทคโนโลยีการประหยัดพลังงานทางอุตสาหกรรมอาหาร	Saving Energy Technology of Food Industrial
261	ทน440	เทคโนโลยีการแปรรูปผลิตภัณฑ์นม	Dairy Product Processing Technology
262	ทน460	เทคโนโลยีชีวภาพและนาโนเทคโนโลยีเพื่ออุตสาหกรรมอาหาร	Biotechnology and Nanotechnology for Food Industrial
263	ทป512	เทคโนโลยีทางด้านทรัพยากรทางน้ำ	Technology in Aquatic Resources
264	ทป596	เรื่องเฉพาะทางด้านเทคโนโลยีการประมงและทรัพยากรทางน้ำ	Selected Topics in Fisheries Technology and Aquatic resources
265	ทป711	นวัตกรรมทางการประมงและการเป็นผู้ประกอบการ	Innovation in Fisheries and Entrepreneurship
266	ทป712	นวัตกรรมทางการประมง	Innovation in Fisheries
267	ทป713	การจัดการทรัพยากรทางน้ำอย่างยั่งยืน	Sustainable Management of Aquatic Resources
268		ระบบการผลิตและการปรับปรุงพันธุ์สัตว์น้ำขั้นสูง	Advanced Aquatic Production System and Breeding
269	ทป714	การจัดการทรัพยากรทางน้ำเชิงบูรณาการ	Integrated Aquatic Resources Management
270		การจัดการสุขภาพสัตว์น้ำขั้นสูง	Advanced Fish Health Management
271	ทป715	ความหลากหลายทางด้านทรัพยากรประมงและการใช้ประโยชน์	Biodiversity of Fisheries Resources
272	ทป716	ความหลากหลายทางด้านทรัพยากรประมงและการใช้ประโยชน์	Biodiversity of Fisheries Resources
273	ทป719	การบูรณาการด้านสาหร่าย พืชน้ำ และพืชอุตสาหกรรมเพื่อผลิตสัตว์น้ำอินทรีย์	Integration of algae aquatic plants and Industrial Crops for organic aquaculture production
274	ทพ200	เทคโนโลยีการผลิตพืช	Crop Production Technology
275	ทพ230	ปฐพีศาสตร์เบื้องต้น	Introduction to Soil Science
276	ทพ301	เทคโนโลยีการผลิตพืชไร่เศรษฐกิจ	Agronomy Production Technology

No.	Course Code	Course Name (Thai)	Course Name (English)
277	ทพ303	เทคโนโลยีการผลิตพืชสวนเศรษฐกิจ	Economic Horticulture Production Technology
278	ทพ304	เทคโนโลยีการผลิตพืชสมุนไพรและเครื่องเทศ	Medicinal Plants and Spices Production Technology
279	ทพ305	เทคโนโลยีการผลิตเห็ดเศรษฐกิจ	Economic Mushroom Production Technology
280	ทพ306	เทคโนโลยีการผลิตไม้ผลเศรษฐกิจ	Economic Fruit Crops Production Technology
251	ทท322	การพาณิชย์อิเล็กทรอนิกส์เพื่ออุตสาหกรรมการท่องเที่ยว	Electronic Commerce for Tourism Industry
249	ทท241	สุขภาวะและความปลอดภัยของการท่องเที่ยว	Health and Tourist Safety
250	ทท270	การจัดการท่องเที่ยวโดยชุมชน	Community – Based Tourism Management
281	ทพ310	เทคโนโลยีการปรับปรุงพันธุ์พืช	Crop Improvement Technology
282	ทพ313	เทคโนโลยีการผลิตปาล์มน้ำมัน	Oil Palm Production Technology
283	ทพ320	กีฏวิทยาการเกษตร	Entomology for Agriculture
284		เทคโนโลยีการผลิตผักเศรษฐกิจ	Economic Vegetable Crops Production Technology
285	ทพ330	เทคโนโลยีเกษตรอัจฉริยะ	Smart Farm Technology
286	ทพ340	การจัดการทรัพยากรการเกษตรและสิ่งแวดล้อม	Agricultural Resources and Environmental Management
287	ทพ374	การจัดการทรัพยากรการเกษตรและสิ่งแวดล้อม	Agricultural Resources and Environmental Management
288	ทพ403	การผลิตพืชแบบอินทรีย์	Organic Crops Production
289	ทพ458	เทคโนโลยีการผลิตหม่อนและไหม	Mulberry and Silk Production Technology
290	ทพ461	เทคโนโลยีสารสนเทศในระบบเกษตร	Information Technology in Agricultural Systems
291	ทพ491	เทคโนโลยีสารสนเทศทางการเกษตร	Agricultural Information Technology
292	ทว500	ระเบียบวิธีวิจัยทางเทคโนโลยีสิ่งแวดล้อม	Research Methodology for Environmental Technology
293	ทว501	เทคโนโลยีและสิ่งแวดล้อม	Technology and Environment
294		ระเบียบวิธีวิจัยทางเทคโนโลยีสิ่งแวดล้อม	Research Methodology for Environmental Technology
295	ทว504	การจัดการคุณภาพสิ่งแวดล้อม	Environmental Quality Management

No.	Course Code	Course Name (Thai)	Course Name (English)
296	ทว511	เทคโนโลยีและสิ่งแวดล้อม	Technology and Environment
297	ทว512	การกำจัดขยะ ของเสียอันตรายและการจัดการ	Solid and Hazardous Waste Disposal and Management
298	ทว513	มลพิษทางดินและการควบคุม	Soil Pollution and Control
299	ทว514	การจัดการคุณภาพสิ่งแวดล้อม	Environmental Quality Management
300	ทว515	พิษวิทยาสิ่งแวดล้อม	Environmental Toxicology
301	ทว516	กระบวนการของจุลินทรีย์ในการจัดการมลพิษสิ่งแวดล้อม	Microbial Process in Environmental Pollution Management
302	ทว517	การจัดการทรัพยากรธรรมชาติและสิ่งแวดล้อม	Natural Resources and Environmental Management
303	ทว518	หัวข้อสนใจ	Selected Topic
304	ทว523	การกำจัดขยะ ของเสียอันตรายและการจัดการ	Solid and Hazardous Waste Disposal and Management
305	ทว524	เทคโนโลยีการบำบัดมลพิษทางดิน	Solid Pollution Treatment Technology
306	ทว525	กระบวนการของจุลินทรีย์ในการจัดการมลพิษสิ่งแวดล้อม	Microbial Process in Environmental Pollution Management
307	ทว526	หัวข้อสนใจทางเทคโนโลยีสิ่งแวดล้อม	Selected Topic in Environmental Technology
308	ทว591	สัมมนา 1	Seminar 1
309	ทว592	สัมมนา 2	Seminar 2
310	ทว593	สัมมนา 3	Seminar 3
311	ทว594	สัมมนา 4	Seminar 4
312	ทว601	สัมมนา 1	Seminar 1
313	ทว602	สัมมนา 2	Seminar 2
314	ทว603	สัมมนา 3	Seminar 3
315	ทว604	สัมมนา 4	Seminar 4
316	ทว695	การค้นคว้าอิสระ	Independent study
317	ทส334	พื้นฐานทางธุรกิจสำหรับเทคโนโลยีสารสนเทศ	Business fundamentals for Information Technology
318	ทส351	เทคโนโลยีสารสนเทศเพื่อการเกษตร	Information Technology for Agriculture
319	ทส496	โครงงานเทคโนโลยีสารสนเทศ	Project in Information Technology
320	ทอ231	การจัดการและความปลอดภัยของวัตถุดิบ	Raw Material Management and Safety
321	ทอ331	ระบบประกันคุณภาพและความปลอดภัยอาหาร	Food Safety and Quality Assurance System

No.	Course Code	Course Name (Thai)	Course Name (English)
322	ทอ332	ระบบประกันคุณภาพอาหาร	Food Quality Assurance System
323	ทอ333	ความปลอดภัยของอาหาร	Food Safety
324	ทอ360	การจัดการและการตลาดอาหาร	Food Management and Marketing
325	ทอ370	การแปรรูปอาหารอินทรีย์และการผลิตอาหารเพื่อสิ่งแวดล้อม	Processing of Organic Foods and Food Production for Environment
326	ทอ445	การแปรรูปเนื้อสัตว์	Muscle Foods Processing
327	ทอ530	การประกันคุณภาพอาหารขั้นสูง	Advances in Food Quality Assurance
328	ทอ531	กฎหมายและมาตรฐานอาหาร	Food Law and Standards
329	ธท200	การจัดการทรัพยากรมนุษย์ในอุตสาหกรรมการท่องเที่ยวและการบริการ	Human Resource Management for Tourism and Hospitality Industry
330	ธท231	การจัดการโลจิสติกส์และโซ่อุปทานทางการท่องเที่ยว	Logistics and Supply Chain Management in Tourism
331	ธท240	ครัวอินทรีย์	Organic Thai Cuisine
332	ธท241	การจัดการโรงแรมและภัตตาคาร	Hotel and Restaurant Management
333	ธท242	การจัดการอาหารและเครื่องดื่ม	Food and Beverage Management
334	ธท301	การจัดการแหล่งท่องเที่ยวที่เป็นมิตรกับสภาพภูมิอากาศ	Climate Friendly Destination Management
335	ธท332	การจัดการเชิงกลยุทธ์ในอุตสาหกรรมการท่องเที่ยวและการบริการ	Strategic Management for Tourism and Hospitality Business
336	ธท337	ทรัพยากรทางทะเลกับการท่องเที่ยว	Marine Tourism
337	นท501	เทคโนโลยีนาโนพื้นฐาน	Fundamental Nanotechnology
338	นท511	สารกึ่งตัวนำอนินทรีย์	Inorganic Semiconductors
339	นท512	กระบวนการและสมบัติของวัสดุนาโนอนินทรีย์	Processing and Properties of Inorganic Nanomaterials
340	นท513	เทคโนโลยีนาโน	Nanotechnology
331	ธท240	ครัวอินทรีย์	Organic Thai Cuisine
332	ธท241	การจัดการโรงแรมและภัตตาคาร	Hotel and Restaurant Management
333	ธท242	การจัดการอาหารและเครื่องดื่ม	Food and Beverage Management
334	ธท301	การจัดการแหล่งท่องเที่ยวที่เป็นมิตรกับสภาพภูมิอากาศ	Climate Friendly Destination Management
335	ธท332	การจัดการเชิงกลยุทธ์ในอุตสาหกรรมการท่องเที่ยวและการบริการ	Strategic Management for Tourism and Hospitality Business
336	ธท337	ทรัพยากรทางทะเลกับการท่องเที่ยว	Marine Tourism
337	นท501	เทคโนโลยีนาโนพื้นฐาน	Fundamental Nanotechnology
338	นท511	สารกึ่งตัวนำอนินทรีย์	Inorganic Semiconductors

No.	Course Code	Course Name (Thai)	Course Name (English)
339	นท512	กระบวนการและสมบัติของวัสดุนาโนอินทรีย์	Processing and Properties of Inorganic Nanomaterials
340	นท513	เทคโนโลยีนาโน	Nanotechnology
341		สารกึ่งตัวนำอินทรีย์	Organic Semiconductors
342	นท524	สารกึ่งตัวนำอินทรีย์และอนินทรีย์	Organic and Inorganic Semiconductors
343	นท525	กระบวนการและสมบัติของวัสดุนาโนอินทรีย์	Processing and Properties of Inorganic Nanomaterials
344	นป111	หลักชีววิทยาเพื่อการประมง	Principle of Biology for Fisheries
345	นป211	ความรู้พื้นฐานด้านนวัตกรรมทางการประมง	Basic Knowledge about Innovation
346	นป212	นิเวศวิทยาและคุณภาพน้ำฟาร์มประมง	Ecology and Water Quality Management in Fish Farm
347	นป213	นวัตกรรมทางเทคโนโลยีทางการเพาะเลี้ยงสัตว์น้ำ	Innovation in Aquaculture Technology
348	นป215	กฎหมาย ข้อบังคับและมาตรฐานสากลด้านประมงและเพาะเลี้ยงสัตว์น้ำ	Laws, Regulations and Global Standards in Fisheries and Aquaculture
349	นป311	การเพาะเลี้ยงสัตว์น้ำเชิงอุตสาหกรรม	Industrial Aquaculture
350	นป312	เทคโนโลยีการเพาะเลี้ยงสัตว์น้ำแม่นยำสูง	Precision Aquaculture Technology
351	นป313	การทำฟาร์มสัตว์น้ำอินทรีย์	Organic Farming for Aquatic Animals
352	นป322	นวัตกรรมทางธุรกิจประมง	Innovation in Fisheries Business
353	นศ1114	ท้องถิ่นศึกษา	Local Study
354	นศ1313	การสื่อสารกับโลกาภิวัตน์	Communication and Globalization
355	นศ1316	การวาดภาพสื่อสารเชิงวิทยาศาสตร์และเกษตรศิลป์	Agricultural and Science Related Communication Drawing
356	นศ1361	การสื่อสารกับโลกาภิวัตน์	Communication and Globalization
357	บช403	การบัญชีเพื่อความรับผิดชอบต่อสังคมและสิ่งแวดล้อม	Accounting for Social and Environmental Responsibility
358	บช404	การบัญชีระหว่างประเทศ	Financial Reporting and Analysis
359	บช411	การบริหารต้นทุนเชิงกลยุทธ์	Strategic Cost Management
360	บช496	สัมมนาการบัญชี	Seminar in Accounting
361	บช531	การวิเคราะห์รายงานทางการเงินขั้นสูง	Advanced Financial Reporting Analysis

No.	Course Code	Course Name (Thai)	Course Name (English)
362	บช532	การกำกับดูแลกิจการและการรายงานความรับผิดชอบต่อสังคม	Corporate Governance and Corporate Social Responsibility Reporting
363	บช535	การบัญชีระหว่างประเทศขั้นสูง	Advanced International Accounting
364	บธ200	ความรู้เบื้องต้นเกี่ยวกับธุรกิจ	Introduction to Business
365	บธ510	การบริหารธุรกิจสำหรับผู้ประกอบการและองค์กรในยุคดิจิทัล	Managing for Entrepreneur and Organization in Digital
366	บธ513	การวินิจฉัยธุรกิจเพื่อการจัดการเชิงกลยุทธ์	Business Diagnostics for strategic management
367	บธ601	การจัดการธุรกิจขนาดกลางและขนาดย่อม	Small and Medium Enterprise Management
368	บธ605	การจัดการเชิงกลยุทธ์สมัยใหม่	Modern Strategic Management
369	บธ611	การจัดการค่าตอบแทน	Compensation Management
370	บธ637	การจัดการตลาดโลก	Global Marketing Management
371	บธ649	สัมมนาการบัญชี	Seminar in Accounting
372	บธ655	นโยบาย และกลยุทธ์ทางการเงินร่วมสมัย	Contemporary Financial Policy and Strategy
373	บธ671	กลยุทธ์ธุรกิจการเกษตร	Agricultural Business Strategy
374	บส522	ฟาร์มเกษตรอินทรีย์ร่วมสมัย	Contemporary Organic Agriculture Farming
375	บส523	การเลี้ยงผึ้งในระบบเกษตรอินทรีย์	Beekeeping in Organic Farming
376	บส541	การแปรรูปผลิตภัณฑ์เกษตรอินทรีย์	Organic Product Processing and Technology
377	บส561	ธุรกิจการเกษตรในสภาวะการเปลี่ยนแปลง	Agribusiness in a Changing Environment
378	บส562	การค้าระหว่างประเทศสำหรับผลผลิตทางการเกษตรของกลุ่มประเทศอาเซียน	International Trade in Agricultural Products of the ASEAN Community
379	บส564	ประเด็นร่วมสมัยทางการบริหารการพัฒนาการเกษตร	Contemporary Issues in the Administration of the Agricultural Development
380	บส712	การจัดการสหวิทยาการเกษตรแบบบูรณาการ	Administration and Management of Integrated Agricultural System
381	บส721	การจัดการระบบเกษตรในสภาวะการเปลี่ยนแปลงภูมิอากาศโลก	Agricultural Management under Global Climate Change
382	ปม511	นิเวศวิทยาป่าไม้และการจัดการขั้นสูง	Advance Forest Ecology and Management

No.	Course Code	Course Name (Thai)	Course Name (English)
383	ปม531	นโยบายและการวางแผนจัดการทรัพยากรป่าไม้อย่างยั่งยืน	Policy and Planning for Sustainable Forest Resource Management
384	ปม541	การประยุกต์หลักภูมิสังคมในการจัดการป่าไม้	Application for Geosocial in Forest Management
385	ปม601	การบริหารจัดการป่าไม้ขั้นสูง	Advanced Forest Management
386	ปม612	นิเวศวิทยาเชิงปริมาณเพื่อการจัดการป่าไม้	Quantitative Ecology for Forest Management
387	ปม633	กลยุทธ์การจัดการป่าไม้เพื่อลดความขัดแย้ง	Conflicts and Forest Resource Management
388	ปม642	เทคโนโลยีการฟื้นฟูป่าไม้	Technology of Forest Landscape Restoration
389	ปม661	การส่งเสริมระบบเกษตรบนยั่งยืนขั้นสูง	Advance Sustainable Agriculture Extension
390	ผม501	ระเบียบวิธีวิจัย	Research Methodology
391		ระเบียบวิธีวิจัยทางการวางผังเมืองและสภาพแวดล้อม	Research Methodology in Environmental and Urban Planning
392	ผม512	ปฏิบัติการวางผังเมืองและสภาพแวดล้อม	Workshop in Environmental and Urban Planning
393	ผม513	เทคนิควิเคราะห์และวิทยาการร่วมสมัยเพื่อการเติบโตอย่างชาญฉลาดในการวางแผนภาคและเมือง	Analytical Techniques and Emerging Methodology for Smart Growth in Urban and Regional Planning
394	ผม514	การวางแผนโครงสร้างพื้นฐานสีเขียว	Green Infrastructure Planning
395	ผม531	ทฤษฎีการวางแผนเมืองและสภาพแวดล้อม	Environmental and Urban Planning Theory
396	ผม532	ปฏิบัติการวางผังเมืองและสภาพแวดล้อม 1	Workshop in Environmental and Urban Planning I
397	ผม533	ปฏิบัติการวางผังเมืองและสภาพแวดล้อม 2	Workshop in Environmental and Urban Planning II
398	ผม541	สัณฐานวิทยาเมืองกับการวางแผนโครงสร้างพื้นฐานสีเขียว	Urban Morphology and Green Infrastructure Planning
399	ผม551	กระบวนการเป็นเมืองกับการเปลี่ยนแปลงทางสังคมและสภาพแวดล้อม	Urbanization and Social and Environmental Change
400	ผม553	การบริหารจัดการเมืองและนิเวศแวดล้อมอย่างมีส่วนร่วม	Urban and Eco Environment Management by Participation
401	ผม561	นิเวศวิทยาเมือง	Urban Ecology

No.	Course Code	Course Name (Thai)	Course Name (English)
402	ผม571	วิทยาการร่วมสมัยเพื่อการเติบโตอย่างชาญฉลาดในการวางแผนภาคและเมือง	Emerging Methodology for Smart Growth in Urban and Regional Planning
403	ผม572	ภูมิสารสนเทศเพื่อการวางผังเมืองและสภาพแวดล้อม	Geo-Informatics for Environmental and Urban Planning
404	ผม581	การจัดการภูมิทัศน์วัฒนธรรม	Cultural Landscape Management
405	ผม583	การวางแผนการท่องเที่ยวสีเขียว	Planning for Green Tourism
406	ผม591	สัมมนา 1	Seminar 1
407		สัมมนาทางการวางผังเมืองและสภาพแวดล้อม 1	Seminar in Environmental and Urban Planning 1
408	ผม592	สัมมนา 2	Seminar 2
409		สัมมนาทางการวางผังเมืองและสภาพแวดล้อม 2	Seminar in Environmental and Urban Planning 2
410	ผม593	สัมมนาทางการวางผังเมืองและสภาพแวดล้อม 3	Seminar in Environmental and Urban Planning 3
411	ผม594	สัมมนาทางการวางผังเมืองและสภาพแวดล้อม 4	Seminar in Environmental and Urban Planning 4
412	ผม595	การฝึกงานทางการวางผังเมืองและสภาพแวดล้อม	Professional Training in Environmental and Urban Planning
413	ผม691	วิทยานิพนธ์ 1	Thesis 1
414	ผษ101	เกษตรเพื่อชีวิต	Agriculture for Life
415	ผษ512	ความขัดแย้งและปัญหาการใช้ที่ดิน	Conflicts and Problems in Land Use
416	ผษ513	การใช้ที่ดินและการจัดการทรัพยากรธรรมชาติในระดับประเทศและภูมิภาค	Land use and Natural Resource Management at National and Regional Level
417	ผษ591	ระเบียบวิธีวิจัยทางการใช้ที่ดินและการจัดการทรัพยากรธรรมชาติอย่างยั่งยืน	Research Methods in Sustainable Land Use and Natural Resource Management
418	ผษ596	สัมมนา 1	Seminar 1
419	ผษ597	สัมมนา 2	Seminar 2
420	ผษ698	ปัญหาพิเศษ	Special Problems
421	ผส275	หลักการจัดการสัตว์ป่า	Principles of Wildlife Management
422	ผส350	กายวิภาคและสรีรวิทยาของสัตว์เลี้ยง	Anatomy and Physiology of Domestic Animal
423	ผส511	ทฤษฎีการวางแผนสิ่งแวดล้อม	Environmental Planning Theory

No.	Course Code	Course Name (Thai)	Course Name (English)
424		ทฤษฎีการออกแบบและวางแผนสิ่งแวดล้อม	Environmental Design and Planning Theory
425	ผส512	การประเมินสิ่งแวดล้อมเพื่อการออกแบบและวางแผน	Environmental Assessment for Design and Planning
426		การวิเคราะห์ผลกระทบสิ่งแวดล้อมสำหรับนักออกแบบ	Environmental Impact Assessment for Designers
427	ผส513	วิทยาการร่วมสมัยทางการออกแบบและการวางแผนสิ่งแวดล้อม	Emerging Methodology in Environmental Design and Planning
428	ผส514	ระบบสารสนเทศภูมิศาสตร์และการประยุกต์	Geographic Information System and Applications
429	ผส521	ปฏิบัติการวางแผนและออกแบบสิ่งแวดล้อม 1	Environmental Planning and Design Workshop 1
430	ผส541	ระบบภูมิสารสนเทศและการประยุกต์	Geomatics and Applications
431	ผส551	พฤติกรรมมนุษย์กับสภาพแวดล้อมชุมชนเมือง	Human Behavior and Urban Environment
432	ผส570	ระเบียบวิธีวิจัยทางการออกแบบและวางแผนสิ่งแวดล้อม	Research Methodology in Environmental Design and Planning
433	ผส571	วิทยาการวิจัยทางการออกแบบและวางแผนสิ่งแวดล้อม	Research Methodology in Environmental Design and Planning
434		สัมมนา 1	Seminar 1
435	ผส572	สัมมนา	Seminar
436		สัมมนา 2	Seminar 2
437	ผส573	สัมมนา 3	Seminar 3
438	ผส574	สัมมนา 4	Seminar 4
439	ผส621	ปฏิบัติการวางแผนและออกแบบสิ่งแวดล้อม 2	Environmental Planning and Design Workshop 2
440	ผส622	ปฏิบัติการวางแผนและออกแบบสิ่งแวดล้อม 2	Environmental Planning and Design Workshop II
441	ผส633	ออกแบบสิ่งแวดล้อมอย่างยั่งยืน	Sustainable Environmental Design
442	ผส643	การวางแผนการใช้ที่ดินและการขนส่งจราจร	Land Use and Transportation Planning
443		การวางแผนการใช้ประโยชน์ที่ดินและการขนส่ง	Land Use and Transportation Planning
444	ผส651	พฤติกรรมมนุษย์กับสภาพแวดล้อมชุมชนเมือง	Human Behavior and Urban Environment
445	ผส653	การวางแผนพื้นที่ขั้นสูง	Advanced Site Planning

