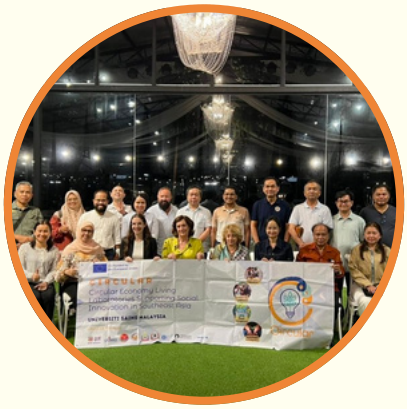
ERASMUS+ CBHE KA2

FINAL PUBLICATION

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



Co-funded by the European Union

CIRCULAR

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Executive Summary

The **CIRCULAR** – Circular Economy Living Laboratories Supporting Social Innovation in Southeast Asia project demonstrates how universities can act as key enablers of community-driven circular economy transitions by working with communities rather than applying top-down solutions. Implemented across six universities in Malaysia, Cambodia, and Laos, the project established CIRCULAR Living Labs as participatory, real-world environments where education, research, and community engagement converge to address pressing sustainability challenges, particularly those related to waste management, plastic pollution, and resource efficiency.

The CIRCULAR Living Labs are not defined by physical infrastructure, but by collaborative processes. They bring together students, academics, community members, civil society organisations, and public-sector stakeholders to co-create locally relevant solutions grounded in circular economy principles. Through participation, experimentation, and mutual learning, stakeholders move from awareness to collective action in ways that reflect local needs and realities.

Circular economy challenges and the role of universities

Across Southeast Asia, rapid urbanisation, changing consumption patterns, and economic growth have intensified environmental pressures. While circular economy principles are increasingly recognised in policy discourse, implementation at the local level often remains fragmented. Behavioural change is uneven, public awareness varies, and gaps persist between policy ambition and everyday practice.

CIRCULAR addresses this challenge by positioning universities as trusted intermediaries capable of translating global sustainability concepts into locally grounded action. Universities are uniquely placed to support circular transitions: they generate and disseminate knowledge, educate future leaders, and maintain long-term relationships with communities and public institutions. The Living Lab approach leverages these strengths to support inclusive and practical sustainability action.

Key achievements across six universities

Across the six participating universities, the CIRCULAR Living Labs implemented a wide range of context-specific activities, including awareness initiatives, waste separation and reuse practices, upcycling workshops, student-led campaigns, curricular integration, and community dialogues. While activities differed by context, several shared achievements emerged.

First, the Living Labs generated meaningful community impact. Communities were engaged as partners in problem-solving rather than passive beneficiaries. Through hands-on activities and dialogue, community members increased their understanding of waste-related issues, recognised the environmental and health implications of existing practices, and gained confidence in adopting more sustainable behaviours. Importantly, trust between universities and communities was strengthened, laying the groundwork for continued collaboration beyond the project.

Second, the Living Labs supported institutional transformation within universities. Circular economy principles were embedded into teaching, extracurricular activities, and engagement practices, reinforcing universities' broader social missions. Academics strengthened their pedagogical approaches through experiential and community-engaged learning, while sustainability increasingly became a shared institutional responsibility, rather than a niche initiative.

Third, student empowerment emerged as one of the most visible and enduring outcomes. Students played central roles as organisers, facilitators, communicators, and innovators. Through creative campaigns, peer engagement, and hands-on activities, students translated circular economy concepts into accessible messages and practical action. These experiences fostered leadership, teamwork, communication, and problem-solving skills, while shaping students' identities as environmentally responsible citizens and change agents.

Why the Living Lab model works

The effectiveness of the CIRCULAR Living Labs lies in their integrated design, which combines Education for Sustainable Development, Citizen Science, and Community Engagement into a single, reinforcing framework. Education builds understanding and motivation; participatory inquiry grounds learning in lived experience; and community engagement translates knowledge into collective action.

Living Lab activities followed a progressive pathway from awareness to co-creation and action. Initial activities built shared understanding of local challenges, followed by collaborative problem identification and solution design, and culminating in practical implementation. Reflection and learning were embedded throughout, allowing participants to adapt and improve practices over time.

Equally important was the model's flexibility. While guided by shared principles, each university adapted the Living Lab to its institutional context and community needs. This adaptability ensured relevance and ownership, while demonstrating the model's transferability across diverse settings.

Legacy, scalability, and future relevance

CIRCULAR's impact extends beyond individual activities or project timelines. By focusing on capacity building rather than one-off interventions, the Living Labs strengthened the ability of universities, students, and communities to continue circular economy initiatives independently. Skills developed through the project—such as participatory facilitation, sustainability communication, and collaborative problem-solving—constitute a legacy.

The CIRCULAR Living Lab model is replicable and scalable. While outcomes are locally grounded, the underlying approach—integrating education, citizen engagement, and social innovation—can be adapted by other higher education institutions and regions facing similar sustainability challenges.

A reference model for circular futures

In summary, the CIRCULAR Living Labs demonstrate the transformative potential of universities working alongside communities to advance circular economy transitions. By embedding co-creation into education and engagement, empowering students, and strengthening institutional capacity, the project offers a credible and transferable model for higher education institutions seeking to support inclusive, community-centred circular futures in Southeast Asia and beyond.

Introduction

CIRCULAR is co-funded by the Erasmus+ programme and will help boost the social innovation ecosystem in Malaysia, Cambodia and Laos by bringing together and reinforcing the linksbetween Teaching, Research, Innovation and Society in order to collaboratively design and testinnovative solutions to mitigate waste management problems, promote circular economy approaches and improve the quality of life of local communities, supported by a socially engaged student body that is committed to environmental sustainability.

