# Sustainability Report 2023

## Valaya Alongkorn Rajabhat University Under the Royal Patronage

# President's Statement

**Valaya Alongkorn Rajabhat University under Royal Patronage (VRU)** has been evaluated for 14th ranking of the World Green University Rankings in Thailand at the academic year 2022 with the total score of 7750. Among Rajabhat Universities, VRU has been received as 1st Ranking two years consecutively. The scores in each category were shown as follow;

Setting and Infrastructure (SI): 1,175 out of 1,500

Energy and Climate Change (EC): 1,550 out of 2,100

Waste (WS): 1,050 out of 1,800

Water (WR): 750 out of 1,000

Transportation (TR): 1,550 out of 1,800

Education (ED): 1,250 out of 1,800

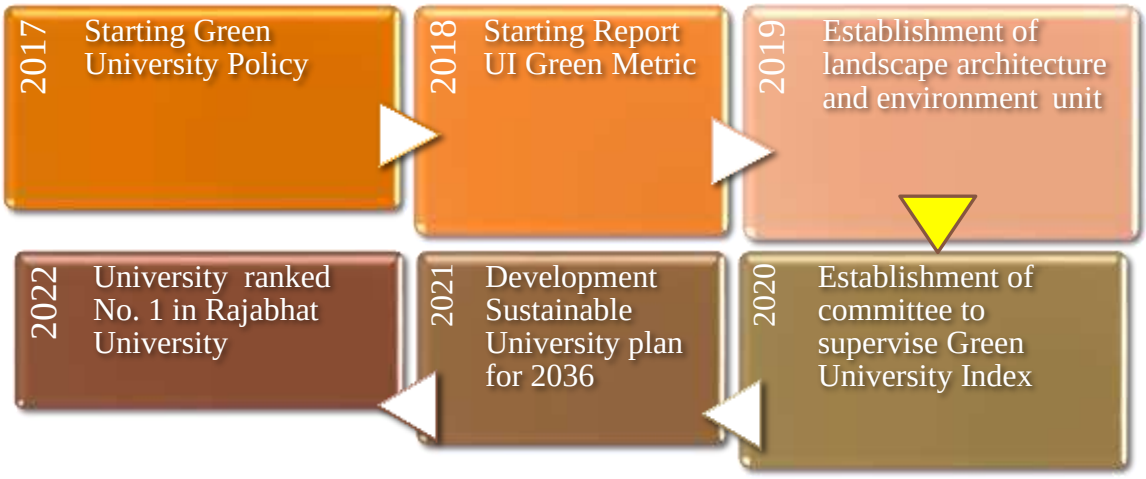
In 2023, The aims of VRU were set up a new vision as one of the Prestigious Green and Sustainable Rajabhat Universities. VRU is located in suburban ecology that surrounded by industries, large communities with the rapid expansion of the population leading to the lack of the public utilities. VRU objectives are strongly focused on the various collaborations driven through the King's philosophy to be a wisdom repository for sustainable educations, communities and social developments. We believe that we can reach our targets within 2026.

# Overview of VRU

In 2023, Valaya Alongkorn Rajabhat University under the Royal Patronage, aims to be a "Green and Sustainable University. The university operates with a commitment that emphasizes community engagement processes, leading to collaborative efforts from external agencies at all levels at local, national and international to become a "Sustainable university by 2036".

**VISION:**

A university of collaboration driven by The King's philosophy aiming to be a wisdom repository for sustainable education, community and social development.




**VRU DRIVING TO "Green and Sustainable University"**



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# Chapter 1
# Setting and Infrastructure

Valaya Alongkorn Rajabhat University under the Royal Patronage, there are 3 campuses with learning and teaching management. VRU service area have 3 areas are the main campus, located in Pathum Thani province, the Bangkok campus and the Sa Kaeo campus.


The location of the university is on Phaholyothin Road. The surrounding area has Nava Nakorn Industrial Estate in the south and west. Communities and agricultural areas to the north The east side of the university is a densely populated village.

