GUIDEBOOK ON INTERGRATION OF SOCIAL-ECOLOGICAL TRANSFORMATION
INTO EDUCATIONAL PROGRAMS FOR YOUTH

CIRCULAR ECONOMY

Hanoi, September 2021

Implementation: Center for Development of Community Initiative and Environment (C&E)

Composed by: Le Huy Huan, Vu Dang Hoang, Le Thi Thao
Edited by: Do Thi Huyen, Hoang Thanh Tam, Bui Thi Thanh Thuy
Designed by: Nguyen Huong Giang
Address: R. 510, E1 Building, Trung Tu diplomatic compound, No. 6 Dang Van Ngu st, Dong Da dist, Hanoi, Vietnam.
Phone: +84 24 35738536
Email: ce.center.office@gmail.com
Website: https://ce-center.org.vn/
Social: https://www.facebook.com/Ce.center.vn/

PREFACE

Within the framework of the project “Integrating and advocating for Social Ecological Transformation (SET) in Vietnam’s tertiary education” funded by the Rosa - Luxemburg-Stiftung via the Southeast Asia. Hanoi office (RLS SEA. Hanoi office), **the toolkit supports the integration of socio-ecological transformation to young people’s education on the topic of Circular economy**.

“The toolkit supports the integration of socio-ecological transformation to young people’s education on the topic of Circular Economy. This is a part of the educational toolkits package on ecological lifestyle.

This document encourages and facilitates access to new knowledge for teachers and students. At the same time, it opens up the potential for theoretical and practical application of circular economy in day-to-day life and future work, particularly the application of circular economics to personal and professional life in the face of the challenges of the current climate crisis.

The document will also support young lecturers, trainers and activists to inspire learners in a diverse, exciting and scientific way through integrated methods. The main approach in this document will be education and awareness raising, professional development and practice as well as how to apply circular economics in daily life as a futher perspective for future work. The document focus on Vietnamese students and young leaders with knowledge and skills to respond to climate change, social and ecological crises, and integrating with the socio-ecological movements that are being developed in Vietnam.

Moreover, this document is a tool compiled in an easy to understand way for all individuals and organizations wishing to learn and integrate this topic into community activities. Readers can be an inspiration to their community, regardless of age or occupation. The document is expected to motivate the target audience to practice circular economic activities, offer initiatives and share practical experiences for young practitioners in implementing sustainability in startups and ecological - social projects. The Center for Development of Community Initiative and Environment (C&E) looks forward to receiving comments from organizations and individuals so that this document will be more comprehensive and widely disseminate in the near future.

C&E Center

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Abbreviations

CE	Circular Economy
RLS SEA	Rosa-Luxemburg-Stiftung Southeast Asia. Hanoi office
SET	Social Ecological Transformation
EMF	Ellen MacArthur Foundation
IPCC	Intergovernmental Panel on Climate Change
LULUCF	Landuse, land use changes and forestry
SL	Service Learning
CDIO	Idea creation, design, implementation andoperation
GFN	Global Footprint Network
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services

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PART

01

UNDERSTANDING THE CIRCULAR ECONOMY

UNDERSTANDING THE CIRCULAR ECONOMY

What is the circular economy?

Linear and circular economy

Since the First Industrial Revolution, people have begun to use fossil fuels, from coal, to oil and gas. Technology improvements in mining have resulted in higher rate of mineral exploitation, such as metals and rare earths. Goods began to be produced on an unprecedented scale. Cities are also becoming bigger. Non-biodegradable waste become an inevitable consequence of the economy's production and consumption cycle.

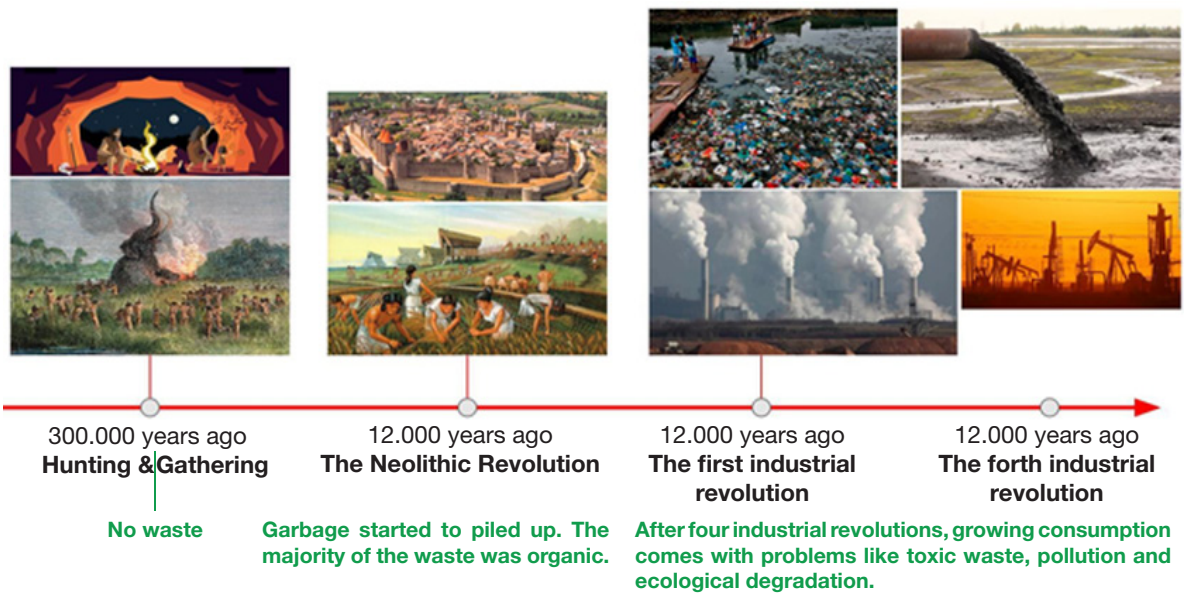


Figure 1. A brief overview of human waste throughout history

(Designed by Trung Pham - C&E Center)

The current environmental crises are deeply rooted in the mindset from the time of the Neolithic Revolution and Pre-Agriculture revolution, which can be called the linear economic mindset. The linear economy has cycles that begin with: (1) Natural resource extraction, then (2) Production, (3) Distribution, (4) Consumption and finally (5) Elimination.

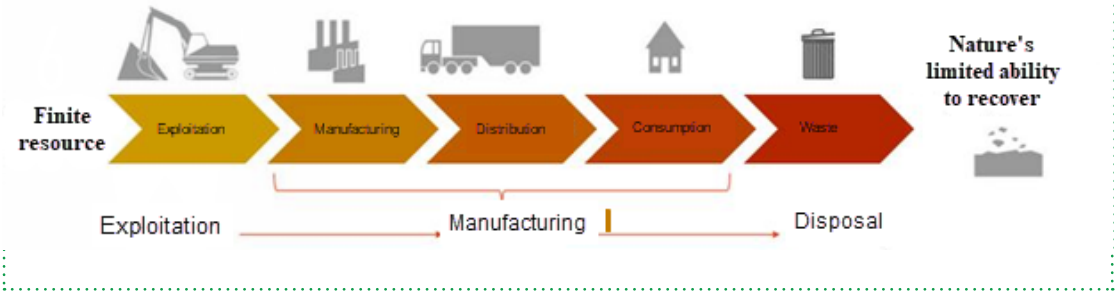


Figure 2. Linear economic cycle [1]

Basically, this is a cycle of taking away without returning. Finite resources are constantly being extracted, while waste is constantly compiling in landfills. This will inevitably lead to resource depletion and environmental pollution.

The ***"linear economy"***, which relies on resource extraction to create products that meet consumer demand, has led to global economic growth and improved human living standards. However, as economies expand and resources gradually deplete, linear economy models have produced serious problems, affecting the sustainability of entire ecosystems, including humans. Therefore, many countries has begun shifting to Circular economy, with recovery and regeneration as core principles to reduce the exploitation of resources and waste to the environment. We will learn more about the circular economy, its characteristics and necessities in this toolkit.

Table 1. The depleting resources on Earth

- Over the past 50 years, the ecological footprint, also known as human consumption of natural resources, has increased by 190% over the same period.[2]
- The Global Footprint Network (GFN), an organization that studies ecological footprints and advocates for setting limits on the exploitation of natural resources, estimates that the demand for natural resources for human economic activities is 1.7 times the earth's capacity. [3]

Illustration: Ecological Footprint

(Photo by @Sustain_Illustr)

Table 2. Resource consumption in Vietnam

- Vietnam's energy consumption in recent years has doubled, compared to GDP growth rate. [4]
- On average, each year, the mining industry provides over 100 million tons of cement limestone, over 70 million cubic meters of conventional building materials, nearly 100 million cubic meters of construction sand, over 40 million tons of clean coal, over 3 million tons of iron ore.
- Vietnam's commercially viable oil and gas reserves are around 814.7 million tons of oil equivalent. Meanwhile, as of September 2, 2009, Vietnam National Oil and Gas Corporation has reached the milestone of exploiting 300 million tons of oil equivalent. [5]

What is the circular economy?

"Circular economy" *is a concept that has been gaining public attention for the last few decades, as a concept of an economic model that's capable of solving some of the sustainability and other problems facing the current economic model that the entire world is facing. Although this is a new concept for many people, since the 1960s, ideas similar to the concept of "circular economy" have been initialized early in the study of sustainable development.*

In 1966, in the essay "The economics of the coming spaceship earth", Kenneath E. Bouldin envisioned that in the future, the economy on Earth would be like a spaceship in space, in which the finite resources inside this spacecraft must be reused, recycling endlessly.

In the decades that followed, economists such as Karl-Goran Maler (Sweden, 1974), Timothy O'Riordan (United Kingdom, 1981), Tom Tietenberg (USA, 1984)... have published studies on economic models and non-linear economic relationships, which have many similarities with the circular economy model. [6, p. 10]

One of the current leading organizations in the study and advocacy of circular economy – the Ellen MacArthur Foundation (EMF), defines ***"Circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the "end of life" concept with restoration, shifts towards the use of renewable energy, eliminate the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and within this, business models ." [7, p. 8]***

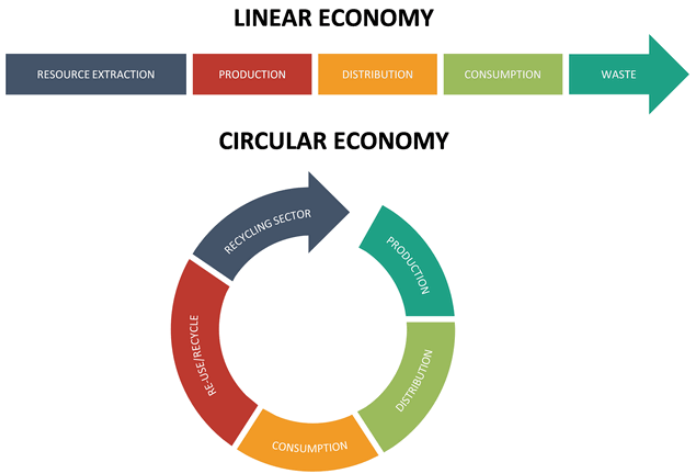


Figure 3. The Circular Economy model versus The Linear Economy model [10]

In a circular economy, economic activity will build and regenerate its own health. This idea highlights the importance of the economy being efficient at all sizes – from small and large businesses, to organisations and individuals, globally and locally. The transition to a circular economy is not just adjustments aimed at reducing the negative impact of the linear economy. Instead, it represents a systemic shift that builds long-term resilience, creates economic opportunities, and provides environmental and social benefits. [7]

Basic principles

The essence of circular economy is restorativeness and regenerativeness, with three basic principles:

1. **Conservation and development of natural capital** through reasonable control of non-recoverable resources and balancing recoverable resources and renewable energy sources;
2. **Optimize resource effectiveness** by circulating non renewable products and materials as much as possible;
3. **Improve the overall performance of the entire system** by specifying and designing to handle negative externalities (waste design, pollution design).[7, p. 23]

The above three principles can be converted into a framework consisting of 6 economic activities, called the ReSOLVE framework, consist of production and business activities that's in line with the nature of circular economic, which helps to build material's life cycles.