SEA countries are particularly affected by the effects of climate change. This is increasingly more concerning since agriculture and agro-based industries are the backbone of the economy in many SEA countries and, in any case, pivotal in ensuring access to affordable and healthy food for all.. Circular economy can help revert this context by favouring eco-effectiveness and reducing environmental impact, at the same time producing a positive ecological, economic and social impact. Indeed, one important principle of circular economy is to decouple economic growth from the consumption of raw materials. In addition to benefits such as resource savings and a reduction in the emission of greenhouse gases, circular economy can lead to a significant growth in employment (since labour is more valued than raw materials) and in innovation.

CIRCULAR Living Labs will act as catalysts for the development of synergies between Teaching, Research, Innovation and Society (including decision-makers, policymakers, civil society and a wide variety of non-governmental actors) by enhancing dialogue and cooperation among localstakeholders in Malaysia, Cambodia and Laos to foster the transition to a circular economy, address waste management problems and enhance overall sustainable development. They will offer a space to collaboratively explore, design, prototype, test and validate open solutions to mitigate waste management problems and promote circular economy.

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It will pursue the following specific objectives:

- Design a new collaborative model for reinforcing HEIs' third mission and for enhancing effective and successful Knowledge Square cooperation for social innovation with a specific focus on the topic of circular economy.
- Enhance community-based participatory research and citizen science at the same time promoting a new pedagogical framework for embedding community engagement actions as part of Higher Education study programmes.
- Set-up Living Labs as open innovation ecosystems that integrate education, research, development and innovation, and regional development to help trigger the adoption of green and more sustainable practices and a more efficient use of resources.
- Build the capacities of academics to design, organise and implement collaborative social innovation programmes that promote students' active citizenship and simultaneously contribute to solve everyday sustainability and climate-change problems.
- Empower students and young people to become socially engaged, climate-conscious and active citizens and raise the awareness of students, young people and members of local communities on the topic of circular economy and sustainable development and promote alternative consumption habits and waste management practices underpinned by knowledge, research and innovation generated by Higher Education Institutions.

The CIRCULAR Consortium brings together nine multidisciplinary institutions from Malaysia (USM and UNIMAS), Cambodia (RUPP and SRU), Laos (NUOL and SKU), Spain (UAL and INCOMA) and Portugal (IPC).

Background

Across Southeast Asia, rapid urbanisation, demographic growth, and changing consumption patterns have significantly intensified pressures on natural resources and waste management systems. In Malaysia, Cambodia, and Laos, increasing volumes of plastic waste, limited waste separation practices, and uneven recycling infrastructure continue to pose environmental and social challenges. While national policies and strategies increasingly recognise the importance of sustainability and circular economy transitions, the translation of policy aspirations into everyday practice remains fragmented and uneven.

The circular economy represents a systemic alternative to the prevailing linear model of production and consumption. Rather than focusing solely on waste management, it promotes the reduction of resource use, extension of product lifecycles, reuse, repair, and regeneration of materials. Achieving such a transition requires not only technological solutions and regulatory frameworks, but also changes in knowledge, values, behaviours, and social practices. These changes depend on the active participation of communities, educational institutions, civil society, and public authorities.

Universities are uniquely positioned to support this transition. As centres of learning and knowledge production, they shape future professionals and leaders. As social actors embedded within local contexts, they also have the capacity to convene diverse stakeholders, facilitate dialogue, and support experimentation with new practices. However, conventional university–community engagement often remains project-based, short-term, or limited to awareness-raising, with insufficient integration between teaching, research, and societal impact.

The CIRCULAR project—Circular Economy Living Laboratories Supporting Social Innovation in Southeast Asia—was conceived to address these gaps. Funded under the Erasmus+ Capacity Building in Higher Education (CBHE) programme, CIRCULAR aims to strengthen the role of higher education institutions in advancing circular economy transitions through participatory, practice-oriented, and socially embedded approaches. Central to the project is the establishment and operationalisation of Living Labs as platforms for learning, experimentation, and co-creation.

Within CIRCULAR, Living Labs are understood not as physical facilities alone, but as process-oriented ecosystems that bring together universities, students, communities, civil society organisations, local authorities, and other stakeholders. These Living Labs enable participants to jointly identify sustainability challenges, co-design solutions, test interventions in real-world contexts, and reflect on outcomes. By doing so, they bridge the gap between abstract sustainability concepts and lived experience.

The conceptual foundation of the CIRCULAR Living Labs rests on three interdependent pillars: Education for Sustainable Development (ESD), Citizen Science, and Community Engagement. These pillars ensure that circular economy initiatives are educationally meaningful, scientifically informed, and socially grounded.

Education for Sustainable Development provides the pedagogical backbone of the Living Labs. Through curricular and extracurricular activities, students and educators engage with sustainability challenges in ways that foster systems thinking, critical reflection, creativity, and problem-solving. Rather than treating circular economy as a purely technical subject, ESD within CIRCULAR emphasises values, ethics, and responsibility, enabling learners to understand their roles as active contributors to sustainable transitions.

Citizen Science constitutes the participatory research dimension of the Living Labs. Students, community members, and non-academic stakeholders are involved in observing, documenting, and analysing waste practices, resource use, and environmental impacts within their own contexts. This approach recognises local knowledge, and lives experience as valuable sources of insight, complementing academic expertise. By engaging citizens in knowledge production, Citizen Science strengthens environmental awareness and fosters a sense of shared ownership over solutions.

Community Engagement is the connective element that links education and research to tangible social impact. Through workshops, dialogues, awareness activities, festivals, exhibitions, and co-design sessions, Living Labs create spaces for trust-building and collaboration between universities and communities. Engagement within CIRCULAR is conceived as an ongoing relationship rather than a one-off consultation, ensuring that initiatives respond to genuine needs and priorities while supporting long-term change.

Together, these three pillars position universities as facilitators of collective learning and action. The CIRCULAR experience demonstrates that when universities embrace this role, they can catalyse locally grounded circular economy practices while strengthening their educational mission and societal relevance.
Building on this conceptual framework, the following section outlines how the CIRCULAR Living Lab model was translated into practice across diverse institutional and community contexts.