No.	Course Code	Course Name (Thai)	Course Name (English)
446	ผส661	เศรษฐสังคมสิ่งแวดล้อม	Environmental Socio-economics
447	ผส671	วิทยานิพนธ์ 1	Thesis 1
448	ผส673	วิทยานิพนธ์ 1	Thesis 1
449	ผส674	วิทยานิพนธ์ 2	Thesis 2
450	ผส675	การค้นคว้าอิสระ	Independent study
451		วิทยานิพนธ์ 5	Thesis 5
452	ผส677	การค้นคว้าอิสระ	Independent study
453	พก531	สังคมวิทยาและเศรษฐศาสตร์ในการพัฒนาทรัพยากรและส่งเสริมการเกษตร	Socio-Economic in Resources Development and Agricultural Extension
454	พก532	การพัฒนาทรัพยากรและส่งเสริมการเกษตรเชิงกลยุทธ์	Strategic Resources Development and Agricultural Extension
455	พก634	จิตวิทยาและความร่วมมือในงานส่งเสริมการเกษตร	Psychology and Cooperation in Agricultural Extension
456	พก641	การจัดการทรัพยากรและสิ่งแวดล้อมทางการเกษตรอย่างยั่งยืน	Sustainable Agricultural Resources and Environmental Management
457	พก642	ภูมิปัญญาท้องถิ่นกับการพัฒนาทรัพยากรการเกษตร	Local Wisdom and Agricultural Resources Development
458	พก712	เทคโนโลยีสารสนเทศเพื่อการจัดการสิ่งแวดล้อมและการเกษตร	Information Technology for Environmental and Agricultural Management
459	พก731	การบริหารจัดการทรัพยากรและระบบเกษตรแบบบูรณาการขั้นสูง	Advance Integrated Management of Resources and Agricultural System
460	พก732	กฎเกณฑ์ทางการค้าระหว่างประเทศ ความปลอดภัยและความมั่นคงทางอาหาร	International Regulations of Trade, Food Safety and Secuerity
461	พก733	การจัดการอุตสาหกรรมเกษตรเชิงนิเวศ	Eco-Agricultural Industry Management
462	พก741	นโยบาย การวางแผน และการประเมินผลด้านทรัพยากรและสิ่งแวดล้อม	Resources and Environmental Policy, Planning, and Assesment
463	พง203	เคมีและชีววิทยาทางวิศวกรรมพลังงาน	Chemistry and Biology in Energy Engineering
464	พง210	พลังงานและผลกระทบต่อสิ่งแวดล้อม	Energy and Environmental Impact
465	พง211	มาตรฐานความปลอดภัยทางวิศวกรรมพลังงาน	Safety Standards for Energy Engineering
466	พง311	เทคโนโลยีเชื้อเพลิงชีวภาพและชีวมวล	Biofuel and Biomass Technology
467	พง313	เทคโนโลยีพลังงานนิวเคลียร์	Nuclear Energy Technology

No.	Course Code	Course Name (Thai)	Course Name (English)
468	พง315	การปฏิบัติงานและความปลอดภัยด้านพลังงาน	Workshop Practices Energy safety
469	พง317	ระบบผลิตก๊าซชีวภาพ	Biogas Production System
470	พง318	การประยุกต์ใช้พลังงานแสงอาทิตย์	Solar Energy Application
471	พง413	เรื่องเฉพาะทางด้านพลังงานทดแทน	Special Tropics of Renewable Energy
472	พง420	พลังงานและผลกระทบต่อสิ่งแวดล้อม	Energy and Environmental Impact
473	พง491	ปฏิบัติการทางวิศวกรรมพลังงานทดแทน	Renewable Energy Engineering Laboratory
474	พง513	การพัฒนาเทคโนโลยีและการจัดการพลังงานชุมชน	Community Energy Management and Technology Development
475	พง514	เศรษฐศาสตร์พลังงานและการวิเคราะห์ความเป็นไปได้โครงการ	Energy Economics and Analysis of Project Feasibility
476	พง520	การออกแบบระบบวิศวกรรมพลังงานแสงอาทิตย์	Solar Energy Engineering System Design
477	พง521	วิศวกรรมเชื้อเพลิงชีวภาพ	Biodiesel Production Technology
478		สถานการณ์ปัจจุบันด้านพลังงานและสิ่งแวดล้อมในอาเซียน	Current Status of Energy and Environment in Asian
479	พง522	วิศวกรรมพลังงานลม	Wind Energy Engineering
480	พง531	การพัฒนาพลังงานและสิ่งแวดล้อมชุมชนอย่างยั่งยืน	Development of Community Energy and Environment for Sustainability
481	พง532	การประยุกต์ใช้พลังงานทดแทนทางการเกษตร	Applications of Renewable Energy for Agriculture
482	พง534	การออกแบบสิ่งแวดล้อมและเทคโนโลยีอาคารเขียว	Environmental Design and Green Building Technology
483	พง535	การประเมินวัฏจักรชีวิตระบบพลังงาน	Life Cycle Assessment for Energy Systems
484	พง536	กฎหมายพลังงานและสิ่งแวดล้อม	Energy and Environmental Law
485	พง695	การค้นคว้าอิสระ	Independent study
486	พช241	นิเวศวิทยาทางทะเล	Marine Ecology
487	พช242	มีนวิทยา	Ichthyology
488	พช243	ชีววิทยาของกุ้ง ปู และหอยทะเล	Biology of shrimps, crabs, and marine molluscs.
489	พช271	สมุทรศาสตร์เพื่อการประมง	Oceanography for Fisheries
490	พช323	การเพาะเลี้ยงกุ้งทะเล	Marine Shrimp Culture
491	พช331	อาหารและโภชนาการสัตว์น้ำ	Food and Nutrition of Aquatic Animals

No.	Course Code	Course Name (Thai)	Course Name (English)
492	พช341	สรีรวิทยาสัตว์น้ำ	Physiology of Aquatic Animals
493	พช351	โรคและการวินิจฉัยโรคสัตว์น้ำ	Diseases and Diagnosis of Aquaculture
494	พช481	การดำน้ำโดยใช้อุปกรณ์	Scuba Driving
495	พท100	ระบบนิเวศและสิ่งแวดล้อม	Ecosystem and Environment
496	พท244	สุขภาวะและความปลอดภัยของการท่องเที่ยว	Health and Tourist Safety
497	พท340	การพัฒนาการท่องเที่ยวอย่างยั่งยืน	Sustainable Tourism Development
498	พท351	การจัดการทรัพยากรมนุษย์เพื่อการท่องเที่ยว	Human Resource Management for Tourism
499	พท440	การประเมินผลกระทบทางการท่องเที่ยว	Impact Assessment in Tourism
500	พท441	การวางแผนและพัฒนาการท่องเที่ยว	Tourism Planning and Development
501	พท450	การจัดการธุรกิจการท่องเที่ยวอย่างยั่งยืน	Sustainable Tourism Business Management
502	พท451	การจัดการธุรกิจ MICE	MICE (Meeting, Incentive, Convention and Exhibition) Managemen
503	พท512	การจัดการนันทนาการและการท่องเที่ยว	Recreation and Tourism Management
504	พท514	การพัฒนาและการจัดการองค์กรทางอุตสาหกรรมท่องเที่ยว	Organizational Development and Management for Tourism Industry
505		การพัฒนาและการจัดการองค์กรทางอุตสาหกรรมการท่องเที่ยว	Organizational Development and Management for Tourism Industry
506	พท515	นโยบาย การวางแผน และกลยุทธ์การพัฒนาการท่องเที่ยว	Policy, Planning and Tourism Developing Strategy
507	พท516	กลยุทธ์การจัดการการนันทนาการชุมชน	Strategic Management for Community Recreation
508	พท517	การพัฒนาการท่องเที่ยวอย่างยั่งยืนเชิงบูรณาการ	Integrated Sustainable Tourism Development
509	พท518	การจัดการการตลาดเชิงบูรณาการเพื่ออุตสาหกรรมการท่องเที่ยว	Integrated marketing management of tourism industry
510	พท519	การพัฒนาการท่องเที่ยวอย่างยั่งยืนเชิงบูรณาการ	Integrated Sustainable Tourism Development
511	พท522	การจัดการทรัพยากรการท่องเที่ยว	Tourism Resource Management
512	พท525	การประเมินมูลค่าแหล่งท่องเที่ยว	Valuation of Tourism Destinations
513	พท528	การนันทนาการและการศึกษาบนฐานทรัพยากรธรรมชาติ	Natural Resource Recreation and Education

No.	Course Code	Course Name (Thai)	Course Name (English)
514	พท529	นโยบาย การวางแผน และกลยุทธ์การพัฒนาการท่องเที่ยว	Policy, Planning and Tourism Developing Strategy
515	พท622	การจัดการสิ่งแวดล้อมสำหรับการนันทนาการและการท่องเที่ยว	Environmental Management for Recreation and Tourism
516	พท627	มนุษย์มิติในการจัดการทรัพยากรเพื่อการท่องเที่ยว	Human Dimensions in Resource Management for Tourism
517	พท634	การจัดการธุรกิจ MICE เชิงบูรณาการ	Integrated Enterprise Management of MIICE
518	พธ510	พันธุศาสตร์ของมนุษย์	Human Genetics
519	พธ513	พันธุวิศวกรรมพืช	Plant Genetic Engineering
520	พธ702	พันธุวิศวกรรมพืชขั้นสูง	Advanced Plant Genetic Engineering
521	พธ703	พันธุวิศวกรรมสัตว์ขั้นสูง	Advanced Animal Genetic Engineering
522	พพ121	มาตรฐานความปลอดภัยสำหรับการอนุรักษ์พลังงาน	Safety Standards for Energy Conservation
523	พพ242	นวัตกรรมเทคโนโลยีการอนุรักษ์พลังงาน	Innovation of Energy Conservation Technology
524	พภ511	ปรัชญา ทฤษฎี และแนวคิดในการพัฒนา	Philosophy, Theories and Concepts of Development
525	พภ512	พระราชปรัชญา	Royal Philosophy
526	พภ513	แนวคิดและทฤษฎีในพระราชดำริ	The Concepts and Theories in the Royal Initiative
527	พภ541	การบริหารจัดการการพัฒนา	Management and Administration of Development
528	พภ544	นวัตกรรมการจัดการทรัพยากรธรรมชาติ	Innovation of Natural Resources Management
529	พภ545	การจัดการนิเวศวิทยามนุษย์	Human Ecology Management
530	พภ546	การพัฒนามนุษย์เพื่อการพัฒนาที่ยั่งยืน	Human Development for sustainable development
531	พภ591	สัมมนา 1	Seminar 1
532	พภ592	สัมมนา 2	Seminar 2
533	พภ593	สัมมนา 3	Seminar 3
534	พภ596	สัมมนา 1	Seminar 1
535	พภ597	สัมมนา 2	Seminar 2
536	พภ598	สัมมนา 3	Seminar 3
537	พภ690	การค้นคว้าอิสระ	Independent study

No.	Course Code	Course Name (Thai)	Course Name (English)
538	พก692	การศึกษาหัวข้อสนใจ	Selected Topics
539	พก693	การค้นคว้าอิสระ	Independent study
540	พร250	หลักพืชกรรม	Fundamentals of Crop Production
541	พร251	พืชเศรษฐกิจ	Economic Crops
542	พร253	หลักเกษตรสำหรับวิศวกรรม	Principle of Agriculture for Engineering
543	พร254	หลักเกษตรกรรมทั่วไป	Fundamentals Agriculture
544	พร351	พืชไร่เศรษฐกิจ	Economic Field Crops
545	พร450	กระบวนการผลิตข้าว	Rice Production
546		ธัญพืช	Cereal Crops
547	พร455	ระบบการเกษตร	Agricultural System
548	พร456	การจัดการธาตุอาหารสำหรับพืชไร่	Nutrient Management in Crop Production
549	พร457	ระบบการเกษตร	Agricultural System
550	พร512	ไบโอเมตริกในงานปรับปรุงพันธุ์พืช	Biometrical Procedures in Plant Breeding
551	พร513	สรีรวิทยาเชิงโมเลกุลของพืช	Molecular Plant Physiology
552	พร521	การปรับตัวของพืช	Plant Adaptation
553		สรีรวิทยาของเมล็ดพันธุ์	Seed Physiology
554	พร522	ความเครียดของพืช	Plant Stress
555	พร523	การผลิตพืชไร่ในสภาพการเปลี่ยนแปลงภูมิอากาศ	Crop Production in Changing Climate
556		การผลิตพืชไร่ในสภาวะโลกที่เปลี่ยนแปลง	Field Crop Production in Global Environmental Changes
557	พร524	วิวัฒนาการของพืชปลูก	Crop Evolution
558	พร525	การปรับตัวของพืช	Plant Adaptation
559	พร540	สรีวิทยาของเมล็ดพันธุ์	Seed Physiology
560	พร541	นวัตกรรมการจัดการธาตุอาหารพืช	Plant Nutrient Management Innovation
561	พร542	นิเวศวิทยาพืชเขตร้อน	Tropical Tree Crops Ecology
562	พร721	การค้นคว้าและพัฒนาทางสรีรวิทยาการผลิตพืชไร่	Research on Advanced in Field Crop Physiology and Production
563	พส222	พันธุศาสตร์และการปรับปรุงพันธุ์สัตว์น้ำ	Genetic and Aquatic Animal Breeding Technology
564	พส311	คุณภาพน้ำทางการประมงเบื้องต้น	Introduction of Water Quality for Fisheries

No.	Course Code	Course Name (Thai)	Course Name (English)
565	wa312	คุณภาพน้ำสำหรับการเพาะเลี้ยงสัตว์น้ำ	Water Quality for Aquaculture
566	wa341	เทคโนโลยีที่เหมาะสมเพื่อผลิตทรัพยากรประมงอย่างยั่งยืน	Appropriated Technology for Sustainable Fishery Resources
567		วิทยาศาสตร์และเทคโนโลยีการประมงที่นำสมัย	Science and Technology Up to Date in Fisheries
568	wa421	การเพาะเลี้ยงกุ้ง	Shrimp Culture
569	wa422	การเพาะเลี้ยงสาหร่ายและแพลงก์ตอน	Algae and Plankton Culture
570	wa424	การเพาะเลี้ยงปลาบึกเพื่อประโยชน์อย่างยั่งยืน	Culture of the Mekong Giant Catfish for Sustainable Utilization
571	wa425	การจัดการโรงเพาะฟัก	Hatchery Management
572	wa426	การเพาะเลี้ยงปลาสวยงามสายพันธุ์ไทย	Ornamental fish Culture of Thai Breeds
573	wa531	เทคโนโลยีการเพาะเลี้ยงสัตว์น้ำ	Aquaculture Technology
574	ws201	หลักการพืชสวน	Principles of Horticulture
575		หลักพืชสวน	Principles of Horticulture
576	ws210	พืชสวนประดับเบื้องต้น	Fundamental of Ornamental Horticulture
577	ws300	วัสดุพืชพรรณและการจำแนกไม้ดอก	Plant Materials and Ornamental Plant Identification
578	ws303	กล้วยไม้เบื้องต้น	Introduction to Orchidology
579	ws311	เกษตรอินทรีย์	Organic Agriculture
580	ws410	ไม้ตัดดอกเพื่อการค้า	Commercial Cut Flower Production
581	ws416	ไม้ผลเขตกึ่งร้อน	Sub Tropical Fruit Crops
582	ws440	การควบคุมสิ่งแวดล้อมในพืชสวน	Environmental Control in Horticulture
583	ws446	การจัดการทางพืชสวนในกระแสโลกาภิวัตน์	Horticulture Management Under the Current of Globalization
584	ws452	เทคโนโลยีการผลิตผัก	Vegetable Production Technology
585	ws502	ธาตุอาหารพืชสวน	Mineral nutrition of horticultural crops
586	ws512	การปลูกพืชในระบบโรงงานพืช	Plant Cultivation in Plant Factory
587	ws522	การปรับปรุงพันธุ์พืชสวนขั้นสูง 2	Advanced Horticultural Crop Brecding 2
588	ws534	สรีรวิทยาความเครียดของพืชสวน	Stress Physiology of Horticultural Crops
589	wf334	นาโนเทคโนโลยีเบื้องต้น	Introduction to Nanotechnology
590	wf422	อิเล็กทรอนิกส์อุตสาหกรรม	Industrial Electronics

No.	Course Code	Course Name (Thai)	Course Name (English)
591	ฟส437	เทคโนโลยีพลังงานไฮโดรเจน	Hydrogen Energy Technology
592	ฟส447	เซ็นเซอร์เพื่อการเกษตร	Agricultural Sensors
593	ภท110	หลักการออกแบบเบื้องต้น	Fundamental of Design
594	ภท181	การก่อสร้างเบื้องต้น	Introduction to Construction
595	ภท214	สรีระวิทยาของพืชสำหรับงานภูมิทัศน์	Landscape Plant Physiology
596	ภท233	การออกแบบร่างภูมิทัศน์ 1	Landscape Sketch Design 1
597	ภท253	วัสดุพืชพรรณสำหรับงานภูมิทัศน์ 2	Plant Materials for Landscape 2
598	ภท281	ปฏิบัติการก่อสร้างภูมิทัศน์ 1	Landscape Construction Workshop I
599	ภท282	ปฏิบัติการก่อสร้างภูมิทัศน์ 1	Landscape Construction Workshop I
600	ภท332	การออกแบบภูมิทัศน์ 2	Landscape Design 2
601	ภท334	การออกแบบร่างภูมิทัศน์ 2	Landscape Sketch Design 2
602	ภท335	พืชพรรณ และการออกแบบ 2	Plant and Design 2
603	ภท341	การบริหารงานก่อสร้างภูมิทัศน์	Landscape Construction Management
604		วัสดุและเทคนิควิธีการก่อสร้างภูมิทัศน์	Building Materials and Methods in Landscape
605	ภท343	การบริหารงานก่อสร้างภูมิทัศน์	Landscape Construction Management
606	ภท354	เทคนิคและการผลิตวัสดุพืชพรรณเชิงธุรกิจภูมิทัศน์	Plant Materials Production and Techniques for Landscape Business
607	ภท361	นิเวศน์วิทยา และการจัดการสิ่งแวดล้อมสนามกอล์ฟ	The Ecology of Golf Course and Environmental Management
608	ภท382	ปฏิบัติการก่อสร้างภูมิทัศน์ 2	Landscape Construction Workshop 2
609	ภท385	ปฏิบัติการก่อสร้างภูมิทัศน์ 2	Landscape Construction Workshop II
610	ภท427	การวิเคราะห์และประเมินคุณภาพภูมิทัศน์ทางสายตา	Visual Landscape Quality Analysis and Assessment
611	ภท431	การออกแบบวางผังภูมิทัศน์ชุมชนเมือง	Urban Landscape Design and Planning
612	ภท432	การวางผังเชิงนิเวศ	Ecological Planning
613	ภท444	การดูแลรักษาต้นไม้ใหญ่	Maintenance of Trees
614	ภท451	ป่าไม้ในเมือง	Urban Forestry
615	ภท456	พืชพรรณและการออกแบบ 2	Plant and Design 2
616	ภท461	การประเมินผลกระทบทางสายตา	Visual Impact Assessment
617		การวิเคราะห์และประเมินคุณภาพภูมิทัศน์ทางสายตา	Visual Landscape Quality Analysis and Assessment

No.	Course Code	Course Name (Thai)	Course Name (English)
618	ภท475	การออกแบบวางผังภูมิทัศน์ชุมชนเมือง	Urban Landscape Design and Planning
619	ภส112	การออกแบบเบื้องต้น	Fundamental Design
620	ภส121	ภูมิสถาปัตยกรรมเบื้องต้น	Introduction to Landscape Architecture
621	ภส166	ภูมิศาสตร์กายภาพ	Physical Geography
622	ภส182	การออกแบบสถาปัตยกรรม	Architectural Design
623	ภส237	การออกแบบร่างภูมิสถาปัตยกรรม 1	Landscape Architectural Sketch Design 1
624	ภส251	วัสดุพืชพรรณและการเลือกใช้ 1	Plant Materials and Plant Selection 1
625	ภส252	วัสดุพืชพรรณและการเลือกใช้ 2	Plant Materials and Plant Selection 2
626	ภส261	นิเวศวิทยาและหลักอนุรักษ์วิทยา	Ecology and Principles of Conservation
627	ภส282	การออกแบบสถาปัตยกรรม	Architectural Design
628	ภส330	แนวคิดและปรัชญาในงานภูมิสถาปัตยกรรม	Concepts and Philosophy in Landscape Architecture
629	ภส333	การออกแบบภูมิสถาปัตยกรรม 3	Landscape Architectural Design 3
630	ภส338	การออกแบบร่างภูมิสถาปัตยกรรม 2	Landscape Architectural Sketch Design 2
631	ภส339	การออกแบบร่างภูมิสถาปัตยกรรม 3	Landscape Architectural Sketch Design 3
632	ภส340	วัสดุและเทคนิควิธีการก่อสร้างภูมิทัศน์	Building Materials and Methods in Landscape
633	ภส351	วัสดุพืชพรรณและการเลือกใช้ 1	Plant Materials and Plant Selection 1
634	ภส352	วัสดุพืชพรรณและการเลือกใช้ 2	Plant Materials and Plant Selection 2
635	ภส353	การออกแบบวางผังพืชพรรณ 1	Planting Design 1
636	ภส367	นิเวศวิทยาภูมิทัศน์	Landscape Ecology
637	ภส434	การออกแบบภูมิสถาปัตยกรรม 4	Landscape Architectural Design 4
638	ภส449	ภูมิทัศน์วัฒนธรรม	Cultural Landscape
639	ภส462	การออกแบบสิ่งแวดล้อมในงานสถาปัตยกรรม	Environmental Design in Architecture
640	ภส471	การวางผังเมืองและชุมชนอย่างยั่งยืน	Sustainable Community and Urban Planning
641	ภส473	การประเมินผลกระทบสิ่งแวดล้อมเมือง	Urban Environmental Impact Assessment