Type of higher education institution : Comprehensive

Climate : Tropical wet

Number of campus sites : 3

Campus setting : Sub urban

Total campus area: 610,751.571 $m^2$

Total campus ground floor area of buildings : 64,213 $m^2$

Total campus buildings area: 186,483 $m^2$

# Total area on campus covered

forest vegetation

planted vegetation

water absorption

Total area on campus covered in forest vegetation

(207,300 / 610,751) *100 = 33.94%

The covered in planted vegetation area

(238,712.50 /610,751)*100 = 39.09 %

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

(180,250/610,751) * 100 = 29.51 %


# Total number of

regular students

academic and administrative staff

total open space area divided by total campus population

university budget for sustainability efforts

Total number of regular students (part time and full time):

Total 11,675 students. 8,178 students of undergraduate and graduated, and 2,292 students in school.

Total number of academic and administrative staff : 1,093 staffs

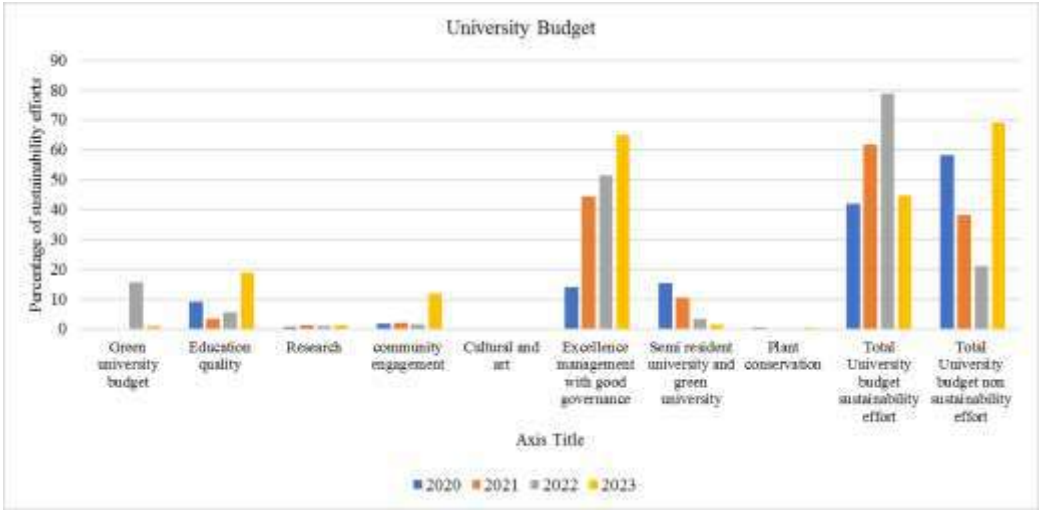
The total open space area divided by total campus population :

((610,751-64,213)/ 11,675) = 46.81%

Total university budget of VRU: 2,4984,570.25 US Dollars.

VRU budget for sustainability effort: 11,095,259.04 US Dollars.

Percentage of university budget for sustainability efforts within a year : 44.72 %




Percentage of university budget of VRU 2020 - 2023

operation and maintenance activities of building

Campus facilities

Security and safety facilities

Health infrastructure facilities

In the year 2023, VRU 63 buildings in total, with a total learning area : 186,483 $m^2$

11 operation and maintenance activities : area of operation and maintenance activities 42,199 $m^2$ (42,199/186,483) x 100 = 22.63%,

The university campus facilities for has renovated sidewalks and ramps with blocking areas to prevent parking, including renovating disabled toilets in most of the old buildings. For new buildings, facilities will be designed and implemented for disable and maternity care.


Emergency Button/Fire Alarm/Springer Water System/Fire Water System

First aid, emergency room, clinic, hospital and certified personal, system and accessible for public

# Conservation

plant, animal and wildlife

genetic resources for food

agriculture secured

medium or long-term conservation facilities

Conservation of plant genetics and biodiversity has been fully utilized with 100% responsibility. The total area of 135,872 $m^2$ is divided into conservation areas, propagation of local vegetables and Economic plant crops of 82,124 $m^2$.

In water resource areas, aquatic animals and aquatic plant propagation 53,748 $m^2$. There has been an action on conservation of endemic plants such as lotus and endemic vegetables.