(1) Regenerate - the main use of renewable energy and materials, including ecosystem and biological resources regeneration.

(2) Share - *the optimization of resources by sharing them between users and reusers throughout the product's life cycle through activities such as maintenance, repair or upgrade.*

(3) Optimise – *the focus on product performance/efficiency by eliminating waste in production throughout the supply chain.*

(4) Loop - keeping the material in closed production loops by prioritizing material flows (reusing products, extracting waste for materials for production...).

(5) Virtualise - providing virtual goods and services.

(6) Exchange - replacing old materials with advanced materials that cannot be reproduced by attempting to apply new technology or new products and services [8, p. 25]

Circular economy is not a homogeneity model. In an economy, there can be many circular models in product production, circulatory models in the supply chain, inconsumption, and even in the smallest actions,...; Circular economy is not a goal, but a way to achieve sustainability. Currently, there are no criteria for identifying or evaluating the “circular economy” of a city, or a country. The current circular economy indicators are intended to guide and monitor the process of implementation, not to be used for evaluation purposes and ranking. The processes and models designation of operation at a macro level are the important stages in circular economy. Designers need to have the vision that cover the whole product lifecycle to turn waste into resource, from the initial production stage until the product is no longer usable.

Main characteristics of the circular economy

One of the most vivid models describing the concept of industrial engineering is the cycle of products and materials from the EMF Foundation, in which products and materials flow continously through economic activities.

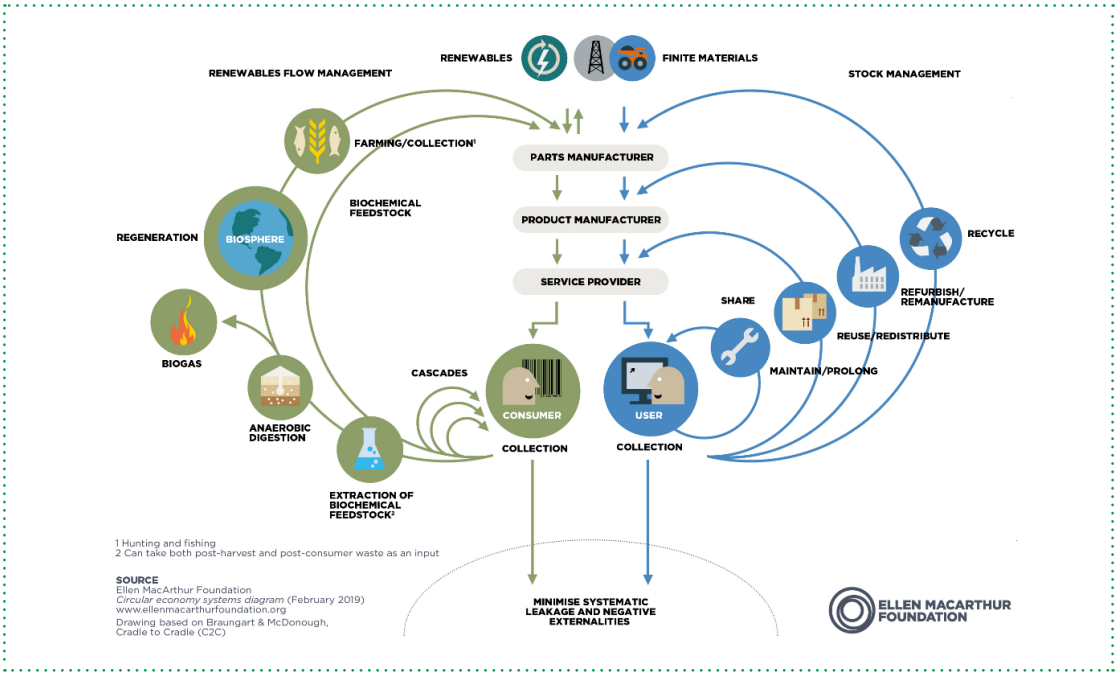


Figure 4. Circular Economic diagram (source: EMF)

In **the circular economic diagram** developed by the EMF Foundation, it is conspicuous that there are two loop that illustrate two basic material cycles: the **renewable, and non-renewable** materials.

Renewable materials are materials of natural origin, which can be decomposed in a relatively simple way,and can be recovered through natural or man-made regeneration. The renewable material cycle is expressed by **biochemical feedstock extraction, anaerobic digestion/ composting, energy recovery (biogas), and restoration,** illustrated by the green loops on the left. When released into the environment, materials will be returned to nature. For example, torned apart cotton jeans can become raw materials for the interior industry, as insulation, before decomposing by anaerobic methods and returning to the environment.

Non-renewable materials (also known as finite resources) are natural resources that cannot be naturally regenerated at a rate fast enough to keep up with consumption rate, such as carbon-based fossil fuels (coal, oil, natural gas), or minerals, metals... In the EMF cycle, non-renewable materials cycles is illustrated on the right. These materials need to be designed to be reusable without much energy, and still maintain the highest quality, This is also the form of material that must not be leaked into the environment as waste, and must be constantly recycled inside the system with their value be preserved.[7, p. 23]

In the non-renewable material cycle, the order of the cycles are as follows:

Maintain/Prolong and **Share:** These are the most preferred loops, with the main focus is of maintaining the usability of the product and material, by extending the life cycle by creating more durable products that are easy to maintain and repair. These long-life products are shared among many users, thereby reducing the need to create new products.

Reuse/Redistribute: Equipment, products, and materials that can be reused many times,or redistributed to other users. Currently, products distributed via eBay can be an example of this cycle.

Refurbish / Remanufacture: This is the process of re-establishing the value of the product. In the process of Remanufacture, the product is dismantled into smaller components, the unusable components will be replaced by new components. The remanufactured product are of the same quality as the new product. In the refurbish process, the editing mainly takes place in the outer shell, usually without the need to dismantle the product.

Recycle: This is the process of product decomposition in terms of the basic raw material level, thereby allowing these materials to become inputs for the new product production process, which is an important process in the circular economy cycles, but because this process consumes manpower and energy, and produces inevitable losses, recycling is not the most preferred process in the system [7, p. 23].

WHY DO WE NEED TO CARE ABOUT THE CIRCULAR ECONOMY?

We have gone through the basic concepts and elements in the circular economy, and have also been introduced to the resources consumption over time. So, let's find out the reasons we need to study circular economy and its benefits to society.

The decline of natural resources

Human activities, most of which are operate in accordance with linear economic model, have been exploiting resources at great intensity, causing the decline of earth's resource reserves.

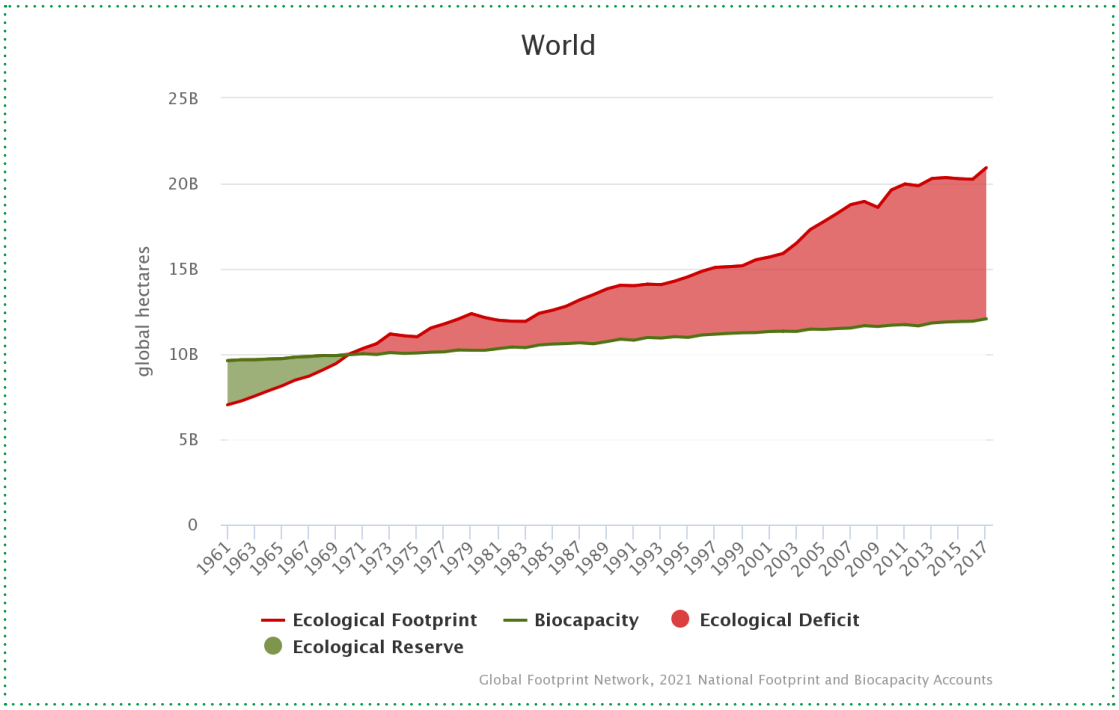


Figure 5 Imbalance in the consumption/regeneration of natural resources according to ecological footprint calculations [3]