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The CIRCULAR Living Lab Model in Practice

The CIRCULAR Living Lab model was implemented as an integrated, adaptive, and process-driven approach rather than a predefined set of activities. While all participating universities shared a common framework, each Living Lab was shaped by local conditions, institutional capacities, and community priorities. This flexibility enabled the model to remain coherent while allowing meaningful contextual adaptation.

In practice, Education for Sustainable Development was embedded through a combination of formal teaching, co-curricular activities, and informal learning spaces. Circular economy concepts were introduced through lectures, workshops, campaigns, exhibitions, and creative activities that encouraged students to reflect on their own consumption patterns and waste practices. By linking learning to real-world challenges on campus and in surrounding communities, students were able to experience sustainability as a lived process rather than an abstract concept.

Citizen Science activities involved students and community participants in observing and documenting waste practices, material flows, and behavioural patterns. These activities often took place during awareness days, workshops, or community events, where participants collectively reflected on existing practices and explored opportunities for improvement. Through this process, participants gained a deeper understanding of local waste challenges and the social dimensions of circular economy transitions.

Community Engagement provided the pathway from learning and reflection to action. Living Labs organised a wide range of engagement activities, including awareness days, campus exhibitions, upcycling workshops, school outreach programmes, community dialogues, festivals, and site visits. These activities created opportunities for interaction between students, academics, community members, and local authorities, fostering trust and shared responsibility.

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Across all Living Labs, implementation followed a progressive pathway from awareness to co-creation and action. Initial activities focused on raising awareness and building shared understanding of circular economy principles and local waste challenges. As awareness increased, stakeholders collaboratively identified problems, discussed constraints, and co-designed context-appropriate interventions. These interventions were then tested through practical actions, such as waste separation initiatives, reuse and upcycling activities, student-led campaigns, and community workshops. Reflection and learning accompanied each stage, allowing practices to evolve over time.

A defining characteristic of the CIRCULAR Living Lab model was the centrality of community needs in shaping activities. Rather than imposing predetermined solutions, Living Labs engaged communities early in the process, enabling participants to articulate challenges, priorities, and feasible actions. This approach enhanced relevance, strengthened ownership, and increased the likelihood of sustained behavioural change.

Within this process, students and academics assumed evolving roles. Academics acted as facilitators and mentors, providing conceptual grounding, methodological guidance, and institutional support. Students emerged as key change agents, organising events, leading campaigns, facilitating workshops, and engaging peers and community members. Through active participation, students developed leadership, communication, and teamwork skills, while internalising circular economy values.

The following section presents a consolidated overview of major Living Lab activities and events implemented under the CIRCULAR project, drawing on verified information from the project website, newsletters, and public communications.

Living Lab Activities Across the CIRCULAR Project

Universiti Sains Malaysia (USM)

Universiti Sains Malaysia is in Penang, a UNESCO-recognised heritage island characterised by dense urban neighbourhoods, a vibrant street economy, and a long tradition of reuse, repair, and communal exchange. Penang's role as a tourism hub and cultural crossroads has heightened public sensitivity to cleanliness, waste visibility, and environmental quality, while simultaneously intensifying pressures from single-use plastics, fast fashion, and consumption-driven lifestyles.

Within this setting, the USM Living Lab positioned circular economy not as an imported concept, but as an extension of familiar local practices and values. Activities were designed to resonate with Penang's everyday culture of making-do, creative reuse, and social responsibility, particularly within multi-ethnic communities where resourcefulness has long been part of daily life.

Circular Economy Awareness Days organised under the Erasmus+ CIRCULAR project were embedded into existing campus and public events, including the SUFIEX Carnival, which reflects Penang's strong culture of student participation and public engagement. The Living Lab deliberately leveraged this festive, open environment to introduce circular economy ideas through accessible language, bilingual materials, and locally recognisable examples. Exhibitions and interactive booths encouraged participants to reflect on their own consumption habits, linking abstract sustainability concepts to the realities of campus life, food consumption, and textile use.

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Upcycling workshops drew directly on Penang's informal repair and reuse traditions. Participants worked together to transform used clothing and fabric into reusable bags and functional items, mirroring practices commonly found in households and small community workshops. These sessions emphasised hands-on learning, creativity, and collective problem-solving, reinforcing the idea that circular economy is rooted in everyday action rather than specialised technology. The inclusion of persons with disabilities in these activities reflected broader local values of care, inclusion, and shared contribution

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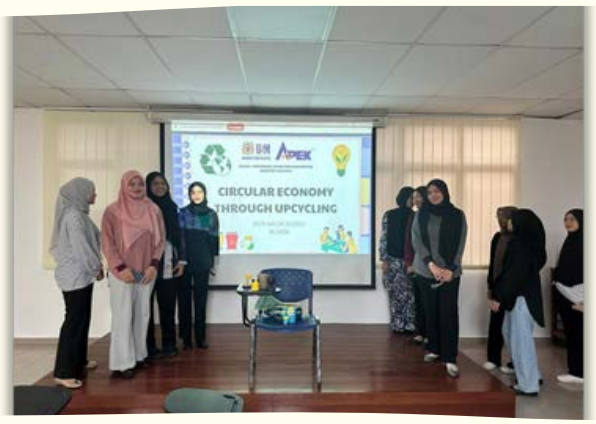
The Living Lab also extended into surrounding communities and schools, where USM students engaged younger learners through storytelling, demonstrations, and creative activities grounded in familiar household practices. This intergenerational approach echoed local norms of mentorship and communal learning, while strengthening students' sense of civic responsibility and leadership.

Student Voice – Universiti Sains Malaysia

"Living Lab activities connected sustainability to everyday practices we see at home and in our communities."

USM's experience illustrates how circular economy initiatives can be embedded within the social and cultural fabric of a heritage city, offering a model for urban universities operating in culturally diverse and tourism-intensive contexts.



