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A case study on contribution of Chuk compostable tableware in circular economy of India

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Abstract

Bagasse is a by-product of sugar industry. It is fibrous residue that remains after sugarcane stalks are crushed for sugar extraction. Sugarcane bagasse are used for making boxes, trays, bowls, plates, cups and saucers and most importantly food containers. Today the food packaging industry in India is using bagasse instead of plastic. In an age of economic uncertainties and India's desire to go green bagasse is a boon can be used instead of plastic. The researcher is giving hereby a case study of Chuk compostable tableware.

Keywords: Circular economy, green initiatives, bagasse, plastic, plastic hazards, fuel, kitchenware, tableware, food containers, food industries

Introduction

An economic model known as the "circular economy" seeks to minimize waste and encourage resource efficiency. It entails creating goods and procedures that put sustainability first, cut waste, and encourage material reuse and recycling.

As long as feasible, existing materials and products should be shared, leased, repaired, renovated, and recycled according to the circular model of production and consumption. The product's life cycle is thus prolonged.

In circular economy, waste is a valuable resource that can be repurposed rather than something for disposing of. This approach aims to create a closed loop system where resources are used for as long as possible, reducing the need for new resources.

In circular economy, products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling and composting.

In a circular economy, resources never go to waste and the environment is replenished. Products and materials are kept in circulation in a circular economy through recycling, composting, refurbishing, reusing, and maintaining. By severing the link between economic activity and the use of limited resources, the circular economy addresses issues such as pollution, waste, and biodiversity loss in addition to climate change.

An industrial system that is restorative or regenerative by design is known as a circular economy. It does away with the idea of end of life and replaces it with restoration, switching to renewable energy and doing away with harmful chemicals that make it harder to reuse and return to the biosphere.

By creating better materials, products, systems, and business models, it seeks to eliminate waste. The goal of the circular economy is waste avoidance. The products are made with a cycle of disassembly and reuse in mind. This distinguishes it from recycling and disposal, which both lose a significant amount of labour and embedded energy.

It presents a distinction between a product's durable and consumable parts. The majority of materials used in circular economy consumables are biological; these materials are non-toxic, possibly even helpful, and can be safely recycled back into the biosphere for one use at a time or through a series of related ones.

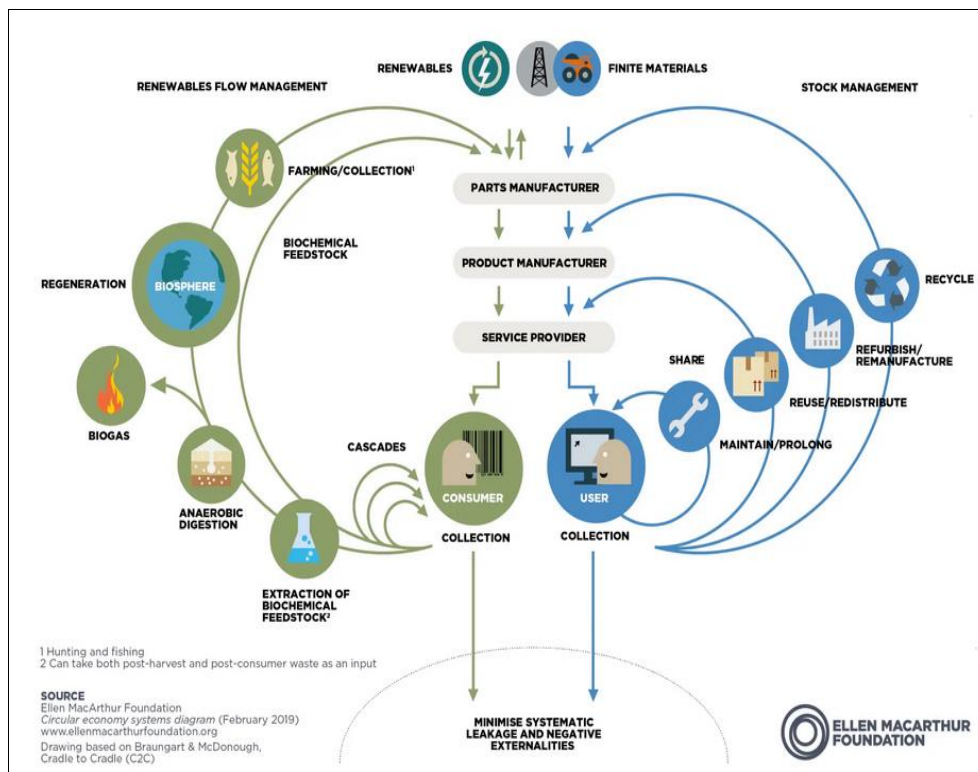
On the other hand, durable items like computers and engines are built of technical materials and are intended to be upgraded due to rapid technological advancement. As before, this cycle should be powered by naturally occurring renewable energy to reduce reliance on external resources and boost system resilience.

