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D4.4 CIRCULAR Living Labs Pilot Implementation Report

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1. Introduction

CIRCULAR is an Erasmus+ project co-funded by the European Union and seeks to boost the social innovation ecosystem in Malaysia, Cambodia, and Laos by bringing together and reinforcing the links between Teaching, Research, Innovation and Society in order to collaboratively design and test innovative solutions to mitigate waste management problems, promote circular economy approaches and improve the quality of life of local communities.
It brings together nine multidisciplinary institutions from Malaysia, Cambodia, Laos, Spain, and Portugal.
Within this framework, Work Package 4: Social Innovation Networks for Circular Economy projects, plays a central role in translating the project's vision into practice.

In particular, the Living Labs initiative contributes to three of the project's strategic objectives:

- SO#3: Establishing Living Labs in six universities in Malaysia, Cambodia, and Laos as open innovation ecosystems that integrate education, research, development and innovation (R&D+I), and regional development. These ecosystems are designed to help trigger the adoption of greener practices and a more efficient use of resources.

- SO#6: Empowering students and young people to become socially engaged, climate-conscious, and active citizens by developing the knowledge, skills, values, and attitudes needed to serve as role models for behavioural change, particularly in their consumption habits, preferences, and lifestyles in support of environmental sustainability.

- SO#7: Raising awareness among students, young people, and local communities on circular economy and sustainable development, and promoting alternative consumption habits and waste management practices underpinned by the knowledge, research, and innovation generated by Higher Education Institutions.

This Deliverable (D4.4) documents the pilot implementation of CIRCULAR Living Labs across the six SEA partner institutions—USM, UNIMAS, RUPP, SRU, NUOL, and SKU—with the support and mentorship of European partner HEIs. The report offers a country-specific descriptive overview of the activities organised, methodologies applied, and results achieved, with a strong emphasis on the benefits for and impact on beneficiaries.
Activities implemented through the Living Labs span a wide range of educational, community-based, and participatory actions, including:

- Community-based participatory research and debates

- Curricular and extracurricular interventions

- Non-formal and informal training

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- Life-cycle assessments of products and services to better understand environmental impact
- Collaborative Online International Learning activities

Designed to be inclusive and participatory, the Living Labs engaged diverse target groups while ensuring representation of underrepresented groups, in line with the CIRCULAR project's principles of diversity, inclusion, and gender equality for vibrant, open ecosystems where education, research, and regional development united, for the adoption of greener practices, Researchers were empowered with updated methods and tools to conduct impactful community-based studies on the circular economy and waste management, ensuring stronger collaboration between academia and society. Supported by Higher Education Institutions, students ultimately served as ambassadors of change, based on the circular economy principles, to strengthen local resilience.
By combining the expertise of partners from Southeast Asia and Europe, the pilot not only delivered practical outcomes but also established a strong foundation for sustainable practices that can be replicated beyond this project. Through collaboration and innovation, the CIRCULAR initiative created lasting change, including tangible improvements in waste management systems that contributed to enhancing the quality of life for local communities.
Therefore, this report serves to capture the processes, methods, and outcomes of the pilot activities, offering clear insights into what worked well, where challenges were encountered, and how collaboration between academic institutions, industry partners, local governments, and community groups handled these.

Beyond the report, the document demonstrates achievements and failures during the project implementation steps by:

- Presentation of a monitoring scale in CIRCULAR Living Labs ensured constant alignment with circular economy principles.
- The timeline of arranged activities and the implementation initiatives.
- Outline of the resources and responsibilities required for sustainable replication and expansion.

2. Structure of the Living Labs

The CIRCULAR Living Labs Work Plans were arranged as dynamic platforms that bring together education, research, and community engagement, with the main priority on the practice of circular economy principles. Designed as hubs for social innovation, the labs provided collaboration among stakeholders and developed solutions that are both sustainable and scalable. Their work was guided by the following parameters:

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- Interdisciplinary Collaboration

The labs united experts from environmental science, engineering, business, and social sciences to address sustainability challenges through innovative and cross-cutting approaches.

- Community Engagement

Local communities took an active role in shaping and testing solutions, ensuring that innovations remain aligned with real-world needs and contexts.

- Practical Application of Knowledge

By bridging academic research with practical implementation, the labs ensured that theoretical knowledge is translated into tangible environmental and social solutions.

- Capacity Building and Education

The labs enhanced learning opportunities by offering hands-on experiences for students, educators, and community members to develop practical skills in sustainability and social innovation.

- Sustainability at the Core

All activities were designed with long-term sustainability in mind, promoting environmental stewardship and improving the quality of life for local communities.

These features make the CIRCULAR Living Labs a cornerstone of the work plan, providing a structured pathway to achieving the project's broader objectives of fostering innovation, embedding sustainability, and generating meaningful social impact.

2.1 Integration of the Main Pillars into the local policy

The Living Labs adopted structured approaches from the work plan for the following pillars (the detailed description in Handbooks D4.2, D4.3). Citizen Science initiatives have been conducted through hands-on workshops, real-time data collection, and community-driven research projects, and allowed non-experts to contribute to the development of the Circular Economy under the facilitation of HEIs in South East Asia. Education for Sustainable Development was established in collaboration with educational institutions. Community Engagement efforts are focused on fostering active participation through regular dialogues, co-design sessions, and feedback mechanisms that empower communities to take ownership of projects in the future.

Citizens Science

Within the work of Circular Living Labs, the Citizen Science pillar connected scientific research and community-driven action. With active citizen involvement in data collection, analysis, and the development of sustainable solutions, direct

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public engagement contributed to strengthening environmental awareness. By leveraging local people's awareness of research, So Living Labs could find alternative eco-friendly solutions and contribute to the development of Circular policies at the community level.

Education for Sustainable Development

Within the Education for Sustainable Development (ESD) pillar, academics and students acquired the knowledge, skills, values, and attitudes necessary to contribute effectively to the sustainable development of the Circular Living Labs. This pillar played a key role in the promotion of responsible decision-making, to foster innovation, and support long-term development in alignment with the principles of the Circular Living Lab policy.

Through Education for Sustainable Development initiatives, students, educators, and community members were empowered to actively engage in sustainability-related activities and to integrate Circular Economy solutions into the educational process. As part of this pillar, participating universities identified and addressed sustainability needs by enlightening a wider student audience to raise awareness and encourage collective action toward sustainability goals.

Community Engagement

CIRCULAR efforts extended beyond academic and institutional settings and actively involved local communities under the Community Engagement pillar. Within this pillar, universities empowered communities to co-create solutions for environmental challenges and contribute to meaningful change through participation, dialogue, and collaboration.

The following section presents a structured report on the activities implemented under the Circular Living Labs. It provides detailed insights into stakeholders' visions and demonstrates the practical outcomes achieved within each pillar, reflecting the progress made according to the roadmap outlined in D4.3: CIRCULAR Living Labs Workplan.

3. Implemented Actions and Outcomes

As part of the pilot phase of the CIRCULAR Living Labs project in SEA, six universities, such as 1)Universiti Sains Malaysia (USM), 2)Universiti Malaysia Sarawak (UNIMAS), 3)Royal University of Phnom Penh (RUPP), 4) Svay Rieng University (SRU), 5) National University of Laos (NUOL), 6) Savannakhet University (SKU) implement a series of activities that bring circular economy principles into practice. These activities served as prototypes of the CIRCULAR Living Labs,

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allowing universities to test, adapt, and scale innovative solutions to environmental challenges while engaging students, faculty, and local communities. And this chapter provides a detailed account of the activities conducted under the CIRCULAR Living Labs in each university, the description includes the timeline, implementation methods, types of activities conducted, and measurable outcomes such as the number of participants and the scope of community engagement.