In addition, create a community food source both vegetable garden organic vegetables, biological systems, organic animals that are human food such as ducks, chickens, fish, etc.

# Chapter 2

## Energy and Climate Change

In 2023, VRU have various buildings will be upgraded. By giving importance to choosing equipment that is energy efficient and environmentally friendly.



2021–2023 saw the replacement of 219 air conditioning units with over 15 years old, low-efficiency air conditioners with inverter system models. At minimum once a year, a cleaning action plan is created to improve air conditioner efficiency. Energy conservation policies minimize the amount of electricity consumed, and appliances with energy-saving labels (such as No. 5) are used. Furthermore, a fluorescent lamp replacement was carried out using 12,000 LED bulbs. Every electrical item at the institution had its performance evaluated. and set up electric equipment that use less energy. Additionally, there are effective safeguards for employees who utilize power.


# Number of

## Smart building Element

## Elements of Green Building

## Renewable energy sources on campus

VRU have **Energy Sustainability Environmental Action Plan in 2021-2025**, Start a project to establish a hybrid renewable energy innovation learning center to promote sustainable learning potential in Pathum Thani Province, and a project plan to establish a learning center Integrated waste management**.**

**Elements of Green Building**

**VRU: Smart building Element : 42.54%**

Use natural air circulation and use sun light for lighting inside the building

Use solar cell for energy supplied

Increase green space and use of natural light

Actions on elements of Green Building include renovating the Office of Information Technology by installing a solar power system

**VRU: Number of renewable energy sources**

Solar panels mounted on the rooftop

Solar power system for illuminating roads and pathways

Biogas from food waste fermentation

Wind power, hybrid energy power standalone

A biodiesel generator

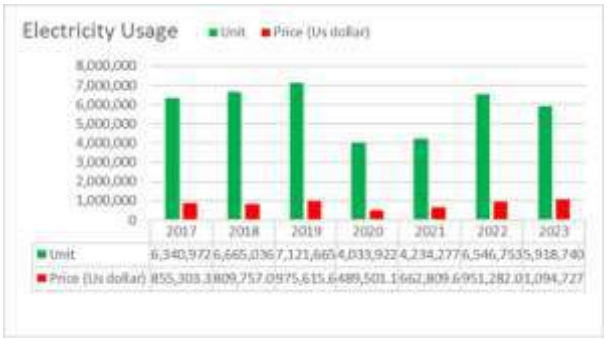
Biomass charcoal kilns

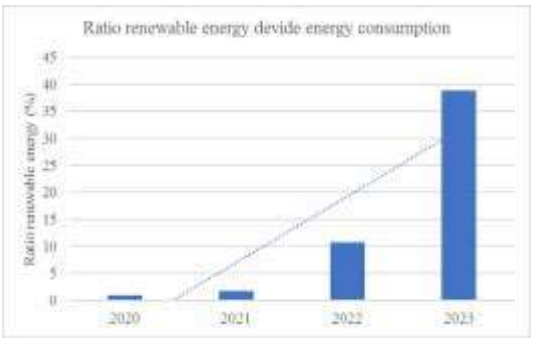

Total electricity usage

The ratio of renewable energy production

Innovative program(s) in Energy and Climate change

In 2023, Electricity consumption of VRU 5,918,740 kWh. There are staff and students equal to 1,070 and 8,419 people, respectively. When comparing electricity consumption per number of people in the university, it is 623.75 units/person/year.




VRU install a solar power generation system on the roof (Solar Rooftop) with a production capacity of not less than 1205.54 kWp.