It substitutes the idea of the user for the idea of the consumer, requiring a new contract between companies and their clients based on the effectiveness of their products. Whenever feasible, the durable goods are rented, shared, or leased.

A circular economy could lower carbon emissions, preserve valuable raw materials, boost productivity, and create jobs. It offers a means of adding value.

Circular Economy Butterfly diagram: The butterfly diagram, which depicts the circular economy system, shows how materials are constantly flowing in a circular economy.

The biological cycle and the technical cycle are the two primary cycles. Through procedures like reuse, repair, remanufacturing, and recycling, goods and materials are kept in circulation throughout the technical cycle. The nutrients from biodegradable materials are brought back to the Earth to replenish nature through the biological cycle.



The circular economy takes a more "metabolic" approach, drawing inspiration from the structure of natural systems. Materials flow and cascade throughout the system, enhancing its overall resilience and providing value at every stage. It's crucial to keep in mind that everything is made to fit the system; this is not a reactive, downstream approach, but rather an upstream, design-led endeavour. Take a look at the diagram above

It presents a comprehensive overview of the circular economy's operation. Two material cycles exist. Technical materials are on the right, and biological materials are on the left. The diagram is commonly referred to as the Butterfly Diagram because these two cycles resemble a butterfly's wings. Each in turn, let's examine them.

Biological Cycle: As the name suggests, the biological cycle includes naturally occurring materials that can be safely and profitably recycled back into the biosphere, like food or agricultural waste like bagasse. The ultimate goal of every biological cycle activity is to replenish the biosphere. In order to restore the biosphere, we must continuously add resources for upcoming cycles and, more crucially, retain carbon in the soil where it cannot escape into space.

Technical Cycle: The way the technical cycle operates is a little bit different. Here, elements and materials like metals and alloys that are incapable of being reintroduced into the biosphere are maintained in the cycle and kept in circulation for as long as feasible. Reusing, remanufacturing, recycling, and repairing products, components, and materials to keep

them at their best value at all times are crucial. Recall from week one how we examined the linear economy's loss of embedded value. The more benefits a product or component receives economically and environmentally, the fewer modifications it needs to undergo (processes that frequently involve the input of materials and/or energy).

The way humans interact with materials is a fundamental difference between the biological and technical cycles: the former uses, while the latter consumes. Organic materials must gradually decompose in the biological cycle, frequently in order to reintegrate into the soil. The biocycle cannot function without it; for example, an apple left to rot in a box has no value to the biocycle. On the other hand, if we want to concentrate on preserving value, consumption isn't ideal in the technical cycle, which is why use is prioritized. The system's materials are meant to be utilized, not exhausted.

Circular Economy & India

"India is making the circular economy a major tool for urban development." Prime Minister Narendra Modi, Post-budget webinar speech, 2023

The circular economy is a method of doing business that promotes the best possible use or total reuse of resources while reducing or eliminating waste. It highlights how important it is to adopt a comprehensive perspective on goods and procedures. India ought to adopt circular economy-based practices in order to improve industrial productivity, competitiveness, and resource efficiency. With a large and rapidly expanding population and an economy

dependent on natural resources, India has enormous potential to lead the world in the circular economy.

Adopting a circular economy could result in significant environmental benefits and a decrease in traffic, which would lower pollution levels in India. This, in turn, has the potential to catalyse economic growth. Given India's Nationally Determined Contribution (NDC) targets for lowering greenhouse gas emissions and meeting its obligations under the Sustainable Development Goals for responsible consumption and production, moving towards a circular economy is essential. A major component of Prime Minister Narendra Modi's Mission Lifestyle for Environment (LiFE) initiative, which encourages people to lead sustainable, ecologically friendly lives, is the circular economy.

The importance of the circular economy—which includes producer responsibility and resource efficiency—was emphasized in the Delhi Declaration during the 2023 G20 Summit. This historic occasion marked the establishment of the Resource Efficiency and Circular Economy Industry Coalition (RECEIC), which represents a group effort to advance zero-waste initiatives, reduce waste generation by a significant amount by 2030, and promote environmentally friendly waste management.