Living Lab Activities Across the CIRCULAR Project

Universiti Malaysia Sarawak (UNIMAS)

Universiti Malaysia Sarawak is situated in Sarawak, a region marked by rich cultural diversity, strong community ties, and close connections between urban centres and surrounding rural and riverine landscapes. Environmental practices in Sarawak are shaped by livelihoods, communal living arrangements, and long-standing relationships with land and resources, making sustainability a lived and relational concept rather than an abstract policy agenda.

The UNIMAS Living Lab embraced this context by foregrounding dialogue, respect for local knowledge, and contextual relevance. Circular Economy Awareness Days brought together students, academics, local authorities, and community members in participatory discussions that acknowledged the diversity of waste practices across urban and semi-rural settings. Rather than promoting uniform solutions, activities encouraged reflection on how circular practices could align with existing community norms and resource-use patterns.

A distinctive feature of the UNIMAS Living Lab was the integration of circular economy themes into Festival Ko-kurikulum, which adopted an Eco Hero theme. This approach drew on Sarawak's strong culture of collective participation and celebration, positioning sustainability as a shared community endeavour rather than a technical obligation. By embedding Living Lab activities within an academic setting, the initiative reached a wider segment of the student population and reinforced the idea that environmental responsibility is part of everyday social life.

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Digital storytelling and social media engagement complemented physical activities, allowing students to document Living Lab experiences and share reflections in ways that blended traditional community values with contemporary communication practices. This hybrid approach supported continuity of engagement and extended the Living Lab's reach beyond specific events

Community Voice – Universiti Malaysia Sarawak

"Living Lab activities respected our local ways of living while encouraging new thinking about waste and reuse."

The UNIMAS case demonstrates the importance of culturally sensitive and place-responsive Living Labs, particularly in regions where sustainability is deeply intertwined with social identity and communal relationships.

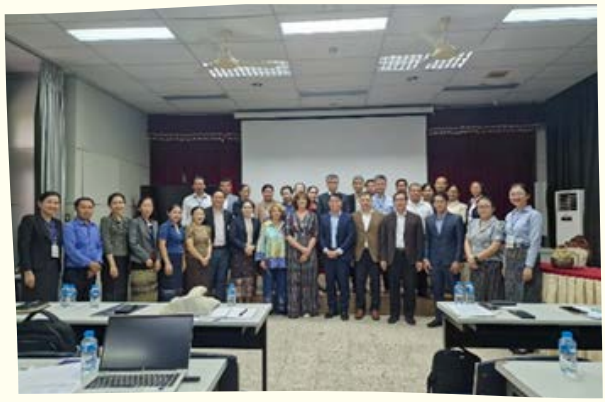
Living Lab Activities Across the CIRCULAR Project

National University of Laos (NUOL)

The National University of Laos operates within a social context where communal living, shared responsibility, and respect for collective spaces are deeply embedded cultural values. In many Lao communities, waste management practices are informal and closely linked to daily routines, neighbourhood cooperation, and limited access to formal infrastructure.

The NUOL Living Lab was launched alongside awareness activities that emphasised practical, everyday learning grounded in local realities. Workshops at the Faculty of Environmental Sciences introduced circular economy concepts using simple demonstrations and culturally familiar examples, ensuring accessibility for students and community participants alike.

Community-based workshops in locations such as Vangvieng reflected local traditions of collective action and mutual learning. Activities focused on waste separation, reuse, and cleanliness within households and neighbourhoods, highlighting how individual actions contribute to community well-being and environmental quality. Students acted as facilitators under academic supervision, reinforcing intergenerational learning and mutual respect.



Living Lab Activities Across the CIRCULAR Project

Savannakhet University (SKU)

Savannakhet University operates within a provincial setting where environmental challenges are closely linked to local governance, infrastructure development, and public service delivery. Community life in Savannakhet Province is shaped by strong relationships with local authorities, making dialogue and institutional collaboration culturally significant.

The SKU Living Lab focused on awareness days, stakeholder dialogues, and site visits that reflected local governance practices centred on face-to-face engagement and relationship-building. By bringing students, academics, and provincial officials together, the Living Lab created culturally appropriate spaces for shared learning and discussion on waste management challenges.

Students gained exposure to the practical and institutional dimensions of circular economy transitions, while public-sector stakeholders engaged with academic perspectives and youth participation. This reciprocal learning supported trust-building and enhanced understanding across sectors.

Stakeholder Voice – Savannakhet University
"Living Lab activities supported constructive dialogue rooted in local governance practices."

The SKU case highlights how Living Labs can operate effectively within provincial governance landscapes, strengthening links between higher education and public service.

Living Lab Activities Across the CIRCULAR Project

Royal University of Phnom Penh (RUPP)

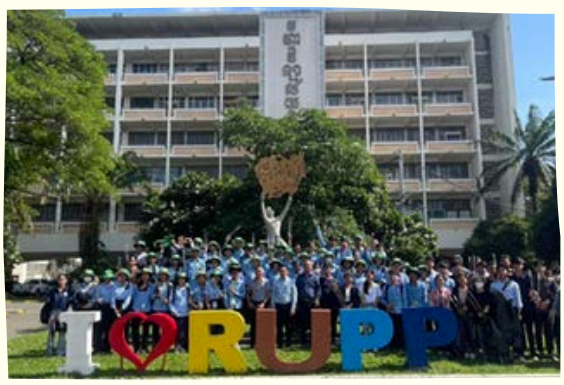
The Royal University of Phnom Penh is located in Cambodia's capital city, where rapid urbanisation and visible plastic waste shape everyday environmental concerns. Campus life at RUPP is characterised by strong peer networks, collective student identity, and a tradition of student-led initiatives.

The RUPP Living Lab built on this culture through the student-led Clean and Green Team, which coordinated waste reduction and awareness activities across campus. Activities were embedded into existing student routines and events, emphasising peer-to-peer learning and visible action. This approach aligned with local values of collective effort and shared responsibility.

Academic staff provided mentorship and institutional support, while students exercised leadership and creativity. Sustainability became part of campus culture rather than an external intervention, reinforcing students' sense of agency in addressing urban environmental challenges.