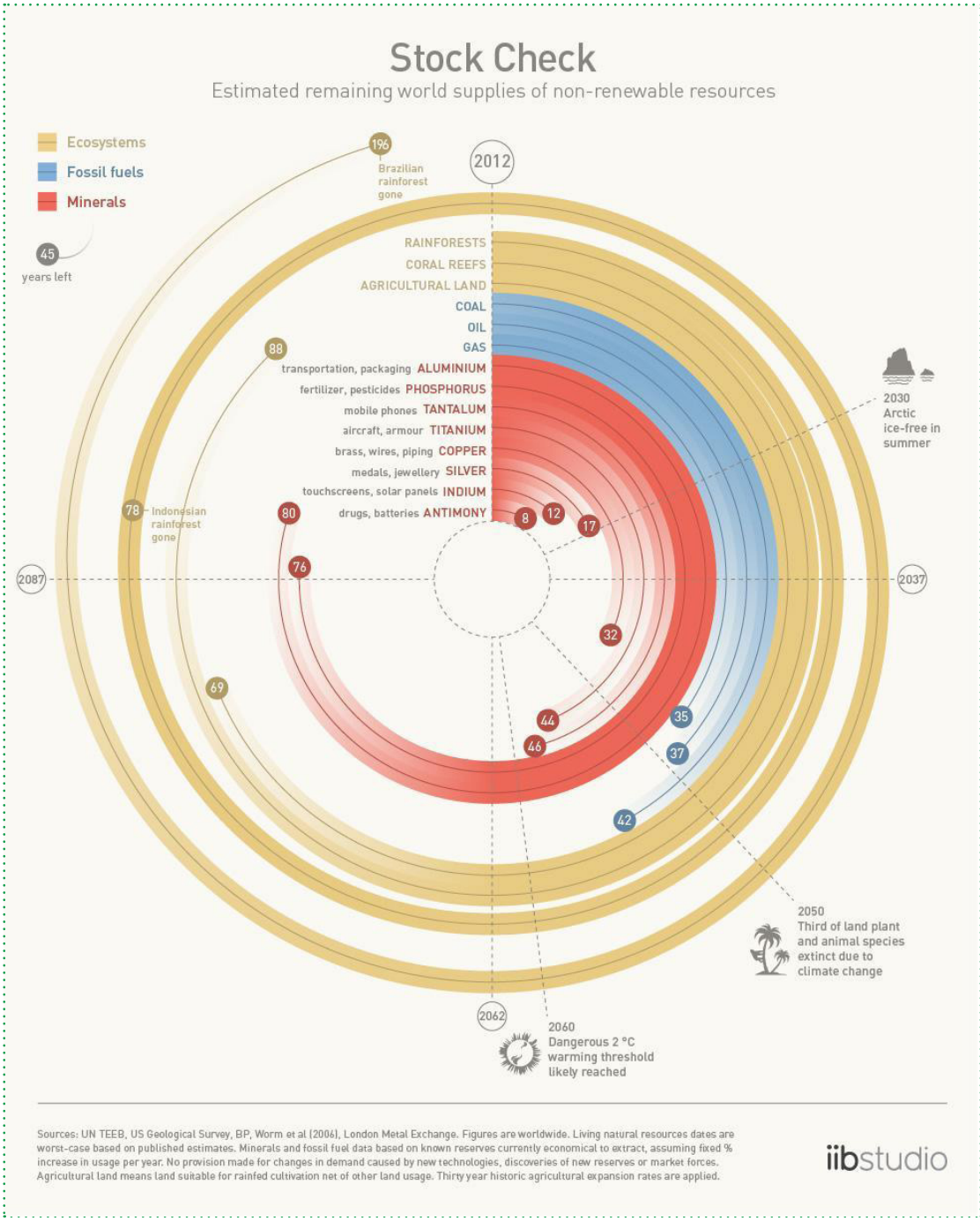


Figure 6. Resource reserves and ecological crisis milestones[9]

The impact of economic activities on the climate

Today's human economic activities not only deplete natural resources, but also accelerate global warming. Greenhouse gas emission[1], such as carbon dioxide (CO2), derived from human activities are the biggest contributor to climate change. This issue is still not properly addressed, leading to increasing greenhouse gas emissions, at the same time, greenhouse gas absorption (carbon sink) such as forests, natural grasslands, mangroves, seagrass and coral reefs, ... are continuing to be destroyed and degraded as well as suffering from other negative effects caused by mining, manufacturing and polluting.

"Greenhouse gases[1] caused by human activities in the 2010s, reached about 51 billion tons per year, of which carbon from increased, from about 275 parts per million (ppm) before the 18th century industrial revolution, to more than 410 ppm by 2020." [10]

"In 2019, the amount of methane (CH4) in the atmosphere was 2.5 times higher than in pre-industrial times. It should be noted that methane has a huge impact on climate change, many times more than CO2. According to the 2021 IPCC report, this gas contributed to an increase in temperatures on Earth by about 0.5 degrees Celsius when comparing the period 2010-2019 with the period 1850-1900."

"Each year the world loses about 75,700 square kilometers of forest, mostly becaused of expanding agriculture." [11]

By 2035, the Arctic Sea will be ice-free in the summer. [12]

There are currently about 1 million plants and animals at risk of extinction within the next few decades. [13]

Under the average, high and very high emission scenarios of the IPCC report 21, (SSP 2-4.5, SSP 3-7.0 and SSP 5.8.5), Earth's temperature will rise by more than 1.5 degrees Celsius compared to the pre-industrial period of 1850-1900 in the years 2021-2040. With a less severe scenario, such has SSP 1-1.9, the temperature rise could still reach 1.5 degrees Celsius.

[1] Greenhouse gases are gases that have the ability to absorb infrared radiation reflected from the earth's surface illuminated by sunlight. After absorption, the heat is scattered, causing a temperature rise effect, also known as the greenhouse effect. Carbon, nitrous oxide, methane and ozone are gases that cause the greenhouse effect.

The pressures of waste

The big difference between the linear and circular economy model is the focus on input materials and output products in business model. By definition, economic models are called linear when they exploit natural materials, and waste at the end of the life cycle. Therefore, as linear economic activities become more active, the problem of waste is also becoming more and more serious.

Table 3. The future of waste

Every year, human produced 2.01 billion tons of waste. Of those, about 33% were not treated safely. Global waste are expected to rise to 3.40 billion tonnes by 2050. [14]

As of 2017, the amount of plastic marine litter that exists in the oceans is already 150 million tons. By 2025, this figure will reach 250 million tons. In that year, for every three million tons of fish, there will be 1 million tons of plastic waste. And by 2050, the total volume of plastic waste will be more the total volume of fishs. [15, p. 22]

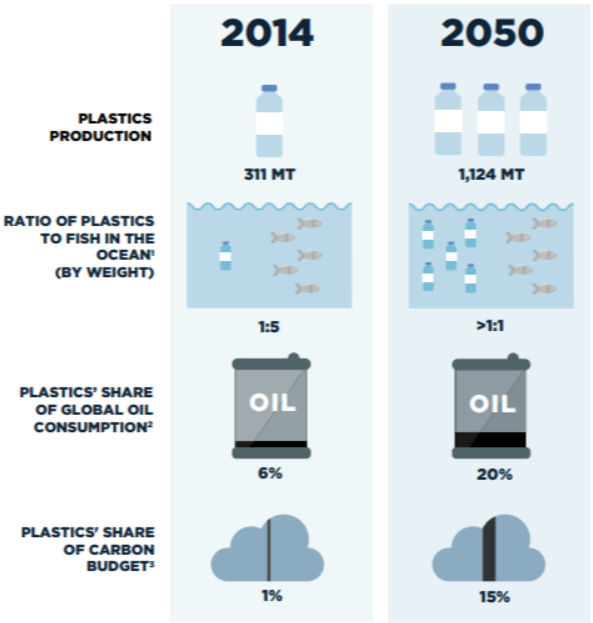


Figure 7. Prediction of plastic garbage in the oceans by 2050[2] [15, p. 28]

[2] Carbon budget is carbon from plastics includes energy used in production and carbon released through incineration and/or energy recovery after-use. The latter is based on 14% incinerated and/or energy recovery in 2014 and 20% in 2050. Carbon budget based on 2 degrees scenario

Table 4. Waste in Vietnam

- Nationwide, solid waste generated is increasing at a rate of about 10% per year, and in the urban area, solid waste is between 10-16% per year.
- Vietnam is ranked 68th in the world in terms of area, 15th in the world in terms of population, but currently is 4th in the world in terms of plastic waste, with 1.83 million tons per year. [16]

These issues point to the importance of changing the current economic model towards sustainability, with designs that put the environment and socio-ecological issues at the center. And the circular economy model can be a potential resolution, not only in bringing economic and social benefits but also environmental sustainability. [17]

The benefits of a circular economy model

In comparison to the Sustainable Development Goals (SDGs) set by the United Nations General Assembly, the goals of the circular economy have many similarities, and can serve as the platform that contribute directly and indirectly to the achievement of the SDGs. Some of the direct effects can be:

SDG 6 - Clean Water and Sanitation: Initiatives such as sustainable small-scale water sanitation systems and wastewater treatment, water reuse and recycling systemt, nutrient recovery processes, biogas, etc. contribute to achieving equitable access to water and sanitation, reduce pollution and improve water quality.

Figure 8. SDG No 6
Clean water and sanitation

SDG 7 - Clean and Affordable Energy: Renewable energy systems, including small-scale biomass energy (e.g. Biogas) and biofuels, energy efficient use in industrial systems will all contribute to this SDG.

Figure 9. SDG No 7
Affordable and Clean Energy

SDG 8 - Sustainable employment and economic growth: Circular business models have the potential to contribute to increased resource management efficiency, waste pricing, and employment additions in environmentally responsible sectors.

Figure 10. SDG No 8
Employment and Economic Growth

SDG 12 - Sustainable consumption and production: Many circular economy models can detach economic activities from resources exploitaion, reduce the environmental and social impacts. More importantly, this goal is the impetus to achieve most other SDGs, helping to drive many indirect impacts from circular economy practices.

Figure 11. SDG No 12
Responsible consumption
and production

SDG 15 – Protecting and restoring the ecosystem: The core of economic activities is the purpose of restoring natural capital. This involves the application of sustainable and renewable combined agricultural and agroforestry practices that capture and protect biodiversity and return biological matter to soils as nutrients – basic practices for restoring terrestrial ecosystems.

Figure 12. SDG No 15 Life on land

In addition, when analyzing in depth the specific objectives of the 17 SDGs, it is to indicated that up to 134 out of 169 specific SDGs objectives are closely related, which can benefit indirect contributions from circular economy activities. [18] [19]

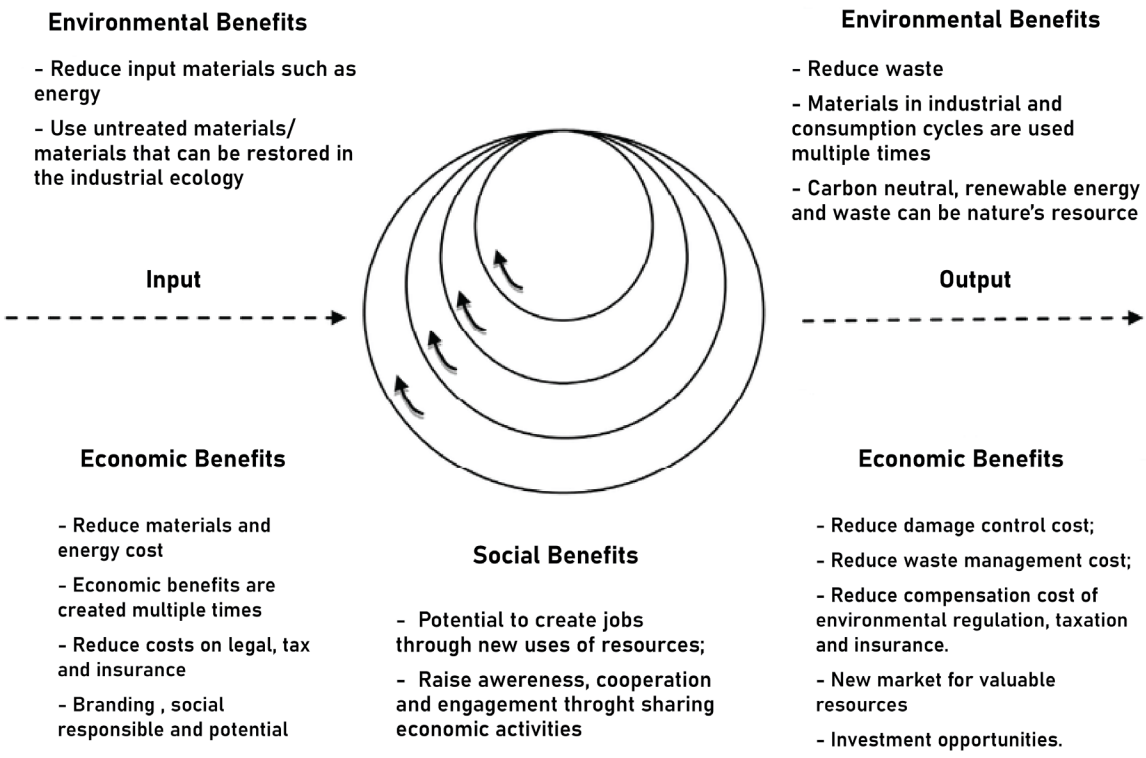


Figure 13. Benefits of circular economy [20]

SHIFTING FROM A LINEAR ECONOMIC MODEL TO A CIRCULAR ECONOMY MODEL

How can we move toward the circular economy?