3.1 Malaysia

2 universities from Malaysia actively participated in this project:
University Sains Malaysia (USM) – Project coordinator; led the development of the CIRCULAR Living Lab framework, sustainability plan, and digital monitoring systems.
University Malaysia Sarawak (UNIMAS) – Implemented teaching innovations and digital tools to track sustainability impact; supported the implementation of Circular Economy principles by the community in East Malaysia.

3.1.1. University Sains Malaysia USM

As the lead coordinating institution of the CIRCULAR Living Labs initiative, USM has demonstrated exemplary leadership in embedding circular economy (CE) principles into campus life, education, and community engagement. Through a diverse range of programs—students' innovation, inclusive social entrepreneurship, and community awareness—USM successfully operationalized the three pillars of the project: Citizen Science, Education for Sustainable Development, and Community Engagement. From large-scale sustainability drives as the Used Clothes Collection Program launched in early 2024 across all USM campuses, mobilized students and staff to donate for reuse and recycling. Over a three-month period, the campaign successfully collected 18 tonnes of used clothes, an estimated 576 tonnes of CO_2 emissions avoided through waste diversion and reuse.
As Circular Plastic TikTok Competition titled "Circular Plastic in Action", a creative learning projects held throughout July 2024, encouraged students to creatively showcase CE practices in short videos. The competition attracted over 100 student entries, amplifying youth-led advocacy for sustainability. And inclusive initiatives as Upcycled Linen for person with disability (PWD) Communities, conducted in partnership with PWD groups, demonstrated how waste textiles could be transformed into marketable products. Hence all activities combined reach thousands of participants directly and indirectly, reduced significant waste volumes, and fostered behavioral change across the campus.
Besides to extend CE learning beyond campus, USM initiated the "Mission to Save Turtles" outreach programme in August 2024, conducted in collaboration with local primary schools in Penang. Through a one-day workshop involving 120

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pupils and teachers, participants explored the links between circular economy principles and marine conservation, creating recycled art pieces inspired by turtle habitats. USM also integrated CE principles into formal education through the Upcycling Projects under the HGG250 course, a Problem-Based Learning (PBL) initiative implemented over eight weeks (May–July 2024). More than 60 students designed functional items such as furniture, lamps, and organizers using discarded campus materials, strengthening their sustainability literacy and creative problem-solving. Complementing these efforts, a CIRCULAR Workshop on Upcycling Old Clothes and a CIRCULAR Colouring Competition were held in September 2024. The workshop, attended by 40 students and staff, offered hands-on training to craft reusable fabric bags, while the colouring competition engaged 50 kindergarten children from nearby preschools, introducing CE concepts at an early age.

Collectively, these activities demonstrate USM's integrated approach to circular economy education —behavioural change, social inclusion, and environmental action to build a culture of sustainability across campus and the wider community, demonstrating how higher education institutions can serve as living laboratories for sustainability transformation, more detailed information about activities can be found in the next link here.

Pic 1 Demonstration of activities by USM

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Table 1 Activities implemented by USM

No.	Activity	Description	Key Achievements
1	Used Clothes Collection Program	Campus-wide collection drive promoting reuse and textile recycling.	18 tonnes of used clothes collected; approximately 576 tons of CO_2 emissions avoided.
2	Circular Economy in Action with Upcycled Linen	Repurposed used hospital linen into marketable products involving PWD communities.	Created income opportunities for PWD, reduced textile waste, fostered social inclusion.
3	Recycling Day – Slot Kelestarian Program	Workshop on upcycling old clothes into tote bags for staff.	Promoted reuse and sustainability culture on campus.
4	TikTok Competition: "Circular Plastic in Action"	Student competition to promote circular economy ideas for plastics.	Youth-led advocacy and creativity in CE; awareness campaign amplified university-wide.
5	Mission to Save Turtles	Workshop with primary school pupils to link CE with marine conservation.	Promoted environmental awareness and hands-on learning through recycled art.
6	Upcycling Projects – HGG250 Course	8-week student-led project transforming campus waste into functional items.	Strengthened sustainability literacy; fostered circular innovation in learning.
7	CIRCULAR Workshop (Upcycling Old Clothes)	Hands-on training to turn old clothes into reusable bags.	Promoted practical sustainability habits and creativity.
8	CIRCULAR Colouring Competition	Sustainability-themed art activity for kindergarten children.	Early childhood exposure to CE and environmental responsibility.

3.1.2. University Malaysia Sarawak (UNIMAS)

UNIMAS, as an active partner in the CIRCULAR Living Labs initiative, played a key role in advancing awareness of the circular economy and promoting sustainable behavior among students and the wider campus community. UNIMAS integrated Living Lab principles into campus life through interactive, inclusive, and experiential learning approaches.

The university's flagship activity — the Booth Exhibition under the Festival Kokurikulum UNIMAS 2024 (Eco Hero Theme) — successfully transformed sustainability education into an engaging public experience. Through this event, UNIMAS demonstrated how higher education institutions can serve as living

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platforms for hands-on learning and community dialogue about circular economy principles and green innovation. The exhibition featured interactive booths, sustainability-themed games, poster displays, and educational exhibits designed to introduce the principles of circular economy to students and visitors.

To embed CE principles within the university's academic ecosystem, UNIMAS organized a Circular Sharing Session in June 2024 with postgraduate students from the Master of Education in Teaching English to Speakers of Other Languages (TESOL) and Master of Education in Learning Sciences programmes. The session introduced the foundations of circular economy and explored how these concepts could be integrated into future classroom activities and teaching materials. Through interactive discussions and group exercises, participants developed plans to incorporate CE themes into lesson designs.

Beyond campus, UNIMAS expanded its outreach through a Circular Talk session conducted in August 2024 with local community members under the Sarawak Lestari. The session highlighted the role of circular economy in supporting Sarawak's 2030 Green Economy vision. 150 participants, including local leaders, entrepreneurs, and residents, attended the session, resulting in increased public understanding and interest in CE-related practices, such as community recycling and waste reduction initiatives.

Collectively, these initiatives at UNIMAS demonstrated how education, creative communication, and community engagement can be effectively leveraged to embed circular economy thinking within both academic and societal contexts, reinforcing the university's contribution to Malaysia's sustainable development agenda (all activities are demonstrated here).

Table 2 Activities implemented by UNIMAS

No.	Activity	Description	Key Achievements
1	Booth Exhibition – Festival Kokurikulum UNIMAS	Conducted as part of the "Eco Hero Theme 2025" festival, the event featured interactive booths, games, sustainability exhibits, and poster presentations	- Shared knowledge about CE concepts. - Created interactive learning opportunities - Fostered community participation toward sustainable lifestyles.
2	Circular Sharing Session	Sharing session on Circular Economy with postgraduate students from Master of Education in Teaching English to Speakers of Other Languages and Master of Education in Learning Sciences. Conducted to introduce CE concepts and its integration into education.	- Students understood the basics of Circular Economy. - Increased awareness among future educators. - Participants planned to apply CE principles in their teaching materials and classroom activities.

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3	Circular Talk	Awareness session on Circular Economy conducted with community members at Daro District under the Sarawak Lestari and SDG initiatives.	- Community gained understanding of Circular Economy as part of SDG 12. - Increased local participation in CE-related activites. - Supported Sarawak's 2030 Green Economy vision.
4	Circular Economy EU–SEA Classroom (Online Collaborative Session)	A regional online classroom connecting eight partner universities — USM, UNIMAS, NUOL, RUPP, SKU, SRU, IPC, and UAL. Each university nominated a minimum of **five student representatives.** The session featured an opening briefing by USM and UNIMAS, followed by four breakout team activities. All activities encouraged peer learning, rating of peer work, and final presentations by group winners.	- Strengthened inter-university collaboration between EU and SEA partners. - Engaged **40 + students** in cross-cultural experiential learning. - Promoted creativity, critical thinking, and behavioural awareness of CE through interactive formats.