Initially, it is planned to install a total of 10 buildings and a design survey will be carried out to install an electric charger. Normal Charger (EV Charger) size not less than 22 kW, at least 4 units. = 2,304,976.75 kwh of renewable energy /5,918,740 kwh) * 100% = 38.94 %

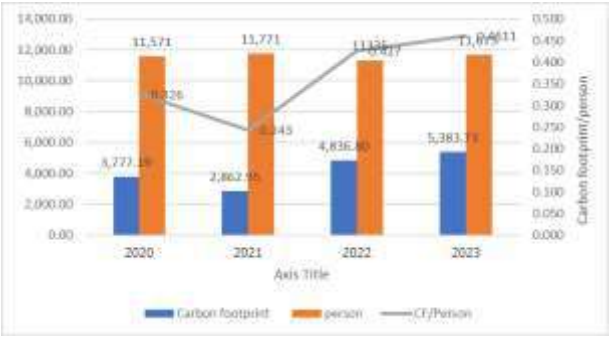
Innovative program in Energy and Climate change

# Total Carbon Footprint

## Greenhouse gas emission reduction program

## Impactful university program(s) on climate change

VRU: Total carbon footprint (CO2 emission in the last 12 months) divided by total campus' population 0.4611 metric tons per person. The increasing trend of the university's carbon footprint is due to the increased use of electricity. Based on the analysis of this data, the university proposes reducing energy use as a key issue in 2024.





For sustainability initiative to inventory the trees of VRU, and compute their carbon storage capacity. AGB and BGB were also estimated using the non-destructive method.

A total of 2,823 trees belonging to 56 different species have been recorded on the campus, with a carbon sequestration potential of 916.20 tons.

The results of the study illuminate the value of urban trees, not only as ornamental and aesthetic plantations but also in mitigating the impacts of climate change at a local level.

Higher education institutes have an important role in expanding their green cover to act as local carbon sinks. The results of the study can be used for future on the university greening plans, and act as a baseline for future assessments of the university carbon sink. Such education institutes can model themselves as agents of change and influence student behavior by undertaking such sustainable green practices in the university.

# Chapter 3

## Waste

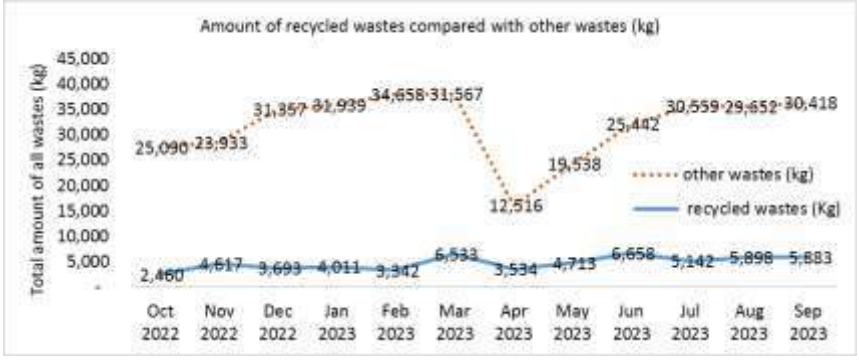
**VRU** realized the importance of waste treatment which arising from many activities at the university and a lot of occurred waste. The university has promoted all staffs and students to share the responsibility for environmental conversation by initiating the projects and activities related to the waste treatment and recycling.

The purposes of the activities are created environment friendly behavior of staffs and students to reuse waste or leftover the materials by the following **3Rs**.

**Reduce:** reduce using materials which cause the wastes.

**Reuse:** bring back the used materials to be used again.

**Recycle:** processing the leftover materials and used again.




**Recyclable waste From October 2022 to September 2023**


# Reduce scale chemistry

One of the simplest ways to reduce the amount of chemical waste is to **reduce the amount of chemicals used in laboratory experiments**.

Chemistry operations that are scaled down use fewer chemicals. Small or modified laboratory equipment and processes that have been modified to express general scientific concepts.

Additionally, reducing the size of experiments means there is less chance of chemicals spilling and becoming waste.

**Reduce**

# Program to reduce the use of paper and plastic on campus

**VRU** has implemented the policies and methods for reducing paper and plastic usage for the goal that is to create a friendly living environment by inviting to do many relevant activities.



## Reducing the plastics project

The university has partnered with convenience stores, restaurants and cafés to reduce of disposable plastic bag and disposable products.

## Say no to foam

The university aware about food packaging product issues especially, the foam boxes.

**Reduce paper and plastic Program**

## E-office

Information technology plays an important role in university management. To replace traditional systems such as paper work, various development projects such as electronic systems, the Internet, and website development have been implemented.