No.	Course Code	Course Name (Thai)	Course Name (English)
642	ภส590	กฎหมายสิ่งแวดล้อมและมาตรฐานคุณภาพสิ่งแวดล้อม	Environmental Law and Standard of Environmental Quality
643	ภส598	วิทยานิพนธ์	Thesis
644	ภอ212	การนำเสนองานภาษาอังกฤษ	Oral English Presentation
645	มพ201	เทคโนโลยีพลังงานสำหรับการเกษตรและชีวิต	Energy Technologies for Agriculture and Life
646	ยพ314	พอลิเมอร์ชีวภาพ	Biopolymer
647	ยพ411	เทคโนโลยีพอลิยูรีเทนและยางซิลิโคน	Polyurethane and Silicone Rubber Technology
648	รบ232	กฎหมายอาญาทั่วไป	Criminal Law : General Principles
649	รบ322	การบริหารท้องถิ่นเพื่อการพัฒนาที่ยั่งยืน	Local Administration for Sustainable Development
650	รบ324	กลยุทธการจัดการทรัพยากรมนุษย์	Human Resource Management Strategy
651	รบ412	ท้องถิ่นกับการจัดการทรัพยากรธรรมชาติ	Local with Natural Resources Management
652	รป111	รัฐประศาสนศาสตร์เบื้องต้น	Introduction to Public Administration
653	รป141	รัฐประศาสนศาสตร์เบื้องต้น	Introduction to Public Administration.
654	รป214	การบริหารทรัพยากรธรรมชาติและสิ่งแวดล้อม	Natural Resource and Environment Administration
655	รป242	การจัดการทรัพยากรธรรมชาติและสิ่งแวดล้อมท้องถิ่น	Local Natural Resource and Environment Management
656		การบริหารทรัพยากรธรรมชาติและสิ่งแวดล้อมท้องถิ่น	Local Natural Resources and Environmental Management
657	รป244	สิทธิชุมชนในการบริหารทรัพยากร	Community Rights in Resources management
658	รป311	การบริหารกิจการท้องถิ่น	Local Affairs Administration
659	รป312	การจัดการเชิงกลยุทธ์ภาครัฐ	Strategic Management in Public Sectors
660	รป314	การบริหารกิจการระหว่างประเทศ	International Affairs Administration
661	รป321	นโยบายสาธารณะ 1	Public Policy 1
662	รป337	การบริหารกิจการท้องถิ่น	Local Affairs Administration
663	รป433	พฤติกรรมและวัฒนธรรมองค์การสาธารณะ	Public Organizational Behavior and Culture
664	รป514	การจัดการและการพัฒนาทรัพยากรมนุษย์	Human Resource Management and Development

No.	Course Code	Course Name (Thai)	Course Name (English)
665	รป620	ประเด็นร่วมสมัยทางรัฐประศาสนศาสตร์	Contemporary Issues in Public Administration
666	รป622	การบริหารกิจการสาธารณะ	Public Service Administration
667	รพ421	โรคของผลผลิตเกษตร	Post-Harvested Diseases
668	รพ430	นิเวศวิทยาของเชื้อสาเหตุโรคพืช	Ecology of Plant Pathogens
669	รพ456	การจัดการธาตุอาหารสำหรับพืชไร่	AG 456
670	ภส590	กฎหมายสิ่งแวดล้อมและมาตรฐานคุณภาพสิ่งแวดล้อม	Nutrient Management in Crop Production
671	รพ531	การระบาดของโรคพืชและการควบคุม	Plant Disease Epidemiology and Control
672	รพ551	การควบคุมโรคพืชโดยชีววิธีขั้นสูง	Advanced Biological Control of Plant Diseases
673	รพ631	โรคพืชขั้นสูง	Advanced Plant Pathology
674	รศ211	นิเวศวิทยาการเมืองและสิ่งแวดล้อม	Political Ecology and Environment Politics
675	รศ216	กฎหมายอาญาหลักทั่วไป	Criminal Law : General Principles
676	รศ325	นิเวศวิทยาการเมือง	Political Ecology
677	รศ332	กฎหมายอาญาหลักทั่วไป	Criminal Law : General Principles
678	รศ333	กฎหมายที่เกี่ยวกับเกษตร	Agriculture Law
679	รศ334	กฎหมายสิ่งแวดล้อม	Environmental Law
680	รศ413	ประชาสังคมและการเมืองท้องถิ่น	Civil Society and Local Politics
681	รศ422	ชุมชนกับการจัดการสาธารณะภัย	Community and Disaster Management
682	วก304	วิศวกรรมโรงงานต้นกำลัง	Power Plant Engineering
683	วก306	การทำความเย็น	Refrigeration
684	วก307	ระบบปรับอากาศ	Air Conditioning
685	วก330	แทรกเตอร์และเครื่องต้นกำลังทางการเกษตร	Tractor and Agricultural Power Unit
686	วก370	เครื่องทุ่นแรงในฟาร์ม	Farm Machinery
687	วก481	หลักเออร์โกโนมิกส์	Principles of Ergonomics
688	วก521	สุขลักษณะในการออกแบบด้านวิศวกรรมอาหาร	Hygiene in Food Engineering Design
689	วท101	วิทยาศาสตร์เพื่อชีวิต	Science for Life
690	วพ320	วัชพืชสำคัญทางเศรษฐกิจ	Economic Weeds
691	วพ360	วัชพืชและการควบคุม	Weeds and Their Control
692	วพ361	การจัดการวัชพืชในสนามหญ้า	Turfgrass Weed Management

No.	Course Code	Course Name (Thai)	Course Name (English)
693	วพ430	นิเวศวิทยาของวัชพืช	Weed Ecology
694	วพ450	หลักการควบคุมวัชพืช	Principle of Weed Control
695	วพ451	การจัดการวัชพืชแบบผสมผสาน	Integrated Weed Management
696	วพ452	การควบคุมวัชพืชโดยชีววิธี	Biological Control of Weeds
697	วพ530	ความสัมพันธ์ของวัชพืชกับพืชปลูก	Weed-Crop Relationships
698	วพ652	ภูมิปัญญาท้องถิ่นกับการพัฒนาทรัพยากรชุมชนและสิ่งแวดล้อม	Local Wisdom and Community Resource and Environment Development
699	วส312	สรีรวิทยาพืชสมุนไพร	Medicinal Plant Physiology
700	วส351	การจัดการสมุนไพรเชิงพาณิชย์	Medicinal Plants Management in Commercial
701	วส463	หลักการส่งเสริมพืชสมุนไพรในชุมชน	Principles of Medicinal Plants Extension in Community
702	วอ101	วิศวกรรมเบื้องต้นในชีวิตประจำวัน	Basic Engineering in Daily Life
703	วอ340	การควบคุมคุณภาพในอุตสาหกรรมอาหารและการจัดการด้านวิศวกรรมอาหาร	Quality Control in Food Industry and Food Engineering Management
704	วอ712	การออกแบบระบบทางวิศวกรรมอาหารแบบองค์รวม	Integrated Food Engineering System Design
705	วอ721	เทคโนโลยีการอบแห้งเชิงนวัตกรรม	Innovative Drying Technology Food Engineering
706	ศท104	มนุษย์และสิ่งแวดล้อม	Man and Environment
707	ศป034	วรรณกรรมไทยร่วมสมัยกับการเกษตรและสิ่งแวดล้อม	Agricultural and the Environmental in Contemporary Thai Literature
708	ศย211	เศรษฐศาสตร์ประยุกต์เพื่อชุมชน	Applied Economics for community
709	ศย312	เศรษฐศาสตร์แห่งความสุขของชุมชน	เศรษฐศาสตร์แห่งความสุขของชุมชน
710	ศย341	หลักเศรษฐศาสตร์ทรัพยากรธรรมชาติและสิ่งแวดล้อม	Principles of Natural Resources and Environmental Economics
711	ศย342	การประเมินมูลค่าความหลากหลายทางชีวภาพ	Evaluation of Biodiversity
712	ศย441	ห่วงโซ่คุณค่าของความหลากหลายทางชีวภาพ	Value Chain of Biodiversity
713	ศย516	พลวัตเศรษฐกิจไทยและเศรษฐกิจโลกเพื่อการพัฒนาอย่างยั่งยืน	Dynamic of Thai and World economy for Sustainable Development
714	ศย522	การแข่งขันทางเศรษฐกิจระหว่างประเทศ	International Economic Competition

No.	Course Code	Course Name (Thai)	Course Name (English)
715	ศย523	การรวมกลุ่มและการพัฒนาทางเศรษฐกิจของเอเชีย	Asian Integration and Economic Development
716	ศย524	การพนักงานสัมพันธ์เชิงกลยุทธ์	Employee Relation Strategy
717	ศย525	การจัดการโลจิสติกส์ และห่วงโซ่อุปทานระหว่างประเทศ	International Logistic and Supply Chain Management
718	ศย531	ทฤษฎีและการประยุกต์เศรษฐศาสตร์การพัฒนา	Theory and Applications of Development Economics
719	ศย544	เศรษฐศาสตร์การจัดการธุรกิจสีเขียว	Economic of Green Business Management
720	ศย551	การจัดการทรัพยากรธรรมชาติและสิ่งแวดล้อม	Natural Resource and Environmental Management
721		เศรษฐศาสตร์ทรัพยากรธรรมชาติและสิ่งแวดล้อม	Natural Resources and Environmental Economics
722	ศย553	การพยากรณ์และการวางแผนทางการเกษตรและทรัพยากรธรรมชาติ	Forecasting and Planning in Agriculture and Natural Resources
723	ศย554	เศรษฐกิจพอเพียงกับการพัฒนาที่ยั่งยืน	Sufficiency Economy and Sustainable Development
724	ศย555	นโยบายเกษตร ทรัพยากรธรรมชาติและสิ่งแวดล้อม	Agricultural, Natural Resources and Environmental Policy
725	ศย563	ระบบสารสนเทศเพื่อการบริหารจัดการสหกรณ์	Information and Technology System for Cooperative Management
726	ศย721	การวิเคราะห์และการพัฒนาเศรษฐกิจชุมชน	Analysis and Development of Community Economy
727	ศย722	เศรษฐศาสตร์เพื่อการจัดการทรัพยากรธรรมชาติและสิ่งแวดล้อม	Economics for Natural Resource and Environmental Management
728	ศย724	เศรษฐศาสตร์เพื่อการพัฒนาอย่างยั่งยืน	Sustainable Economic Development
729	ศร363	เศรษฐศาสตร์ว่าด้วยอาหารของโลก	World Food Economics
730	ศร444	เศรษฐศาสตร์การพัฒนาเศรษฐกิจและสังคม	Socio-Economic Development
731	ศล111	เกษตรและสิ่งแวดล้อมเบื้องต้น	Introduction to Agricultural and Environmental
732	ศล211	เศรษฐศาสตร์ทรัพยากรเกษตรและสิ่งแวดล้อมเบื้องต้น	Introduction to Agricultural Resources and Environmental Economics
733		เศรษฐศาสตร์ทรัพยากรธรรมชาติและสิ่งแวดล้อม 1	Natural Resources and Environmental Economics 1

No.	Course Code	Course Name (Thai)	Course Name (English)
734	ศล212	เศรษฐศาสตร์ทรัพยากรธรรมชาติ	Natural Resources Economics
735		เศรษฐศาสตร์ทรัพยากรธรรมชาติและสิ่งแวดล้อม 2	Natural Resources and Environmental Economics 2
736	ศล213	เศรษฐศาสตร์สิ่งแวดล้อม	Environmental Economics
737	ศล232	เศรษฐศาสตร์เกษตร	Agricultural Economics
738	ศล313	เศรษฐศาสตร์ทรัพยากรน้ำ	Economics of Water Resources
739	ศล321	การจัดการมลพิษสิ่งแวดล้อม	Environmental Pollution Management
740		การประเมินผลกระทบสิ่งแวดล้อม	Environmental Impact Assessment
741	ศล322	ระบบการจัดการสิ่งแวดล้อม	Environmental Management System
742		สิ่งแวดล้อมชุมชน	Community Environment
743	ศล323	การจัดการสิ่งแวดล้อมชุมชนเพื่อความยั่งยืน	Community Environment Management for Sustainability
744		ระบบมาตรฐานการจัดการสิ่งแวดล้อม	Environment Management System
745	ศล333	การจัดการฟาร์ม	Farm Management
746	ศล334	การจัดการฟาร์ม	Farm Management
747	ศล414	เศรษฐศาสตร์ว่าด้วยการเปลี่ยนแปลงสภาพภูมิอากาศเบื้องต้น	Introduction to Economics of Climate Change
748	ศล415	เศรษฐศาสตร์ว่าด้วยการเปลี่ยนแปลงสภาพภูมิอากาศเบื้องต้น	Introduction to Economics of Climate Change
749	ศล416	เศรษฐศาสตร์สีเขียว	Green Economics
750	ศล423	การจัดการมลพิษสิ่งแวดล้อม	Environmental Pollution Management
751	ศล424	การจัดการความขัดแย้งท้องถิ่น	Local Conflict Management
752		การจัดการความขัดแย้งทางทรัพยากรและสิ่งแวดล้อม	Conflict Management of Resources and Environment
753		การบริหารโครงการพัฒนาสิ่งแวดล้อม	Environmental Development Project Administration
754	ศล425	การบริหารโครงการพัฒนาสิ่งแวดล้อม	Environmental Development Project Administration
755		การประเมินผลกระทบสิ่งแวดล้อม	Environmental Impact Assessment
756	ศล426	การจัดการด้านอนามัยสิ่งแวดล้อม	Environmental Health Management
757		การบริหารโครงการพัฒนาสิ่งแวดล้อม	Environmental Development Project Administration
758	ศล443	นโยบายเกษตรและสิ่งแวดล้อม	Agricultural and Environmental Policy
759	ศล464	เทคนิคการประเมินมูลค่าทรัพยากรและสิ่งแวดล้อม	Resource and Environmental Valuation Techniques

No.	Course Code	Course Name (Thai)	Course Name (English)
760	ศล465	วิธีวิจัยทางเศรษฐศาสตร์เกษตรและสิ่งแวดล้อม	Research Methods in Agricultural and Environmental
761	ศล466	วิธีวิจัยทางเศรษฐศาสตร์เกษตรและสิ่งแวดล้อม	Research Methods in Agricultural and Environmental Economics
762	ศล467	เทคนิคการประเมินมูลค่าทรัพยากรและสิ่งแวดล้อม	Resource and Environmental Valuation Techniques
763	ศว324	การจัดการมลพิษสิ่งแวดล้อม	Environmental Pollution Management
764	ศว423	การบริหารโครงการพัฒนาสิ่งแวดล้อม	Environment Development Project Administration
765	ศว461	การบริหารโครงการพัฒนาสิ่งแวดล้อม	Environmental Development Projec Administration
766	ศศ452	ความยากจนความเหลื่อมล้ำ และการพัฒนาที่ยั่งยืน	Poverty, Inequality and Sustainable development
767	สก302	ระบบนิเวศวิทยาทางการเกษตรแบบยั่งยืน	Sustainable Agriculture Ecosystems
768	สก351	การพัฒนาชุมชน	Community Development
769		การพัฒนาชุมชนและสังคมเกษตร	Community and Agricultural Society Development
770	สก402	ภูมิปัญญาและวัฒนธรรมท้องถิ่น	Local Wisdom and Culture
771	สก403	การจัดการทรัพยากรและสิ่งแวดล้อมในชนบท	Rural Resources and Environmental Management
772		การจัดการทรัพยากรและสิ่งแวดล้อมในชุมชน	Communities Resources and Environmental Management
773	สก404	กฎเกณฑ์การค้าและมาตรฐานผลผลิตและผลิตภัณฑ์ทางการเกษตร	Laws Commercial and Standard of Agricultural Products
774	สก453	ประชากรกับการเกษตร ทรัพยากรและสิ่งแวดล้อม	Population and Agriculture Natural Resources, and Environment
775	สถ121	กระบวนการคิดและพฤติกรรมมนุษย์ในงานสถาปัตยกรรม	Thinking Process and Human Behavior in Architectural Design
776	สถ223	ภูมิสถาปัตยกรรมเบื้องต้นสำหรับวิชาชีพสถาปัตยกรรม	Introduction to Landscape Architecture for Architectural Practices
777	สถ271	วัสดุและระบบการก่อสร้าง 3	Material and Construction 3
778	สถ371	เทคโนโลยีสิ่งแวดล้อมทางสถาปัตยกรรมและภูมิสังคม 1	Environmental Technology in Architecture and Geo-social Base 1
779	สถ431	การออกแบบสิ่งแวดล้อมทางสถาปัตยกรรมและภูมิสังคม 1	Environmental Technology in Architecture and Geo-social Base 1

No.	Course Code	Course Name (Thai)	Course Name (English)
780	สถ432	การออกแบบสิ่งแวดล้อมทางสถาปัตยกรรมและภูมิสังคม 2	Environmental Technology in Architecture and Geo-social Base 2
781	สธ402	การเป็นผู้ประกอบการแนวใหม่ในธุรกิจเทคโนโลยีสารสนเทศ	Entrepreneurship in Information Technology Business
782	สว501	ระเบียบวิธีวิจัยทางการออกแบบและวางแผนสิ่งแวดล้อม	Research Methodology in Environmental Design and Planning
783	สว511	ทฤษฎีการวิเคราะห์ระบบสิ่งแวดล้อม	Environmental System Analysis Theory
784	สว512	การออกแบบอย่างบูรณาการและมีส่วนร่วม	Comprehensive & Collaborative Design Studio
785	สว513	วิทยาการร่วมสมัยในด้านเทคโนโลยี นวัตกรรมและสิ่งแวดล้อม	Integrative and Emerging Frameworks for Technology, Innovation, and Environment
786	สศ311	การเจริญเติบโตของสัตว์	Animal Growth
787	สศ351	โรงเรือนและอุปกรณ์สัตว์ปีก	Poultry Housing and Equipments
788	สศ352	การจัดการฟาร์มโคนมและโคเนื้อ	Dairy and Beef Cattle Farm Management
789	สศ354	โรงเรือนและอุปกรณ์สัตว์ปีก	Poultry Housing and Equipments
790	สศ355	โรงเรือนและอุปกรณ์ในการเลี้ยงสุกร	Swine Housing and Equipments
791	สศ356	โรงเรือนและอุปกรณ์สัตว์เลี้ยง	Domestic Animal Housing and Equipments
792	สศ446	การผลิตสัตว์ในระบบอินทรีย์	Animal Production in Organic System
793	สศ450	การจัดการสิ่งแวดล้อมในฟาร์มปศุสัตว์	Environmental Management in Livestock Farm
794	สศ451	การจัดการฟาร์มปศุสัตว์ด้วยเทคโนโลยีที่ก้าวหน้า	Smart Livestock Farm Management
795	สศ460	เทคโนโลยีเนื้อสัตว์และผลิตภัณฑ์	Meat and Meat Product Technology
796	สศ522	โภชนศาสตร์สัตว์ไม่เคี้ยวเอื้อง	Non-Ruminant Nutrition
797	สศ533	การจัดการฟาร์มเลี้ยงสัตว์อย่างยั่งยืน	
798	สศ534	การจัดการฟาร์มเลี้ยงสัตว์อย่างยั่งยืน	Sustainable in Animal Farm Management
799	สศ540	การผลิตสัตว์ในเขตร้อนอย่างยั่งยืน	Sustainable Animal Production in the Tropics

No.	Course Code	Course Name (Thai)	Course Name (English)
800	สศ541	การจัดการสิ่งแวดล้อมในฟาร์มเลี้ยงสัตว์	Environmental Management in Animal Farm
801	สศ542	โภชนศาสตร์สัตว์และสิ่งแวดล้อม	Environment and Animal Nutrition
802	สศ550	มาตรฐานการผลิตและการแปรรูปผลิตภัณฑ์สัตว์	Standard Practices for Animal Production and Processing
803	สศ552	การวางแผนและพัฒนาธุรกิจปศุสัตว์	Planning and Development for Livestock Business
804	สศ553	การเป็นผู้ประกอบการแนวใหม่ในธุรกิจปศุสัตว์	Entrepreneurs in Livestock Business
805	สศ650	การบริหารการตลาดผลิตภัณฑ์เกษตร	Marketing Management for Agricultural Products
806	สศ651	การบริหารเชิงกลยุทธ์ธุรกิจปศุสัตว์	Strategic Management for Livestock Business
807	สศ652	การจัดการสิ่งแวดล้อมในอุตสาหกรรมการผลิตสัตว์	Environmental Management in Animal Production Industry
808	สศ653	การบริหารจัดการสิ่งแวดล้อมในฟาร์มเลี้ยงสัตว์	Environmental Administration and Management in Animal Farm
809	สศ654	การบริหารจัดการโรงงานอาหารสัตว์	Feed Mill Manufacturing Administration and Management
810	สศ656	การบริหารจัดการโรงงานผลิตภัณฑ์สัตว์	Administration and Management of Animal Product Factory
811	สศ711	พิษวิทยาในอาหารและพืชอาหารสัตว์	Toxicology in Feeds and Forage Crops
812	สศ742	การประยุกต์การจัดการของเสียจากสัตว์	Applied Animal Waste Management
813	สศ743	ระบบการผลิตปศุสัตว์อย่างยั่งยืน	Sustainable Animal Production System
814	อป102	นิเวศวิทยาป่าไม้	Forest Ecology
815	อป321	เทคโนโลยีเครื่องจักรงานไม้และการแปรรูป	Wood Machining and Processing Technology
816	อป322	เทคโนโลยีการประสานและการตกแต่ง	Adhesives and Finishing Technology
817	อป331	เทคโนโลยีการป้องกันรักษาเนื้อไม้	Wood Protection Technology
818	อป371	ผลิตภัณฑ์สมุนไพรป่าไม้	Forest Herbs Products
819	อป442	การออกแบบผลิตภัณฑ์ไม้	Wood Products Design
820	อป471	เทคโนโลยีผลิตภัณฑ์ที่ไม่ใช่ไม้	Non-Timber Products Technology
821	อพ601	การจัดการด้านอารักขาพืช	Plant Protection Management

No.	Course Code	Course Name (Thai)	Course Name (English)
822	อพ680	พันธุวิศวกรรมด้านอารักขาพืช	Genetic Engineering in Plant Protection

Total research funds dedicated to sustainability research (in US Dollars)

Total research funds (in US Dollars)

The ratio of sustainability research funding to total research funding

Research fund	Total research fund (USD)	Total research fund dedicated to sustainability research (USD)
2021	4,700,822.50	3,335,958.71
2022	2,360,585.88	1,297,045.17
2023	5,197,901	920,164.84
Averaged last 3 years of research fund	**4,086,436.46**	**1,851,056.24**

**1 USD = 33.375 baht, (27 October 2021) for 2021*

**1 USD = 38.276 baht, (20 October 2022) for 2022*

**1 USD = 36.40 bath, (19 October 2023) for 2023*

Description

We attend to be green, organic, and eco university; therefore, the strategies of research and academic service trend to be in these lines. The keywords for this are green, sustainable, eco-, ecology, climate change, waste, energy, environment, and organic that found in both titles and keywords of the research. This year there are 84 research projects (920,164.84USD) that related to green and sustainability. Thus, the ratio of sustainability research funding to total research funding in the last 3 years (2021-2023) is **45%**.