Currently, there are many approaches in transforming toward the cicular economy model. We can divide them into two main directions:

(i) The systematic approach: from local level (enterprise, industrial park, city, province) or regional (intercity, inter-city), national or even inter-national level. Basically, this approach is the integration of business and production activities into material cycles in the economic space. At the same time, it develop cooperative mechanisms and solutions (networks, regulations, promotions...) to direct the economy in a general direction.

(ii) The second approach focus on analysis of products and raw materials : this approach focuses on manufacturing units, industry ecosystems by industry group, product or by raw materials. [21]

In this document, we will analyze the solutions to transform from linear economy to circular economy for the busines sector. The solutions introduced are initiatives that are applicable to enterprises, cooperatives, business households….

In the past, products from the circular economy model were often aimed toward niche segments of the market. However, there have been analyses by foundation such as the EMF Foundation, showing that the concept works effectively and feasibly in terms of economic benefits as well as potentially scalable with diverse products, regardless of what type of product that product belongs to, with how long it lasts.[7, p. 10]

For businesses, there are many ways to apply circular economic principles. The transition to circular economy can refer to the 4 principles proposed by the EMF Foundation as below.

Principles of value creation of the circular economy

The principles of economic economy have showed its economic potential. The competitive advantages and economic value of cycles such as reuse, remanufacturing, and recycling, etc.. are different for each type of product, no matter what geographic region or segment they are in. Still, we can have four simple principles for creating value in the circular economy.

Building material circulations

Source: EMF

This principle focus on resource efficiency. Unlike the linear economic model, the circular economy model will have inputs from reusable, upgraded, repaired procedures. The higher the efficiency of the cycles, the greater the possibility of savingmaterials, energy, and other resource. Toxic water and emissions will be reduced. When recycling, remanufacturing and reusing activities are efficiently implemented during operation, more values are created in comparison to the linear model. Whenever the costs of collecting, reprocessing, and returning the product, component or material back to the economy, it's generally lower than the linear option (including avoidance of end-of-life treatment costs). Therefore, the establishment of a circular system using principles can contribute to creating economic value [7, p. 30].

Lengthen the cycle of raw materials and products

Source: EMF

This principle aims to create more consecutive cycles (be it reuse, reproduction or recycling) or maximize the time within a cycle. The core value is that products, components and materials are kept longer in production cycles that's circular characteristically . This can be done by creating more consecutive cycles (e.g., increasing the number of repairs and recycling of machinery engines), or by lengthen one cycle (e.g., extending the cycle capacity of the washing machine from 1,000 to 10,000). This principle will maximize the value of materials, replace the input materials extracted from the environment and reduce material loss out of the economy [7, p. 30].

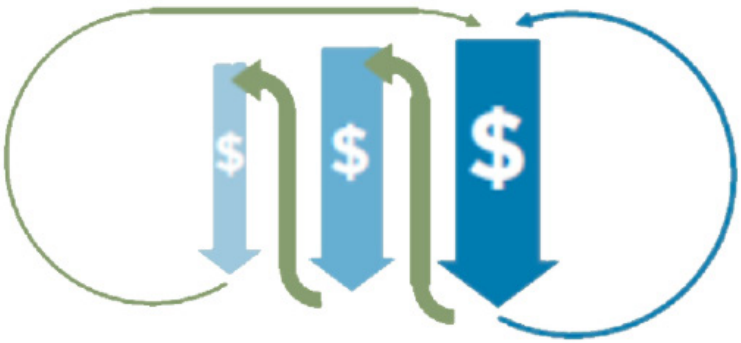
Another example that has emerged in recent years are sharing business models, such as ride-sharing, or equipment rental services, which were previously commonly applied in large businesses, now have reached household level. With the advancement of technology, today these models become easy to operate in practice, can empowering and shift the reuse, remanufature, and repair activities to professionals. These cycles are empowered to be more efficient, and maximize the usage of materiasl.

Table 5. An approach on usage & consumption

The Ellen MacArthur Foundation's circular economy model distinguish between "consumption" and "use". In circular economy, a renewable material is the only material that can apply the term "consume" , while the non-renewable material is type of material that can be "used". It is not reasonable to assume that using a washing machine, or a car, is the same as consuming food. This is a small, but very important point in how to view the human's relationship with materials.

This view raises questions about whether we need to own a product in the traditional way. Why own a drill when all we need is a few holes in the wall to hang the paintings? It can be said that the circular economy model will focus on creating services that bring higher values than owning products. Understanding the nature of this shift is an important step for individuals and businesses to practice the transformation from linear to circular.

Production cascading and products/raw materials substitutions



Source: EMF

This principle focus on the diversification of reusing across the entire value chain. For example, when used cotton clothing is first transferred to the interior industry in the form of lint in upholstery and fillers, then reused in insulation for construction—replacing the raw material line — before the cotton fibers are safely returned to the environment.

While the principle of lengthen the product lifecycle emphasizes the reuse of the same products and raw materials in the cycle, the principle of cascading focus on the ability to use one industry's product as source for the other to create economic benefits and save resources. In cycles, the arbitrage value creation potential is based on the reuse of cascaded materials that cost less than raw materials and their related costs (labor, energy) as well as externalities against the marginal costs of bringing the material back into a repurposed use. [7, p. 31].

Build non-toxic and easily separated input/output sources

Source: EMF

We've seen that the material in the circulatory model can be the used materials/products from another industry. The value of manufacturing activities in circular economy is further increased when the recycled materials for production are not contaminated. This contributes to higher efficiency of collection and redistribution while maintaining quality, especially non-renewable materials, thereby extending the life of the product and increasing the efficiency of using raw materials. The strength of this principle lies in the fact that the potential to reach higher value is relied on the purer, better quality cycles. This principle has been applied by the packaging processing industry when the packaging type is produced with recycled materials, while limiting the combination of many materials such as plastic, paper, metal... to make recovery, sorting and recycling more efficient. [7, p. 8].

Table 6. The current circulation of material.

Circle Economy, a non-profit organization advocate for circular economy, is one of the organization that has measured the level of circulation of the world economy today. The organization's Circular Gap 2020 report provided data on the total amount of raw materials in the economy, there are 100.6 billion tons of materials in the world, of which 48.0 billion tons have been put into long-term storage.

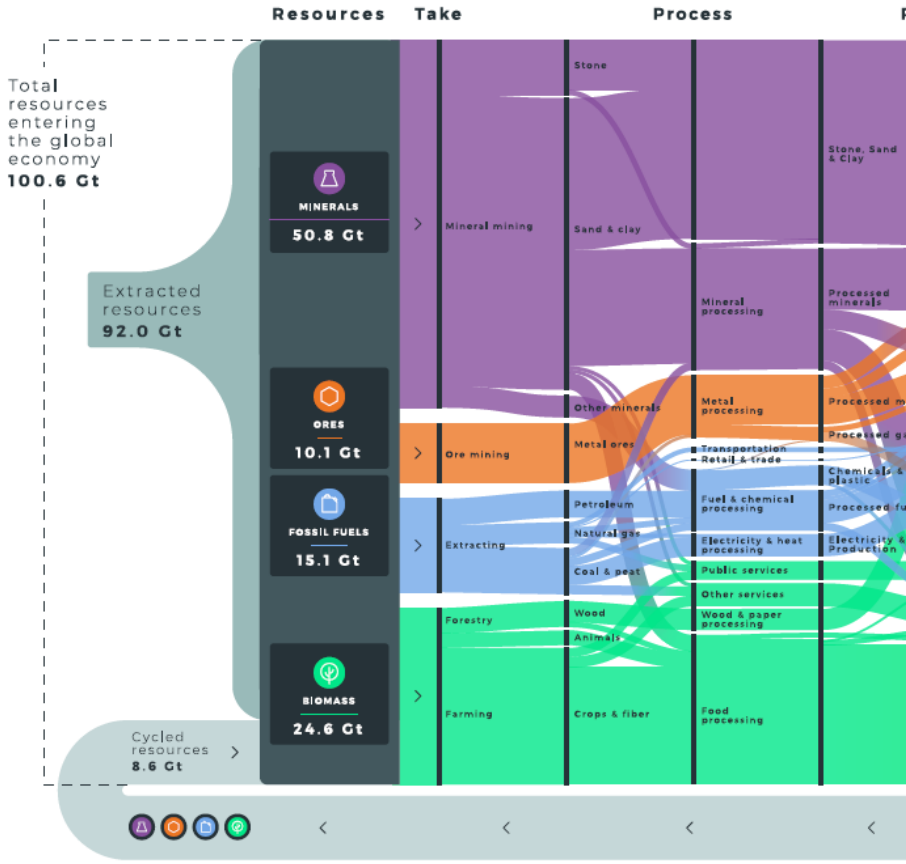


Figure 1 The global resource footprint behind meeting key societal needs showing the numbers that indicate our global economy is only 8.6% circular.

Figure 14. Flow of material through the economy, Source: Circularity Gap Report 2021

The report showed that 32.6 billion tons of materials and products are treated as waste. The majority of these wastes, which is about 23.9 billion tons are lost, or either buried, burned, or wasted during extraction, operation, or segmentation of waste that has not been calculated. Of the materials classified as waste, only 8.65 billion tons or 8.6% of society's total material is circulated. [22, p. 19]