3.2 Laos

The implementation of the CIRCULAR Living Labs in Laos was realized in collaboration with two key universities in the country—National University of Laos (NUOL), and Savannakhet University (SKU). The Lao partners played a significant role in localizing circular economy (CE) principles within higher education and community settings. Their work focused on promoting behavioural change, developing context-sensitive learning materials, and piloting community-based circular initiatives.

3.2.1. National University of Laos (NUOL)

National University of Laos (NUOL) – Lead institution for national coordination and CE curriculum integration. The project team from the Faculty of Environmental Sciences at NUOL organized a one-day workshop designed to introduce the concept of circular economy and sustainable waste management practices to the local community in Vangvieng district — a well-known tourist destination facing waste issues caused by hospitality and tourism activities.
The programmes engaged approximately 100 participants, including villagers, university students, faculty members, and Buddhist monks from nearby temples. The flagship activity, the Community Workshop on Circular Economy and Waste Management, was held in Vientiane Province in May 2024. This was followed

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by Experiential Learning Activities, including hands-on demonstrations of waste sorting, composting, and creative reuse of discarded materials. Participants shared their personal and community-level waste-handling challenges and collaboratively explored locally adaptable circular solutions suitable for rural and semi-urban environments.

Notably, monks from nearby temples joined the workshop and expressed interest in integrating waste awareness into temple activities and community education. The programme also strengthened collaboration between community members, local leaders, and educators, for sustained partnerships in environmental stewardship.

To deepen this engagement, NUOL implemented a Participatory and Community-Based Learning Approach between June and August 2024, emphasizing inclusive learning and experiential participation. The workshops were designed around active discussion, problem-solving exercises, and reflection sessions, ensuring that local participants were not just recipients of knowledge but co-creators of solutions. This approach fostered a strong sense of ownership and empowerment, enabling communities to initiate small-scale composting and recycling systems on their own.

Through these efforts, NUOL successfully demonstrated how education, cultural collaboration, and community participation can work together to advance circular economy as demonstrated Here and below:

Pic 2 Demonstration of activities by NUOL

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Table 3 Activities implemented by NUOL

No.	Activity	Description	Key Achievements
1	Community Workshop on Circular Economy and Waste Management	1. Introduction Session: Presentation on circular economy principles, waste reduction, waste separation. 2. Experiential Learning Activities: waste sorting, composting, reusing materials.	- Enhanced participants' understanding of circular economy - Villagers committed to implement waste separation. - Monks from nearby temples joined discussions. - Strengthened collaboration between community, local leaders, and educators for sustainable waste practices.
2	Participatory and Community-Based Learning Approach	The workshop applied participatory methods , experiential learning, and deep community engagement.	- Encouraged active involvement and knowledge sharing among participants. - Built community ownership of waste management initiatives. - Fostered long-term behavioral change toward sustainable and circular living.
3	Consultation Program for Local Community	Collaborative one-day workshop organized by the NUOL Project Team and the Faculty of Environmental Sciences in Vangvieng District, Vientiane Province.	- Villagers improved household waste separation and recycling practices. - Strengthened community collaboration between NUOL in Vangvieng.

3.2.2. Savannakhet University (SKU)

Savannakhet University (SKU) – Specialized in innovation and student-driven sustainability projects. These approaches collectively enhance student learning outcomes while embedding CE values into university teaching, research, and community engagement.

The first activity, Teaching Sessions on Circular Economy, was conducted between March and June 2024 across multiple undergraduate courses. Lecturers incorporated CE themes such as resource efficiency, sustainable consumption, and waste-management systems into classroom modules and student projects. Through interactive lectures, group discussions, and local case studies, students gained a conceptual understanding of circular economy models and how they relate to sustainability goals within Lao PDR's development agenda.

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Complementing the theoretical instruction, SKU organised a series of Training Programmes on Circular Practicesfrom July to September 2024. These workshops offered practical, hands-on experience in waste segregation, recycling processes, and sustainable material use. Students and staff actively participated in campus-based clean-up campaigns.
Overall, these initiatives demonstrated SKU's commitment to embedding circular-economy learning both in the classroom and in practice, thereby contributing to the national movement toward greener education and community-driven sustainability in Lao PDR.

Table 4 Activities implemented by SKU

No.	Activity	Description	Key Achievements
1	Teaching Sessions on Circular Economy (CE)	Integration of CE principles into classroom teaching to build understanding among students on sustainability, waste management, and resource efficiency.	- Conceptual understanding of Circular Economy and sustainability. - Strengthened partnership with the private sector
2	Training Programmes on Circular Practices	Practical workshops providing hands-on experience in waste segregation	Improved practical skills and engagement in campus sustainability initiatives

3.3 Cambodia

3.3.1. Royal University of Phnom Penh (RUPP)

Royal University of Phnom Penh (RUPP) - Led the development of citizen science and research-based CE solutions, integrating academic and community collaboration.
As one of the key pilot institutions under the CIRCULAR Living Labs initiative, the Royal University of Phnom Penh (RUPP) actively implemented multiple activities throughout 2024. These efforts aimed to build a culture of sustainability within the university. Collectively, the initiatives engaged more than 400 students, staff, and community members and positioned RUPP as a pioneering model for circular economy (CE) innovation in Cambodia.
The first major activity was held in May 2024 during RUPP's 65th Anniversary and Charity Event, which emphasized plastic-free practices and waste reduction as part of the university's sustainability theme. Coordinated by the Clean and Green Team (CGT) with support from the CIRCULAR project, the event transformed the campus celebration into a learning platform for environmental responsibility. Over 200 participants took part in activities such as waste sorting demonstrations, sustainability booths, and a campus-wide clean-up campaign.
To institutionalize these efforts, RUPP formally established the CIRCULAR Living Lab in June 2024. The Living Lab functions as a collaborative innovation hub where students, faculty, and external partners jointly explore circular economy solutions. It supports student-led research and interdisciplinary collaboration.

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In August 2024, the university, through the support of the CIRCULAR project, undertook the Renovation of Samdach Sang Chuon Nath Park, transforming it into a Circular Economy Learning Field. The initiative mobilized student volunteers who planted flowers using compost made from organic waste, reused discarded materials for landscaping and design. The renovated park now serves as a living demonstration of "waste-to-resource" practices. This initiative fostered student ownership and a sense of responsibility for long-term park maintenance. And activities demonstrated here reflect RUPP's strategic approach based on circular economy principles into both its academic and operational framework—through visible campus transformation, strong student leadership, and cross-sector collaboration—laying the foundation for sustainable change within Cambodian higher education.

CIRCULAR Project Activity:

On 15th March 2024, Prof. Dr. Seak Sophat, Vice dean of Faculty of Development Studies, and coordinator of MSc in Climate Change Program participated the Regional Dialogue on Addressing climate Risks to Peace and Security in the Mekong region. Senior experts from Cambodia, China, Lao PDR, Thailand, Vietnam, Singapore, and Switzerland joined the dialogue to share experiences and discuss about the strategies to address climate risks in the region. During the dialogue, we also discussed on the circular economy as pathway to reduce risk from climate change.