**E-Office Program**

# Waste treatment

**Organic waste**

**Inorganic waste**

**Toxic waste**

## Organic waste

More than 50% of all solid waste is organic waste such as food waste, vegetables, fruits and weeds. The organic waste can be into compost and this choice turns burden into value.




### The composting project






### Upcycling

### Recycle waste material


## Inorganic waste

Factors in choosing a waste disposal method include the nature of waste, quantity, equipment, and waste disposal area. The cooperation of students and staff benefits from the elimination of many types of waste thrown away every day.

## Toxic waste

Total volume of toxic waste 0.52 tons per year: 1) general toxic waste produced 0.3 tons per year, chemical waste produced 0.12 tons per year, infectious waste produced 0.1 tons per year. Total volume of toxic waste operated in cooperation with the municipality to collect and dispose of properly.



# Chapter 4

# Water

In 2023, Implementation of the water conservation project of VRU there are many formats. Can be adapted to suit departments and areas within the university as follows:

**Installation of a wastewater treatment system** to use techniques and methods to improve wastewater that is in the form of wastewater.

**Wastewater treatment using nature** It is a joint process of living and non-living things.

**Water turbine**, solar and electric aeration.

**Biological fermentation** It is the production of a liquid obtained from the fermentation reaction of plants, vegetables, and various fruits with clean water and natural sugar or molasses.

Carrying out **water conservation activities** by raising fish in cages Releasing treated water into rice fields and lotus fields to emphasize sustainable water utilization.

There are also **activities of students creating innovations** to add aeration to water sources. The Green Youth Project encourages students, teachers, and staff to participate. There is a public relations sign posted. Campaigns by various units regarding conservation of resources, energy and water, such as the Office of Science Services and Information Technology Vocational experience training center and Faculty of Science and Technology, etc.


# Implementation

## Water recycling program

## Water- efficient appliances usage

**VRU have two systems that are oxidation pound and activated sludge.**

Afterwards, the influent is drained to **16 stabilization pounds** around the university. Water resource management activities / rainwater / water tanks / wells.

The water after treated from the wastewater treatment systems (**approximately 12,500 L/week) is implied to plant watering and floor cleaning and etc.**

Furthermore, not only recycling water usages. **620,000 L of reclaimed water is utilized to fish cultivation ponds as well.**

**VRU has a policy to support faculty and various unit for Use water-saving devices in the water closet.**

**Classroom buildings** according to various faculties Bathrooms have been renovated to include products that **reduce water use by approximately 29%.**

**There are water saving devices as follows:**

Sensor urinal system set

Central system sink set

Use the Automatic Single Faucet Karat automatic hand washing system.

Sanitary ware: Cotto flat-sitting sanitary ware.

# Implementation

## Consumption of treated water

**VRU** has established wastewater treatment systems for buildings, including the 100 Years of Somdet Phra Srinagarindra Building, the main cafeteria, Satit VRU School, the dormitory cafeteria, and the student dormitory**.**

The **fixed film systems (biological wastewater treatment process)** have been used to treat wastewater from the 100 Years of Somdet Phra Srinagarindra Building

The septic tanks and grease and oil traps have been used to treat wastewater from Satil VRU School, the main cafeteria, dormitory cafeteria, and student dormitory.

Rainfall and treated water are drained into stabilization pounds in the university that are applied to wetland plants and aerators to improve water quality.

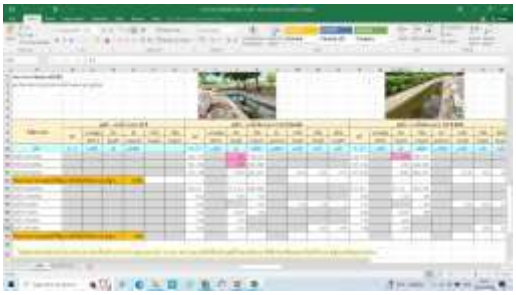
Wastewater management of the university mentioned above, it can treat **more than 70 percent of the water used and also utilize the treated water for garden watering, solid waste shelter cleaning**, and approximately 180,000 L/week. Furthermore, 350,000 L from the oxidation pounds will be drained into the paddy fields, the lotus gardens, and the fish culturing cages.