Student Voice – Royal University of Phnom Penh
"Working together made sustainability part of our everyday campus life."

The RUPP experience demonstrates how student culture and collective action can drive circular economy practices in rapidly urbanising contexts.



Living Lab Activities Across the CIRCULAR Project

Svay Rieng University (SRU)

Svay Rieng University (SRU) operates within a provincial Cambodian context where awareness of circular economy principles remains at an early stage, particularly within higher education and surrounding communities. While national strategies increasingly prioritise sustainability and green growth, translating these frameworks into institutional practice and public understanding outside major urban centres presents ongoing challenges. Within this setting, SRU's Living Lab focused on building foundational awareness, institutional alignment, and policy literacy as critical enablers of longer-term circular economy action. SRU's Living Lab activities were centred on a Circular Economy Awareness Day, designed as a multi-stakeholder platform for learning, dialogue, and alignment. The event brought together university leadership, academic staff, students, and representatives from provincial and national authorities, including the Ministry of Industry, Science, Technology and Innovation and the Svay Rieng Provincial Department of Environment. This composition reflected a deliberate Living Lab strategy: positioning the university as a bridge between national policy frameworks and local institutional realities.




The Awareness Day introduced core circular economy concepts, innovation pathways, and Cambodia's Circular Economy Strategy and Action Plan, alongside national environmental priorities for 2023–2028. Importantly, the format extended beyond formal presentations. Structured discussions and question-and-answer sessions enabled participants to reflect on local environmental challenges, explore the relevance of circular economy principles for provincial development, and consider the role of universities in supporting behavioural change and innovation.

Students participated alongside academic staff and administrators, reinforcing the Living Lab emphasis on shared learning across roles and generations. Exposure to policy-level perspectives helped situate sustainability learning within real-world governance contexts, strengthening students' understanding of the links between education, environmental responsibility, and national development agendas.

Taken together, these place-based narratives show that the strength of the CIRCULAR Living Lab model lies not in uniformity, but in its ability to adapt to local cultures, landscapes, and social practices. The following section synthesises the cross-cutting impacts of these culturally grounded Living Labs across students, institutions, communities, and local sustainability agendas.

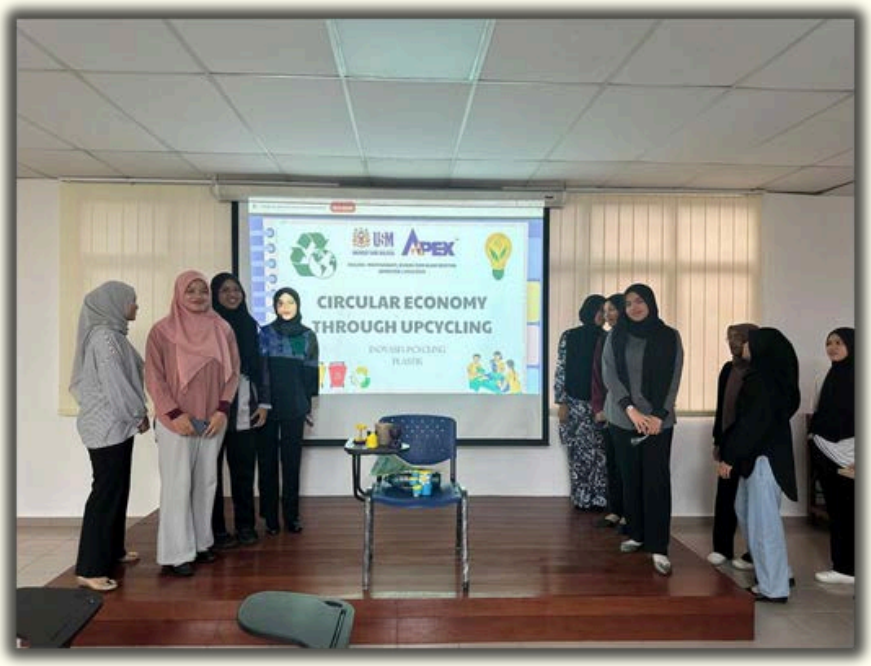
Impacts of the CIRCULAR Living Labs

The impact of the CIRCULAR Living Labs extends beyond individual activities or institutional contexts. Across six universities in Malaysia, Cambodia, and Laos, the Living Labs functioned as catalytic mechanisms, generating change through a combination of participation, co-creation, and experiential learning. Rather than producing uniform outcomes, the Living Labs enabled context-sensitive transformations that share common underlying patterns. This section analyses impact across five interrelated dimensions: students, academics, institutions, communities, and local sustainability ecosystems.

Student Empowerment and Skills Development

A central impact of the CIRCULAR Living Labs was the repositioning of students from learners to active change agents. This shift did not occur automatically; it emerged through deliberate design choices that emphasised responsibility, trust, and real-world engagement. Students were not only exposed to circular economy concepts but were given meaningful roles in organising activities, facilitating dialogue, and communicating sustainability messages.

As students became responsible for planning and implementation, sustainability ceased to be an abstract concept and became a lived practice. This process contributed to the development of transferable skills such as communication, teamwork, problem solving, and facilitation, while also fostering civic mindedness and ethical awareness.



Importantly, the impact was not limited to individual skill acquisition. Student-led initiatives influenced peer behaviour and campus norms, demonstrating how student empowerment functions as a multiplier within institutional environments. In this sense, students were not only beneficiaries of the Living Labs but also key vectors through which impact was amplified. Across all partner universities, students emerged as central actors in the Living Lab process. Participation in awareness days, workshops, community outreach, and student-led initiatives fostered a range of transferable skills, including leadership, communication, teamwork, and problem-solving. Students increasingly perceived themselves not only as learners, but as contributors to sustainability transitions within their institutions and communities.

Hands-on involvement enabled students to connect academic learning with real-world practice. Organising events, facilitating discussions, and engaging with diverse stakeholders strengthened their confidence and sense of responsibility. In several cases, students reported a shift in perspective—from viewing sustainability as an abstract concept to recognising it as a shared, actionable responsibility embedded in everyday decisions.