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Royal University of Phnom Penh
Faculty of Engineering
Department of Environmental Engineering

Course summary

Course Name	**: Climate Policy and Technology**
Course number	:
Duration	: 45 hours
Credit	: 3 (3 Theory)
Course level	: BEng.
Course structure	: 3 hours/week (45 hours in 15 weeks)
Lecturer/instructor	: Prof. Dr. Seak Sophat
Tel	: 016 506 888
Email	: seak.sophat@rupp.edu.kh/seaksophat@gmail.com

Pic 4 Demonstration of activities by RUPP

Table 5 Activities implemented by RUPP

No.	Activity	Description	Key Achievements
1	RUPP's 65th Anniversary and Charity Event	To mark its 65th Anniversary, RUPP organized a campus-wide charity event emphasizing plastic-free and waste reduction practices.	- Promoted citizen science and youth participation in CE. - Engaged 200+ participants in plastic-free and sustainability awareness. - Strengthened partnership with the private sector
2	Establishment of the CIRCULAR Living Lab	The CIRCULAR Living Lab, functions as a collaborative hub for knowledge dissemination and innovation in CE and waste management promoting sustainable practices.	- Established the first Living Lab at RUPP dedicated to CE innovation. - Enabled student-led research and peer learning. - Created a permanent space for collaboration. - Strengthened the academic–community.
3	Renovation of Samdach Sang Chuon Nath Park –	The park's renovation as a Circular Economy Learning Field. Students planted flowers using compost from organic waste and reused materials for park design.	- Revitalized campus space. - Promoted practical application of CE principles. - Encouraged ownership and long-term student maintenance. - Enhanced campus biodiversity
4	Certification Award	Certificates of Appreciation to Clean and Green Team members for their	- Recognized and motivated active student leaders in CE. - Strengthened institutional support for environmental

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		outstanding environmental efforts and campus waste management initiatives.	volunteering. - Fostered long-term student engagement in sustainability initiatives.
5	Green Team of Student Volunteers	The CIRCULAR project, RUPP established the **Clean and Green Team (CGT)**. The CGT received training on CE principles and applied them in campus-based solid waste management initiatives.	- Enhanced student awareness and capacity in circular economy and waste management. - Promoted peer-to-peer learning and leadership in sustainability.

3.3.2. Svay Rieng University (SRU)

Svay Rieng University (SRU) focused its activities on local community engagement and practical implementation of CE activities.

As part of the CIRCULAR Living Labs pilot implementation in Cambodia, **Svay** Rieng University (SRU) focused on embedding sustainability education across multiple faculties — from economics and agriculture to arts and science — thereby, these activities engaged over 60 students and faculty members, while generating two peer-reviewed research publications indexed in Sinta 5, reflecting SRU's growing academic visibility in regional sustainability research.

The first initiative, Circular Economy Integration into the Foundation Year Course, was implemented by the Faculty of Economics in early 2025. Following a series of faculty coordination meetings, CE principles were formally integrated into the Introduction to Economics course as a 9-hour teaching module focused on resource efficiency, waste reduction, and sustainable consumption. The curriculum design was guided by the National Circular Economy Strategy (2023–2028). This integration provided early exposure for 50 Foundation Year students to sustainability concepts. It also established a formal connection between economic education and environmental responsibility.

SRU promoted applied research under the Faculty of Agriculture, where a group of five undergraduate students, supervised by two lecturers, completed a thesis titled *"Effectiveness of Household Waste Management: A Case Study of Svay Chrum District."* The research, defended on 23 July 2025, surveyed 80 households across three communes and nine villages to assess solid and plastic waste management practices. The study identified key community challenges in waste collection, segregation, and recycling, and proposed practical solutions aligned with circular economy principles. This initiative not only enhanced student research and fieldwork skills, but also linked academic research with real-world environmental issues relevant to rural Cambodia.

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Also, SRU encouraged cross-disciplinary CE exploration through student-led publications. A student from the Faculty of Arts, Humanities, and Foreign Languages, supported by five co-researchers, published the paper *"Implementation of the 'Going Paperless' Idea as a Concept of Circular Economy at a Senior High School in Svay Rieng Province"* indexed in Sinta 5. The study explored how digital transformation and reduced paper usage could serve as practical applications of CE in education, promoting sustainable academic practices and interdisciplinary research engagement.
The university's multidisciplinary engagement and scholarly output highlight its commitment to positioning CE as a core academic and developmental theme in higher education within Cambodia.

សាកលវិទ្យាល័យស្វាយរៀង

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ព្រួយបត្រជំនាញ: ត្រួតត្រង គណនេយ្យ ពីស្ប៉ា ហិរញ្ញវត្ថុ និងធនាគារ

ប្លង់មេរៀនលម្អិត

មុខវិជ្ជា: ទីក្រុងសេដ្ឋកិច្ច

Agenda

CIRCULAR - Circular Economy Living Laboratories supporting Social Innovation in Southeast Asia

CIRCULAR Lab Activities:
Educational Workshop for Students, Academics and Local Citizens

27th July 2025, 08:30 – 16:30

Place: Faculty of Economics and Business Management
National University of Laos, Vientiane, Lao PDR

Time	Topic	Responsible person
08:30 – 09:00	Registration	Organizing Team
09:00 – 09:10	Introduction of event, guests, and speakers	Dr. Soubin Sisavath, CIRCULAR Project Coordinator
09:10 – 10:00	Presentation of CIRCULAR Project and Accomplishments	Dr. Soubin Sisavath, CIRCULAR Project Coordinator
10:00 – 10:20	Coffee break	All participants
10:20 – 12:00	Concept, Strategies and Work Plan of CIRCULAR Living Lab	Dr. Keuangkham Sisengnam, Researcher of CIRCULAR Team
12:00 – 13:00	Lunch + networking	All participants
13:00 – 14:30	Waste management & circular economy	Dr. Phetdalaphone Bouttavong, Faculty of Environmental Sciences, NUOL
14:30 – 14:45	Coffee break	All participants
14:45 – 16:10	Experiential learning activities on Circular economy and Waste management	Students, academics, local citizens
16:10 – 16:20	Reflection & evaluation	Assoc. Prof. Dr. Bouasone Sengsourivong, Researcher of CIRCULAR Team
16:20 – 16:30	Group Photos & Closing	CIRCULAR Project Team

Pic 5 Demonstration of activities by SRU

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Table 6 Activities implemented by SRU

No.	Activity	Description	Key Achievements
1	Circular Economy Integration into Foundation Year Course	Curriculum integration and classroom implementation The Faculty organized a coordination meeting to integrate CE principles into the Introduction to Economics course. The 9-hour module focuses on resource efficiency, waste reduction, and sustainable consumption.	- CE content officially introduced into the Foundation Year curriculum. - Early exposure of 50 students to sustainability principles. - Faculty capacity strengthened through curriculum development. - Established alignment between economics and environmental responsibility.
2	Undergraduate Thesis on CE in the Faculty of Agriculture	Type: Undergraduate research and thesis defense Thesis titled "Effectiveness of Household Waste Management: A Case Study of Svay Chrum District" management challenges in 3 communes and 9 villages, surveying 80 households.	- Promoted CE-oriented research in agriculture and rural development. - Strengthened student research capacity and data collection skills. - Connected academic research to local environmental challenges.
3	Student Research & Publication (Faculty of Arts, Humanities, and Foreign Languages)	Type: Student research and journal publication "Implementation of the 'Going Paperless' Idea as a Concept of Circular Economy at a Senior High School in Svay Rieng Province"	- Promoted CE through digitalization and sustainable academic practices. - Encouraged interdisciplinary applications of CE concepts. - Enhanced SRU's research visibility through international publication.
4	Student Research & Publication (Faculty of Science and Technology)	Type: Student research and journal publication "The Authority's Roles in Waste Management: A Case of Svay Rieng Municipality"	- Strengthened research capacity in environmental governance. - Promoted evidence-based approaches to local waste management. - Enhanced cross-faculty engagement in CE-focused academic work.