The ratio of sustainability research funding to total research funding

= (1,851,056.24/4,086,436.46) x 100 **= 45 %.**

[1] ≤ 1%

[2] > 1 - 8%

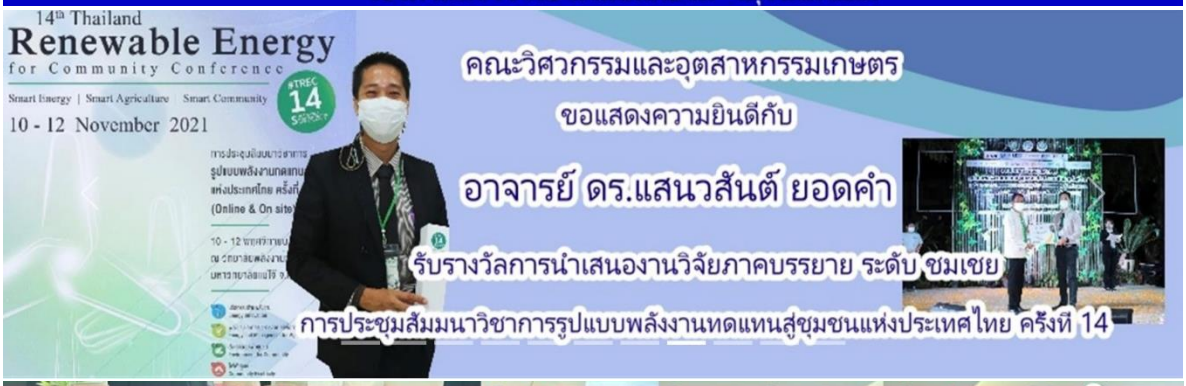
[3] > 8 - 20%

[4] > 20 - 40%

[5] > 40%

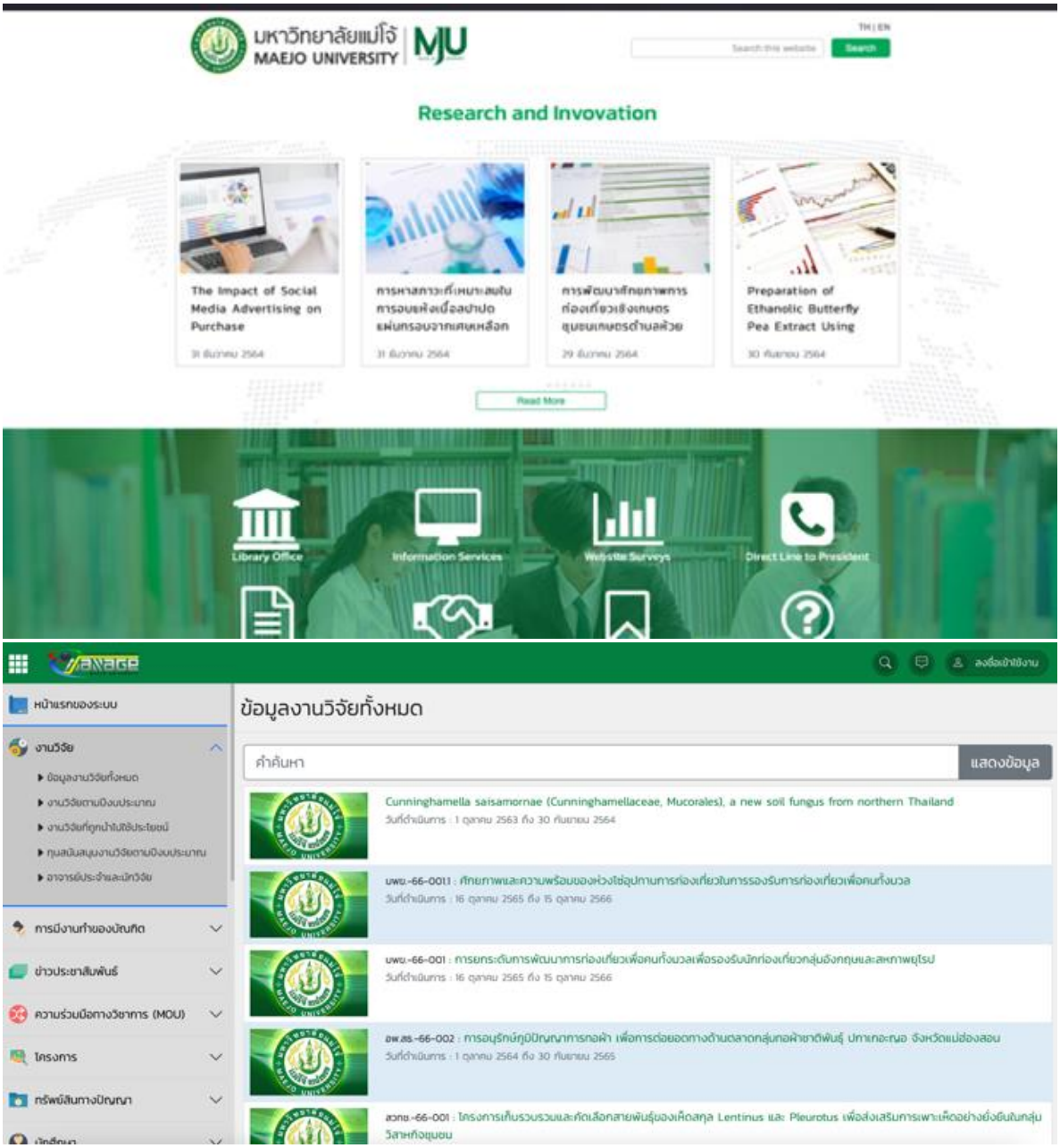
Lists of all research and the budget are available on https://erp.mju.ac.th/researchIndex.aspx


นักวิจัย สวก. ได้รับรางวัลเกียรติคุณ
การวิจัยแห่งชาติ รางวัลผลงานประดิษฐ์คิดค้น ประจำปี 2565
"นวัตกรรมเพื่อเพิ่มมูลค่าของเหลือทิ้ง ลดการปล่อย CO_2"
รองศาสตราจารย์ ดร.สมเกียรติ จตุรงค์ล้ำเลิศ


14th Thailand
Renewable Energy
for Community Conference
Smart Energy | Smart Agriculture Smart Community
10 - 12 November 2021
คณะวิศวกรรมและอุตสาหกรรมเกษตร
ขอแสดงความยินดีกับ
อาจารย์ ดร.แสนวสันต์ ยอดคำ
รับรางวัลการนำเสนองานวิจัยภาคบรรยาย ระดับ ชมเชย
การประชุมสัมมนาวิชาการรูปแบบพลังงานทดแทนสู่ชุมชนแห่งประเทศไทย ครั้งที่ 14


ขอแสดงความยินดีกับ 2 รางวัล จากการแข่งขัน SAFE Innovation (Product Innovation Competition ในงาน
SAFE2023 International Conference Sustainable Agriculture, Food, and Energy
ระหว่างวันที่ 28-29 พฤษภาคม 2566
เหรียญทองจาก "Long Gun Shot: Encapsulation of crude extract powder from Dimocarpus longan"
เหรียญเงินจาก "COBICA Cold brew coffee with innovation process"
LONG GUN SHOT
COLDBICA


สำนักวิจัยและส่งเสริมวิชาการการเกษตร มหาวิทยาลัยแม่โจ้
The Office of Agricultural Research and Extension Maejo University
หน้าหลัก
เกี่ยวกับสำนักวิจัยฯ
หน่วยงานภายใน
บุคลากรภายใน
เอกสารดาวน์โหลด
ติดต่อ
สำนักวิจัยและส่งเสริมวิชาการการเกษตร มหาวิทยาลัยแม่โจ้
ขอเชิญชวนคณาจารย์ นักวิจัย นักวิชาการ นักศึกษา และผู้ที่สนใจส่งบทความวิจัย
เพื่อพิจารณาตีพิมพ์ในวารสารวิจัยและส่งเสริมวิชาการเกษตร สำนักวิจัยฯ มหาวิทยาลัยแม่โจ้
โดยกำหนดจัดพิมพ์ออกเผยแพร่ ปีละ 3 ฉบับ
ฉบับที่ 1 (มกราคม - เมษายน) ฉบับที่ 2 (พฤษภาคม - สิงหาคม) และฉบับที่ 3 (กันยายน - ธันวาคม)ของทุกปี
ทั้งนี้สามารถส่งบทความผ่านระบบวารสารออนไลน์ ระบบ Thaijo ตั้งแต่บัดนี้เป็นต้นไป ได้ที่
https://www.tci-thaijo.org/index.php/MJUJN/index
สามารถคลิกดูรายละเอียดเพิ่มเติมได้ที่ http://www.jare.mju.ac.th/
ข่าวประชาสัมพันธ์และกิจกรรม
ข่าวทั้งหมดของหน่วยงาน
ข่าวกิจกรรม
ข่าวประชาสัมพันธ์
ข่าวจัดซื้อ-จัดจ้าง/สมัครงาน
ข่าวประกาศ
สำนักวิจัยฯ จัดการเสวนาบรรยาย "แนวคิดและกลยุทธ์ในการขับเคลื่อนธุรกิจเพื่อความยั่งยืน"
วันที่ 28 ตุลาคม 2565 สำนักวิจัยฯ จัดการเสวนาบรรยาย "แนวคิดและกลยุทธ์ในการขับเคลื่อนธุรกิจเพื่อความยั่งยืน" โดยมีรองศาสตราจารย์
28 ตุลาคม 2565
สำนักวิจัยฯ ต้อนรับ คณะดูงานจากเครือข่ายมหาวิทยาลัยยั่งยืนแห่งประเทศไทย
วันที่ 28 ตุลาคม 2565 สำนักวิจัยฯ นำโดยผู้ช่วยศาสตราจารย์ ดร.ตะวัน จัตรสูงเนิน รองผู้อำนวยการสำนักวิจัยฯ ฝ่ายบริการวิชาการ ให้การต้อนรับ
28 ตุลาคม 2565
รองผู้อำนวยการสำนักวิจัยฯ ฝ่ายบริการวิชาการ ให้การต้อนรับคณะดูงานจากเครือข่าย
วันที่ 27 ตุลาคม 2565 ผู้ช่วยศาสตราจารย์ ดร.ตะวัน จัตรสูงเนิน รองผู้อำนวยการสำนักวิจัยฯ ฝ่ายบริการวิชาการ ให้การต้อนรับคณะดูงานจาก
28 ตุลาคม 2565



The titles of green and sustainable research from 2020-2022 are represented as follows;

No.	Title of research (2021)	Budget (USD)
	Government source	
1	Enhancement of Thai Herbs Drying by using the Rotary Microwave Dryer System for the community Enterprise	39,595.51
2	Adding value of the northern herbs of Ma-Kwaen (Zanthozylum limonella Alston) to the economic plants and the pharmaceutical products development	107,865.17
	Project management	89,88.76

No.	Title of research (2021)	Budget (USD)
4	Management and upgrading oil palm biomass as renewable energy for sustainable agricultural and environmental	131,044.19
	Project management	65,31.84
6	The Bamboo management in Phrae Province	113,857.68
	Project management	20,074.91
8	Integrative tourism promotion for Chumphon community-based tourism enlargement	128,874.91
	Project management	22,098.73
9	Product Development and Value-Added Economic Crops in Chumphon Province	74,906.37
	Project management	7,490.64
10	*Vigna unguiculata* spp. *sesquipedalis*) for Sustainable Organic Agriculture System	74,906.37
	Project management	299.63
11	The prototype innovation of agricultural products and tourism service from community based by local wisdom based to the value added of consumer market for upper northern province sector 1	59,925.09
	Project management	16,479.40
12	Assessing the Potential of Building and Environment on the use of the Elderly in Chiang Mai Thammapakorn Elder Aid Centre	7,490.64
13	Local Resources Management by Tourism Innovation for Sustainability of Community Based Tourism	66,811.84
	Project management	3,890.49
14	Caesalpinia sappan and Aloe vera - Derived Teat Sealant as Therapeutic for Mastitis in Dairy Cows	20,044.19
	Other sources	
15	Closed Plant Production System:CPPS) Developing a prototype for strawberry production in a closed crop system	11,008.24
16	A small plant for orchid culture, bottling to promote career and conservation of bottling orchids to promote career and orchid conservation of Ban Pong Krai community.	2,397.00
17	Enhancing Green Community in Smart Fish Farming in Chiang Mai Province	113,857.68
18	Technology transfer of Smart NPK application in combination with a portable soil analyzer for soil and fertilizer management for large crops	50,202.25

No.	Title of research (2021)	Budget (USD)
19	The process of developing innovative media (Production based) to enhance skills in preparing young people for careers in digital communication (Media Lab)	47,211.45
20	Biocatalytic reduction of carbonyl compounds by violet plants	7,490.64
21	Explore creative business information in Chiang Mai area	8,988.76
22	Research and development of antagonistic microorganisms for root rot and leaf spot control of fresh vegetables and technology transfer for biological pest management applications	89,737.83
23	Diversity of aquatic animals, plankton and water quality in Mae Chang Reservoir and Mae Kham Reservoir, EGAT Mae Moh, Lampang Province	63,768.15
24	Water management for the development of model communities and clean energy power generation Upper Mae Pae Basin, Ban Pae Subdistrict, Chom Thong District, Chiang Mai Province	100,553.26
25	Prototype production of personal protective clothing for medical personnel to have antimicrobial properties.	8,305.62
26	Improving of Different Factors Affecting on Growth and Quality of Some Ornamental Plants	4,495.10
27	Cucumber seed production in greenhouses using stingless bees (*Tetragonula laevicep*) as a pollinator	13,573.03
28	Development of planting process and natural dyeing with bio-innovation in Phrae Province	25,378.28
29	Low Cost Temporary Submerged Bioreactor Control System for Small Operators	7,490.64
30	Microcapsule antibacterial and insecticidal textile manufacturing process	7,490.64
31	Development of essential oil products to suppress bee mites using atmospheric pressure plasma technology.	7,490.64
32	Intelligent Live Aquatic Movement System	11,835.21
33	Community planning to maintain green areas in the city	104,868.91
34	Water management for the development of model communities and clean energy power generation Upper Mae Pae Basin, Ban Pae Subdistrict, Chom Thong District, Chiang Mai Province	100,553.26
35	Developing a model for food security through innovative aquaculture, crops and solar energy to support future climate change	102,067.66
36	Community business development through agricultural production supply chains To add value to the community economy in the highlands	104,492.04

No.	Title of research (2021)	Budget (USD)
37	The Effects of Responsible Tourism Management for Businesses, Communities and Visitors	80,299.63
38	Construction of a greenhouse solar drying greenhouse for dried banana blossoms	20,029.06
39	Production of fabrics for medical materials containing keratin from chicken feathers to be waterproof and antibacterial.	17,198.50
40	Sustainable Solid Waste Management and Policies (SWAP)	100,360.29
41	A study of the distribution of pollution by height and its application for the design of a vegetation barrier for environmental quality management	7,490.64
42	Project to promote and transfer technology, innovation, economic crop cultivation together with mycorrhiza mushroom cultivation for sustainable development of community economy.	38,451.06
43	Technology development and management for cultivating spirulina with a smart closed tank system	47,672.66
44	A study of industrial vetiver grass production system using transient sinking bioreactor as raw material for product development for root knot nematode control	16,746.04
45	Oxidative stress study as a tool for assessing environmental risks	17,977.53
46	Climate Change Risk Analysis and Success Factors of Climate Index Insurance for Thailand Rice Production	8,988.76
47	Formulation of an integrated science plan Research and Innovation for Sustainable Development in Northern Region	35,655.43
48	Development of a solar incubator with an automatic controlled supplement heating system with IoT technology	52,733.78
49	A study of the reduction of PM2.5 from the reduction of agricultural burning on the hills in the North with an alternative model that creates sustainability and is acceptable to agriculture	2,208.24
50	Cultural capital management in Phrae City to increase the competitiveness of cultural enterprise entrepreneurs	44,943.82
51	Restoration of the degraded watershed areas by planting mixed crops according to the ecological characteristics by cooperating with the local people in a spatial integration	8,988.76
52	Young Smart Farmer 4.0 (YSF 4.0) and modifying the university to create YSE 4.0	898.88

No.	Title of research (2021)	Budget (USD)
53	A series of research and development projects to increase the efficiency of hydrangea production, the Royal Project Foundation. Sub-project 5, the study of optimal timing for inducing hydrangea bud formation with potassium chlorate and gibberellic acid	1,836.70
54	Big Data Storage, Analysis and Access System (BIGDATA) Project Kit of the Royal Project Foundation Sub-project 3, Environmental and Agricultural Database Management, Royal Project	29,430.41
55	Persistent and Emerging Contaminants in the water Resources of the Ping River Catchment in Northern Thailand	62,545.65
56	A prototype of the development of a water production system for agriculture from the air by using ground cooling and solar energy	30,741.57
57	A small plant factory for cultivating orchids, launches bottles to promote career and orchid conservation, release bottles to promote careers and orchid conservation of Ban Pong Krai community	2,696.63
58	Survey of energy potential and living conditions for sustainable development in Ban Manora Community, Thung Yao Sub-district, Pai District, Mae Hong Son Province (to develop into a model village for tourism for education and renewable energy)	2,996.25
59	Development of ecotourism potential for conservation of upstream forest resources in the upstream reservoir area of the Royal Initiated Reservoir Project, Ban Phu Din, Mae Ho Phra Subdistrict, Chiang Mai Province	3,295.88
60	Approaches to the use of biotechnology and smart farms in farm management for safe and stable tilapia-tilapia production	2,247.19
61	Application of natural mechanism techniques to improve school environment to cope with the problem of fine dust (PM 2.5)	32,659.18
62	A prototype of the development of a water production system for agriculture from the air by using ground cooling and solar energy	30,741.57
63	Survey of energy potential and living conditions for sustainable development in Ban Manora Community, Thung Yao Sub-district, Pai District, Mae Hong Son Province (to develop into a model village for tourism for education and renewable energy)	2,996.25
64	Development of ecotourism potential for conservation of upstream forest resources in the upstream reservoir area of the Royal Initiated Reservoir Project, Ban Phu Din, Mae Ho Phra Subdistrict, Chiang Mai Province	3,295.88

No.	Title of research (2021)	Budget (USD)
65	Approaches to the use of biotechnology and smart farms in farm management for safe and stable tilapia-tilapia production	2,247.19
66	Mae Chaem Safe Nature Project (Mae Pan-San Kiang Model) : Research and development of a model community towards a sustainable community for conserving water, forests and occupations that are environmentally friendly.	59,820.22
67	Combined heat generation system from infectious medical waste	29,962.55
68	Research and development of cannabis strains that provide medicinal cannabinoids	633,369.89
	Total sustainable research fund 2021	**3,335,958.71**

No.	Title of research (2022)	Budget (USD)
1	Guidelines for the development of Ban Mae Taman Hot Springs to increase competitiveness and value added of health tourism in Mae Teang District, Chiang Mai Province	750,000.00
2	Prototype of natural astaxanthin production system from Haematococcus alga for using in the food and cosmetics industry	450,000.00
3	Application of biomass residue from Jerusalem artichoke for developing bioherbicide and biosurfactant to promote organic farming	400,000.00
4	Plasma technology in the production of plant essential oils as potential non-chemical control agents against honeybee mites as a substitute for synthetic chemicals	400,000.00
5	Potential Development of Yard Long Bean (Vigna unguiculata spp. sesquipedalis) for Sustainable Organic Agriculture System	1,000,000.00
6	Development of aquaponics in recirculating aquaculture systems (RAS) for system adaptation under climate change small fish farmers in the northern region	2,000,000.00
7	Application of plant probiotics and bio-nanoparticles for disease control in rice	350,000.00
8	Bioplastics films eco-friendly synthesis from crude glycerin by-product form biodiesel production and natural materials	400,000.00
9	Energy Economic and Environmental Analysis of Combined Power Disposal Waste and Heating	200,000.00
10	Development and Upgrading of Product Identity in Phrae Community from Hom Herb Extracts	450,000.00

No.	Title of research (2022)	Budget (USD)
11	Development of Hot Air Duct Combined with Solar Powered Fan for Agricultural Product Dryer	240,000.00
12	Functional database of microbial communities utilized for sustainable rice production management	350,000.00
13	Well-being Development of the Elderly Base on Lanna Wisdom	450,000.00
14	IOT sensor device for ripeness detecting of durian fruit without damaging the fruit	300,000.00
15	Efficacy of Non-thermal Plasma Technology for Controlling of Dirty Panicle Disease in Rice	300,000.00
16	Research for Development of Southern Thai Kluai Hom Thong [Musa (AAA Group) Kluai Hom Thong] Production System by Participatory Method to Reduce the Waste of Produce from a Sustainably Plantation System	250,000.00
17	Systematic biology of off season flowering and zero waste innovative of longan production	1,900,000.00
18	Management and upgrading oil palm biomass as renewable energy for sustainable agricultural and environment	1,250,000.00
19	Application of Compost Synergistic with Microbial Consortium, Water Management and Bio-organic Stimulants for Increasing of 2-Acetyl-1-Pyrroline (2AP) Accumulation and Antioxidant Activity in Aromatic Organic Rice	350,000.00
20	Soil microbial community data for precision agriculture: a case study on longan farm with potassium chlorate-mediated flower induction	450,000.00
21	Synergistic antagonistic activity of surface functionalized nanomaterials via non-thermal atmospheric pressure plasma and Chaetomium for inhibition of Phytophthora from durian root rot	250,000.00
22	Development of meal replacement for malabsorption syndrome using locally-available ingredients	300,000.00
23	Effect of Chaya leaves on health and growth performance in native chicken	120,000.00
24	Isomaltulose Production from Low Grade Longan	375,000.00
25	Utilization of fuelwood guideline for sustainable forest management in The Royal Initiative Project Huai Mae Kieng Highland Agricultural Development Station, Chiang Dao District, Chiang Mai Province	180,000.00
26	Development of functional drink product from Thai herbals to reduce blood sugar levels for Aging age	210,000.00