These outcomes align closely with the objectives of Education for Sustainable Development, which emphasises active learning, critical reflection, and the development of competencies for sustainable action

Academic Capacity Building and Pedagogical Innovation

For academic staff, the Living Labs contributed to a reconfiguration of professional roles. Academics increasingly acted as facilitators, mentors, and connectors rather than sole knowledge providers. This role transformation was enabled by engagement with communities and students in non-traditional learning environments. Facilitating Living Lab activities encouraged staff to move beyond traditional lecture-based methods toward experiential, problem-based, and community-engaged learning.

The impact on academic capacity is best understood as pedagogical and relational rather than purely technical. Academics strengthened their ability to design experiential and problem-based learning, to translate sustainability concepts for non-academic audiences, and to engage in participatory forms of inquiry. These capacities are critical for addressing complex sustainability challenges that cannot be solved through disciplinary expertise alone.

At the same time, the Living Labs surfaced structural constraints, such as time and workload pressures, highlighting the importance of institutional recognition and support for community-engaged academic work. Where such support was present, the Living Labs contributed to more durable shifts in teaching and engagement practices.

Academics reported enhanced confidence in integrating sustainability and circular economy concepts into curricula, as well as greater appreciation for participatory and co-creative methodologies. Engagement with students and communities in real-world settings also informed research perspectives, reinforcing the relevance of applied, socially engaged scholarship.

Capacity-building programmes and bootcamps further strengthened academic capability by introducing Living Lab methodologies, participatory research approaches, and innovative pedagogies. These activities contributed to institutional readiness to sustain and expand Living Lab initiatives beyond the project duration.

Institutional Culture Change

At the institutional level, the Living Labs supported incremental but meaningful culture change. Sustainability and circular economy principles became more visible within campus life, moving beyond isolated projects to inform teaching, student activities, and engagement strategies. This shift reflects organisational learning rather than compliance-driven change. In several universities, Living Lab activities contributed to broader conversations about the university's social responsibility and public mission.

The Living Labs functioned as boundary spaces within universities—connecting teaching, research, and engagement units that often operate in silos. By doing so, they reinforced sustainability as a shared institutional concern rather than the responsibility of individual champions. While these changes are emergent rather than fully institutionalised, they represent an important step toward embedding circular economy thinking within university systems.

The presence of Living Labs helped normalise sustainability-oriented experimentation within institutional structures, encouraging collaboration across faculties and administrative units. Importantly, student leadership and ownership played a key role in embedding these practices within everyday campus life, rather than positioning them as isolated projects.

Community Awareness and Behavioural Change

Community impact emerged primarily through changes in awareness, behaviour, and relationships, rather than through the adoption of complex technical solutions. Communities engaged in the Living Labs increased their understanding of waste-related issues and the relevance of circular economy principles to daily life. Practical demonstrations and participatory dialogue were particularly effective in supporting behavioural reflection and incremental change.

From an analytical perspective, the most significant community-level impact lies in relational trust. Communities experienced universities as accessible partners willing to listen, learn, and co-create rather than prescribe solutions. In several contexts, community participants reported greater willingness to adopt practices such as waste separation and reuse, particularly when supported by practical demonstrations and sustained engagement. This relational shift enhances the likelihood that sustainability practices introduced through the Living Labs will be sustained and adapted over time.

The Living Labs also facilitated intergenerational learning and social inclusion, demonstrating that circular economy initiatives can generate social value alongside environmental benefits. By valuing local knowledge and lived experience, Living Labs fostered trust and mutual learning between universities and communities.

Contribution to Local Sustainability Agendas

The CIRCULAR Living Labs also contributed to local sustainability agendas by strengthening dialogue between universities, communities, and public authorities. Activities involving policymakers and practitioners, such as stakeholder dialogues and site visits, supported shared understanding of challenges and opportunities related to waste management and circular economy transitions.

While Living Labs did not replace formal policy processes, they complemented them by providing evidence from practice, highlighting community perspectives, and demonstrating the potential of collaborative approaches. In this way, the project reinforced the role of universities as knowledge brokers and facilitators within local sustainability ecosystems.

Voices from the Living Labs

Beyond thematic and institutional impacts, the significance of the CIRCULAR Living Labs is most clearly revealed through the lived experiences of those directly involved. Reflections shared by students, academics, and community participants consistently point to the transformative value of hands-on engagement, shared learning, and trust-building as central elements of circular economy action.

For students, participation in the Living Labs marked a shift from conceptual understanding to embodied experience. Organising activities, facilitating workshops, and engaging directly with community members challenged students to translate abstract sustainability principles into practical action. Many students described how this process altered their perception of the circular economy—from a distant policy or technical concept to a collective, achievable practice rooted in everyday decisions and relationships. Through these experiences, sustainability became not only understandable, but actionable, fostering confidence, leadership, and a sense of responsibility for influencing change within and beyond the university.

Academic reflections similarly highlight a process of professional and pedagogical transformation. Participation in the Living Labs required academics to move beyond traditional instructional roles toward facilitation, mentoring, and co-learning. Engaging with students and communities in non-classroom settings exposed academics to diverse perspectives and forms of knowledge, often challenging established assumptions about expertise and authority. This shift enriched teaching and research practices, reinforcing the value of participatory and experiential approaches in addressing complex sustainability challenges. For many academics, the Living Labs reaffirmed the university's broader social mission and the importance of knowledge that is relational, applied, and socially embedded.