# Implementation

## Water pollution control

**VRU has set the policy towards a green university with the targets of changing and developing a sustainable environment.**

The water quality has been sampled and monitored every month and has the following parameters: 1) Physical parameters (pH, turbidity, temperature) 2) Chemical parameters (DO, BOD with Azide Modification Method, COD, conductivity, TKN, and TDS), respectively. The results of the water quality analysis of the university, found that the quality was within the surface water quality standards at every point.



Water quality monitoring, the **water quality committee informs all Green U committee members about the water quality** of surface water within the university and the water management guidelines.

# Chapter 5

## Transportation

### The total number of vehicles: 0.12

The university has activities and projects for count car and motorcycle assess to university. Report of reservation of 41 central cars in 2023, has the same usage 13,548 times. The total distance of the car is 1,246,674 kilometers. The average number of cars entering the university is 650 cars/day, approximately 19,500 cars/year. The average number of motorcycles entering the university is 780 vehicles/day, approximately 23,400 vehicles/year.

### Shuttle services

The university has provided a shuttle bus service. Projects for arranging transportation within the university for substitute private vehicles. These are free service to avoid using private vehicles of staff, instructors and students. Follow by: Shuttle/bus campus inside campus 3 shuttle bus, 8 electric car, Walking, Public transportation station. Electric vehicle charging station, and the use of public vehicles in the office



# Zero Emission Vehicles (ZEV)

Policy on campus

Total number

## Zero Emission Vehicles (ZEV) policy on campus

The university's policy is to reduce greenhouse gas emissions and reduce the use of private cars and reduce the use of cars that generate polluting the combustion engine. The university has provided more electric trains to serve students and staff, with a charting station available. The university also encourages students and staff to use bicycles, with 93 registered, 30 electric bicycles/electric motorcycles and 20 free borrowed bicycles. There are 8 more electric trains in free service.






## The total number of Zero Emission Vehicles (ZEV) : 0.0143

The university also encourages students and staff to use bicycles, with 93 registered, 30 electric bicycles/electric motorcycles and 20 free borrowed bicycles. There are 8 more electric trains in free service. The total number of Zero Emission Vehicles (ZEV) divided equal to 168 vehicle. Total campus population 11,675 persons.

Formular ((5.10)/(1.12+1.14)) = 168/11,675 = 0.0143



# The ground parking area

Parking area to the total campus' area

Program to limit or decrease the parking area

Number of initiatives to decrease private vehicles

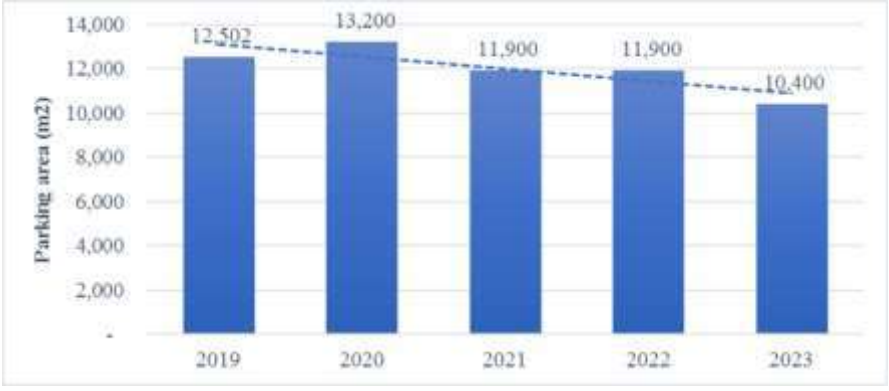
## Ratio of ground parking area to total campus' area

In 2023, Parking space has been organized for other uses, resulting in a reduction of parking space by 1,500 square meters. In addition, parking spaces are organized in an orderly manner and there are restrictions on the use of personal cars within the university. Ratio of parking area to total campus area.