No.	Title of research (2022)	Budget (USD)
27	Development of small household compost bin ,Super green, for organic and food waste	180,000.00
28	Potential development of Cordyceps militaris for application in protective and/or therapeutic diseases and as functional foods for non-communicable diseases (NCDs) protection or for elderly health	1,200,000.00
29	Development of processed seafood products to safe food for promote marketing in the development of creative tourism in Chumphon province.	900,000.00
30	Survey and assessment of the health of Nang Phaya Sua Krong trees; The landscape of tourism routes in Doi Fa Hom Pok National Park	20,000.00
31	Developing the quality of agricultural products through innovative bio-fertilizer production to raise the sustainable economy of the household.	685,200.00
32	Developing the production of medicinal and supplementary plants to raise household incomes sustainably	1,000,000.00
33	Project for developing the potential of processed agricultural products and marketing community products to support organic tourism based on a new normal	1,280,000.00
34	Improving the quality of life of farmers and communities through science, technology and innovation: the context of Lamphun Province.	1,240,000.00
35	Creating innovators and raising the standard of crop production in safe and organic agriculture systems.	690,000.00
36	Developing a community marketplace and online marketplace to enhance value and add value to identity products;. Lamphun Sustainable Agriculture	690,000.00
37	Creating an innovative model organic tourism community with community participation	690,000.00
38	Creating a participatory process for spatial development Doi Mon Chaem Community, Mae Raem Subdistrict, Mae Rim District, Chiang Mai Province	500,000.00
39	Developing the capacity of young smart farmers in developing a circular economy and linking bamboo systems in Lampang province, creating a participatory process for spatial development Doi Mon Chaem Community, Mae Raem Subdistrict, Mae Rim District, Chiang Mai Province	1,000,000.00
40	Sustainable and Development design Guidelines for Integrating Business Activities Case Study 7-Eleven Convenience Store Area, Mae Raem Subdistrict	448,000.00
41	Genetic, Physical Characteristics and Materials study of Hemp for Food and Medical Uses	100,000.00

No.	Title of research (2022)	Budget (USD)
42	Innovative efficiency of prefabricated walls (PCC Sandwich Panel) for energy saving	100,000.00
43	Guidelines for improving public restrooms by using design principles for all people: a case study of public toilets at Wat Phra That Cho Hae, Phrae Province	16,000.00
44	Community business development through coffee and beef cattle supply chain management To create sustainable career opportunities in accordance with the highland context	3,200,820.00
45	Innovative technology transfer training Cultivation of precious woods and cash crops together with integrated mycorrhiza cultivation	2,551,500.00
46	Co-generation of electricity, cooling and heating from infectious medical waste.	500,000.00
47	Cultural entrepreneurship development Cultural innovators to create added value of cultural products and stimulate the fundamental economy in Chiang Mai area.	5,700,000.00
48	Development of ozone gas fumigation system for digestion of fresh durian SAR-CoV2 virus	3,258,046.00
49	Innovation for adding value of palm bunch for sustainable economic development	3,821,000.00
50	Value addition of chili waste processing into functional extracts and health food products	2,452,120.00
51	Project to study the phenotype of 22 species of plants in the Royal Park Rajapruek, Phase 5	200,000.00
52	Natural Resources and Environment Management Project for Tourism Activities to study the pattern of income distribution between the tourism industry and the local community in a concrete way	2,690,515.00
53	Developing innovators to promote community-based tourism Lao People's Democratic Republic	600,000.00
54	The study of woodcarving for the conservatin of Local wisdom and the development of designs for digital market: Case study Kiew Lae Noi Village, Chiang Mai Province.	25,000.00
55	Social Capitals and Economic Security Constructing of Karen Farmers at Ban Ka Boe Din, Omkoi District, Chiang Mai Province	40,000.00
56	Design of souvenir products with an integrated concept of local Thai architecture.	4,000.00

No.	Title of research (2022)	Budget (USD)
57	Assessment of pedestrian service level and walking ability in Mae Jo University	4,000.00
58	Design guidelines for improving the park area to reduce the spread of the covid 19 virus	4,000.00
59	The development of community agricultural gardens on public areas in the Thai context.	4,000.00
60	The potential of access to areas of the transportation and transportation network and land use of the Chiang Mai City Planning (Revised No. 4) B.E. 2022	4,000.00
61	Designing a water storage system with vegetation for use in treating household wastewater.	4,000.00
62	Creating added value from organic horse manure used to increase soil microorganisms to organic farming areas to generate income for farmers in Ban Huai Yab community, Ban Thi district, Lamphun province.	23,000.00
63	Foundational community management based on organic agriculture for upgrading the economic quality of communities in On Klang Subdistrict, Mae On District, Chiang Mai Province.	23,000.00
64	Website development to increase distribution channels for organic farming community enterprises at Ban Mae Tad, Huai Sai Sub-district, San Kamphaeng District Chiang Mai Province	23,000.00
65	Adding value of vegetable oil from the synthesis of lubricant soap for industrial use	9,000.00
66	Comparison of environmental impacts of longan waste management	9,000.00
67	A study of microplastic contamination in sediment water and freshwater mollusks at Khlong Mae Kha, Chiang Mai Province.	9,000.00
68	Soil moisture sensor for embedding inside plant pots	7,500.00
69	Testing the effect of *Chromolaena odorata* (L.) R.M.King&H.Rob. leaves in repelling insects in a museum room	20,000.00
70	Study on growth and agronomy of safflower under the management of water and organic fertilizers	20,000.00
71	Attitudes towards planting in organic farming system of farmers in Mae Faek Mai Sub-district, San Sai District, Chiang Mai Province	20,000.00
72	Green Office Criteria Behavior Survey of the Dean's Office personnel agricultural production committee	5,000.00
	Total sustainable research fund 2022	**1,297,045.17**

No.	Title of research (2023	Budget (USD)
1	Food Security of Gated Communities, Case Study of Maejo Municipality, Chiang mai province.	6,456.04
2	Incense innovation from fragrant native flowers	8,241.76
3	Development of Fruit Skin Color Quality for Longan by Using of Paclobutrazol and Fungicides	10,989.01
4	Fire retardant of Particleboard from Teak Residue by Coated Boron Compounds in Phrae Province	10,989.01
5	Using of fermented feed by Bacillus fermented soybean (Thua-nao) to improve the growth performance and immunity in free-range chickens	8,241.76
6	The Development of Analysis and Forecasting System among Production, Domestic Consumption and Export of Longan Fruit using Business Intelligence System Concept	8,241.76
7	Extraction Process Development of Active Substances from Hemp leaf Hemp Seed and its By-Products for Utilization as Health Food Products and Process Prototypes for Commercialization	13,736.26
8	Product Development of Herbal Tea Prototype from Local Winter Fruits	6,868.13
9	Competitiveness enhancement of Nameko mushrooms by developing as extract for skin care products	9,615.38
10	Development of Litsea cubeba Pers. tea for reduce blood sugar levels	6,868.13
11	Antiviral, immunostimulatory, and growth promoting potentials of myricetin in pigs	10,989.01
12	Geographic Information Development Conducting for Water Resource Management under the Climate Change Consequences in The Thung Luang Royal Project, Chiang Mai Province	13,736.26
13	Applications of Y-aminobutyric acid and 5-aminolevulinic acid producing bacteria for value adding of black garlic products	5,494.51
14	Synthesis and characterizations of biochar-carbon nanotube hybrid materials for energy storage applications	9,615.38
15	Seed priming technology for enhance vigor seed of marigold seeds	4,120.88
16	Efficacy of plasma technology against honeybee pathogens for reducing synthetic chemical use in beekeeping industry	13,736.26
17	Innovation of modified biochar for agriculture residues management for agro-circular economy community development	24,725.27
18	Biochemical analysis of neonicotinoid pesticides and the other derivatives on neurotoxicity of Danio rerio	9,615.38

No.	Title of research (2023	Budget (USD)
19	Effects of cold plasma in controlling adult of rice weevil (Sitophilus oryzae L.)	6,868.13
20	Production of compost from mushroom spawns mixed with coffee grounds and corn dust by using endophytic bacteria (Pseudoxanthomonas spadix MJUP08) as a starter	9,615.38
21	The study of Estrus synchronization and fixed time artificial insemination to improve productive effciency of swamp buffalo in Maesai subdistrict	9,615.38
22	Prototype Smart Greenhouse by Reduce the Temperature and Create the Water drop with Peltier to Increase Medicinal Herbs due to Climate change	8,241.76
23	Improvement of rice variety for blast resistance by genome editing technology	9,615.38
24	Social innovation promoting products and service to reduce inequity and enhance community economy	13,736.26
25	Comparison of Basic Extender(Egg –Yolk Tris) and New Extender(MJ-EX2TM Extender) on insemination rate and conception rate in goats.	10,989.01
26	White Sweet Corn Breeding For Fresh Eating	9,615.38
27	The formulation development of skin products from Curcuma longa L., Clinacanthus nutans (Burm.f.) Lindau. ,and Artocarpus lakoocha Roxb. with anti-inflammatory, antioxidation and anti-skin pathogenic bacterial effects for elderly person with xerosis cutis	8,241.76
28	Innovation of Organic Hemp and Extract for Feed Supplements to Increase Productivity and Quality in Economic Animals as Safe Food and Organic Products	13,736.26
29	Upgrading pasteurized instant curry paste to food security through the community innovation of San Sai District, Chiang Mai Province.	6,868.13
30	Extractable substances EGCG in Miang tea inhibit COVID-19	8,241.76
31	Development the process culture of algae Nannochloropsis sp. with high cell density and chemical composition with closed culture system for nursery of blue swimming crab (Portunus pelagicus) larvae with bioencapsulation technique under climate change conditions	10,989.01
32	Synthesis and properties of low-cost graphene from longan waste for medical applications	9,615.38
33	Processing and development of date palm products with participation for economic value added and connecting to sustainable community economy promotion	24,725.27

No.	Title of research (2023	Budget (USD)
34	Development in Thai Orchids cultivation system for Aromatherapy products, Cosmetic Prototype and conservation.	10,494.51
35	Development of DNA marker for Drought tolerance from Thai Rice	9,615.38
36	Fabrication of favipiravir sensor for anti-covid-19 virus	9,615.38
37	Development of molecular marker linked to folate content in rice	9,615.38
38	Development of an Intelligent Electric Vehicle for Agriculture	20,604.40
39	Design of an interface circuit for capacitance measurement in precision agriculture	6,043.96
40	Breeding day- length insensitivity chrysanthemum for year round production	10,989.01
41	Application of Firmicutes and Proteobacteria in biofertilizer formulation for controlling rice diseases and rice growth promotion in drought stress	7,280.22
42	Development of Sulfur Dioxide Smart Sensor for Longan Industry to Enhance the Value of Agricultural Products and Operational Safety	9,615.38
43	Evaluating plant growth promoting rhizobacteria (PGPR) for alleviation of drought stress in rice	12,362.64
44	Fabrication of wavelength selective and energy harvesting hybrid materials for greenhouse horticulture application	9,615.38
45	Application of Speed Breeding Technology for Cannabis Breeding Program	20,604.40
46	Improvement of RD79 Rice Variety to be Early Flowering, Fragrant and Resistance to Bacterial Leaf Blight, Blast Diseases and Brown Plant Hopper Using Molecular Marker. (second-year)	24,725.27
47	Development of spatial biomass management system and promoting the use of suitable renewable energy innovation to supporting smog reduction	24,725.27
48	Biomaterial-graphene composites film for energy storage for smart farm	9,615.38
49	The improvement of mesoporous natural rubber/silica nanocomposites with organosulfonic acid groups for catalytic esterification of free fatty acid in biodiesel production	10,989.01
50	Improvement of Non-photoperiod Sensitive, Semi-dwarf, Glutinous Aromatic RD-MAEJO 2 Rice Variety for Early Maturity, Resistance to Brown Plant Hopper, Bacterial Leaf Blight and Blast Diseases Using Molecular Marker Assisted Selection.	24,725.27

No.	Title of research (2023	Budget (USD)
51	Reducing agricultural greenhouse gas emissions through site-specific nutrient management through the C_STOCK application and portable soil analysis kit	8,241.76
52	Effect of MJU Health Application on Health Literacy Among Elders with Hypertension	6,181.32
53	Improvement of raw soybean by non-thermal plasma for producing organic feed ingredient	10,989.01
54	Data Visualization Techniques to Showcase Research Synthesizing in Phrae Province	2,747.25
55	Development of Galactagogue herb Products for Postpartum	3,791.21
56	Nutrient management for improving yield and grain quality of high nutritional rice grown under climate change	8,241.76
57	Organic aquaculture production for food safety production in Chiang Mai and the Upper North Region	24,725.27
58	Breeding Curcuma for resistance to algal disease by DNA markers	24,725.27
59	Development of Extender freezing Thai buffalo semen for genetic preservation	9,615.38
60	The use of microencapsulated extract of Lingzhi (Ganoderma lucidum) waste as a functional feed additive in poultry production	8,241.76
61	The Synergy of Development between Local Administrative Organizations and Community to Restore Tourism Resources and Enhance Community Health Related Management in Preventing and Solving the Pandemic of Coronavirus Disease 2019 to Support the New Normal of Tourism Community	13,736.26
62	Reducing production costs and increasing income for fish farmers by combining black soldier fly with fish culture using smart systems	10,989.01
63	STUDY THE EFFECTIVE OF GAMMA RADIATION PLASMA AND ION BEAM FOR MUTATION OF CANNABIS	9,615.38
64	The Efficiency of Atmospheric Pressure Plasma Technology Innovation for Controlling an Anthracnose Disease and Increasing the Potential Chili Safe Production	10,989.01
65	Functional food product development of colored rice extract and probiotic drink powder	10,989.01
66	Creating a database of animal feed ingredients in the Thai Northern and development of MJU Feed Formulator Program	12,362.64

No.	Title of research (2023	Budget (USD)
67	Increasing freshwater prawn production with natural astaxanthin supplementation innovation from Haematococcus algae within smart biofloc technology	10,989.01
68	Development a prototype of a biomass packaging extrusion machine using solar energy	9,615.38
69	Creation a prototype of community enterprise group of biomass packaging production with marketing innovations	6,538.46
70	Study the potential of using distiller's soluble from rice wine as swine feed and developing the black pig (Department of Livestock Development 1) production system for smallholders pig producers.	9,615.38
71	A study of the effects of Lumpy skin disease on reproductive performance in cattle.	10,714.29
72	Effects of non-thermal atmospheric pressure plasma on nanomaterials attachment to natural dye powder from Teak leaves	5,494.51
73	Development of finished product from Ginger and Citronella essential oil to protect and eliminate mite in chicken for animal production in organic farm	10,989.01
74	Enhancement of pest management effectiveness for food safety production of longan farmers in upper-northern part of Thailand	26,098.90
75	Development of premium grade channel catfish cultured in recirculating water systems together with aquaponic under low water exchange and using suitable bacteria for water treatment	10,989.01
76	Effects of Lawsonia inermis extract on growth performance and microbiome variation in the gastrointestinal tract of industrial weaned pigs	10,989.01
77	The Effect of Low Temperature Conditions in Experimental Room Control on Crickets (Gryllus bimaculatus De Geer) Rearing When Using Incubator Controller to Adjust Temperature for Increase Productivity.	4,120.88
78	Research for Development of Southern Thai Kluai Hom Thong [Musa (AAA Group) Kluai Hom Thong] Production System by Participatory Method to Reduce the Waste of Produce from a Sustainably Plantation System Year 2	5,494.51
79	Innovation of giant freshwater prawn (Macrobrachium rosenbergii) raising and feeding by using low-cost food from insects and extracts from local plants to accelerate growth under a complete Recirculating Aquaculture System (RAS) water system	10,989.01

No.	Title of research (2023	Budget (USD)
80	Enhancing of Organic Rice Farming's Competitive Capabilities in Phrae Province under the Concepts of Green Supply Chain	9,615.38
81	A Cultural Tourism Model for Community Grass Roots Economic Promoting in the Phrae's Urban Area	10,989.01
82	Assessment of carbon dioxide emissions on the development of innovated sweet corn germ vinegar product from sweet corn germ waste in canned sweet corn industry	9,615.38
83	The decision to select organic longan species from blind testing and demographic factors affecting the selection	2,692.31
84	Model development of a participatory management that affects the management efficiency according to the principles of good governance of local government organization in Phrae pprovinces	4,203.30
	Total	920,164.84

Number of scholarly publications on sustainability

Description

The publication that we selected for the list of sustainability was based on the keywords; green, organic, sustainable, environment, climate, energy, and ecology. This year, we used a new method for management in the publication database. The number of publication articles comes from three sources; the database of publications on Scopus, Web of Science between January, 1st - August, 31st 2023, and the TCI database.

The number of scholarly publications on sustainability (average 3 years) is **146**

(237+122+79 = **438)**

438/3 = 146

Number of scholarly publications on sustainability			
2021	2022	2023	average
237	122	79	**146**

Sample of publication database of 2023. (All articles are presented on https://green.mju.ac.th/?page_id=246)

No.	Title	Authors	Year	Source title	Volume	Issue	Pages	ISSN	type	Languag	DOI
1	A call for reducing tourism risk to environmental hazards in the Himalaya	Ziegler, A.D.| Wasson, R.J.| Sundriyal, Y.| Srivastava, P.| Sasges, G.| Ramchunder, S.J.| Ong, C.E.| Nepal, S.K.| McAdoo, B.G.| Gillen, J.| Bishwokarma, D.| Bhardwaj, A.| Apollo, M.	2023	Environmental Hazards	22	1	1-28	ISSN-17477891	Journal	English	10.1080/17477891.2021.19841 6
2	A comprehensive review of Bifidobacterium spp: as a probiotic, application in the food and therapeutic, and forthcoming trends	Abdul Kalam Saleena, L.| Chang, S.K.| Simarani, K.| Arunachalam, K.D.| Thammakulkrajang, R.| How, Y.H.| Pui, L.P.	2023	Critical Reviews in Microbiology	-	-	-	ISSN-1040841X	Journal	English	10.1080/1040841X.2023.22436 7
3	A comprehensive review of the synthesis strategies, properties, and applications of transparent wood as a renewable and sustainable resource	Chutturi, M.| Gillela, S.| Yadav, S.M.| Wibowo, E.S.| Sihag, K.| Rangppa, S.M.| Bhuyar, P.| Sienţchin, S.| Antov, P.| Kristak, L.| Sinha, A.	2023	Science of the Total Environment	864	-	-	ISSN-00489697	Journal	English	10.1016/j.scitotenv.2022.16106
4	A hybrid waste–solar power generation and waste disposal system in Luang Prabang, Lao People's Democratic Republic (Lao PDR)	Yangchongthuochuaya, K.| Chaiyat, N.	2023	Case Studies in Chemical and Environmental Engineering	7	-	-	ISSN-26660164	Journal	English	10.1016/j.cscee.2023.100332
5	A novel carbon electrode for up-scaling flexible perovskite solar cells	Passatorntaschakorn, W.| Khampa, W.| Musikpan, W.| Bhoomanee, C.| Ngarmjarurojana, A.| Rimjaem, S.| Gardchareon, A.| Rodwihok, C.| Kim, H.S.| Khambunkoed, N.| Supruangnet, R.| Nakajima, H.| Srathongsian, L.| Kanjanaboos, P.| Intaniwet, A.| Kaewprajak, A.| Kumnorkaew, P.| Goubard, F.| Ruankham, P.| Wongratanaphisan, D.	2023	Applied Materials Today	34	-	-	ISSN-23529407	Journal	English	10.1016/j.apmt.2023.101895
6	A review on pollutants remediation competence of nanocomposites on contaminated water	Xia, C.| Li, X.| Wu, Y.| Suharti, S.| Unpaprom, Y.| Puţazhendhi, A.	2023	Environmental Research	222	-	-	ISSN-00139351	Journal	English	10.1016/j.envres.2023.115318
7	Accelerating global mountain forest loss threatens biodiversity hotspots	He, X.| Ziegler, A.D.| Elsen, P.R.| Feng, Y.| Baker, J.C.A.| Liang, S.| Holden, J.| Spracklen, B.	2023	One Earth and Hard Materials	6	3	303-315	ISSN-25903330	Journal	English	10.1016/j.oneear.2023.02.005
9	Agriculture of microalgae Chlorella vulgaris for polyunsaturated fatty acids (PUFAs) production employing palm oil mill effluents (POME) for future food, wastewater, and energy nexus	Kumaran, M.| Palanisamy, K.M.| Bhuyar, P.| Maniam, G.P.| Rahim, M.H.A.| Govindan, N.	2023	Energy Nexus	9	-	-	ISSN-27724271	Journal	English	10.1016/j.nexus.2022.100169
10	AN EMPIRICAL ANALYSIS OF THE CAUSAL RELATIONSHIP BETWEEN TOURISM GROWTH AND THE SERVICE INDUSTRY IN THAILAND	Chulaphan, W.| Fidel, J.| Caceres, B.	2023	Humanities, Arts and Social Sciences Studies	23	2	297-307	ISSN-26300079	Journal	English	10.14456/hasss.2023.27
11	An endophytic fungus, Penicillium simplicissimum conjugated with C60 fullerene for its potential antimitotic, anti-inflammatory, anticancer and photodegradation activities	Govindappa, M.| Vishaka, A.| Akshatha, B.S.| Popli, D.| Sunayana, N.| Srinivas, C.| Puţazhendhi, A.| Raghavendra, V.B.	2023	Environmental Technology (United Kingdom)	44	6	817-831	ISSN-09593330	Journal	English	10.1080/09593330.2021.19856 1
12	Application of modern approaches to the synthesis of biohydrogen from organic waste	Sharma, P.| Jain, A.| Bora, B.J.| Balakrishnan, D.| Show, P.L.| Ramaraj, R.| Ağbulut, Ü.| Khoo, K.S.	2023	International Journal of Hydrogen Energy	48	55	21189-21213	ISSN-03603199	Journal	English	10.1016/j.ijhydene.2023.03.029
13	Assessment of Antidiabetic and Anti-Inflammatory Activities of Carissa carandas Linn Extract: In Vitro and In Vivo Study	Lailerd, M.| Linn, T.W.| Lailerd, N.| Amornlerdpison, D.| Imsumran, A.	2023	Applied Sciences (Switzerland)	13	11	-	ISSN-20763417	Journal	English	10.3390/app13116454
14	Assessment of phenolic profile, allicin content, and inhibitory potential against α-amylase and α-glucosidase on conventional and organic garlic (Allium sativum L.)	Wongsa, P.| Bhuyar, P.| Müller, J.	2023	European Food Research and Technology	-	-	-	ISSN-14382377	Journal	English	10.1007/s00217-023-04337-3
15	Biorefining and biotechnology prospects of low-cost fish feed on Red tilapia production with different feeding regime	Klahan, R.| Yuangsoi, B.| Whangchai, N.| Ramaraj, R.| Unpaprom, Y.| Khoo, K.S.| Deepanraj, B.| Pimpimol, T.	2023	Chemosphere	311	-	-	ISSN-00456535	Journal	English	10.1016/j.chemosphere.2022.13 098
16	Biotechnology approach of various biorefinery substrates for Thai native earthworm cultivation	Wasunan, P.| Maneewong, C.| Daengprok, W.| Thirabunyanon, M.	2023	Biomass Conversion and Biorefinery	-	-	-	ISSN-21906815	Journal	English	10.1007/s13399-023-04314-6
17	Boundary exchange completes the marine Pb cycle jigsaw	Chen, M.| Carrasco, G.| Zhao, N.| Wang, X.| Lee, J.N.| Tanzil, J.T.I.| Annammala, K.V.| Poh, S.C.| Lauro, F.M.| Ziegler, A.D.| Duangnamon, D.| Boyle, E.A.	2023	Proceedings of the National Academy of Sciences of the	120	6	-	ISSN-00278424	Journal	English	10.1073/pnas.2213163120