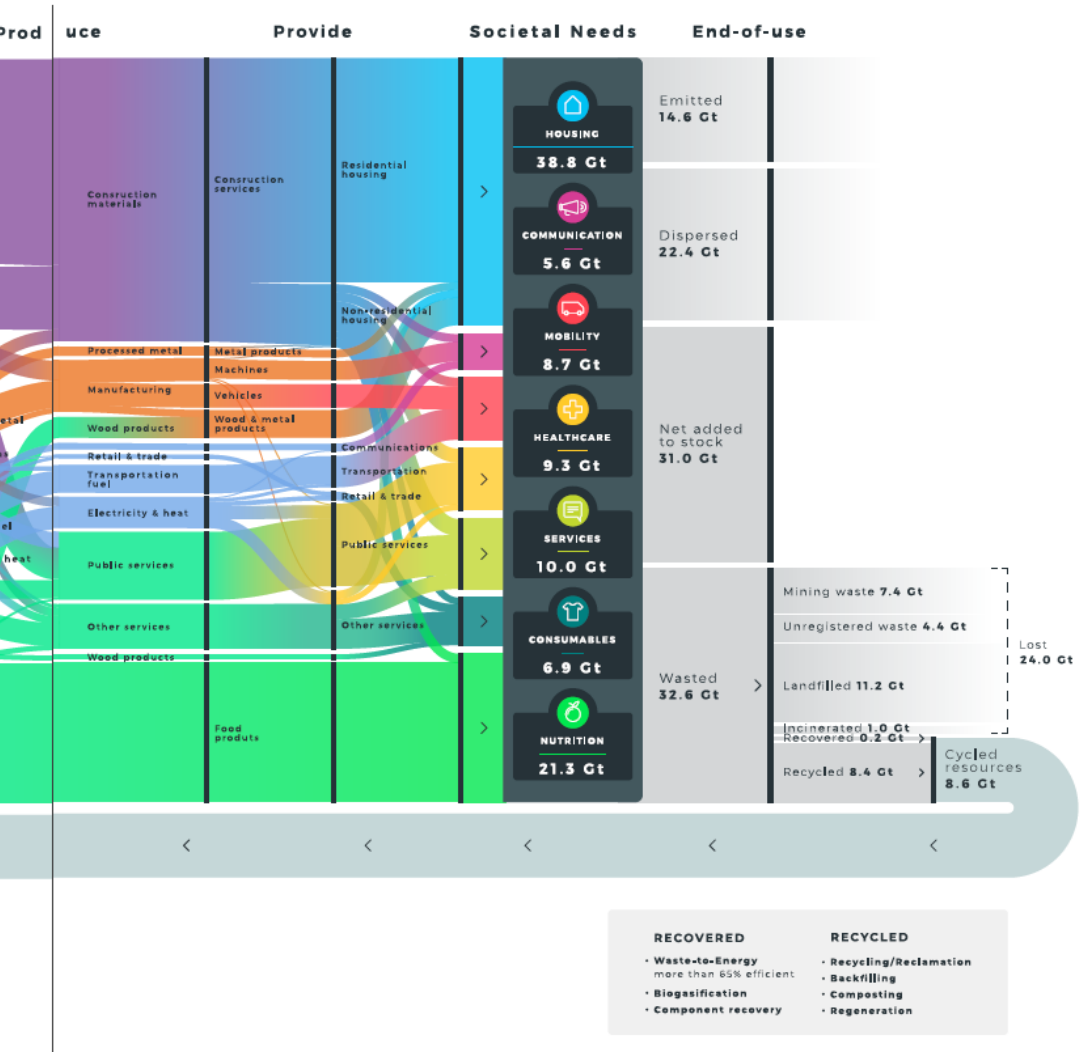


Table 6. A calculaton on the level of circularity

The Ellen Macarthur Foundation introduces an analytical method for calculating the level of circulation in a product. This method compares the inputs that make up a product in the usual fashion("linear") and compares it to the inputs to create a product in a circular model. This method focuses on five main factors:

Raw material	This factor compares the quality of linear and circulatory materials. The unit charged here is the U.S. Dollar, as it will be difficult to compare by other units (such as weight).
Labor	This factor takes into account the amount of labor required to create a new product, and compares it to the amount of labor to produce the same product in the circular model. (including refurbishment of old products, or recycling, reusing products).
Energy input	With each product, compare the energy needed to create the product between the linear model and the circulatory model.
Carbon emissions	On each product, the carbon emissions generated during production are compared between the two models.
Trade balance	According to the EMF, this factor compares input materials and considers which materials are imported into the country (European Union), thereby calculating how to affect its circularity.

In applying the above-mentioned calculating method, EMF has demonstrated that certain types of products such as mobile phones, washing machines, and light transport equipment will be more profitable if they are manufactured in a circular approach.[7, p. 39]

USE OF CIRCULATION AND ECOLOGICAL LIFESTYLE IN SOCIO-ECOLOGICAL TRANSFORMATION

Transforming the economy from linear to circular is an important piece in the overall picture of sustainable development. In that shift, the behavior and lifestyle of each individual, correlated with socio-economic-- environment principles are important factor.

From understanding the nature of consumption in the Circular economy...

At the moment, we don't have much research on circular consumption lifestyle (Juana Camacho-Otero's analysis of circulatory consumption with colleagues in the previous section was one of the first, published in 2018).

The biggest differences of circular consumption compared to other models are the implications that the products give users and their changing view on consumer actions. The concept of "consumption" in the circular economy includes the following aspects:

- **Personal ownership of the product is decreased:** In some circulatory models, users do not own a product, they only use and benefit from the functionality of that product. Ownership decreases, so users will somewhat reduce the need to express themselves through stuffs they own.

- **Improve the human relationship between users and producers:** Community connectivity, collaboration, and exchange will be further developed through shared activities in the consumer community and in buyer-seller communication. These relationships are usually built and developed naturally rather than being influenced by the manufacturer's intentions.

- **Create new values:** Although circular consumption is still a consumer behavior, so products are still functionally valuable, many studies have proven they also offer symbolic values, such as simplicity and happiness.

- **Escape from common opinions about consumption:** In the past, materials partly represent people's classes in society, leading to the appreciation toward buying and owning. But in the circular economy, consumption towards reducing materiality is one of the main elements. [23, p. 14]

The above principles have shown many common things between circular consumption and ecological lifestyle. It can be stated that circular consumption lifestyles are in line with eco-friendly

lifestyles and other vital principles about environmental conservation. Besides, with the focus on the relationship between people and the commodity economy of circular consumption, we can consider seeing circular consumption as one character of the eco-lifestyle – which covers many idea such as Water and Energy conservation, Food waste reduction, sustainable transportation and entertainment, etc.

> "Consumer behavior plays an important role in creating consumer trends" (UNEP).

To actual actions

It's obvious that the improvement of consumer's knowledge and their growing support for ecological and sustainable lifestyles will be strong driving forces for businesses and economies to shift to circular economic models. As consumers, we have every right to choose the ways and products we consume every day. Our choice help shape the direction of future production and consumption trends.

For example, just a few years ago, the problem of plastic waste, and then the "Say no to plastic bags" movement are still something quite new to everyone, but today, the movement to reduce plastic waste generation, plastic bags, single-use plastics has attracted much greater attention. Many manufacturers are also becoming more interested in developing environmentally friendly solutions about environmental packaging. That shift is originally initiated from the perception and behavior change of pioneering consumers.

Fair use of ecological products is also our way of demonstrating consumer rights, creating consumption trends that respect the environment and human rights, and supporting socially responsible manufacturers. The more people are interested in fair ecological products, the more incentives the manufacturers will have to change towards more sustainable production methods, thereby spreading positive change.

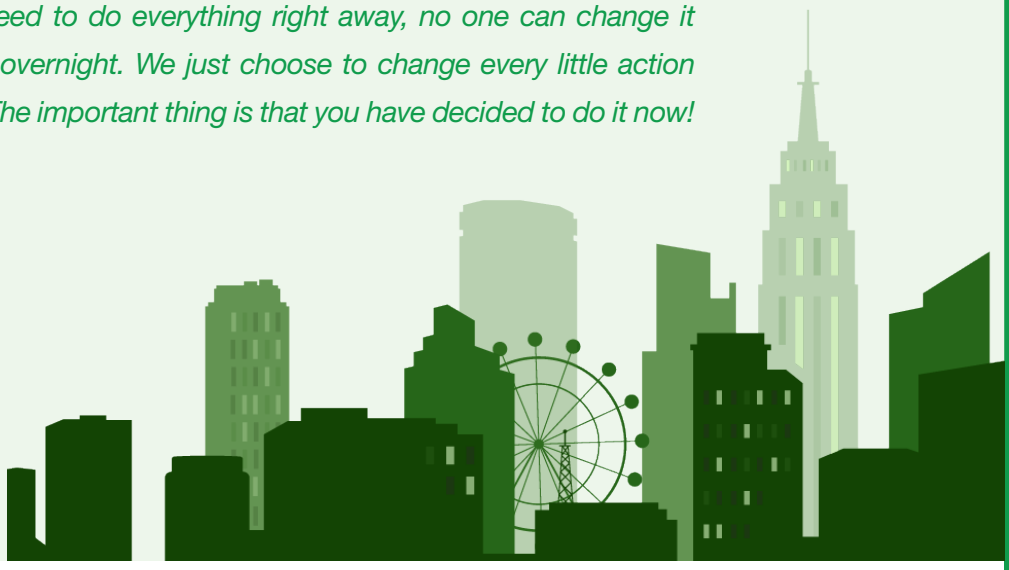
And challenges for the community.

In order to make recycling, reusing and sharing resources to be more popular and attractive to the manufacturers than the old way of the linear economic model, it is important to mobilize policy and disseminate public knowledge. These activities can be carried out by many parties, from individuals, businesses, government agencies, to other social organizations. Non-market mechanisms and movements can provide big impact on promoting the formation of circular economic models.

For example, the regulation of components and raw materials in the production of heavy and light industrial products will help the community support businesses in identifying factors that can improve and upgrade circulation in production activities. Other activities such as education and the integration in teaching and learning programs, improving professional skills also have a great role in helping organizations build and improve the curent production models, monitoring and supervising the comliance of circular economy principles in their organizations. [7, p. 60]

In circular economy,products and materials serves as both the input and output . There will need to be concern from the media on topics such as safety and risk management so that the community has more understanding of circulatory products. This is a very important stage in making the consumption of products from the circular economy mor popular. [23, p. 14]

We don't need to do everything right away, no one can change it completely overnight. We just choose to change every little action every day. The important thing is that you have decided to do it now!



PART

02

CIRCULAR ECONOMY MODEL: CASE STUDIES

Although it is still a new concept, circular economy has gradually been applied to production and business activities in many countries around the world – not only in advanced countries, where the level of production, the industrial foundation has been well established, but also in developing countries. In order to provide the readers with various circular economic initiatives and solutions, this document will introduce a number of examples by sectors such as industrial manufacturing, agriculture, food and consumption. Since the indicators of the circular economy are intended to guide and monitor, not to determine the level of circularity, readers can use the principles in this document to find more practical business solutions.

MANUFACTURING

Most businesses around the world are in the early stages of adopting sustainable development practices or other concept such as circular economy. For the circular economy model, business leaders often point to aspects such as emissions reduction and recycling activities, without much attention to product designing and product life lengthening. However, the above issues has been tackle by some businesses that have seized the opportunity and pioneered in pilot production-business models in the direction of circular economy.

Circular economic practices in industry often include:

- **Maintain/Prolong and Share:** Services that maintain and repair goods and materials that can be used for longer, or models that share products/services for multiple users.
- **Reuse / Redistribute:** Forms of reuse of used equipment, materials, or business activities, redistribution of equipment, materials, and goods to users, or other manufacturers.
- **Refurbish / Remanufacture:** Services that repair, remanufacture products, or services that separate, recall parts of goods and use them in the manufacturing of products.
- **Recycle:** Activities that turn goods into basic materials, thereby allowing these materials to become inputs for the new product manufacturing cycle.

We'll look at some examples of circular economic models in the industry. The examples below represent a number of cycles such as Remanufacture is represented by a Bestbuy-HP collaboration,or Prolong such as Philips service.

Best Buy and HP - A collaboration between manufacturer + retailer

Best Buy, a major U.S. retailer, has partnered with device maker HP in a printer recall model. Best Buy offers customers a way to dispose of old printers by reselling old printer and printing materials that are broken, or no longer in need. They have collected more than 1.7 billion pounds of raw materials since 2009, when the program was first initiated, and are expected to collect about 2 billion pounds of raw materials by 2020.

Under the partnership between Best Buy and HP, new printers will be manufactured by HP by reusing the inputs of old printer devices that Best Buy acquired. It took them years to develop this model, but to date, there are 03 lines of printer: hp envy photo 6200, 7100, and 7800 printers produced from plastic and electronic parts collected from the program.[6, p. 253]

Figure 15. Best Buy's printing equipment and supplies collection area
(Source: US 's Chamber of Commerce Foundation)

Lighting service rental – Philips

An idea to apply circular economy in Philips's services, a long-standing supplier of lighting equipment in the Netherlands, has given users a different option than buying lighting equipment. When using this service, users pay for the use of light, while the business will take care of research, improvement and especially handling technical risks. When the equipment is no longer suitable, Philips recalls and reuses them. This service is currently available in Singapore and Buenos Aires. According to this option, the amount of energy consumed by the installation of new light bulbs such as LEDs allows for up to 50-70% of the energy savings in organization contracted with Philips.