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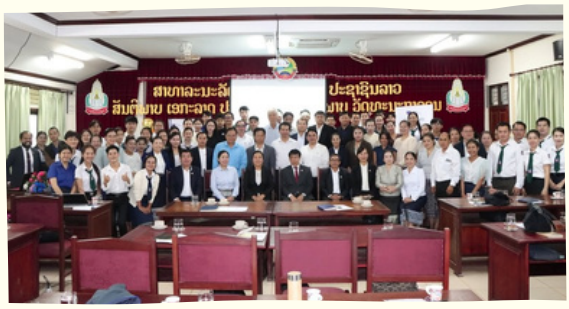
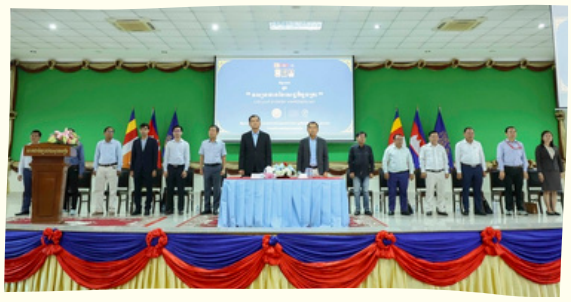
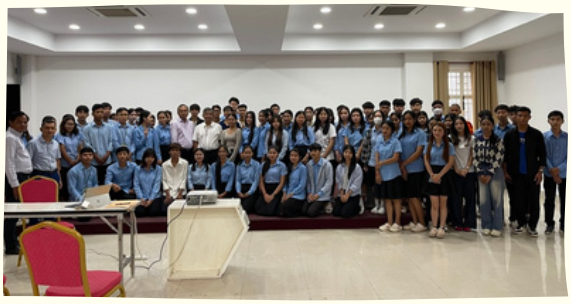
Community participants consistently emphasised how Living Lab activities made sustainability intelligible and relevant by connecting circular economy concepts to everyday practices. Rather than receiving information passively, community members engaged in dialogue, shared experiences, and reflected on local challenges alongside students and academics. This collaborative process fostered a sense of inclusion and mutual respect, as community knowledge and lived experience were recognised as essential components of problem-solving. The opportunity to engage directly with universities helped reposition higher education institutions as approachable partners, strengthening trust and opening pathways for continued collaboration.

Taken together, these voices underscore the human dimension of circular economy transitions. They illustrate that meaningful change depends not only on technical solutions or policy frameworks, but on relationships, participation, and learning through experience. The Living Labs created spaces where sustainability was negotiated, practiced, and internalised—demonstrating that trust, agency, and co-creation are foundational to enduring impact.







Lessons Learned and Actionable Guidance

Drawing on experiences across partner institutions, several cross-cutting lessons emerge that are relevant for universities and stakeholders seeking to implement Living Labs for circular economy and sustainability.

First, participation and ownership are decisive factors in generating impact. Engaging students and communities as active partners, rather than passive recipients, enhances relevance, motivation, and the durability of outcomes. Student-led initiatives, supported by academic mentorship, proved particularly effective in embedding circular economy practices within campus culture and peer networks, while also amplifying impact beyond individual activities.

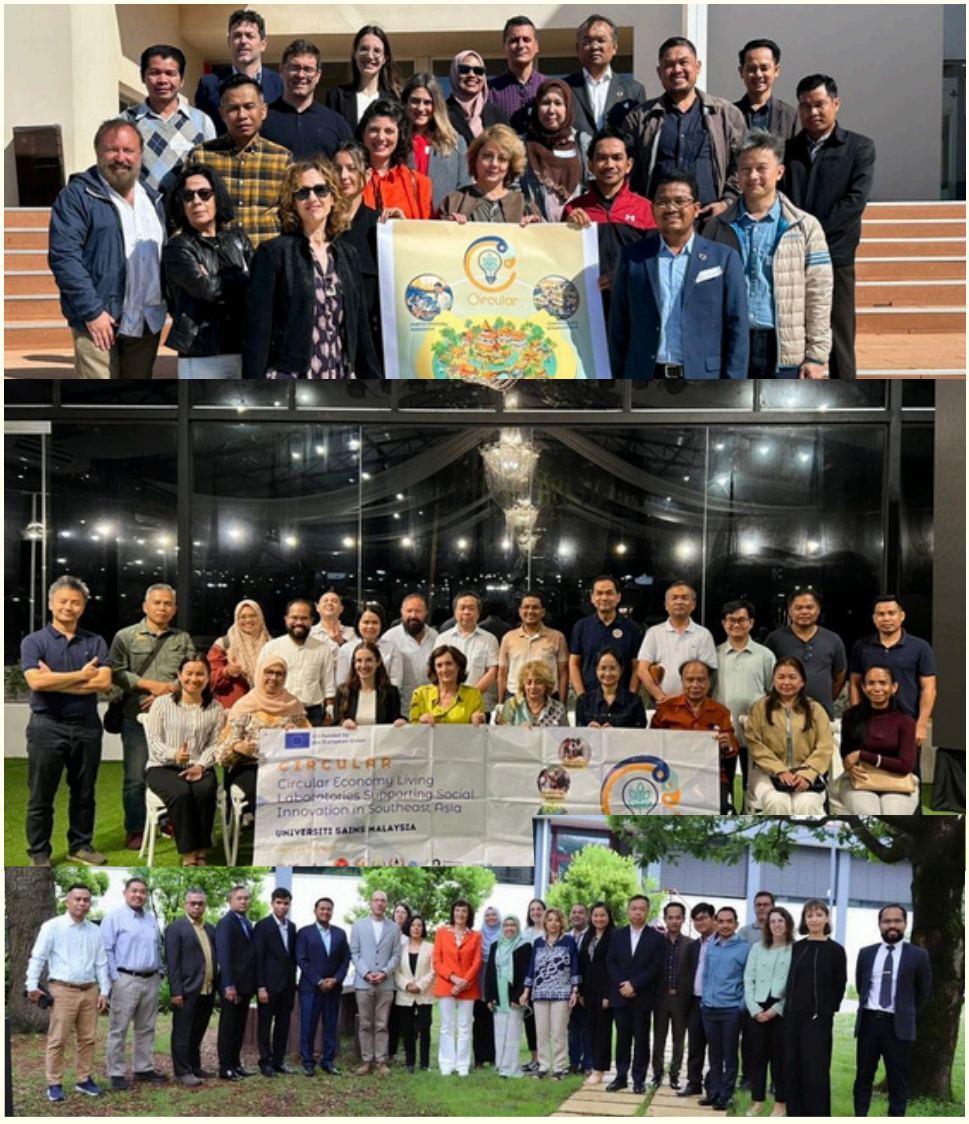
Second, context sensitivity is essential. Living Labs must remain flexible and responsive to local environmental conditions, cultural norms, and institutional capacities. Approaches that proved effective in urban, resource-rich campuses differed from those implemented in regional or resource-constrained settings. This underscores the importance of adaptation rather than replication, with shared principles guiding locally tailored solutions.