18	Characterization of Rice Husk Biochar and Its Particle Size Effects on Soil Properties in Sandy Loam Soil	Wangdi, K.| Khongdee, N.| Intanon, S.| Samaksaman, U.| Spreer, W.| Kiravittaya, S.| Pansak, W.	2023	GMSARN International Journal	17	4	389-395	ISSN-19059094	Journal	English	-
19	Chicken Feather Waste Hydrolysate as a Potential Biofertilizer for Environmental Sustainability in Organic Agriculture Management	Gupta, S.| Sharma, S.| Aich, A.| Verma, A.K.| Bhuyar, P.| Nadda, A.K.| Mulla, S.I.| Kalia, S.	2023	Waste and Biomass Valorization	-	-	-	ISSN-18772641	Journal	English	10.1007/s12649-023-02123-
20	Corrigendum to "Comparative study of different catalysts mediated FAME conversion from macroalga Padina tetrastromatica biomass and hydrothermal liquefaction facilitated bio-oil production" [Chemosphere 292 (2022) 133485] (Chemosphere (2022) 292, (S0045653521039590X), (10.1016/j.chemosphere.2021.133485))	Vimali, E.| Gunaseelan, S.| Chitra Devi, V.| Mothil, S.| Muthu Arumugam| Ashokkumar, B.| Ganesh Moorthy, I.M.| Pugazhendhi, A.| Varalakshmi, P.	2023	Chemosphere	312	-	-	ISSN-00456535	Journal	English	10.1016/j.chemosphere.2022 241
21	Current application of seaweed waste for composting and biochar: A review	Dang, B.-T.| Ramaraj, R.| Huynh, K.-P.-H.| Le, M.-V.| Tomoaki, I.| Pham, T.-T.| Hoang Luan, V.| Thi Le Na, P.| Tran, D.P.H.	2023	Bioresource Technology	375	-	-	ISSN-09608524	Journal	English	10.1016/j.biortech.2023.1288
22	Developing a Model for Building Farmers' Beliefs in the Sufficiency Economy Philosophy to Accommodate Sustainable Agricultural Practices in the Highlands of Chiang Mai Province, Thailand	Jeerat, P.| Kruekum, P.| Sakkatat, P.| Rungkawat, N.| Fongmul, S.	2023	Sustainability (Switzerland)	15	1	-	ISSN-20711050	Journal	English	10.3390/su15010511
23	Developing of components and indicators of appropriate carrying capacity of community-based tourism attractions in upper north Thailand	Noosut, K.| Attawongchayakorn, K.| Panyadee, C.| Trakarnsiriwanich, K.	2023	Kasetsart Journal of Social Sciences	44	1	95-104	ISSN-24523151	Journal	English	10.34044/j.kjss.2023.44.1.10
24	Effects of El Niño drought on seedling dynamics in a seasonally dry tropical forest in Northern Thailand	Nutiprapun, P.| Hermhuk, S.| Nanami, S.| Itoh, A.| Kanzaki, M.| Marod, D.	2023	Global Change Biology	29	2	451-461	ISSN-13541013	Journal	English	10.1111/gcb.16466
25	Effects of LED Lighting Technology on Morphology, Antioxidant activity, and the Bioactive Compounds Accumulation of Anoectochilus burmannicus in the Greenhouse System	Tangtragoon, T.| Kawaree, R.| Sutigoolabud, P.| Mongkon, S.| Polvongsri, S.| Nilapaka, W.	2023	Trends in Sciences	20	3	-	ISSN-27740226	Journal	English	10.48048/tis.2023.6296
26	Effects of Natural Dye Solvent Extraction on the Efficiency of Dye-Sensitive Solar Cells from the Leaf Biomass of Sandoricum koetjape and Syzygium samarangense	Sabarikirishwaran, P.| Unpaprom, Y.| Ramaraj, R.	2023	Waste and Biomass Valorization	-	-	-	ISSN-18772641	Journal	English	10.1007/s12649-022-02030-
27	Efficient and Stable Carbon-Based Perovskite Solar Cells Enabled by Mixed CuPcCuSCN Hole Transporting Layer for Indoor Applications	Makming, P.| Homnan, S.| Ngamjarurojana, A.| Rimjaem, S.| Gardchareon, A.| Sagawa, T.| Haruta, M.| Pakawatpanurut, P.| Wongratanaphisan, D.| Kanjanaboos, P.| Intaniwet, A.| Ruankham, P.	2023	ACS Applied Materials and Interfaces	15	12	15486-15497	ISSN-19448244	Journal	English	10.1021/acsami.2c23136
28	Endophytic Bacteria Isolated from Tea Leaves (Camellia sinensis var. assamica) Enhanced Plant-Growth-Promoting Activity	Kabir, M.H.| Unban, K.| Kodchasee, P.| Govindarajan, R.K.| Lumyong, S.| Suwannarach, N.| Wongputtisin, P.| Shetty, K.| Khanongnuch, C.	2023	Agriculture (Switzerland)	13	3	-	ISSN-20770472	Journal	English	10.3390/agriculture13030533
29	Energy production and water savings from floating solar photovoltaics on global reservoirs	Jin, Y.| Hu, S.| Ziegler, A.D.| Gibson, L.| Campbell, J.E.| Xu, R.| Chen, D.| Zhu, K.| Zheng, Y.| Ye, B.| Ye, F.| Zeng, Z.	2023	Nature Sustainability	6	7	865-874	ISSN-23989629	Journal	English	10.1038/s41893-023-01089-
30	Enhancement of Fermentable Sugars From Fresh Elephant Ear Plant for Bioethanol Production Using Ash as a Source of CaO	Trejo, M.| Bhuyar, P.| Unpaprom, Y.| Rodriguez Valadez, F.J.| Ramaraj, R.	2023	AIP Conference Proceedings	2682	-	-	ISSN-0094243X	Conference Proceeding	English	10.1063/5.0118231
31	Environment Friendly Approach for Plant Mediated Green Biosynthesis of Gold Nanoparticles and Their Modern Applications in Biomedical Aspects—an Updated Report	Nithin, B.R.| Bhuyar, P.| Maniam, G.P.| Rahim, M.H.A.| Govindan, N.	2023	BioNanoScience	-	-	-	ISSN-21911630	Journal	English	10.1007/s12668-023-01134-
32	Explaining the digital divide in the European Union: the complementary role of information security concerns in the social process of internet appropriation	Lamberti, G.| Lopez-Sintas, J.| Sukphan, J.	2023	Information Technology for Development	-	-	-	ISSN-02681102	Journal	English	10.1080/02681102.2023.220 0
33	Extraction, purification and characterization of phenazine from Pseudomonas aeruginosa isolate of wastewater sources: a panacea towards clinical pathogens	Thacharodi, A.| Priyadharshini, R.| Karthikeyan, G.| Jeganathan, C.| Reghu, A.P.| Pugazhendhi, A.	2023	Applied Nanoscience (Switzerland)	13	3	2365-2378	ISSN-21905509	Journal	English	10.1007/s13204-021-01944-
34	Fabrication and performance evaluation of dye-sensitized solar cell integrated with natural dye from Strobilanthes cusia under different counter-electrode materials	Mejica, G.F.C.| Unpaprom, Y.| Ramaraj, R.	2023	Applied Nanoscience (Switzerland)	13	2	1073-1083	ISSN-21905509	Journal	English	10.1007/s13204-021-01853-

35	Fabrication of a simple 3D-printed microfluidic device with embedded electrochemiluminescence detection for rapid determination of sibutramine in dietary supplements	Praoboon, N.| Tangkuaram, T.| Kruefu, V.| Pookmanee, P.| Phaisansuthichol, S.| Kuimalee, S.| Laorodphan, N.| Satienperakul, S.	2023	Microchimica Acta	190	4	-	ISSN-00263672	Journal	English	10.1007/s00604-023-057
36	Factors affecting the participation in community forest conservation in Northern Upland of Laos P.D.R	Phonchaluen, S.| Fongmul, S.| Sakkatat, P.| Kanokhong, K.	2023	International Journal of Agricultural Technology	19	3	1191-1208	ISSN-26300192	Journal	English	-
37	Feasibility and optimizing assessments on biogas and biomethane productions from E. coli fermenter effluent	Sabarikirishwaran, P.| Shen, M.-Y.| Ramaraj, R.| Unpaprom, Y.| Wu, H.-C.| Chu, C.-Y.	2023	Biomass and Bioenergy	173	-	-	ISSN-09619534	Journal	English	10.1016/j.biombioe.2023
38	First-principles study on the electronic structure of siligraphene on a ZnO monolayer	Kanchiang, K.| Pramchu, S.| Mcintyre, G.J.	2023	Journal of Applied	56	-	1091-1098	ISSN-00218898	Journal	English	10.1107/S160057672300
39	Identification, Characterization, and Control of Black Spot on Chinese Kale Caused by Sphaerobolus cuprophilus sp. nov.	Kalayanamitra, P.| Kalayanamitra, K.| Nontajak, S.| Taylor, P.W.J.| Jonglaekha, N.| Bussaban, B.	2023	Plants	12	3	-	ISSN-22237747	Journal	English	10.3390/plants12030480
40	Impact of positive and negative pressure on rice straw torrefaction: Optimization using response surface methodology	Seithtanabutara, V.| Kaewmahawong, S.| Polvongsri, S.| Wang, J.| Wongwuttanasatian, T.	2023	Case Studies in Chemical and Environmental Engineering	7	-	-	ISSN-26660164	Journal	English	10.1016/j.cscee.2023.100
41	In vivo Testing of Plant Extracts in Controlling Rice Brown Spot Disease Through Folia Application	Jantasorn, A.| Oiuphisittraiwat, T.| Mongon, J.| Dethoup, T.	2023	Indian Journal of Agricultural Research	57	2	242-248	ISSN-03678245	Journal	English	10.18805/IJARe.AF-673
42	Influences of Bacillus subtilis and fructooligosaccharide on growth performances, immune responses, and disease resistance of Nile tilapia, Oreochromis niloticus	Panase, A.| Thirabunyanon, M.| Promya, J.| Chitmanat, C.	2023	Frontiers in Veterinary Science	9	-	-	ISSN-22971769	Journal	English	10.3389/fvets.2022.1094
43	Intraspecific Diversity and Pathogenicity of Bacillus thuringiensis Isolates from an Emetic Illness	Pheepakpraw, J.| Kaewkod, T.| Konkit, M.| Krongdang, S.| Jantakee, K.| Praphruet, R.| Bovonsombut, S.| Panya, A.| Tragoolpua, Y.|	2023	Toxins	15	2	-	ISSN-20726651	Journal	English	10.3390/toxins15020089
44	Investigation of Secondary Organic Aerosol Formation during O3 and PM2.5 Episodes in Bangkok, Thailand	Uttamang, P.| Choomanee, P.| Phupijit, J.| Bualert, S.| Thongyen, T.	2023	Atmosphere	14	6	-	ISSN-20734433	Journal	English	10.3390/atmos1406099
45	Key influencing factors for the success of external innovation strategies in the biotechnology industry	Lin, M.| Lekhawipat, W.	2023	Journal of Business and Industrial Marketing	-	-	-	ISSN-08858624	Journal	English	10.1108/JBIM-07-2022-0
46	Natural dyes extracted from Inthanin bok leaves as light-harvesting units for dye-sensitized solar cells	Khammee, P.| Unpaprom, Y.| Thurakitseree, T.| Dussadee, N.| Kojinok, S.| Ramaraj, R.	2023	Applied Nanoscience (Switzerland)	13	1	391-403	ISSN-21905509	Journal	English	10.1007/s13204-021-01
47	Optimization of Rubber Seed Oil Extraction: Adaptive Neuro-Fuzzy Inference-Based Yield Prediction Model by Studying Polarity and Moisture Content	Khazaai, S.N.M.| Bhuyar, P.| Strezov, V.| Govindan, N.| Rahim, M.H.A.| Maniam, G.P.	2023	Bioenergy Research	-	-	-	ISSN-19391234	Journal	English	10.1007/s12155-023-10
48	Optimized model of fermentable sugar production from Napier grass for biohydrogen generation via dark fermentation	Balakrishnan, D.| Manmai, N.| Ponnambalam, S.| Unpaprom, Y.| Chaichompoo, C.| Ramaraj, R.	2023	International Journal of Hydrogen Energy	48	55	21152-21160	ISSN-03603199	Journal	English	10.1016/j.ijhydene.2022.
49	Potential bioactivities via anticancer, antioxidant, and immunomodulatory properties of cultured mycelial enriched β-D-glucan polysaccharides from a novel fungus Ophiocordyceps sinensis OS8	Chatnarin, S.| Thirabunyanon, M.	2023	Frontiers in Immunology	14	-	-	ISSN-16643224	Journal	English	10.3389/fimmu.2023.11
50	Recent advances in biowaste management towards sustainable environment	Piechota, G.| Unpaprom, Y.| Dong, C.-D.| Kumar, G.	2023	Bioresource Technology	368	-	-	ISSN-09608524	Journal	English	10.1016/j.biortech.2022.
51	Revision on the Genus Paris in Thailand, with a New Species Paris siamensis	Ruchisansakun, S.| Sraphet, S.| Yothawut, C.| Thamanukornsri, C.| Suksee, N.| Kongsawadworakul, P.| Srisawad, N.| Thawara, N.| Umpunjun, P.| Rodpradit, S.| Sangkaew, W.| Triwitayakorn, K.	2023	Plants	12	3	-	ISSN-22237747	Journal	English	10.3390/plants12030430
52	Smart Wellness Technology for Tourism Destination Based-on Evolving Tourist Expectation Model	Panyadee, C.| Krajangchom, S.| Sangkakorn, K.| Intawong, K.	2023	TEM Journal	12	2	1218-1226	ISSN-22178309	Journal	English	10.18421/TEM122-68

53	Social innovation: relationships with social and human capitals, entrepreneurial competencies and growth of social enterprises in a developing country context	Pansuwong, W.| Photchanachan, S.| Thechatakerng, P.	2023	Social Enterprise Journal	19	1	51-79	ISSN-17508614	Journal	English	10.1108/SEJ-02-2022-0014
54	Stability analysis for Nabla discrete fractional-order of Glucose–Insulin Regulatory System on diabetes mellitus with Mittag-Leffler kernel	Narayanan, G.| Syed Ali, M.| Rajchakit, G.| Jirawattanapanit, A.| Priya, B.	2023	Biomedical Signal Processing and Control	80	-	-	ISSN-17468094	Journal	English	10.1016/j.bspc.2022.104295
55	STRATEGIC RESPONSES FOR THE AIRLINE BUSINESS DURING THE COVID-19 PANDEMIC: A REVIEW OF PAST CRISES	Chutiphongdech, T.| Apiluckserbsakul, N.| Choktanasukarn, K.| Phengkona, J.	2023	ABAC Journal	43	3	-	ISSN-08580855	Journal	English	10.59865/abacj.2023.26
56	Study of the Interaction of Dissolved Organic Carbon, Available Nutrients, and Clay Content Driving Soil Carbon Storage in the Rice Rotation Cropping System in Northern Thailand	Aumtong, S.| Chotamonsak, C.| Glomchinda, T.	2023	Agronomy	13	1	-	ISSN-20734395	Journal	English	10.3390/agronomy13010142
57	Synthesis of Granular Biochar-based Catalyst for Transesterification Reaction	Chanathaworn, J.| Yatongchai, C.	2023	International Energy Journal	23	2	97-104	ISSN-1513718X	Journal	English	-
58	Tailoring defects in electron transporting Zn2SnO4 layers by multilayer engineering and Cr doping towards efficient and stable carbon-based perovskite solar cells	Homnan, S.| Makming, P.| Phromma, C.| Chimupala, Y.| Kanjanaboos, P.| Gardchareon, A.| Wongratanaphisan, D.| Sagawa, T.| Ruankham, P.	2023	Journal of Power Sources	580	-	-	ISSN-03787753	Journal	English	10.1016/j.jpowsour.2023.23
59	The Educational Role of The Constitutional Court in Compliance of Indonesian Citizens	Marwiyah, S.| Borman, M.S.| Ruba'ie| Ramadhani, M.C.| Saraswati, R.| Naprathansuk, N.	2023	Law Reform: Jurnal Pembaharuan Hukum	19	1	148-168	ISSN-18584810	Journal	English	10.14710/lr.v19i1.53971
60	The effect of horizontal elements and building orientation on PM2.5 concentration in classrooms	Tikul, N.| Hokpunna, A.| Chawana, P.	2023	Frontiers of Architectural Research	12	4	775-787	ISSN-20952635	Journal	English	10.1016/j.foar.2023.05.007
61	The influence of napier grass biomass mixed feed on the biorefinery indicator for Nile tilapia production	Klahan, R.| Krajabthong, K.| Maksiri, W.| Tamruangit, J.| Whangchai, N.| Pimpimol, T.| Whangchai, K.	2023	Biomass Conversion and Biorefinery	-	-	-	ISSN-21906815	Journal	English	10.1007/s13399-023-04235
62	The solid-state reaction facilitated by a microwave-assisted method for lithium vanadium silicon oxide synthesis by incorporating pure silica and rice husk ash for the application as anode material in lithium-ion battery	Kumchompoo, J.| Kunthadee, P.| Laorodphan, N.| Kidkhunthod, P.| Kuimalee, S.| Tangkuaram, T.| Puntharod, R.	2023	Radiation Physics and Chemistry	207	-	-	ISSN-0969806X	Journal	English	10.1016/j.radphyschem.20 863
63	Thermal imaging for assessment of maize water stress and yield prediction under drought conditions	Pradawet, C.| Khongdee, N.| Pansak, W.| Spreer, W.| Hilger, T.| Cadisch, G.	2023	Journal of Agronomy and Crop Science	209	1	56-70	ISSN-09312250	Journal	English	10.1111/jac.12582
64	Valorization and biorefinery of kaffir lime peels waste for antifungal activity and sustainable control of mango fruit anthracnose	Chit-aree, L.| Unpaprom, Y.| Ramaraj, R.| Thirabunyanon, M.	2023	Biomass Conversion and Biorefinery	13	12	10735-10749	ISSN-21906815	Journal	English	10.1007/s13399-021-017
65	Vertical farming: A potential farming practice for lettuce production	Wicharuck, S.| Khongdee, N.| Pripanakul, T.| Whangchai, N.| Pimpimol, T.| Chaichana, C.	2023	Chilean Journal of Agricultural Research	83	3	248-259	ISSN-07185820	Journal	English	10.4067/S0718-58392023000300248
66	Waste Management System using Waste Classification on Mobile Application	Polchan, M.| Pukao, A.| Cheunban, T.| Sinthupuan, S.	2023	8th International Conference on Digital Arts, Media and Technology and 6th ECTI Northern Section Conference on Electrical, Electronics, Computer and Telecommunications Engineering, ECTI DAMT and NCON 2023	-	-	229-233	-	Conference Proceeding	English	10.1109/ECTIDAMTNCON5 023.10139770
67	We Have Eaten the Rivers: The Past, Present, and Unsustainable Future of Hydroelectricity in Vietnam	Sasges, G.| Ziegler, A.D.	2023	Sustainability (Switzerland)	15	11	-	ISSN-20711050	Journal	English	10.3390/su15118969

68	What drives the change of capacity factor of wind turbine in the United States?	Xu, J.| Zou, J.| Ziegler, A.D.| Wu, J.| Zeng, Z.	2023	Environmental Research Letters	18	6	-	ISSN-17489318	Journal	English	10.1088/1748-9326/acce4f
69	Low-Cost Solar Energy Harvesting: A Study on Dye-Sensitized Solar Cells Using Inthanin Leaf Extract as a Natural Photosensitizer	Maria Onyemowo, Yuwalee Unpaprom,Rameshprabu Ramaraj	2023	AJARCDE (Asian Journal of Applied Research for Community Development and Empowerment)	7	3			Journal	English	https://doi.org/10.29165/ajarcd 7i3.329
70	Carcass composition and meat quality of Thai indigenous chicken raised in organic production system	Malaithong, W. 1 , Khonyang, D. 1 , Tongrueng, S.1 , Chaimanee, V.2 and Wattananapakasem, I.	2023	International Journal of Agricultural Technology	19	5	2135-2144		Journal	English	http://www.ijat-aatsea.com/pdf/v19_n5_2023_ptember/12_IJAT_19(5)_2023_laithong,%20W.(121).pdf
71	The Sustainable Pig Nutrition by Partial Replacement of Soybean Meal with Copra Meal	Thomtisang, C., Amornlerdpison, D., Hsia, L. C., & Jantasin, W.	2023	AJARCDE (Asian Journal of Applied Research for Community Development and Empowerment)	7	2			Journal	English	https://doi.org/10.29165/ajarcd 7i2.276
72	Growth and Development of Black-Boned Chicken Embryonic Stem Cells for Culture Meat using Different Serums as Medium	P. Promtan, J. Panatuk, W. Kongbuntad, D. Amornlerdpison, Y. Nanta, N. Pripwai, W. Thaworn, W. Pattanawong	2023	Tropical Animal Science Journal	46	3			Journal	English	https://doi.org/10.5398/tasj.20 46.3.354
73	Silver Nano Chito Oligomer Hybrid Solution for the Treatment of Citrus Greening Disease (CGD) and Biostimulants in Citrus Horticulture	Vatcharakajon, P.; Sornsaket, A.; Choengpanya, K.; Susawaengsup, C.; Sornsakdanuphap, J.; Boonplod, N.; Bhuyar, P.; Dangtungee	2023	*Horticulturae*	9	6	725		Journal	English	https://doi.org/10.3390/hortic rae9060725
74	Caffeine removal from aqueous solution by amine-functionalized rice husk ash	Pattanan Chanhom , Narit Nitjapan , Nuntawat Ta-in , Sasiprapa Radchatawin , Sakdinun Nuntang	2023	D - Science and Technology					Book	English	https://hcuconf.hcu.ac.th/wp-content/uploads/2023/06/5.-Science-and-Technology-International.pdf#page=166
75	Study of plasma activated water and secondary effects on water using gamma radiation with FTIR in seeds germinations	A Somjaimak, K Prakrajang, S Sarapirom, S Rimjaem and K Janpong	2023	Journal of Physics:					Journal	English	10.1088/1742-6596/2431/1/012013
76	Exploring the impact of light-emitting diodes and pH on microalgae *Spirulina* biomass production optimization using a central composite design	Obaid Bhat, Yuwalee Unpaprom & Rameshprabu Ramaraj	2023	Biomass Conversion and Biorefinery					Journal	English	https://doi.org/10.1007/s1339 023-04666-z
77	Effect of Photoperiod and White LED on Biomass Growth and Protein Production by *Spirulina*	Obaid Bhat, Yuwalee Unpaprom & Rameshprabu Ramaraj	2023	Molecular Biotechnology					Journal	English	https://doi.org/10.1007/s1203 023-00787-y
78	*Spirulina* Cultivation Under Different light-emitting Diodes for Boosting Biomass and Protein Production	Obaid Bhat, Yuwalee Unpaprom & Rameshprabu Ramaraj	2023	Molecular Biotechnology					Journal	English	https://doi.org/10.1007/s1203 023-00842-8
79	Innovative Insights for Establishing a Synbiotic Relationship with *Bacillus coagulans* : Viability, Bioactivity, and *In Vitro* -Simulated Gastrointestinal Digestion	Saranya Suwanangul,Pannapapol Jaichakan, Nukrob Narkprasom, Supaluck Kraithong, Kanjana Narkprasom, Papungkorn Sangsawad	2023	Foods	12	19	3692		Journal	English	https://doi.org/10.3390/foods1 93692

Number of activities organized by student organizations related to sustainability per year

Description

There are many student organizations that create activities about green and environmental conservation such as volunteer activities for rural development, cleaning public road areas, separating waste, growing rice, and organic farming. There are 18 student organizations and they have at least one project related to sustainability per year.