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4. Impact of the Circular Living Lab Across the Three Pillars

The CIRCULAR Living Labs activity delivered tangible results across all three pillars of the project in each of the universities (section 4), and this section includes a detailed description of the outcome and achievements at the end of the project. In the area of Citizen Science, the initiative successfully mobilized communities and students to co-design and test solutions for waste management and sustainable resource use, with participation rates exceeding the initial targets. Within Education for Sustainable Development, new thematic groups were established, and curriculum content was enhanced to integrate circular economy principles, engaging more than 100 students and faculty members across universities in SEA and the EU. Through Community Engagement, Living Labs facilitated direct interaction with over 60 community representatives, resulting in positive social impacts such as increased awareness of sustainability practices and strengthened local ownership of CE initiatives.

The CIRCULAR Project has generated substantial impact across all partner universities — USM, RUPP, NUOL, and UNIMAS — creating transformative change at multiple levels. Over 2,000 students were directly engaged through courses, workshops, exhibitions, and Living Lab activities, enhancing their knowledge of Circular Economy (CE) concepts and developing practical skills in sustainability, waste management, and innovation. The integration of CE into more than 10 academic courses and 15 student-led initiatives promoted behavioral change and strengthened youth leadership in sustainability. More than 100 academic and administrative staff participated in capacity-building sessions, curriculum integration, and inter-faculty collaborations, leading to the creation of six new teaching modules and the embedding of CE principles within institutional frameworks.
At the community level, over 25,000 individuals were reached through awareness campaigns, training workshops, exhibitions, and citizen science activities, fostering greater public understanding of sustainable practices and encouraging communities to adopt waste separation, recycling, and green living habits. Local collaborations with municipalities, schools, and NGOs established universities as active contributors to community transformation. In the research and policy domain, the project produced three national exhibitions, four institutional reports, and a regional policy paper, supported by data collected from over 1,500 respondents. These outcomes have provided valuable evidence for policy formulation and strengthened universities' roles as knowledge hubs for Circular Economy research and education. Collectively, these results demonstrate that the CIRCULAR Project has successfully laid a strong foundation for institutional sustainability, regional collaboration, and long-term scaling of Circular Economy practices across Southeast Asia.

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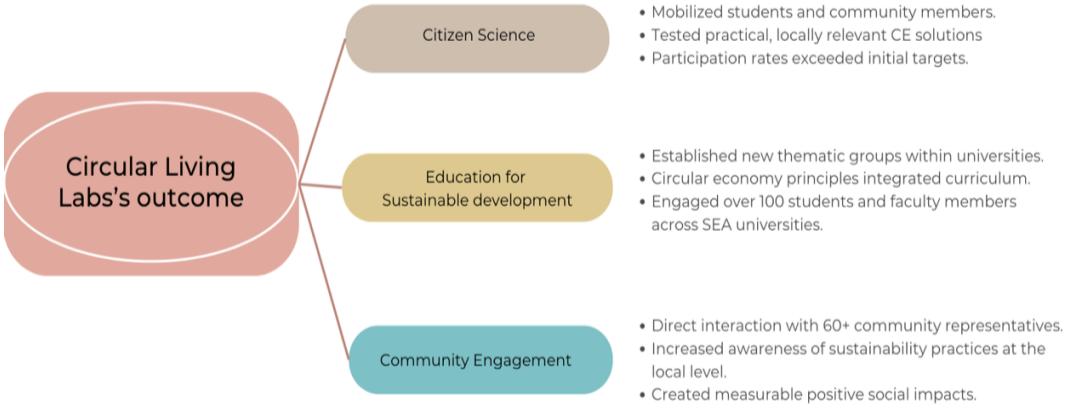

Diagram 1: Circular Living Labs' outcomes per pillar

Through the pilot implementation phase, partner universities in Malaysia, Cambodia, and Laos translated the CIRCULAR vision into practical action by embedding sustainability into curricula, advancing applied research on waste management and resource efficiency. Each pillar was not approached in isolation but as part of an interconnected framework, ensuring that educational activities informed research, research fed into innovation, and innovation reinforced community engagement.

4.1 Education for Sustainable Development

The workshops and training sessions by universities were handled within this pillar. Universities emphasized awareness, co-curricular activities, and teaching innovation to equip students with both theoretical knowledge and practical skills in sustainability.

Table 7 Circular Living Labs activities in 6 universities.

Institution	Key Education Activities	Outcomes
USM	Awareness programs; co-curricular activities at schools	Increased CE awareness; school-level integration of circular concepts
UNIMAS	Awareness programs; CE policy in student associations; case study workshops	Stronger student-led governance; strategies for CE implementation
RUPP	Awareness raising sessions; student gatherings	Broader student understanding; peer-to-peer networking on CE

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SRU	Teaching workshops; training programs	Students and faculty gained foundational CE teaching and applied skills
NUOL	Educational workshops; training sessions	Improved CE knowledge and skill development
SKU	Teaching sessions; training programs	Students trained in both CE concepts and practice

4.2 Citizens Science

This pillar emphasized applied and community-based research, allowing students and faculty to explore sustainability challenges and co-create scalable solutions.

Table 8 Circular Living Labs activities in 6 universities

Institution	Key Research Activities	Outcomes
USM	PBL workshops; participatory research	Practical, student-driven solutions for local waste problems
UNIMAS	Research projects on CE practices	Publishable academic outputs; evidence-based CE models
RUPP	Solid waste management initiatives	Improved waste handling practices on campus
SRU	Training with research elements	Developed training modules tested in practice
NUOL	Participatory research; consultation	Locally tailored sustainability action plans

4.3 Innovation & Community

This pillar placed communities at the center of the Living Labs, involving them in awareness campaigns, cleanup drives, and participatory projects. Students acted as ambassadors, bridging academia and society.

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Table 9 Circular Living Labs activities in 6 universities.

Institution	Key Community Activities	Outcomes
USM	School co-curriculum engagement	Stronger university-school partnerships; local CE awareness
UNIMAS	Booth exhibition at Festival Kokurikulum; CE awareness campaigns	Public visibility of CE practices; dialogue between academia and community
RUPP	Campus cleanup drives; awareness raising	Cleaner environment; active student-community collaboration
SRU	Training with community interaction	Direct skill transfer to local communities
NUOL	Participatory workshops and research	Communities co-developed waste management solutions

Sustainability in the CIRCULAR Living Labs has been demonstrated through a combination of long-term environmental benefits, community empowerment, and institutional commitment. Living Labs have hosted joint workshops, peer-learning sessions, and exchange visits, which ensured sustainability through knowledge transfer and collective ownership.

In addition, social and cultural integration has been a key element, ensuring that Living Lab activities resonate with local communities by addressing their needs and creating tangible positive impacts. Continuous stakeholder support and adaptive adjustments to project interventions have further optimized outcomes, strengthening both long-term sustainability and the replicability of results.

5. Achievements of the Pilot Implementation

This report outlines the steps taken by universities and outcomes that demonstrate how universities have become drivers of systemic change. By documenting these efforts, the report highlights lessons learned, showcases best practices, and provides a foundation for scaling the CIRCULAR Living Labs model across Southeast Asia. These achievements demonstrate not only the feasibility of the Living Labs model but also its capacity to generate measurable environmental, social, and educational benefits. They confirm that the project has established a solid foundation for future scaling and long-term sustainability.