Third, visible and hands-on action strengthens learning and behavioural change. Practical activities, such as workshops, upcycling sessions, demonstrations, and collaborative events, made circular economy concepts tangible and memorable. These experiential approaches consistently supported deeper understanding and reflection compared to purely informational or awareness-based interventions, reinforcing the value of learning through doing.

Fourth, institutional support is a critical enabler of sustainability. Recognition of community engagement within academic roles, alignment of Living Lab activities with institutional sustainability strategies, and investment in staff and student capacity building all influence the longevity of Living Labs. Where institutional frameworks supported engagement and experimentation, impacts were more likely to persist beyond project funding.

Finally, Living Labs should be understood as long-term processes rather than short-term projects. Meaningful circular economy transitions require sustained engagement, iterative learning, and space for reflection and adaptation. The CIRCULAR experience demonstrates that Living Labs function most effectively when they are embedded within institutional structures and relationships, allowing change to evolve incrementally over time.

Together, these lessons position the CIRCULAR Living Labs as a practical and transferable approach for universities seeking to contribute to circular economy transitions. By centring participation, contextual relevance, experiential learning, and institutional commitment, Living Labs offer a robust framework for aligning higher education with community-centred sustainability pathways.



Conclusion and Way Forward

The CIRCULAR – Circular Economy Living Laboratories Supporting Social Innovation in Southeast Asia project demonstrates that circular economy transitions are most effective when they are approached as social, educational, and institutional processes, rather than as isolated technical interventions. Across six universities in Malaysia, Cambodia, and Laos, the CIRCULAR Living Labs functioned as enabling platforms where learning, experimentation, and community engagement converged to address locally defined sustainability challenges. The project's significance lies not only in what was implemented, but in how change was generated—through participation, co-creation, and sustained relationships.

A central lesson from CIRCULAR is the evolving role of universities as facilitators and intermediaries in circular economy transitions. Rather than positioning themselves as solution providers, participating universities acted as conveners of dialogue, brokers of knowledge, and supporters of collective learning. Through the Living Labs, universities created credible and inclusive spaces where students, academics, community members, civil society organisations, and public actors could jointly identify challenges, test ideas, and reflect on outcomes.

This facilitative role proved particularly valuable in contexts where sustainability challenges are complex, resource constraints are real, and behavioural change is as critical as technical innovation. By embedding circular economy principles within education, participatory inquiry, and community engagement, universities helped translate global sustainability agendas into locally meaningful practices. In doing so, they reinforced higher education's public mission and demonstrated its relevance to community-centred development.

CIRCULAR is best understood in terms of capacity building and cultural change, rather than the continuation of individual activities. Students developed skills, confidence, and agency that position them as future sustainability leaders and active citizens. Academics expanded their pedagogical and engagement practices, strengthening their ability to work across disciplinary and societal boundaries. Institutions began to normalise sustainability and circular economy thinking as shared responsibilities, supported by experiential learning and community partnership.

Equally important are the relationships and networks established through the Living Labs. Trust between universities and communities was strengthened, creating foundations for ongoing collaboration. These relational outcomes enhance the durability of impact, as they enable adaptation, learning, and co-creation beyond the formal project period. In this sense, CIRCULAR's legacy resides in the social infrastructure required for long-term circular economy transitions.

While firmly rooted in local contexts, the CIRCULAR Living Lab model offers a scalable and replicable framework for other higher education institutions and regions. Its transferability does not depend on replicating specific activities, but on adopting core principles: participation, co-creation, contextual sensitivity, and learning through action. The flexibility of the model allows universities to adapt Living Labs to their own institutional capacities, community needs, and policy environments.

For scaling to be effective, several enabling conditions are critical. These include institutional recognition of community engagement and experiential learning, support for student-led initiatives, and alignment with broader sustainability strategies. When these conditions are present, Living Labs can move from pilot initiatives to embedded institutional practices that support systemic change.
CIRCULAR also demonstrates how universities can contribute to policy-relevant sustainability agendas without positioning themselves as policy-makers. By building awareness, capacity, and social readiness, Living Labs act as bridges between policy intent and everyday practice. They support inclusive governance by enabling dialogue among stakeholders and by grounding sustainability transitions in lived experience.

In the context of Southeast Asia, where diversity of socio-economic and institutional conditions is pronounced, this intermediary role is particularly important. The CIRCULAR experience shows that higher education institutions can enhance the effectiveness of circular economy policies by fostering community engagement, behavioural change, and shared ownership of sustainability goals.

Looking Forward: From Project to Pathway

As CIRCULAR concludes, its Living Labs should be seen not as completed outputs, but as pathways for continued learning and action. The project provides a reference model for universities seeking to align education, research, and engagement with circular economy and social innovation objectives. It invites higher education leaders, policymakers, and community partners to view Living Labs as long-term commitments—spaces where sustainability is practiced, negotiated, and refined over time.

In an era of escalating environmental and social challenges, the CIRCULAR Living Labs offer a compelling reminder that sustainable transitions are built through people, partnerships, and processes of learning. By centring co-creation and trust, and by empowering universities to act as facilitators of change, CIRCULAR contributes a durable and adaptable approach to advancing inclusive, community-centred circular futures in Southeast Asia and beyond.

Acknowledgement

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