This program is mapped to SDG 11 (Sustainable cities and communities).

[5] > 10

No.	Logo	Name of organization	Objectives of organization	Activities
1		องค์การนักศึกษา มหาวิทยาลัยแม่โจ้ Student Union of Maejo University	It is the main organization of students in organizing activities to develop students within the university in accordance with the identity of the university.	MJU learning & sharing together 2022 activities
2		สภานักศึกษา มหาวิทยาลัยแม่โจ้ Student Council of Maejo University	It is a student organization to monitor, defend the rights, and present the material necessary for the life of students on campus.	Intinil project, a new bold council in 2022
3		สโมสรนักศึกษาคณะเศรษฐศาสตร์ Student Union of Faculty of Economics	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	Training courses "Organic vegetable production and simple straw mushroom cultivation

No.	Logo	Name of organization	Objectives of organization	Activities
4		สโมสรนักศึกษาคณะวิทยาศาสตร์ Student Union of Faculty of Science	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	Project Activities "Garbage Exchange"
5		สโมสรคณะเทคโนโลยีการประมงและทรัพยากรทางน้ำ Student Union of Faculty of Fisheries Technology and Aquatic Resources	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	Project New Breed Smart Farmer
6		สโมสรวิทยาลัยบริหารศาสตร์ Student Union of School of Administrative Studies	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	MJU Car Free Day 2022 event
7		สโมสรนักศึกษาคณะผลิตกรรมการเกษตร Student Union of Faculty of Agricultural Production	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	Activities to wish world peace.

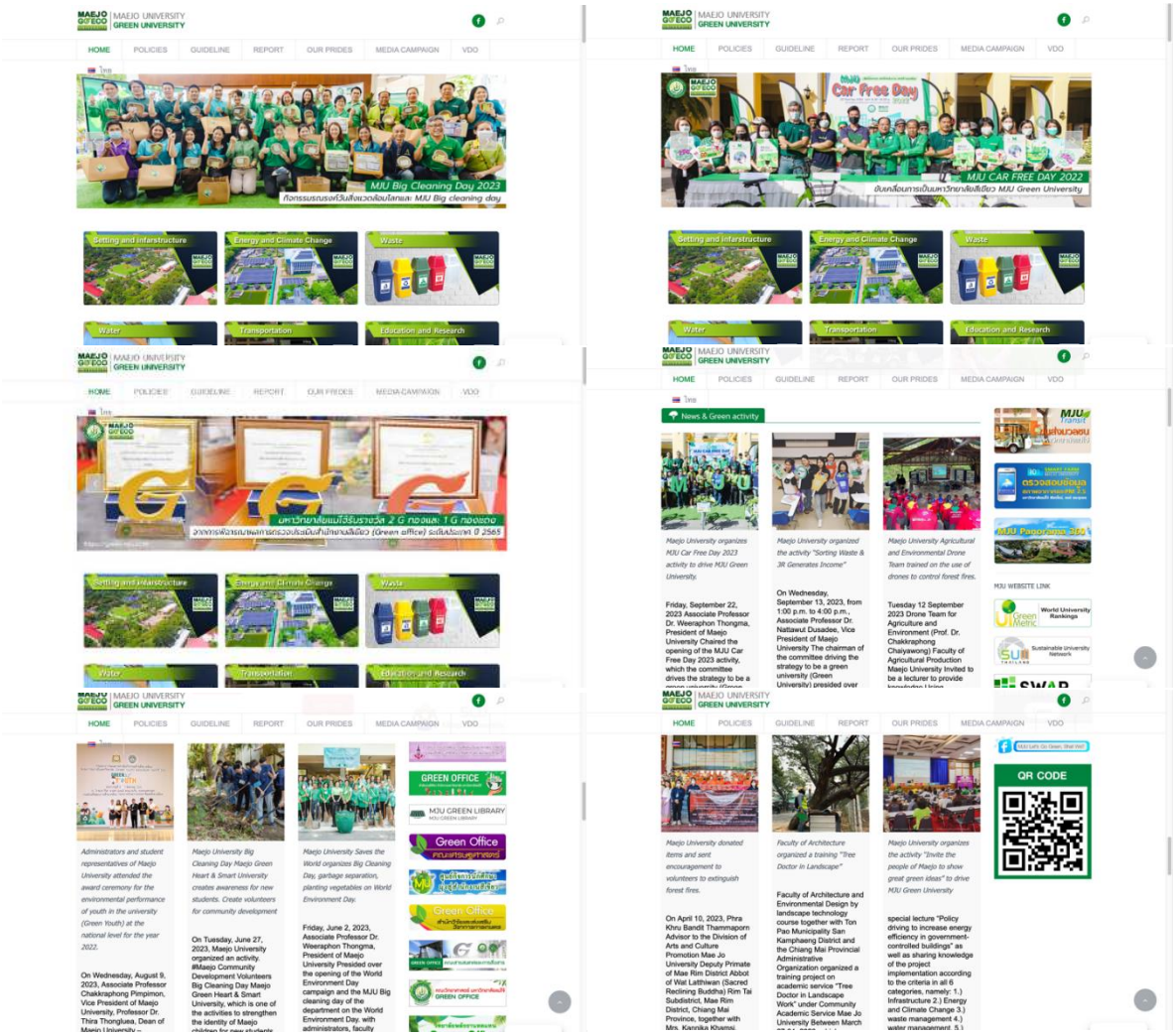
No.	Logo	Name of organization	Objectives of organization	Activities
8		สโมสรนักศึกษาคณะศิลปศาสตร์ Student Union of Faculty of Liberal Arts	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	Classify the garbage before disposal.
9		สโมสรนักศึกษาคณะวิศวกรรมและอุสาหกรรมเกษตร Student Union of Faculty of Engineering and Agro-industry	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	MJU Green & Clean Food Festival
10		สโมสรนักศึกษา คณะสถาปัตยกรรมศาสตร์และการออกแบบสิ่งแวดล้อม Student Union of Faculty of Architecture and Environmental Design	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	Environmental protection camp
11		สโมสรนักศึกษาคณะสัตวศาสตร์และเทคโนโลยี Student Union of Faculty of Animal	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	Green Heart Smart Student Animal Science Volunteer University

No.	Logo	Name of organization	Objectives of organization	Activities
		science and Technology		Development Activities
12		สโมสรนักศึกษาคณะสารสนเทศและการสื่อสาร Student Union of Faculty of Information and Communication	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	Faculty Development Volunteer Activities
13		สโมสรนักศึกษาคณะพัฒนาการท่องเที่ยว Student Union of School of Tourism Development	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	Provide drinking water for forest fire fighting tasks to the forest fire fighting volunteer team, and establish forest fire lines in the area.
14		สโมสรนักศึกษาวิทยาลัยพลังงานทดแทน Student Union of School of Renewable Energy	Faculty-level student organization that organizes activities for students within the Faculty to become students according to the Faculty's graduate qualities.	volunteer activities
15		ชมรมนกเสรี Freedom Bird Club	To develop creative competence and problem solving in the public mind	lack rice planting camp and learn life skills

No.	Logo	Name of organization	Objectives of organization	Activities
			towards helping the community and society.	
16		ชมรมรากดินแม่โจ้ Maejo's Rakdin Club (RMC)	To encourage students to have a public mind to help the community and society.	Invite the new generation to try, learn and understand the community, and enjoy the happiest meal in the Huay Hin Lad community.
17		ชมรมอนุรักษณ์ธรรมชาติและสิ่งแวดล้อม Nature and Environmental Conservation Club	To enable students who are interested in environmental conservation to participate in activities and benefits.	Biochar making activity
18		ชมรมยุวเกษตรกร Young Farmers Club	To foster the attitude of young agricultural group members to be proud of the value of agriculture and to accept agriculture as a profession	Project to Strengthen Agricultural Production Group

University-run sustainability website

[5] Website is available, accessible, and updated regularly.

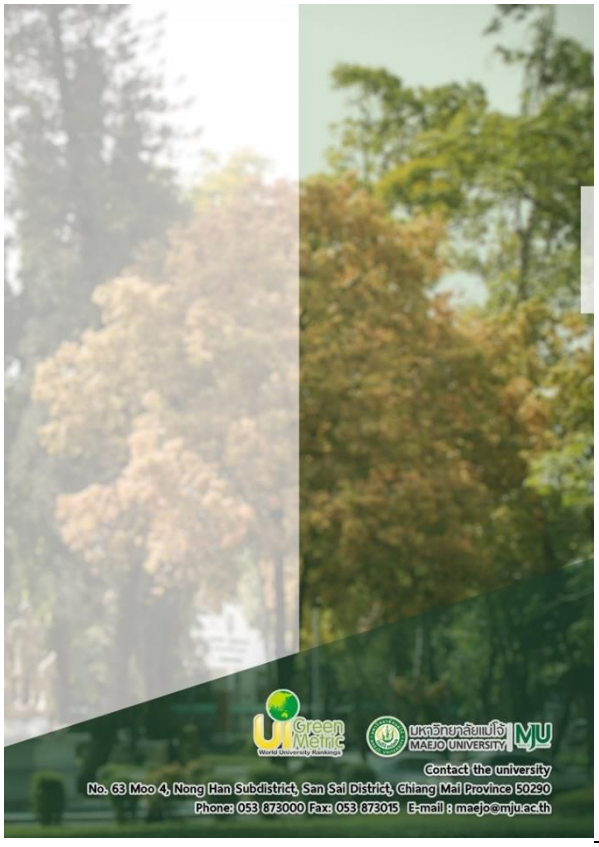


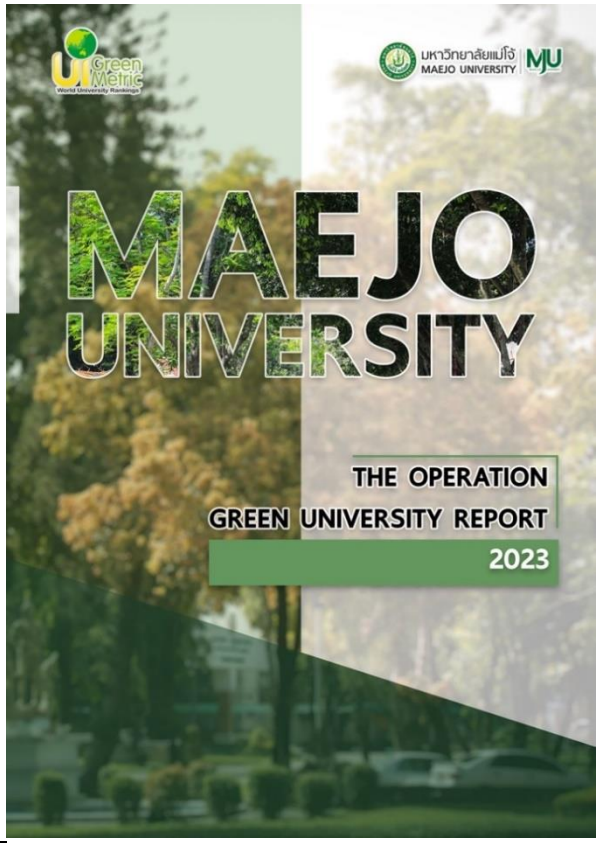
Description

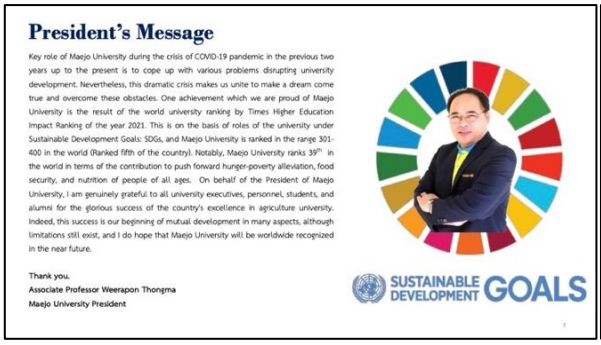
The University sustainability website is available at http://www.green.mju.ac.th as a bilingual description which consists of the university's policy and strategies in green and sustainability. The information on green university issues, news, and activities of both our staff and students was published on the website. In addition, we also operate activities of SDGs (https://sdg.mju.ac.th) and green office that are linked on the university's website. Our website is available, accessible, and updated regularly.

Sustainability report

[5] Sustainability report is accessible and published annually.







Description

The sustainability report of Maejo University is available and updated annually. We operate both in UI Green metric and SDGs report that are available on website https://green.mju.ac.th/?page_id=3289&lang=en and https://sdg.mju.ac.th

Number of cultural activities on campus (e.g.Cultural Festival) including virtual activities

Description:

The cultural activities on campus are organized by the University: **more than 3 events in this year**

References: https://erp.mju.ac.th/informationIndex.aspx?tid=7

1. พิธีแฮกนาปลูกข้าว First time Rice growing of the year ceremony

References :

https://www.facebook.com/AGR.MJU/posts/pfbid06Vp4PF6kDaNrG4q243CSiZnpBVLJmUwbMqsUsaq7zC8Rk4nb7fhDUYxT8QW81Y18l

2. Teacher worship ceremony 2023 https://mjuradio.com/fm9550/90177/

References :

https://www.facebook.com/mjuradio/posts/pfbid02m3zoDr9r5gSrbMPD7aGxrwfNLqohf5qDyWWtN39CgRKq3ipX5YtQRPkwmeDkZpURl

3. Candle casting ceremony for the year 2023 https://mjuradio.com/fm9550/90147/

4. Sacred ceremony to indoctrinate the students, Faculty of Architecture and environmental design

References : https://edu-arch.mju.ac.th/wtms_newsDetail.aspx?nID=28073&lang=th-TH


5. Welcome new students ceremony for the year 2023, Faculty of Liberal Arts

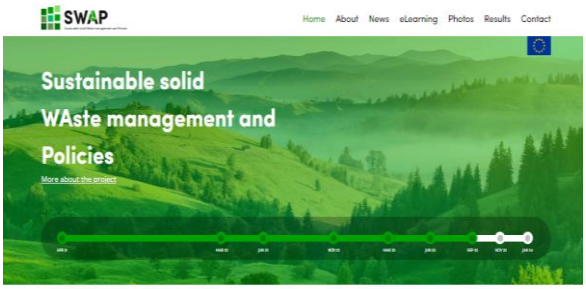
References :

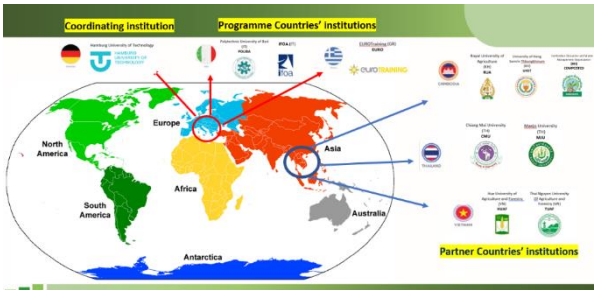
https://www.facebook.com/mjuradio/posts/pfbid02Kph32JTcrkk8NhBHXMacU4USxJE8xdQ3tSHKUfzU7kSChDKvzF3erxvWjGcfcHFYl

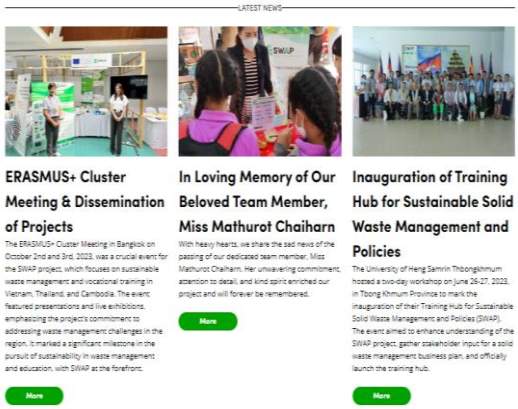

6. Shong Karn festival or Thai new year https://thelibrary.mju.ac.th/?p=19075

Number of university sustainability program(s) with international collaborations

More than 3 programs







Erasmus project on Sustainable solid Waste management and Policies – SWAP with 12 universities and non-profit organization; TUHH - Hamburg University of Technology (TUHH)), Germany; I.F.O.A. - Istituto Formazione Operatori Aziendali , Italy; POLIBA - Politecnico Di Bari, Italy; EURO Training Educational Organization , Greece; HUAF – Hue University of Agriculture and Forestry, Vietnam ; TUAF – Thai Nguyen University of Agriculture and Forestry , Vietnam; RUA - Royal University of Agriculture, P.O. Box 2696 , Cambodia; UHST - University of Heng Samrin Thbongkhmum, Cambodia; COMPOSTED - Cambodian Education and Waste Management Organisation , Cambodia ; CMU - Chiang Mai University , Thailand and MJU - Maejo University, Maejo University , Thailand

Description:

1. The Erasmus project on Sustainable solid Waste management and Policies - SWAP

The SWAP project has started from 2021 till 2024 supporting by ERASMUS+ . With 12 partners from Europe and Asia working together, this project contributes and supports in building capacity at tertiary level, as well as in supporting training addressed to the vulnerable group of informal waste practitioners. Improve entrepreneurship and employability of university graduates in the sector of sustainable solid waste management and pave the way to support relevant policies, providing high quality educational products and tools. The activities include developing curriculums regarding solid waste management for bachelor and master degree levels, developing training hub for waste management and T_VET courses and raising awareness activities on waste management for young generation. https://www.facebook.com/SWAPProjectOfficial

2. Faculty of Liberal Arts Maejo University Organized an online academic cooperation (MoU) signing ceremony with the College of Arts and Social Sciences, Central Luzon State University, Philippines by Associate Professor Dr. Weeraphon Thongma, President of Maejo University and Prof. Dr. Edgar A. Orden, President of Central Luzon State University. This academic and research cooperation project has a duration of 3 years and covers the exchange of faculty and students. Organizing projects and doing collaborative research organizing conferences, seminars and publishing joint work, developing teaching media organizing short-term academic projects sharing facilities and related resources for teaching and research. and other projects agreed upon by both parties.

3. Associate Professor Dr. Weeraphon Thongma, President of Maejo University Opening the Agricultural Sustainability: Train the Trainer Initiative for Nigerian Farmers training program for 20 participants from Nigeria between 15 -31 May 2023, which is a collaborative project between international colleges. Maejo University together with Nigeria in Diasporra Organization Thailand (NIDO) on this occasion were honored by Mr. Ovikuroma Orogun Djebah (H.E. Mr. Ovikuroma Orogun Djebah)

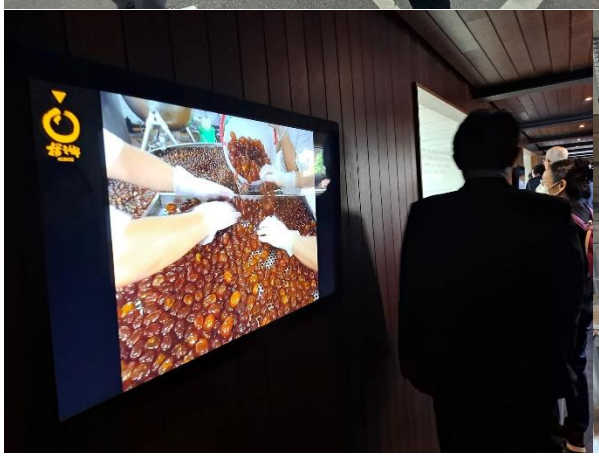
4. President of Maejo University Accompanied with the Executives of the University, Faculties, Schools, College, Offices, and Science Park Visited Jinwen University of Science and Technology, Taiwan (R.O.C) to Sign an MOU

https://erp.mju.ac.th/informationDetail.aspx?newsId=5222&zId=6&interaffairs=true

https://www.facebook.com/permalink.php?story_fbid=pfbid0WQ1qTEftLBbwozT79KMXH3aHhoUjRtqfuF8H9dLFuNzv15tubucUsB4xkp4Mb4FSl&id=100057339225184

5. Associate Professor Dr. Weerapon Thongma, President of Maejo University together with the executives of the University, faculties, schools, college, office, and science park visited Kumquat Candied Fruit Factory which is a partner of National Ilan University. On this opportunity, the delegation had an opportunity to explore the management of the fruit processing factory to add value to the fresh produce.






6. Associate Professor Dr. Weerapon Thongma, President of Maejo University together with the executives of the University, faculties, schools, college, office, and science park visited Toucheng Leisure Farm, a long-term partner of Maejo University. The founder of the farm, Madame Chen Ming Cho, has received an Honorary Doctorate Degree in Tourism Management from the International College, Maejo University in 2022.

https://erp.mju.ac.th/informationDetail.aspx?newsId=4930&zId=6&interaffairs=true

7. Associate Professor Dr. Weerapon Thongma, President of Maejo University welcomed Associate Professor Dr. Somchanh Bounphanmy, Vice President, and Dr. Santi Kongmany, Director of the Center for Environmental Excellence from the National University of Laos, Lao People's Democratic Republic on the occasion of visiting Maejo University to discuss and exchange policies/guides for educational operations, academic services, teaching, and researches between the two institutes at Puangsaed Room, University Office Building. The delegation was also joined with Associate Professor Chakrapong Pimpimon, Vice President, Dr. Koblarp Areesrisom, Deputy Dean for Special Affairs, Faculty of Agricultural Production and Assistant Professor Dr. Pavinee Areesrisom, lecturer, Faculty of Agricultural Production.