Not only is it developing services in the lighting sector, for healthcare, Philips is also adopting a circular model towards building equipment lease partnerships, and it can recover old equipment, recycle them, upgrade them and resell them.

As of 2016, 9% of Philips' revenue comes from products belonging to the company's circular model.

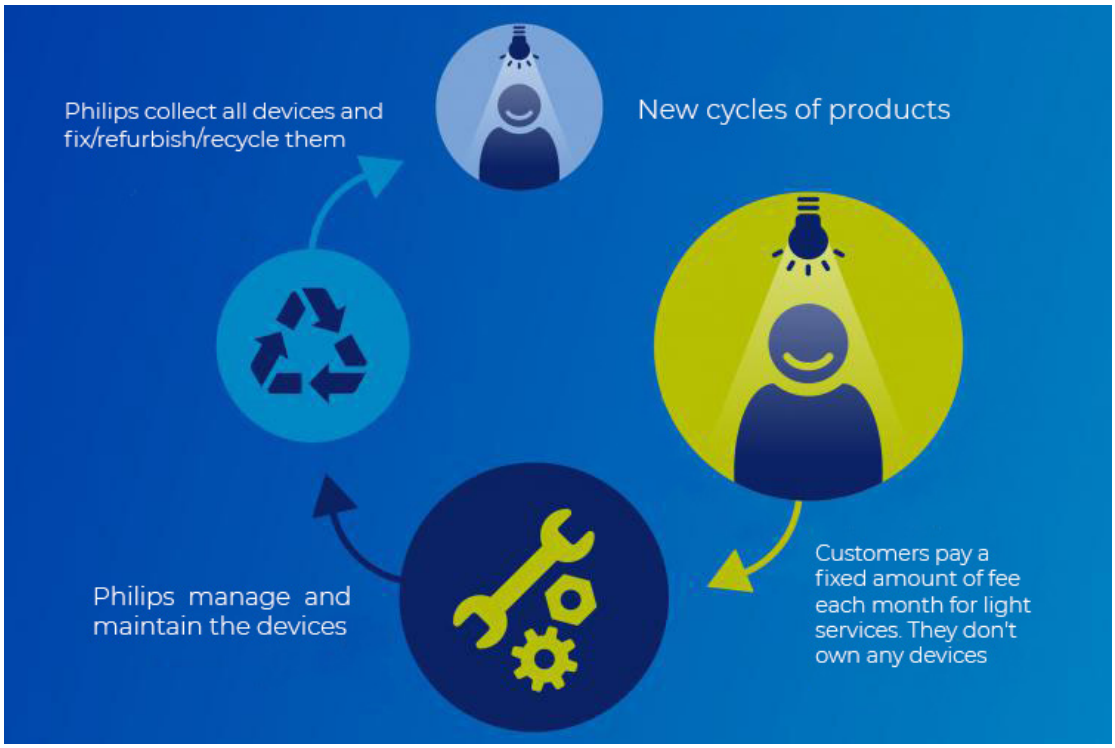


Figure 16. Philips Light Service Model [24]

AGRICULTURE

Food security is increasingly gaining interest in the world, in the context of climate change and global warming in particular is becoming more and more serious. Therefore, the application of modern, circular agricultural models will contribute to increasing the sustainability of each link in the value chain, contribute to protecting biodiversity, protecting water resources and mitigating the impacts of climate change. [6]

If we use the EMF diagram, we can define that circular economic practices in agriculture are often generalized into the following groups:

- **Biochemical refraction:** The production of high-impact, affordable probiotics, or the production of bio-energy from agricultural by-products, such as biological gasoline production processes, or probiotics in bio-linings that treat waste in livestock area.
- **Anaerobic/composting treatment:** sorting and recovering leftovers, agricultural by-products for composting as fertilizer.
- **Energy recovery:** Accumulation of other types of energy from composting and by-product processing, such as biogas and Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IFES).
- **Regeneration:** uses of materials from the above-mentioned processes for agricultural production, such as the garden-pond-pigsty model.

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services in An Giang

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services are production systems designed to integrate and produce food and energy simultaneously in two directions:

1. **Type 1:** Production of food, food and energy simultaneously in one area, through cultivation in various forms or through agroforestry system;
2. **Type 2:** Production systems that optimize the use of biomass for the production of food and energy as well as for other valuable products.

Currently, there are 7 IFES models being implemented in a number of provinces in Vietnam, including: Rice cultivation and modified stoves, Rice cultivation and use chaff wood for energy, Livestock and Bio-gas and the use of bio-sludge as fertilizer for fruit/rice crops [in small scale], Livestock & use biogas to produce electricity & bio-sludge as compost [medium/large scale], Coconut farming & agroforestry, with coconut byproducts are used as energy, pangasius farming and biodiesel processing from fish fillet production, combined with other agroforestry models.

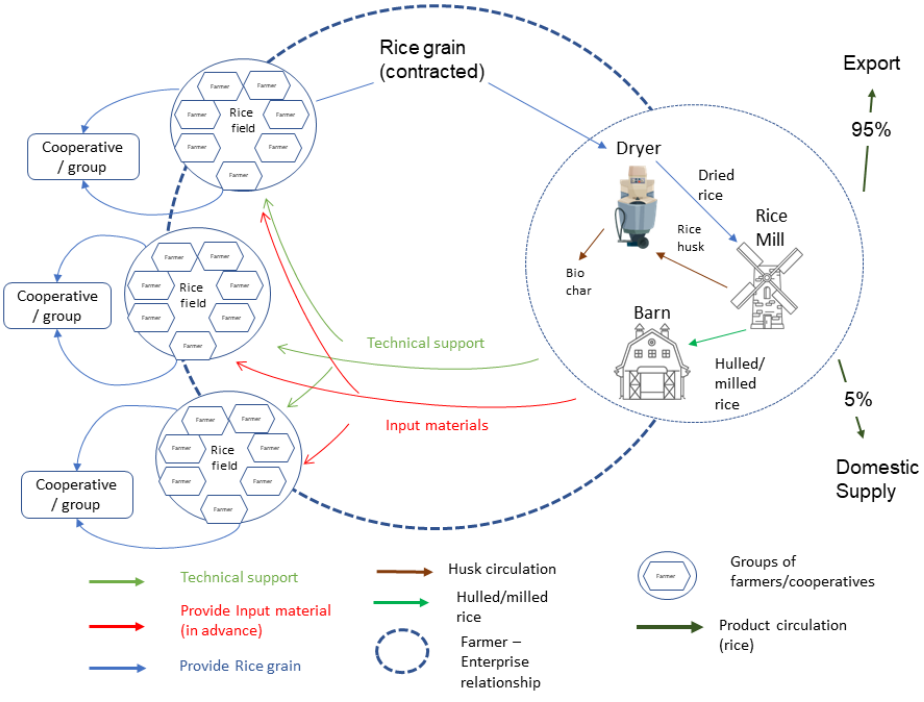


Figure 17. IFES rice production model at Vinh Binh rice mill, An Giang

By applying IFES models, farmers can reduce costs by saving fuel and input materials. For example, DK-T5 stoves can reduce energy use in cooking by 30-40% and therefore fuel costs would decrease from 800,000 to 1.2 million VND/household. In addition, the use of the improved stove can improve women and children's health, especially reducing eye and respiratory diseases, and reduce the pollutants generated by the burning of industrial coal/gas in poorly ventilated rooms. The use of improved stoves also contributes to reducing the burning of straw in the field.

The results showed that the seven IFES models were economically and environmentally viable. Cost and benefit analysis shows that economic, social and environmental benefits have been more prioritized in IFES models than other models.

Model of coconut production and processing chain in Ben Tre

The coconut industry in Ben Tre province, Vietnam has developed rapidly in many directions in commodities, accounting for a large proportion in the manufacturing industry, and is considered a key economic sector of the province. Currently, the province has nearly 2,000 coconut processing facilities, with many models and scales, capable of processing all coconut in the Mekong Delta. The industrial production value of coconut products in 2018 reached VND 3,300 billion, accounting for 12.34% of the value of industrial production.

Coconut products are divided into 2 groups: refined processing (coconut candy, grated coconut rice, canned coconut milk, canned coconut milk, coconut milk powder, activated carbon, virgin coconut oil, mask from high-value coconut jelly) and crude processing (crude coconut oil, coarse coconut jelly, coconut fiber, products from threads, sintered coal). In addition to processing products, Ben Tre is also famous for producing handicraft products from coconut (coconut wood, coconut dipper, coconut fiber, coconut stalks, coconuts as decoration). The export value of coconut has reached nearly US$225 million (accounting for more than one-fifth of the province's total export turnover).

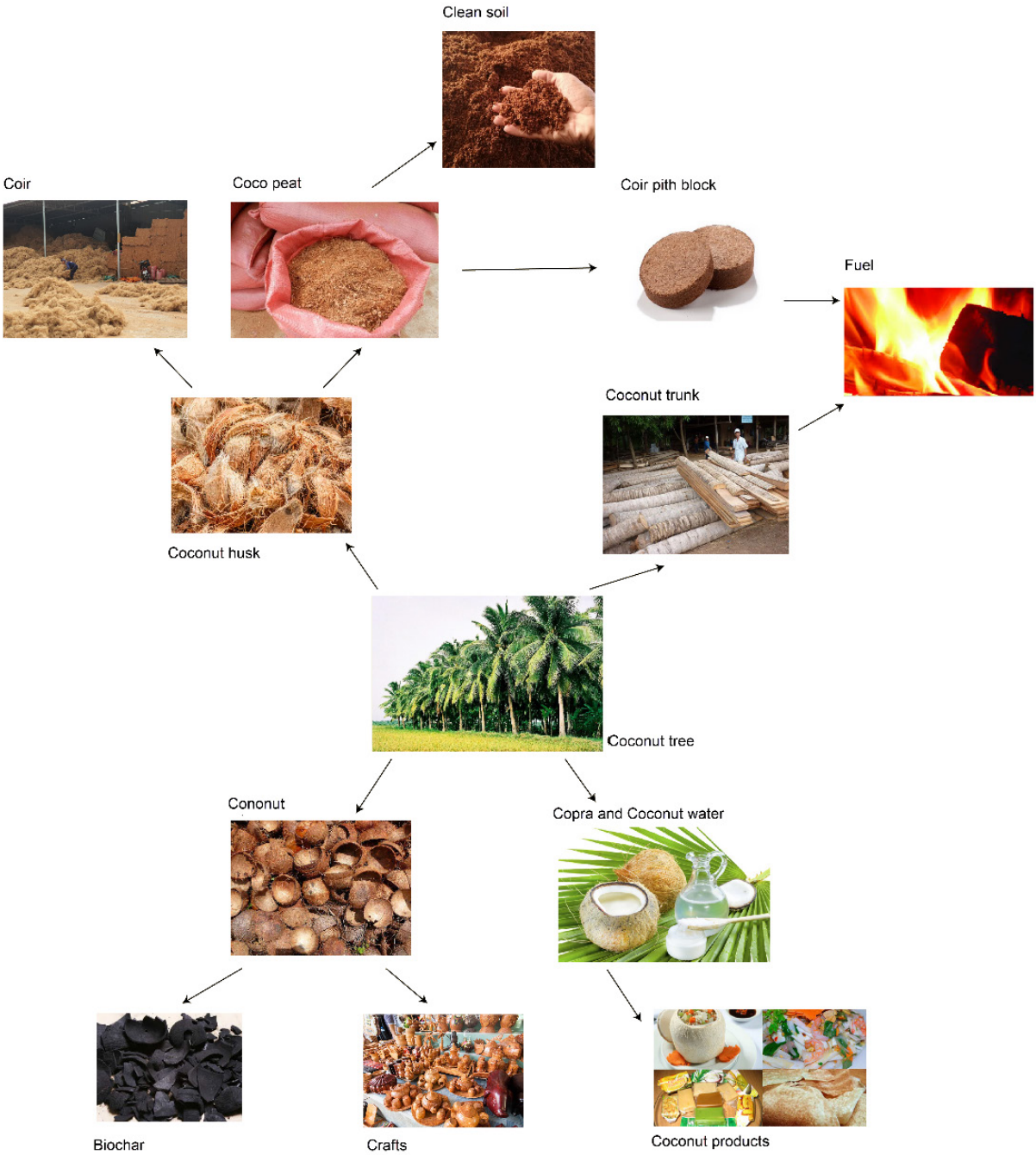


Figure 18. Coconut processing model in Ben Tre

FOOD

At various stages (from harvest to consumption), food is thrown away even if it is still usable. It is estimated that up to 30% of the food produced for human consumption in the world is discarded during the process of collecting, production, distribution, or were waste in consumption. [29] We'll explore a few examples of circular economy in food processing.