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By demonstration through both qualitative and quantitative measures based on the activities of the universities:

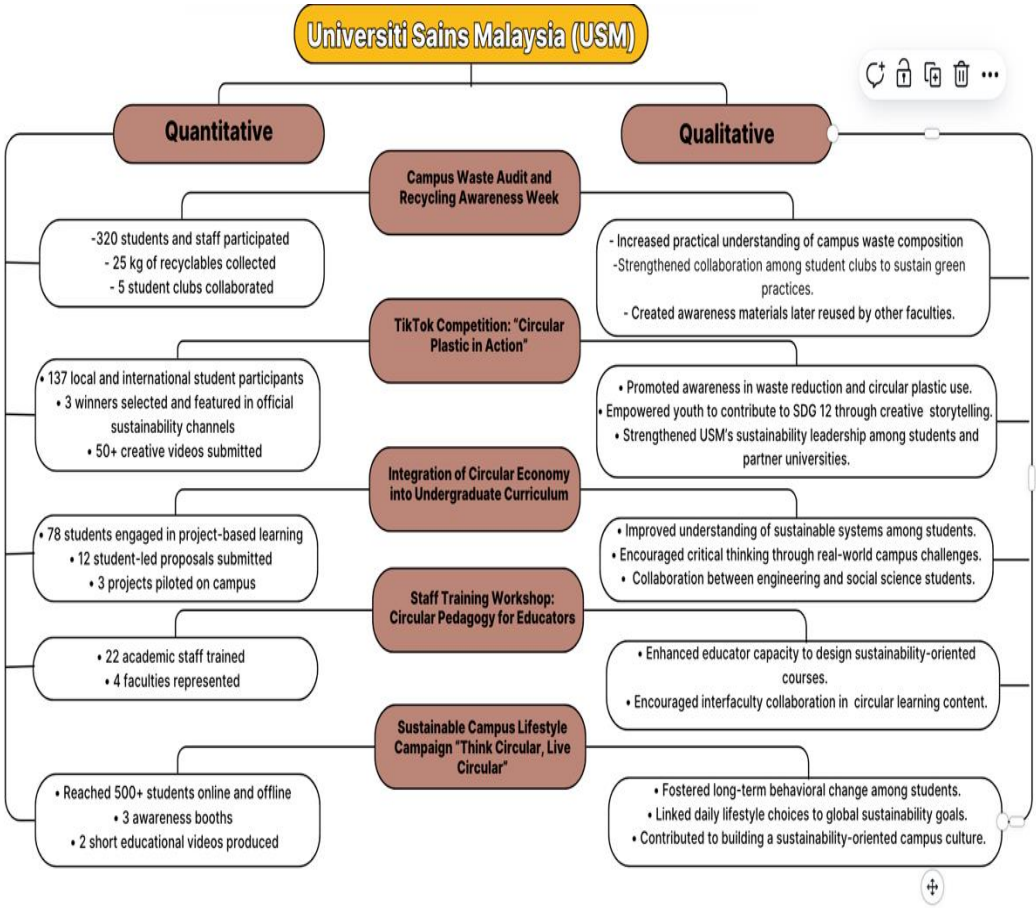

Diagram 2 Outcome measurement USM

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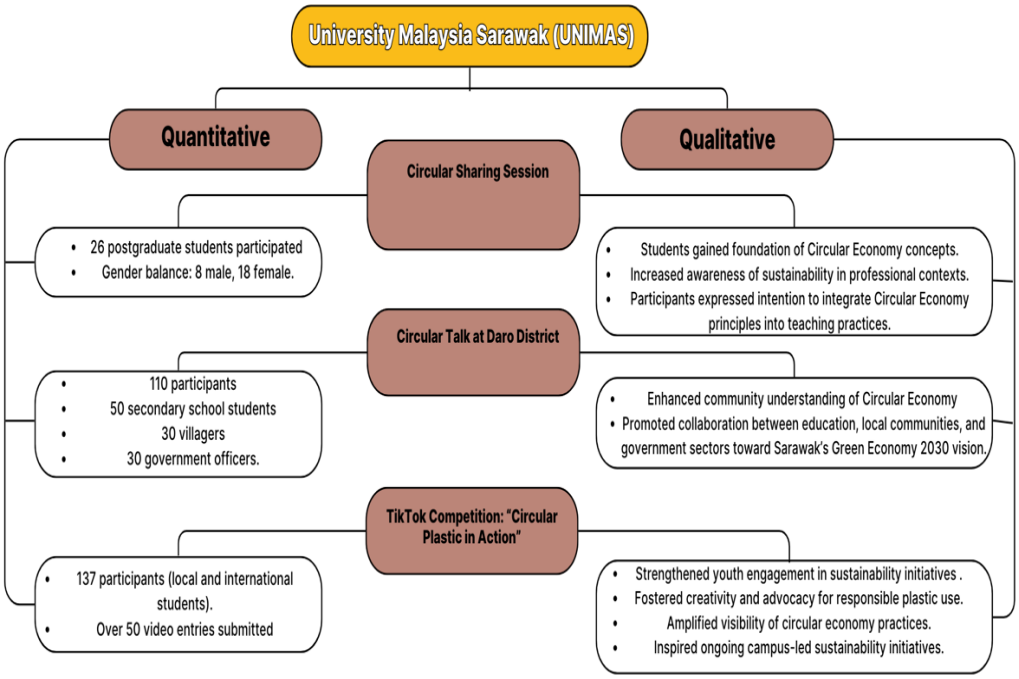