No.	Cooperating agencies	Issue	Start	End	Duration	Note
1	Sulawesi Barat University ,Indonesia	Sulawesi Barat University	06/09/2023	06/09/2027	5	MJU-Chumporn
2	Chiba University ,Japan	Chiba University	01/09/2023	01/09/2027	5	
3	Chiba University ,Japan	Chiba University	01/09/2023	01/09/2027	5	
4	University of Agriculture and Environmental Sciences ,Nigeria	University of Agriculture and Environmental Sciences	01/09/2023	01/09/2027	5	
5	University Network for Tropical Agriculture (UNTA) ,Unknow	University Network for Tropical Agriculture	17/08/2023	N/A	N/A	
6	Jinwen University of Science and Technology ,Taiwan	Jinwen University of Science and Technology	11/05/2023	11/05/2027	5	
7	Taiwan Leisure Agriculture Association ,Taiwan	Taiwan Leisure Agriculture Association	11/05/2023	11/05/2027	5	
8	Liaoning Institute of Science and Technology ,China	Liaoning Institute of Science and Technology	27/03/2023	27/03/2027	5	
9	Universitas Negeri Yogyakarta ,Indonesia	Universitas Negeri Yogyakarta	10/03/2023	10/03/2027	5	

No.	Cooperating agencies	Issue	Start	End	Duration	Note
10	Alauddin State Islamic University ,Indonesia	Alauddin State Islamic University (UIN)	01/03/2023	01/03/2027	5	MJU-Chumporn
11	State Institute of Islamic Sorong West Papua ,Indonesia	State Institute of Islamic Studies Sorong West Papua	01/03/2023	01/03/2027	5	MJU-Chumporn
12	Universitas Patompo Makasaar ,Indonesia	Universitas Patompo Makasaar	01/01/2023	01/01/2027	5	MJU-Chumporn
13	Universiti Teknologi MARA ,Malaysia	Universiti Teknologi MARA	26/12/2022	26/12/2026	5	Faculty of Engineer
14	Fushoushan Farm, Veterans Affairs Council ,Taiwan	Fushoushan Farm, Veterans Affairs Council	02/12/2022	30/11/2026	5	Faculty of Agri. Production
15	Fengshan Tropical Horticultural Experiment Branch ,Taiwan	Fengshan Tropical Horticultural Experiment Branch	28/11/2022	28/11/2026	5	Faculty of Agri. Production
16	Universitas Brawijaya ,Indonesia	Universitas Brawijaya	26/11/2022	26/11/2026	5	
17	Wuling Farm, Veterans Affairs Commission, Executive Yuan Republic of China (Taiwan) ,Taiwan	Wuling Farm, Veterans Affairs Council	07/11/2022	07/11/2026	5	Faculty of Agri. Production
18	Universitas PGRI Adi Buana Surabaya ,Indonesia	Universitas PGRI Adi Buana Surabaya	23/09/2022	23/09/2026	5	
19	Northern Agriculture and Forestry College,LAO PDR ,Laos	Northern Agriculture and Forestry College	01/09/2022	01/09/2026	5	

Number of sustainability community services project organized by and/or involving students

There are **26 sustainablity community services projects**.

No.	Project name	Project duration	Project area
1	โครงการ Green economics for all students 2021 (Green economics for all students 2021 project)	1 year	ED
2	โครงการการดำเนินกิจกรรมด้านสิ่งแวดล้อมของเยาวชนภายในมหาวิทยาลัย (Green Youth) ปี 2565 (Biochar/เชื้อเพลิงแข็ง รักษ์ดิน รักษ์โลก) (Environmental Activities for Youth within the University Project (Green Youth) Year 2022 (Biochar/Solid Fuels, Save the Earth, Save the Planet))	1 year	EC, ED
3	โครงการศึกษาดูงานด้านรัฐศาสตร์และรัฐประศาสนศาสตร์ในมิติการบริหารองค์การชุมชนและสิ่งแวดล้อม ประจำปีการศึกษา 2564 (A study visit project on political science and public administration in the dimension of community organization management and environment Academic year 2021)	1 year	ED
4	กิจกรรมการเพิ่มช่องทางการเข้าถึงบทความในฐานข้อมูลออนไลน์ ด้านอนุรักษ์พลังงานและสิ่งแวดล้อม ด้านการเกษตร (Activities to increase access to articles in online databases Energy and Environment Conservation Agriculture)	1 year	EC
5	โครงการ “ธรรมชาติปลอดภัยแม่แจ่ม ; สร้างฝายมีชีวิตเพื่ออนุรักษ์คน น้ำ ป่า และอาชีพที่เป็นมิตรกับสิ่งแวดล้อม ประจำปี 2565” (Project “Nature is safe, Mae Chaem ; Build a living weir to conserve people, water, forests, and environmentally-friendly occupations for the year 2022.”)	1 year	SI
6	โครงการค่ายอนุรักษ์และพัฒนาสิ่งแวดล้อม ประจำปีการศึกษา 2564 (Environmental Conservation and Development Camp Project Academic year 2021)	1 year	EC
7	โครงการปรับปรุงและพัฒนาสิ่งแวดล้อม (Environmental improvement and development project)	1 year	SI
8	โครงการเพิ่มศักยภาพการเรียนรู้ และส่งเสริมการจัดกิจกรรมของนักศึกษาหลักสูตรการออกแบบและวางแผนสิ่งแวดล้อม (Project to increase learning potential and promote the organization of student activities in the Environmental Design and Planning Program)	1 year	ED

No.	Project name	Project duration	Project area
9	โครงการศึกษาดูงานนอกสถานที ทำความดีเพื่อชุมชน รณรงค์รักษ์สิงแวดล้อม (Field investigation: do well for the community and carry out environmental protection campaigns)	1 year	WS
10	โครงการส่งเสริมการขับเคลื่อนยุทธศาสตร์เกษตรพลังงานทดแทนและพัฒนาสิงแวดล้อมมหาวิทยาลัยแม่โจ้ (Project to promote the strategy of agriculture, renewable energy and environmental development, Maejo University)	1 year	EC
11	โครงการสัมมนาสโมสรนักศึกษาคณะสถาปัตยกรรมศาสตร์และการออกแบบสิงแวดล้อม ประจำปี 2565 (Student Club Seminar Project of Faculty of Architecture and Environmental Design Year 2022)	1 year	ED
12	โครงการสานสัมพันธ์น้องพีสาขาวิชาเศรษฐศาสตร์เกษตรและสิงแวดล้อม ประจำปี 2565 (Sister Relations Project in the field of Agricultural Economics and Environment Year 2022)	1 year	ED
13	โครงการอนุรักษ์สิงแวดล้อม (environmental conservation project)	1 year	EC
14	โครงการอบรมเชิงปฏิบัติการตามแผนแม่บทโครงการอนุรักษ์พันธุกรรมพืชอันเนื่องมาจากพระราชดำริ สมเด็จพระกนิษฐาธิราชเจ้า กรมสมเด็จพระเทพรัตนราชสุดาฯ สยามบรมราชกุมารี เรื่อง"หมอต้นไม้ในงานภูมิทัศน์" โดยเทศบาลตำบลแม่สาย จังหวัดเชียงราย ร่วมกับ หลักสูตรเทคโนโลยีภูมิทัศน์ คณะสถาปัตยกรรมศาสตร์และการออกแบบสิงแวดล้อม มหาวิทยาลัยแม่โจ้ จังหวัดเชียงใหม่ มหาวิทยาลัยราชภัฏเชียงราย สมาคมยางนา-ขี้เหล็กสยาม (Workshop project according to the Master Plan of Plant Genetic Conservation Project under the Royal Initiative Somdej Phra Kanitthathirat Department of Her Royal Highness Princess Maha Chakri Sirindhorn Her Royal Highness Princess Maha Chakri Sirindhorn "Tree Doctor in Landscape Work" by Mae Sai Subdistrict Municipality Chiang Rai Province together with the Landscape Technology Course Faculty of Architecture and Environmental Design Maejo University Chiang Mai Province Chiang Rai Rajabhat University Rubber Association - Cassia Siam)	1 year	ED
15	โครงการการบริหารจัดการและพัฒนาชุมชนโดยใช้ทุนทางสังคมเป็นฐานเพื่อการพัฒนาอย่างยั่งยืน	1 year	ED

No.	Project name	Project duration	Project area
	(Social Capital-Based Community Management and Development Projects for Sustainable Development)		
16	การผลิต "ถ่านใบไม้ไร้ควัน" เพื่อการพัฒนาที่ยั่งยืนของเครือข่ายวิสาหกิจชุมชน ในตำบลป่าไผ่ อำเภอสันทราย จังหวัดเชียงใหม่ (Production of "smokeless leaf charcoal" for sustainable development of community enterprise networks in Tambon Pa Phai, San Sai District, Chiang Mai Province)	1 year	EC
17	โครงการบัณฑิตนักพัฒนา มุ่งสร้างคุณค่าแหล่งท่องเที่ยวสู่ความยั่งยืน (Developer Graduate Program Aiming to create tourism value for sustainability)	1 year	ED
18	โครงการพัฒนาศูนย์ต้นแบบเศรษฐกิจพอเพียง (SE) ตามแนวทางพระราชดำริฯ สู่การพัฒนาที่ยั่งยืน (SDGs) มหาวิทยาลัยแม่โจ้-แพร่ เฉลิมพระเกียรติ (According to the project of the Demonstration Center (SE) for the Development of Self sufficiency Economy under the Royal Sustainable Development Initiative (SDG), Maejo University - Phrae, ChaloemPhrakiat)	1 year	ED
19	โครงการส่งเสริมความเข้มแข็งและยั่งยืนของชุมชน (Community Strengthening and Sustainability Project)	1 year	ED
20	โครงการเสริมสร้างความเข้มแข็งการพึ่งพาตนเองในการทำการเกษตรแบบปลอดภัยเพื่อการพัฒนาที่ยั่งยืน (Strengthening sustainable development, safe agriculture and self-reliance Project)	1 year	ED
21	งานเกษตรแม่โจ้ตามศาสตร์พระราชาเพื่อการพัฒนาอย่างยั่งยืน (Maejo Agriculture Fair according to the King's Science for Sustainable Development)	1 year	ED
22	โครงการ 1 คณะ 1 ผลิตภัณฑ์ (ต้นแบบ ตู้อบแห้งพลังงานพลังงานแสงอาทิตย์ร่วมกับไฟฟ้าแบบแยกส่วน) (Project 1 Board 1 Product (Prototype Drying Cabinet Solar Energy Combined with Split Electricity))	1 year	EC
23	โครงการ พัฒนาพลังงานทดแทนอย่างมีส่วนร่วมเพื่อเพิ่มศักยภาพศูนย์การเรียนชาวไทยภูเขาและคุณภาพชีวิตที่ดีกว่าของชุมชนบนพื้นที่สูงบ้านจอลือเหนือ จังหวัดแม่ฮ่องสอน (Participatory renewable energy development project to increase the potential of the hill tribe learning center and the better quality of life of the community in Ban Jorlue Nuea, Mae Hong Son Province)	1 year	EC

No.	Project name	Project duration	Project area
24	โครงการ อบรมเผยแพร่องค์ความรู้เทคโนโลยีพลังงานทดแทนและระบบสมาร์ทฟาร์มแก่เกษตรกรเพื่อพัฒนาสู่เกษตรดิจิตอล 4.0 (Training project to disseminate knowledge of renewable energy technology and smart farm systems for farmers to develop into digital agriculture 4.0)	1 year	EC
25	โครงการจัดการพลังงานทางเลือกของชุมชนอย่างยั่งยืน (Sustainable Community Alternative Energy Management Project)	1 year	EC
26	โครงการผลิตบัณฑิตและพัฒนาศักยภาพบัณฑิตทางด้านพลังงานทดแทนในกลุ่มประเทศอาเซียนสำหรับนักศึกษาปริญญาตรี (โครงาน ทุนยากจน) (Graduate Production and Graduate Potential Development Program in Renewable Energy in ASEAN Countries for Undergraduate Students (Poverty Scholarship Program))	1 year	EC

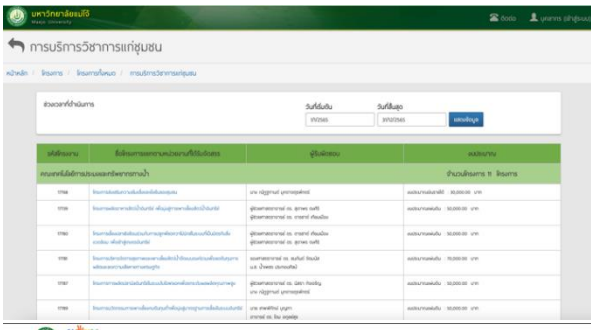
Description:

The knowledge base of our campus was operated both onsite visiting and in the media that participants can access via online. Such as

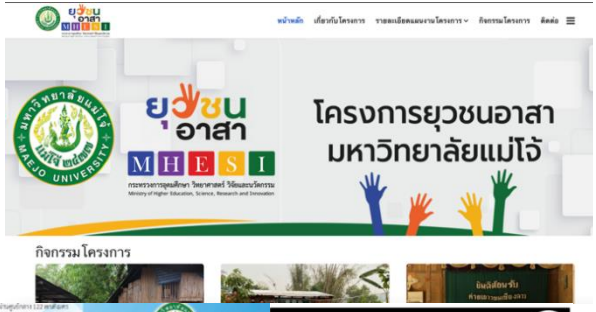
Centrifugal and circulating hydraulic pumps	https://kb.mju.ac.th/article.aspx?id=3596
Academic services project of Maejo university;	https://erp.mju.ac.th/projectPlanLst.aspx?pid=2
The Office of Agricultural Research and Extension Maejo University	https://rae.mju.ac.th/wtms_index.aspx?&lang=th-TH
MJU U2T	https://researchex.mju.ac.th/otou/index.php
Ministry of Higher Education, Science, Research and Innovation	https://researchex.mju.ac.th/youth/
Smart mush	https://www.youtube.com/watch?v=QrrdXB_fU9w
The more you know, the more you love Maejo Chumphon.	https://www.youtube.com/watch?v=NBG3F27qB9Y


ฐานเรียนรู้ มหาวิทยาลัยแม่โจ้


RANKING WEB OF UNIVERSITIES
มหาวิทยาลัย
ได้รับการจัดอันดับที่สูงขึ้นจาก Webometrics
อันดับ 2586 ของโล
อันดับ 91 ของ South
รอบที่ 2 เดือนกรกฎาคม
1,011,115 บ.
312,461 บ.
2,906 บ.


การบริการวิชาการแก่ชุมชน


สำนักวิจัยและส่งเสริมวิชาการการเกษตร มหาวิทยาลัยแม่โจ้
The Office of Agricultural Research and Extension Maejo University
สำนักวิจัยและส่งเสริมวิชาการการเกษตร มหาวิทยาลัยแม่โจ้
ขอเชิญชวนคณาจารย์ นักวิจัย นักวิชาการ นักศึกษา และผู้ที่สนใจส่งบทความวิจัย
เพื่อพิจารณาตีพิมพ์ในวารสารวิจัยและส่งเสริมวิชาการเกษตร สำนักวิจัยฯ มหาวิทยาลัยแม่โจ้
โดยกำหนดจัดพิมพ์ออกเผยแพร่ ปีละ 3 ฉบับ
ฉบับที่ 1 (มกราคม - เมษายน) ฉบับที่ 2 (พฤษภาคม - สิงหาคม) และฉบับที่ 3 (กันยายน - ธันวาคม)ของทุกปี
ทั้งนี้สามารถส่งบทความผ่านระบบวารสารออนไลน์ ระบบ Thaijo ตั้งแต่บัดนี้เป็นต้นไป ได้ที่
https://www.tci-thaijo.org/index.php/MJUJN/index
สามารถคลิกดูรายละเอียดเพิ่มเติมได้ที่ http://www.jare.mju.ac.th/


ยุวชนอาสา
MHESI
โครงการยุวชนอาสา
มหาวิทยาลัยแม่โจ้
กิจกรรมโครงการ


STARTUP MAEJO
เครื่องสูบน้ำ
พลังน้ำไหลแบบวงกลมและแบบสูบชัก
KINEMASTER
ระบบโรงเรือนเห็ดอัจฉริยะ (Smart mush)
ยิ่งรู้จัก ยิ่งหลงรักแม่โจ้-ชุมพร ภายใต้แนวคิด


1 ตำบล 1 มหาวิทยาลัย มหาวิทยาลัยแม่โจ้
หน้าหลัก
เกี่ยวกับโครงการ
ข้อมูลข่าวสาร
ข่าวกิจกรรม
VIDEO
ดาวน์โหลดเอกสาร
ติดต่อ
กระทรวงการอุดมศึกษา
วิทยาศาสตร์ วิจัยและนวัตกรรม
MAEJO UNIVERSITY
MJU
มหาวิทยาลัย 1 ตำบล
โครงการยกระดับเศรษฐกิจและสังคมรายตำบลแบบบูรณาการ
(มหาวิทยาลัยสู่ตำบล)

Number of sustainability-related startups

In this year there are 4 cases of BCG/SDG Green Business Entrepreneur supported by Technology Business Incubator and Innovation Ecosystem Development, Maejo Agro - Food Park: MAP as follows; **[2] 1 – 5 startups**

1. Project to develop a collaborative network to incubate BCG innovative businesses to the international level

Maejo Agro Food Park (MAP) is the main agency collaborating with the Institute of Innovation and Technology Transfer University of Phayao and the Intellectual Property and Innovation Management Section Mae Fah Luang University Science Park organize a project to develop a collaborative network to incubate BCG innovative businesses to the international level, To exchange knowledge and experience in incubating innovative agricultural businesses under the BCG economic development guidelines, including the development of a network of cooperation in technology business incubation between Thailand's regional science park network of 16 universities and Benguet State University, Philippines, at meeting room 311, 75th Anniversary Maejo Building, Faculty of Information and Communication Maejo University, Chiang Mai Province, on 6-12 September 2023.

2. IoT workshop: Closed greenhouse system, Smart mushroom cultivation greenhouse

Name of operator:

1) Mr. Nitipat Panya, an alumnus of the College of Alternative Energy, Department of Energy Conservation Engineering

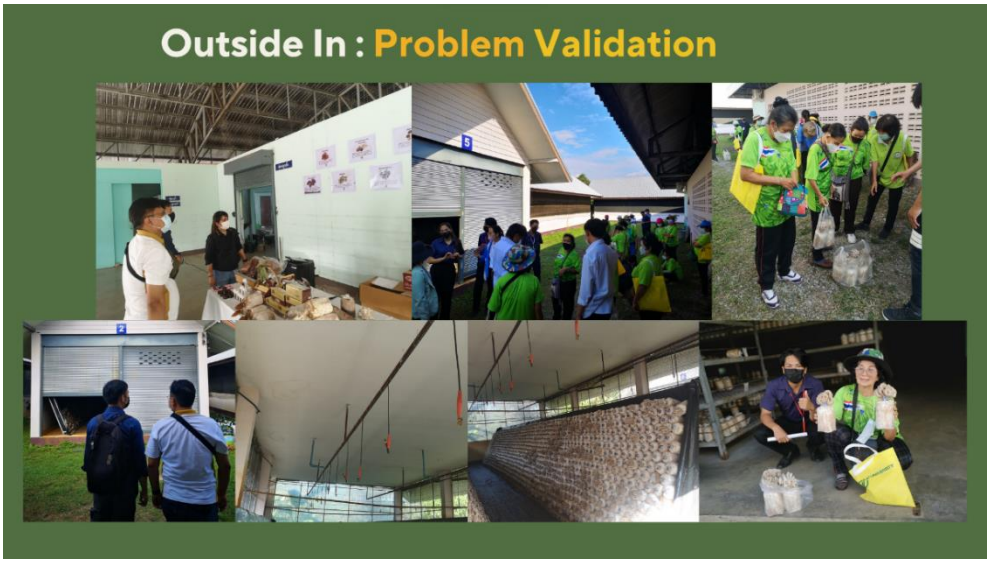
2) Mr. Pitiphon Jingta, alumni of the College of Alternative Energy, Department of Energy Conservation Engineering

3) Mr. Phutthaphong Suwannakul, Master's degree student College of Renewable Energy, Department of Energy Conservation Engineering

Startup area in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED): ED**URL:**

Description:

Control equipment for a closed jelly mushroom cultivation greenhouse that uses the IoT system to help control production. To make the mushrooms high quality and safe from dangerous chemicals. Design and develop a mushroom cultivation greenhouse using the IoT system that can control temperature, humidity, light, and carbon dioxide levels. Providing nutrients Data is collected from the smart farm system and mushroom farmers. This way can adjust the type of mushroom cultivation flexibly and no need to invest a lot more.



3. Startup name: Blis balm Dragon Blood Tea Antioxidant Mask

Name of operator:

1. Miss Sasiprapa Ratchathewin, Master's degree student, Faculty of Science Department of Applied Chemistry
2 Mr. Theparit Jang, Bachelor's degree student, Faculty of Science Department of Industrial Chemistry Innovation
3. Mr. Thanachan Khamphira, Bachelor's degree student, Faculty of Science Department of Industrial Chemistry Innovation
4. Miss Wanwisa Krajangchai, Bachelor's degree student, Faculty of Science Department of Industrial Chemistry Innovation
5. Miss Soradaporn Thaenkrae, Bachelor's degree student, Faculty of Engineering and Agro-Industry, Department of Food Science and Technology

Startup area in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED): EDURL:

Description:

The problem of dark, dry, and cracked lips is an important problem that causes concern for many consumers. Especially teenagers and working people who like to go out and socialize. It impairs the beauty of the face, causing insecurity in living a life that requires going out and meeting other people.

Therefore, it is the cause of using anthocyanin extract from dragon's blood tea that has antioxidant properties and has a deep red color that helps make the color of the lips healthy and moisturized. By taking this type of extract to produce an innovation for health. Applied as an ingredient in making mouth masks to use it more efficiently.

4. Startup name: Peat Plant Thailand Peat moss

Name of operator: Mr. Kriengkrai Jaiyasuk, student of the Faculty of Animal Science and Technology, Department of Smart Agriculture

Startup area in UI Greenmetric questionnaire (SI, EC, WS, WR, TR, ED): ED**URL:**

- **https://www.facebook.com/phuyaimoon**

Planting materials for seeds and seedlings from natural organic materials that go through the anaerobic fermentation process using microorganisms. To be used in the production of plant-growing materials instead of importing peat moss from abroad. This project is part of creating a cycle for plant waste that does not require the excretion of waste to be burned or released into nature. This reduces the amount of greenhouse gas emissions and uses materials that are cheap and can be used to grow plants appropriately. The technology used to produce planting material from plant waste is the use of biodegradation technology, which can be done using tools such as a Conveyor belt, grinder, or sorter. To separate planting material from plant residues and cause a rapid decomposition process of the material using the anaerobic fermentation process using microorganisms, as a helper for decomposition. Therefore it is eco-friendly, the materials obtained from this decomposition will be processed to be suitable for growing crops combined with nutrients to optimize plant growth.


ภาพการทดลองเพาะปลูก


ภาพการทดลองเพาะปลูก


VALUE PROPOSITIONS
PEAT PLANT
เพิ่มอัตราการงอกของเมล็ดพืช
สูงถึง 90 – 95 %
ปราศจากเชื้อรา มีสภาวะชื้นเหมาะสม
ต่อการงอกของเมล็ดและต้นกล้า
ลดการนำเข้าวัสดุเพาะเมล็ด
และต้นกล้าจากต่างประเทศ
มีค่ากรด – ด่างมี
ความเป็นกลาง
ลดอัตราการเน่าในเมล็ดพืช
และเพิ่มโอกาสการเติบโต

Contact the university
No. 63 Moo 4, Nong Han Subdistrict, San Sai District, Chiang Mai Province 50290
Phone: 053 873000 Fax: 053 873015 E-mail : maejo@mju.ac.th