Formula: ((5.12/1.5) x 100%)= ((10,400/610,751)x100%) = 1.702

## Transportation program designed to limit or decrease the parking area on campus for the last 3 years

Transportation program designed to limit or decrease the parking area on campus for the last 3 years. Transportation program designed for parking spaces will have a restriction policy for parking to include points at the parking building. From the collection of parking spaces, there is a tendency to decrease due to more utilization of space and increasing green space. Program result in 21.2 % decrease in parking area .



# Number of initiatives

## Decrease private vehicles

## Pedestrian path on campus

### Number of initiatives to decrease private vehicles on campus

The university has a policy of providing zero-emission vehicles and can transport large numbers of people to reduce the use of personal vehicles. In addition, there is also a way to change travel behavior to be the same way together. Tram free service, Electric car free service, Bicycle free service and Electric car free service.



### Pedestrian path on campus

Pedestrian is developed that can walk along the building. Separator between road for vehicle and pedestrian path. Street lamp for pedestrian in night use solar energy by focusing on safety and orderliness.





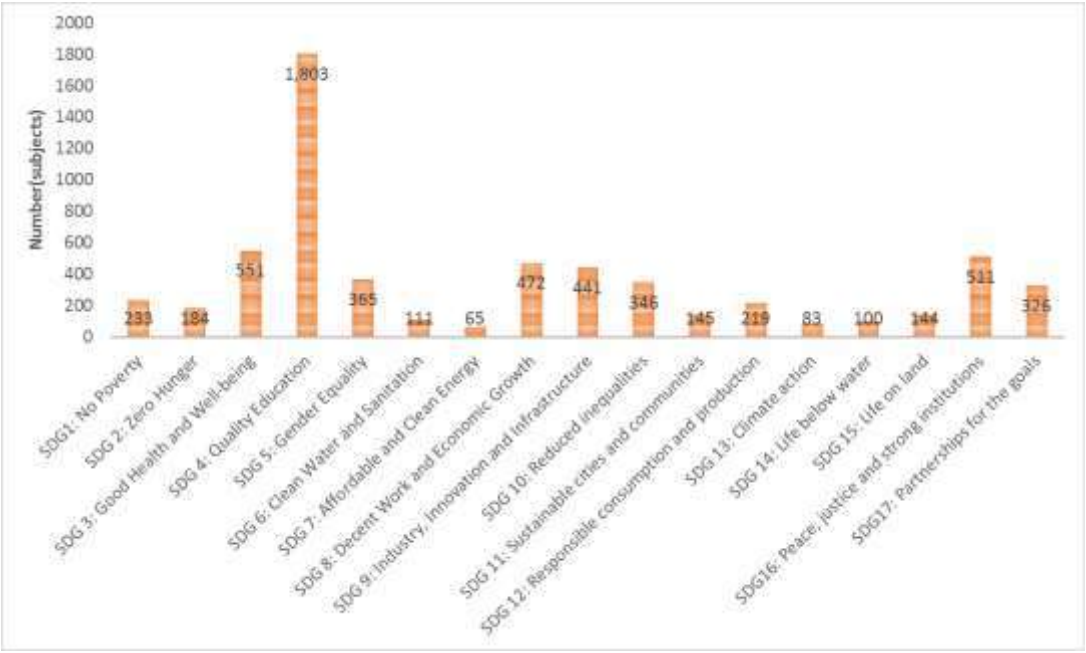

# Chapter 6

## Education & Research

### Number of courses/subjects related to sustainability offered

Number of courses/subjects related to sustainability offered in 2023 of 4,610 subjects. Total Number of courses/subjects offered in 2023 of 6,099 subjects. The total number of courses related to Sustainability offered in 2023 of 79 courses and 4,610 subjects from 6,099 subjects as a percentage of 75.59%