Toast Ale - a circular economy model in alcoholic beverage.

As a well-known brewing business in the United Kingdom, Toast Ale has begun the initiative to use raw materials from unused bread from bakeries and sandwich manufacturers. Usually, these breads will be dumped as garbage. But in Toast Ale's model, the bread replaced a third of the pure malted barley they needed to produce beer. The company has been actively expanding their recycling program, from more than 11 tons of bread at the beginning, and the 2020 target is at least 100 tons. Toast Ale also builds communication programs for its customer community that encourages proper use of food, reducing the waste of leftovers, which is still an issue that has not been given enough attention in their customer community.

In terms of packaging, Toast Ale conducted research to evaluate,in consultation with Advance London,a firm that specilized in circular economic models consultation, and research has shown that for Toast Ale's production model, the environmental impact of aluminum cans will be lower than that of glass bottles, which was used at the time, because the can is lighter and easier to stack, which saves weight during road transportation. So Toast added canned into their beer packaging. The new form of marketing and packaging is a fairly effective mode of sustainability communication, encouraging consumers to explore the impact of the products they consume regularly and connect with Toast Ale on a personal level. [30, p. 196][31]

Figure 19. Toast Ale beer and a loaf of bread (Photo: @ournameisfarm)

FASHION

Although it can also be considered an industry, the fashion industry accounts for 10% of all human carbon emissions, and is the world's second largest water consumer, only behind cultivation. In addition, the strong development of production and commercial capacity has made fashion an area of development that far exceeds human demand, leading to major waste problems. We'll explore circulatory initiatives in fashion. [33]

YCloset - A Closet In The Cloud

In China and also around the world, the growing middle class is increasingly using fast fashion products as they demand diversity and novelty in their everyday clothes. Currently, China's growth in garment sales is about 6.5 kg per person,more than the average of 5kg per person in the world. The fast fashion market is expected to grow 22.5% in 2020, reaching CNY 654.9 billion (US$100 billion), while the size of the total fashion market is expected to be tripled.

Realizing the need to transform to a more sustainable model in the fashion industry, to create an effective clothe usages system that meet consumer needs that limit the negative impact on the environment, and help clothes last longer, YCloset has provided online clothing rental services to their customers.

Figure 20. Mobile-based Ycloset (Source: Smartshanghai)

Each month, subscribers can access up to 30 items from a category of more than 150,000 medium and premium clothing options with a registration fee of CNY 499. YCloset offers everyday attire, not just formal occasion clothing. Customers are given the right to use a wide variety of clothing so that they can try new styles without having to make a purchase.

The key to building a loyal customer base is the convenience of delivery and trust in cleaning quality. YCloset has partnered with a dry cleaning company to ensure the cleaning of clothes, and found that durable, clean, trendy clothing can be used by upto 40 different people. There is also the option to buy clothes after renting, which is a popular choice.

Clothing rental such as Ycloset model can play an important role in minimizing the conflict between fast fashion and the environment. By allowing clothes to be reused over and over again, the model increases usage rates, reduces waste, thereby reduce pressure on the environment and resources. At the same time, it can meet the growing demand of consumers for high-quality and affordable clothing.

PART
03

INTEGRATING CIRCULAR ECONOMY INTO EDUCATION ACTIVITIES FOR YOUNG PEOPLE

In the modern era, while natural resources are gradually depleted, human demand continues to grow. The big question is whether it is worth the trade-off between the environment and the economy that lead to increasingly serious challenges in environmental protection, climate change response and disaster risk mitigation. We need to take a new direction to get to the core of the national economic development problem to come up with a more thorough and far-reaching solution. Therefore, the introduction and implementation of the socio-economic model into education is necessary and has the potential to effectively support the social ecological transformation.

However, circular economy is a new approach in both the field of research and practice in Vietnam, which is both a challenge but also an opportunity for educational activities to become more comprehensive, diverse, creative and effective. This document not only provides information and knowledge about circular economy, but also introduces the methods, processes and tools to integrate this topic into teaching programs to effectively impact young people and promote changes in their perceptions and actions.

Integrate into lessons

Circular economy is a topic that requires deep research and analysis, but basically, this topic is a combination of all aspects of real life activities and in development, from socio-economic to culture, education, technology... Therefore, there are many options for integrating this topic into teaching.

**Note: due to the novelty of this topic, in order to avoid confusion, lecturers should clearly introduce the context and principles of circular economy, the differences between circular economy and linear economy, and give specific examples close to life as well as the local custom.*

Lecturers, teachers as well as trainers can explore this topic in a variety of aspects and scales, can be brought directly into as a focus, or provide additional information for the lecture depending on the specific case.

Suggestions for this approach can be:

- *Application of artificial intelligence in circular economic development*
- *Is the circular economy an inevitable transformation in today's market economy?*

- *Relationships between consumers, manufacturers and distributors in the context of the Covid pandemic*

- *Policy analysis thatsupports andpromotes circular economic development in the national economy*

In addition, in order for students to have a more proactive approach to this topic, lecturers can give assignments or orientations to guide student to choose a specific topic depending on the subject or interests of the student to practice in the daily lifestyle.

Integrate into research

The topic of circular economy is still a fairly new research direction in Vietnam. Therefore, there are many organizations that are conducting researcs to learn more and apply circular economy models in developing countries such as Vietnam. This is also an opportunity for educational institutions to participate in the research process, exchange and co-creation.

The academic environment at universities and colleges facilitates students, faculty and researchers to devote time and resources to new topics such as circular economics. The broad scope and multidisciplinary multidisciplinary nature of circular economics makes it easier to choose research topics, and circular economics can also become an additional element to support the research available in schools or academy institution.

Some examples of integrated circular economy research in different specialties such as:

- *Research on the potential of circular economy in Vietnam's agricultural system*
- *Research on the value chain in the circular economy system*
- *Research on comparison of circular economy versus linear economy*
- *Assesment on production circular models in Vietnam today*
- *Research on economic models and non-linear economic relationships*

Integrate into training and field-trip

Extracurricular training is an effective form for teachers to introduce a certain topic further to students. Depending on specific conditions of resources such as human resources, time, location, finance... these training can be organized in different ways. For example, in a limited time and resources siuation, teachers can hold a short seminar for about 2-3 hours on the topic of “Circular economy” at a school location. With this topic, lecturers can choose to invite a speaker with knowledge and experience to share with students within about 2 hours. They also can organize a real case analysis related to the topic (e.g., visiting the circular economic solutions on whey water treatment in the production chain of Pizza 4Ps in Da Lat).

One characteristic of the training is that the number of participants should not be too large because this can affect the quality of the session. Depend on the method, a training course should have about 30 to 40 participants. If the program has many interractive activities, the number of people should be kept at a moderate level. With sessions with guest sharing or screenings, the number of participants can be greater.

Although the topic of industry is new and often associated with research or advocacy, the examples in part one of this document show that this topic can be applied into a variety of industries and fields. Actual site visit duration should be at least half a day (excluding travel time) and the number of participants should depend on the nature of the chosen location. With the site vist activity, lecturers need to define circular economy, as well as create a clear link between the topic and the actual visit. Lecturers can also use the examples in the previous section of this document to refer to and help students understand similar cases at local level. In addition, field trips can take place in an actual circular pratices, such as local bussinesses, with assignment in order to make student explore the sitet and propose solutions that have circular economy model spirit.

Integrate into events, campaigns, movements

This is a form of integration that is quite familiar to students because schools regularly organize extracurricular events or movements throughout the school year. These events can vary in form: from competitions, exhibitions to fairs, creating art, volunteering, or synthesizing various forms of organization.

Events will offten widespread and likely to be geared toward a larger number of participants

than actual training or travel. Another interesting point of integration into the event is that students can fully participate in the process of planning and organizing these events together with teachers. This will help you improve your skills and also have the opportunity to learn more about the topic of the event.

Some examples: a songwriting contest on circular economy, a green technology innovation movement towards circulation in enterprises, social enterprises fair, a program to introduce new technologies in production, Circular Economy day...

PART
04

SUGGESTIONS ON INTEGRATING CIRCULAR ECONOMY INTO EDUCATIONAL ACTIVITIES

The theme "Circular economy" requires an overall observation and in-depth analysis of the aspects behind the model, a loop, or a given technology. Therefore, in order to support learners to understand science in a thorough and comprehensive way, this document introduces a number of educational tools that effectively support the development of system thinking.

RECOMMENDED METHODS

Simulation

Simulation is a learning method that allows the use of a certain amount of time for practicing, learning on real-life situations that need to be addressed by the student, and simulating the real nature of the facts/real-life situations. Students are provided with a model that represents the characteristics, behaviors and functions of the subject and will conduct research and solve the problems posed. Simulation learning methods allow for changes and adjustments to certain practical factors in a way that is conducive to the accumulation of knowledge and practice (e.g., reducing repetitive factors, requiring less processing time, easy to rmonitor, pointing out lessons learned to learners), and allow learners to 'reset' the scenarios and try alternative strategies and methods. [36]

Simulation is a very flexible teaching method that can be used in most disciplines, but this means that the way it is done will vary greatly. The key to simulation is that it is a dynamic rather than fixed experience, with the ever changing scenario following the learner's activity, so that the actions of the participants and the participants adapting as a result of script chagning.

The student's assignment may be to simulate an input/output issue of a production and business establishment. For example, at business establishment A, inputs and outputs are currently not circular and not environmentally friendly in many stages (lecturers can offer more specific emulators). Participating students will choose roles in the business model such as customer/employee/financial manager... Students have a mission to build production design solutions that adapt to existing resources and challenges posed by model participants. This model simulates the real-world environment in which students are able to work, where customers/internal businesses change their requirements throughout the production and business processes.

In order to perform a successful simulation, it is important that the set up is as specific and closely to reality as possible.

Values of the method

- Promote the creativity of students, improve their ability to adapt to real-life situations.
- Provide complex problems that would need investments and efforts to be solved. The complexity of the problem can be adjusted by the instructor depending on the time allowed.