Diagram 3 Outcome measurement UNIMAS

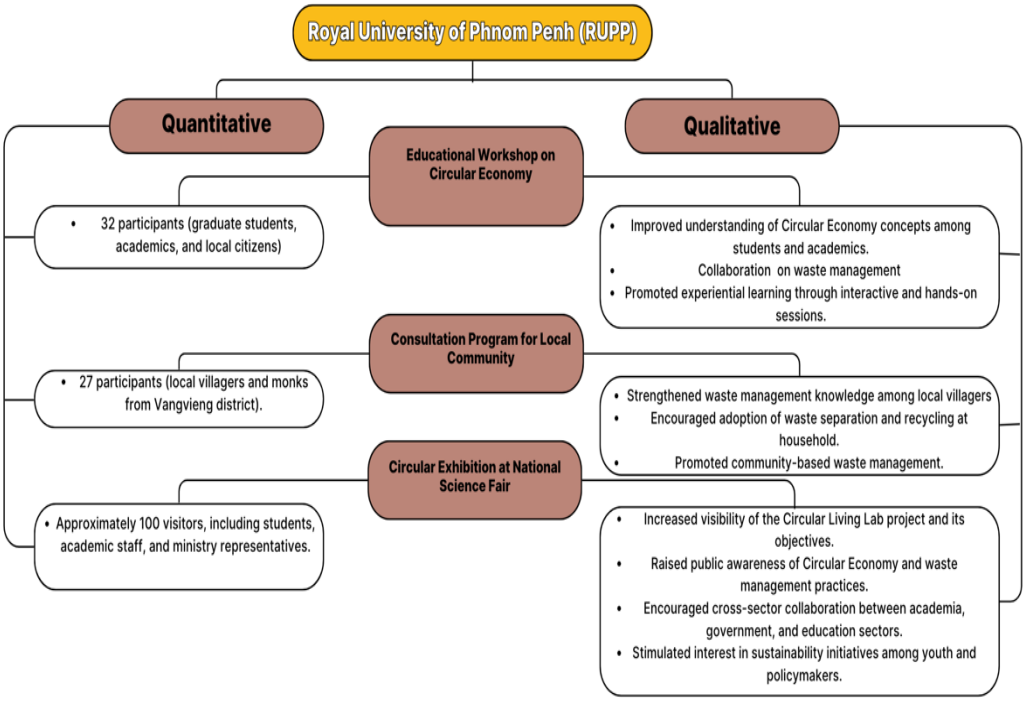

Diagram 4 Outcome Measurement RUPP

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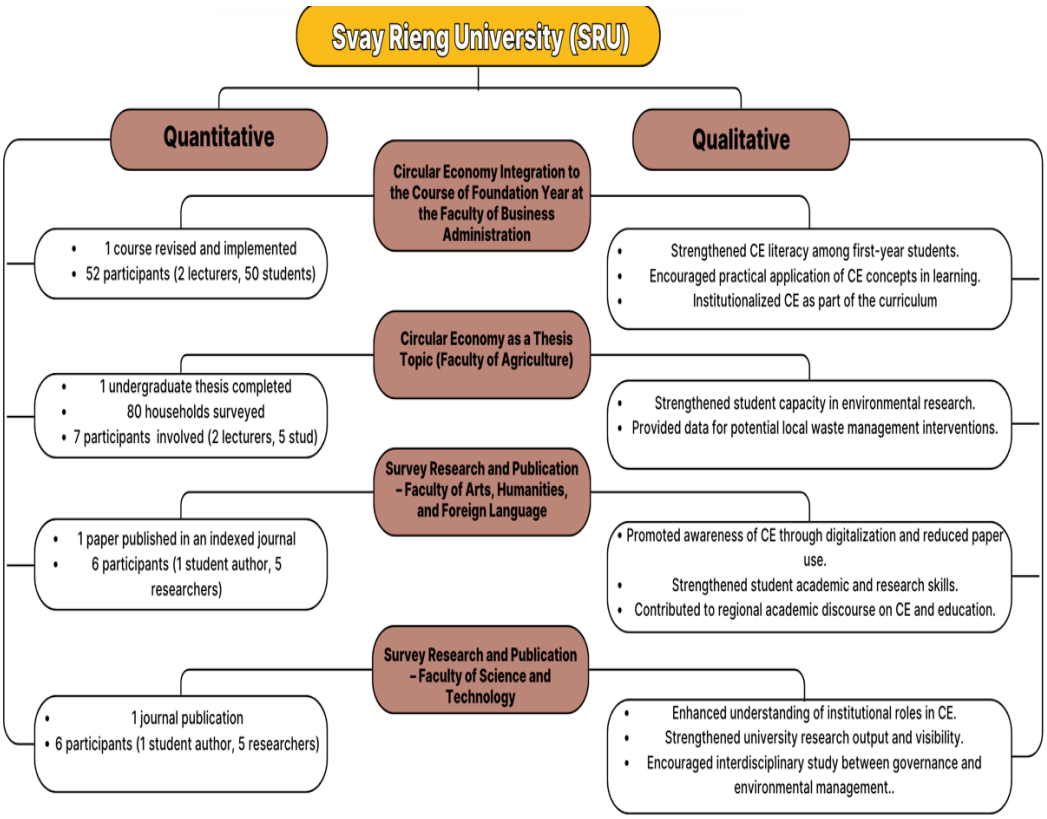

Diagram 5 Outcome measurement SRU

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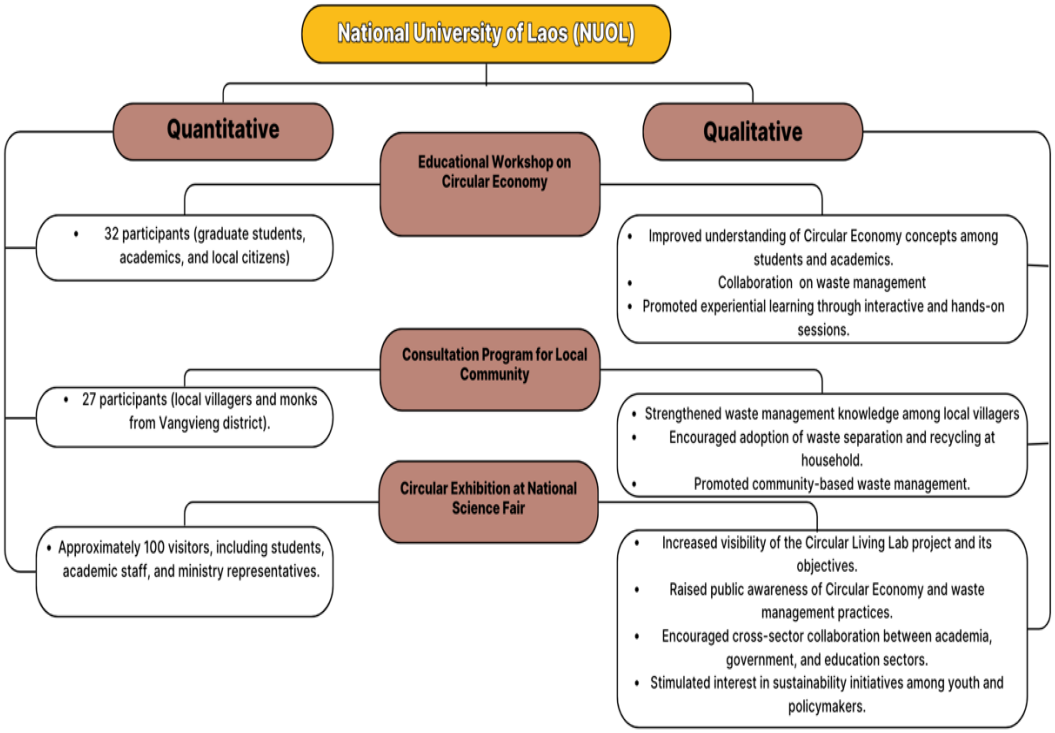

Diagram 6 Outcome measurement NUOL

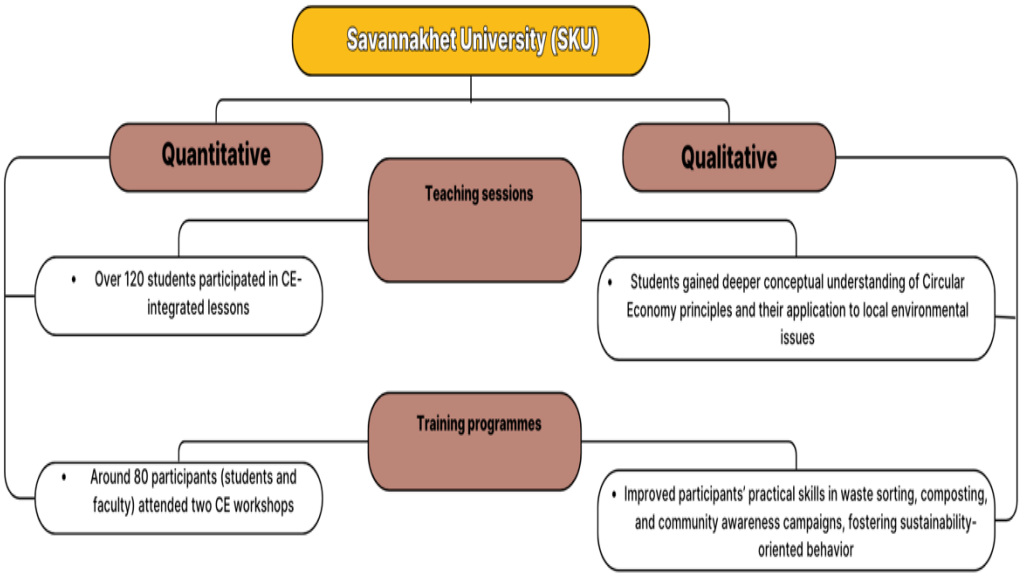

Diagram 7 Outcome measurement SKU

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Collectively, the achievements of all six universities illustrate measurable progress in both quantitative reach and qualitative transformation. The CIRCULAR project has effectively fostered a network of academic and community actors committed to advancing circular practices, ensuring that sustainability principles are not only taught but actively lived across campuses and in the communities.