(4,610 / 6,099) X 100% = 75.59%

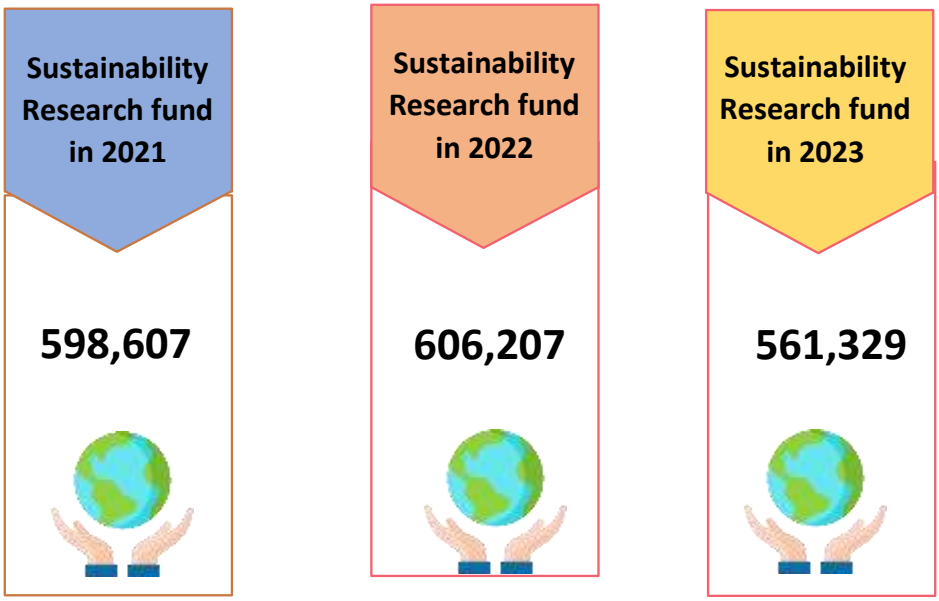



# The ratio of sustainability

## Research funding

### Number of courses/subjects related to sustainability offered

Total Research Funds Dedicated to Sustainability Research per annum over the last 3 years 1,766,143 US Dollars. The ratio of sustainability research funding to total research funding 100%




Valaya Alongkorn Rajabhat University Under the Royal Patronage





# Number of events

## Related to sustainability

**Number of events related to sustainability. (average annualy for the past 3 years) :** 51 events


# Number of events

## Related to sustainability

Number of events related to the issues of environment and sustainability hosted or organized by your university equal to 15 events. For example Recycled Waste Bank Learning Base Workshop, Recycling Waste Bank Project Activities, Activities to participate in the Student Leader Potential Development Project and Volunteer Camp, Rajabhat Volunteer Camp Activities, Volunteer VRU for Environment Camp, Volunteer Family Club, Volunteer VRU for Safety, culture exchange , Volunteer VRU for Health, and Robot Club.












# Number of

## Cultural activities on campus

## Program(s) with international collaborations

**Number of cultural activities on campus**.

Project to promote the preservation of arts and culture to further the creative economy equal to 4 events per year follow as: Cultural festival activities , Culture For Learning activity, Culture for Learning, Network development activities and arts and culture activities and Activities to disseminate arts and culture (Arts and Culture Council of Thailand)


**Number of university sustainability program(s) with international collaborations**.

Project to promote the preservation of arts and culture to further the creative economy equal to 4 events per year follow as: Cultural festival activities , Culture For Learning activity, Culture for Learning, Network development activities and arts and culture activities and Activities to disseminate arts and culture (Arts and Culture Council of Thailand)



# Number of

## sustainability community services project organized and/or involving students

**Number of sustainability community services project organized 6 projects.**

1) School Botanical Garden Training Project 5 Components Course.

2) 4 learning base projects, including Bhumi Phalang Phaendin Flooding food streams for the community food security and contemporary Thai ways.

3) Resource collection survey project Resource protection activities and resource planting and conservation activities Assemble the benefits.

4) Project for conservation and resource utilization activities Conducting research together with various faculties to study the potential of food and medicinal plants. plant tissue culture.

5) Plant Genetic Information Center activity project Biodiversity information, plant species information, as well as wisdom on the use of plant genetics and a framework for creating awareness.

6) Activities project to create awareness of resource conservation Operating according to the school botanical garden Activities to create awareness of conservation of plant resources and utilization of plants. To be a source of knowledge and advice to create stability in environmental resources.



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# Number of

## of sustainability-related startups

Total number of sustainability-related startups initiated and managed by university**: 14 startups**











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