Notifications

- Lecturers need to choose the right location/model associated with the topic of circular economy.
- Building models/situations may require technological support to help made the simulation achieve its intended purpose (many simulations need to be based on computer software).
- The results must be verified.

To support this approach, trainers/trainers can collect additional materials such as scientific researchs, articles, videos, documentaries and also from the original model so that full information can be obtained in the formulation of teaching content.

Service Learning

Service learning (SL) has been available since the 1960s in the U.S. Its is a teaching and learning method through which learners will be albe to apply the knowledge achieved in the classroom to real-world situation, and the results of the learning process aimed to meet the needs of the community and are used by the community. SL has been applied at many universities around the world, to date in the United States more than 1,000 universities and colleges apply this method to more than 6 million students (Campus Compact, 2007). SL is considered a sustainable development strategy of universities in the United States and is gradually influencing other universities in Asia. SL method is a collaboration on the basis of the relationships of 4 participants: administrators, faculty, community partners, and students. The advantage of SL is that it helps learners enrich their knowledge from theory to reality and vice versa (bring books to life and life to books), this learning process through experience should be able to enhance academic knowledge, train and develop soft skills such as critical thinking, teamwork, communication, presentations, and life skills.

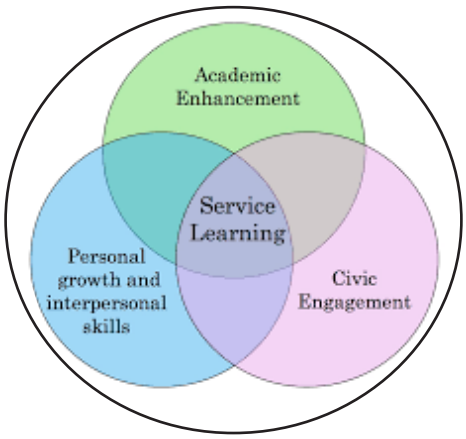


Figure 21. Service learning, the community in the relationship between learning and service *(based on the Miami-Dade College's chart, http://www.mdc.edu/cci/servicelearningoverview.asp)*

The service learning method should follows:

1. The community raises the issue that needs to be addressed;
2. Teachers integrate the community issues that need to be addressed into the subject as the assignment of student internships. It is important to note that these topics must be in line with the subject content, and suitale with qualifications and skills of students;
3. Students are organized into groups to implement the topic under the guidance of teachers. When implementing the topic, students must apply the knowledge of the subject to solve problems with the community;
4. The results of the topic are used by the community. [37]

This method can help achieve the output standard according to the training method into ideas, design, implementation and operation (CDIO) such as: Roles and responsibilities for society; Recognizing the context of social organizations; Desire to learn and study for life, analytical thinking; Teamwork; Writing and presentation communication skills.

This method will help students gain more practical experiences, accumulate practical experience, analyze specific local conditions from presenting problems and challenges in the process of applying circular economic models in real life.

We can take a look at the community service learning program, created by Guatemala's city council in collaboration with the University of Massachusetts Department of Regional Planning and Landscape Architecture, aims to study ways to address the amount of waste generated by the downtown market, while also aim to reduce the fund of $300,000 per year for the production of compost for soil improvement in this central American volcanic belt. The participants in the project were well-supported by local communities, who saw them as individuals who wished to connect and support real intervention, not academics or researchers. As a result, with the school's technical support, along with the help from a local religious organization, a social enterprise called AbonOrgániCo was established. The company produces fertilizers based on daily organic waste supplied from the central market. They also employed local workers, facilitates participation for poor students in the area and has begun to have small customers after a steady operation process and is covered by the city council. [38]

Values of the method

- There are good examples for students to experience reality.
- Opportunities for students to enrich their knowledge from theory to reality and vice versa
- Help students enhance their academic knowledge, provide trainning course and develop soft skills such as critical thinking, teamwork, communication, presentation, and life skills.
- Act as the foundations for developing or implementing practical ideas and experiences to shape the development of green careers in the future.

To achieve the wanted effect in applying the method of serving the community, lecturers need to thoroughly research the locality and plan the implementation in detail. It is necessary to cooperate with local organization to be able to create a practical condition, associated with the knowledge learned. With a new concept such as Circular economy, this will be a method to help students learn from real experiences and practices.

Notifications

- Lecturers need to choose the right location/model associated with the topic of circular economy.
- The experiential space must be associated with the content of the lecture so that students

can apply from theory to practice.

- There are specific orientation exercises for students to harvest and learn lessons from.

Case-study analysis

This is a commonly used tool in research and development to analyze real-life cases to draw lessons. Sometimes knowledge of development can be seen as “theoretical” or “too ideal” or “far from reality”, especially in the context of urban cities in Vietnam and there are many models applied in the world of circular economy. Making specific cases to real people, real cases, will make this sustainable picture clearer and closer. The closer the chosen case is to the reality of the participant’s life, the more convincing it can become.

Invest in building a clear connection between the case and students. If it is difficul to find the right examples, models in other provinces, even other countries can be considered. Then be aware of the different factors in terms of geographic, climatic, and social conditions that may influence the application of the model in reality.

Values of the method

- Act as an example (to understand complex problems).
- Connect student emotions (for students to immersed to the real cases, real people, real experiences).
- Ace as evidence for theory, provide faculty and practitioners with evidence to support their argument (see what has been done /is being done).

When using this method, the lecturers can achieve many goal:

- Attract students's attention
- Review the student's knowledge.
- Help students find the connection between theory and real practice
- Develop critical thinking (what would the student do in this situation?) and an understanding of often complex relationships between social, economic, and environmental conditions in a country
- Raise awareness and stimulate students' actions

Notifications

- Case studies need to be thoroughly prepared and received authenticity agreement and update of information (does the model still work? is the information you find accurate?).
- Avoid using controversial cases, there are many conflicting opinions and no reliable sources of information to authenticate.
- Although the duration of the lecture is limited, it is advisable to provide in-depth information and help students relate from this example to themselves and the context in which they live. More references can be given to students to learn more after the lecture.

To support the case-by-case approach, instructors/trainers can collect additional materials such as scientific research, articles, videos, documentaries, and experience from success/ failure from hyena. The information at the beginning of this document and the reference section may be useful in finding and selecting a suitable example.

In order for readers to better visualize and understand the application of the above-mentioned learning model, this document will introduce some examples of teaching plans in the next section.

PART
05

EXAMPLES OF TRAINING PROGRAMS

In this section of the document, we will introduce a number of plans to apply the theme "Circular economy" to educational and training activities using the methods introduced above. Lecturers and trainers can actively change the lesson plan to suit the student audience and practical conditions.

Class lectures

Topic: Understanding the circular economy

Duration: 90 minutes

Lesson objectives:

- Students understand what circular economy is, the differences of the circular economy and the linear economy
- Students experience analyzing a problem related to circular economy applying a typical case analysis model
- Students gain a better understanding of the approach of circular economy through exposure to some real-life examples

Method

- Simulation
- Case analysis

Lecture plan

STT	Content	Duration	Detailed description	Prepare
1	Boot	5-7 minutes	Melting Icebreaking Games The groups were prepared with an A1 sheet, the group members stood on the same sheet of paper. After each turn the temperature rises the paper will lose 1/2 of the area. Students divide roles and stand the longest on the smallest piece of paper.	Used A1 paper

2	What's going on	5-7 minutes	Show video clips or sets of photos of environmental issuu.com , consequences from the linear economy (choosing a topic related to the subject or related to the local situation) After showing the clip, quickly survey with an open tool or question about the student's feelings and thoughts immediately after viewing.	Video Projectors, slideshows
3	Product life cycle in linear economy	40 minutes	Product lifecycle analysis • Participants discuss in pairs (or in groups of 3-4 people) analyzing the life cycle of objects from material preparation to production, distribution and consumption • Invite teams to share quickly about the life cycle of products • The teacher comments and generalizes.	Prepare items such as tires, phones, water bottles, T-shirts
4	About the circular economy	10 minutes	Lectures on the concept of circular economy, the context of birth and the criteria/principles of circular economy	Lecture slide
5	Practical examples	20 minutes	Students are divided into 3 groups, each receiving a set of information about the actual model of applying circular economy. The team's task is to discuss (for 15 minutes) this case and analyze the selection of cases that are suitable for each loop as renewable or finite/non-renewable materials. Each group then had five minutes to share back in front of the class.	Document of typical example cases

6	Summary	5 minutes	The teacher summarizes the main ideas and assigns assignments or invitations to action after the lesson (if any)

In case time is limited, or the class has more than 30 students, the instructor can divide this lecture plan into two sessions. Session one focuses on the context, concepts, and application of a typical case analysis model. The second session focuses on the solution with real-life examples. Note that you can use the approach of experiential learning in both sessions.

Field-trip

With the theme of ***"Circular economy"***, lecturers can choose the actual learning visiting locations that have been successfully implemented, or visit a model that is available locally and for students to analyze, evaluate the status quo as well as propose solutions for this model towards replication of circular economy model development.

You can choose the actual location depending on the following factors:

1. The purpose of the trip.
2. Available resources: time, people, funding
3. Distance and location (prioritise near-range locations to save time, resources and reduce emissions due to mobility).

Here is a suggested example of a real-life tour to the Production Chain Model and, coconut processing in Ben Tre for 2 days and 1 night for a school in the south.

Purpose:

- Students have a deep and intuitive understanding of circular economic models and practical circular economy applications
- Students are motivated to participate in promoting the circular economy in terms of future career orientation
- Students are engaged in diverse, practical, useful and exciting educational activities

STT	Content	Duration	Detailed description
			Day 1
1	Move	2-4 hours	Depending on the distance, it can be held early in the morning, or from the previous afternoon
2	Ben Tre Coconut Story	1 hour 30 minutes	Listen to the stories from the members of Ben Tre Coconut Q&A Take a tour of the coconut production areas in Ben Tre
3	Lunch and lunch break	1 hour 30 minutes	
4	Experience activities at Vietherb	2 hours	Practice experience in the stages of coconut production and processing in Ben Tre. It can be divided into small groups according to the different jobs available at Ben Tre Coconut such as refined processing, handicrafts and handicrafts from coconut.
5	Share and screen	1 hours	Students share their experiences and lessons leanrned Take notes
			Day 2
1	Vietherb product experience	1 hours	Students can experience using Ben Tre Coconut products according to the instructions
2	Deep exploration	1 hour 30 minutes	Apply community service learning methods to help learners enrich their knowledge of circular economy in practice,for example, To coordinate with businesses/ local authorities to develop a plan to enhance the value of coconut byproducts currently arising in the production/business process
3	Share and sum up	1 hours	Students share observations and lessons Q&A and chat with Ben Tre Coconut Trip summary Invitation to plan action
4	Leaving		

PART

06

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This document was accomplished within the framework of the project **“Integrating and advocating for Social Ecological Transformation (SET) in Vietnam’s tertiary education”** implemented by the Center for Development of Community Initiative and Environment funded by the Rosa-Luxemburg-Stiftung via the Southeast Asia. Hanoi office

Rosa-Luxemburg-Stiftung Southeast Asia. Hanoi office

Address: No. 8C, Alley 76 To Ngọc Van street, Tay Ho, Hanoi
Phone: +84-24-37185836
Fax: +84-24-37185834
Email: hanoi@rosalux.org

Earth provides enough to satisfy every man's needs, but not every man's greed
- Mahatma Gandhi -

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