5. Monitoring and Evaluation Framework

Effective monitoring served not only as a control mechanism but also as a learning process throughout the CIRCULAR Living Labs pilot phase. Rather than relying on generic indicators, the Evaluation and Quality Assurance (E&QA) surveys and participatory reviews generated quantitative and qualitative data on how the initiative performed across universities, measuring outcomes in learning impact, community participation, and institutional capacity development.

The monitoring framework was applied for all universities that reflected both regional and institutional specialties. Regular feedback, documentation, and participatory evaluation mechanisms provided accountability. The success of the CIRCULAR Living Labs is underpinned by several characteristics that ensure consistency, scalability, and long-term sustainability across all participating universities.

During the pilot phase, feedback was systematically collected and used to refine activities in real time. Mechanisms were established at multiple levels—participants, consortium members, stakeholders, and through digital tools—to ensure responsiveness and adaptability. These processes helped universities adjust activities to local needs, improve the quality of delivery, and align project outcomes with CIRCULAR's objectives.

Table 10 Feedback mechanism

Feedback Source	Method Applied
Students & Faculty	Post-event surveys, focus group discussions, informal feedback during activities
Consortium Partners	Regular coordination meetings (online & onsite)
Community Participants	Direct consultations during outreach events; feedback forms after activities
Stakeholders (NGOs, Gov't, Private Sector)	Stakeholder roundtables and follow-up interviews
Digital Monitoring Tools	Online reporting platforms, participation dashboards

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The results indicate that over 80% of respondents either completely or partially agreed that their participation improved awareness and motivation related to sustainability, circular economy, and citizen science. The smallest proportion—fewer than 10%—reported neutrality, while no participants expressed disagreement with the statements.

These findings confirm that the CIRCULAR Living Labs successfully achieved its learning objectives by:

Strengthening sustainability literacy among the local communities. Encouraging citizen science as a participatory method for environmental action. Motivating behavioural change, particularly in waste reduction and sustainable consumption habits. Collectively, the data validate the project's transformative educational impact, demonstrating that CE principles were not only understood conceptually but also internalized as part of participants' attitudes and daily practices.

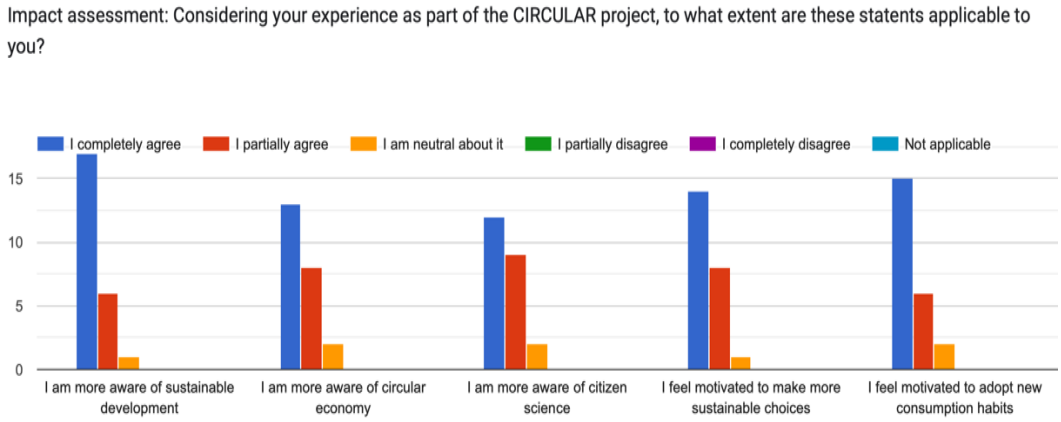

Diagram 8 Summary of feedback from local communities

The expanded E&QA survey conducted across all participating universities gathered 105 valid responses from students, faculty, and community participants. Respondents evaluated seven key statements assessing how their participation in the CIRCULAR Living Labs influenced their knowledge, awareness, and motivation related to circular economy (CE) practices.

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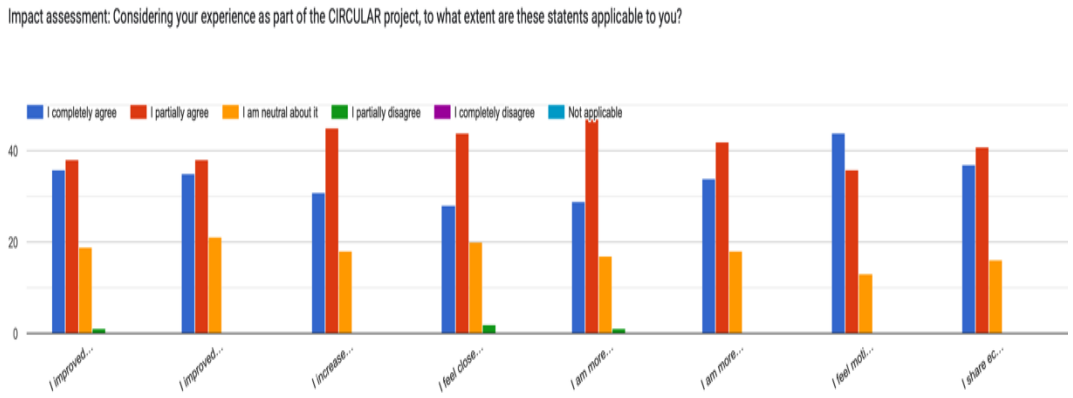

Diagram 9 Summary of Academician and students' feedback.

Diagram 9 presents the aggregated distribution of responses. Across all indicators, a clear majority of respondents selected "I completely agree" or "I partially agree," confirming strong positive outcomes of the project. Neutral or disagreeing responses were minimal (below 5%), indicating broad consensus on the project's educational and motivational impact.

7. Conclusion

The CIRCULAR Living Labs initiative across Southeast Asia has demonstrated that the transition toward a circular economy in higher education is not only possible, but measurable, scalable, and transformative. Through collaboration among six participating universities — Universiti Sains Malaysia (USM), Universiti Malaysia Sarawak (UNIMAS), Royal University of Phnom Penh (RUPP), Svay Rieng University (SRU), National University of Laos (NUOL), and Savannakhet University (SKU) — the project successfully integrated sustainability learning, community engagement, and citizen science into both academic and social practice.

Across the pilot phase, the CIRCULAR Living Labs established more than 40 distinct activities encompassing curriculum innovation, student-led research, community workshops, and public campaigns. These initiatives collectively reached over 2,000 participants, including students, faculty, community members, and private-sector partners.

Across all participating universities, more than 1,200 students and 150 academic staff directly benefited from teaching and training programmes focused on CE principles, sustainable waste management, and innovative green practices. Additionally, over 600 community members took part in awareness and engagement events such as recycling campaigns, green market initiatives, and circular design workshops. In total, over 30 training and community activities

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were organized during the project cycle, demonstrating strong interinstitutional collaboration and outreach impact. The project has resulted in a strengthened institutional commitment toward integrating CE concepts into higher education curricula. Universities partner universities successfully piloted course modules and student-led innovation challenges, while other regional partners applied practical CE knowledge through training sessions and local capacity-building workshops.

Ultimately, the CIRCULAR Living Labs have proven that circularity is not merely an economic framework but a learning journey and cultural transformation. By equipping students, educators, and communities with the skills and mindset for sustainable living, the initiative has positioned universities as catalysts of change — shaping not only greener campuses, but a more responsible and resilient Southeast Asia.

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