While putting the nation on a fast growth trajectory, the Modi Government is leading the drive to move India toward a circular economy through an environmentally friendly, sustainable economic policy framework. In order to support a circular economy, it has announced a number of regulations, including those pertaining to plastic waste management, e-waste management, construction and demolition waste management, and metals recycling policy. Prime Minister Narendra Modi's 2014 launch of Swachh Bharat Mission-Urban (SBM-U) gave the circular economy agenda's principles pertaining to municipal solid and liquid waste a major boost. The three guiding concepts of the mission are known as the 3Rs: reduce, reuse, and recycle. India has improved its solid waste treatment capacity from 18% in 2014 to over 68%, demonstrating its remarkable success. Utilizing fly ash and slag produced in the steel industry and other sectors has advanced significantly.

Bringing in a variety of stakeholders and planning at the macroeconomic level are necessary for the transition to a circular economy. The goals of the Modi administration are very clear: a circular economy is urgently needed, and it supports implementing the seven Rs of the circular economy: reduce, reuse, recycle, redesign, remanufacture, refurbish, and repair. Business parks, industrial clusters, and new ventures should all be designed with these principles in mind. India can be a manufacturing powerhouse and meet its climate change commitment if it has a stable and encouraging policy environment for a circular economy.

Literature Review

Since the late 1970s, there has been a growing movement toward the circular economy. Pearce and Turner (1989) are credited by a number of authors, including Andersen (2007), Ghisellini *et al.* (2016), and Su *et al.* (2013), with introducing the concept. They explore the linear and open ended features of modern economic systems by explaining how natural resources impact the economy by acting as sinks for outputs in the form of waste and as inputs for

production and consumption. This is influenced by Boulding's (1966) work, which concluded that the economy and environment coexist in equilibrium by describing the earth as a closed, circular system with a limited capacity for assimilation.

Stahel and Reday (1976) introduced certain features of circular economy with a focus on industrial economics. They conceptualised a loop economy to describe industrial strategies for waste prevention, regional job creation, resource efficiency and dematerialisation of industrial economy.

Stahel (1982) also emphasised selling utilisation instead of ownership of goods as most relevant sustainable business model for a loop economy, allowing industries to profit without externalising costs and risks associated with waste.

The contemporary understanding of the circular Economy and its practical application to economic systems and industrial processes has evolved to incorporate different features and contributions from a variety of concepts that share the ideas of closed loops.

The most renowned definition has been framed by the Ellen Macarthur Foundation, introducing Circular Economy as “an industrial economy that is restorative or regenerative by intention and design” (2013b:14). Similarly Geng and Doberstein (2008:231) focusing on the Chinese implementation of the concept, describe the circular economy as “the realization of (a) closed loop material flow in the whole economic system “. Webster (2015:16) adds that “a circular economy is one that is restorative by design and which aims to keep products, components and materials at their highest utility and value at all times.

Accordingly, Yuan *et al* (2008:5) state that “the core (of the circular economy) is the circular (closed) flow materials and the use of raw materials and energy through multiple phases”. Bocken *et al* (2016:309) categorise the characteristics of the circular economy by defining it as “design and business model strategies (that are) slowing, closing and narrowing resource loops”.

Based on these various contributions, the circular economy is described as a regenerative system that slows, closes, and narrows material and energy loops in order to minimize resource input, waste emission, and energy leakage. Long-lasting design, upkeep, repair, reuse, remanufacturing, refurbishing, and recycling can all help achieve this.

Chuk Compostable Tableware—: In today's world there is a growing need to embrace sustainability practices in all aspects of our lives. This has led to the rise of eco-friendly products including compostable tableware. Compostable tableware refers to disposal plates, cups and utensils made from materials that can be composted after use.

Non-recyclable tableware such as plastic plates and cups significantly impact the environment. These products are made from petroleum based materials which are not biodegradable and take several years to decompose when disposed of improperly, they end up in landfills or oceans causing pollution and harm to wildlife.

Furthermore the production and transportation of non-recyclable tableware require fossil fuel contributing to greenhouse gas emissions and climate change. The production process also uses significant water and energy further depleting natural resources.



Objectives of the Study

- 1) To assess the model of circular economy in depth
- 2) To study bagasse as a substitute for plastic
- 3) To evaluate green initiatives for economic sustainability.

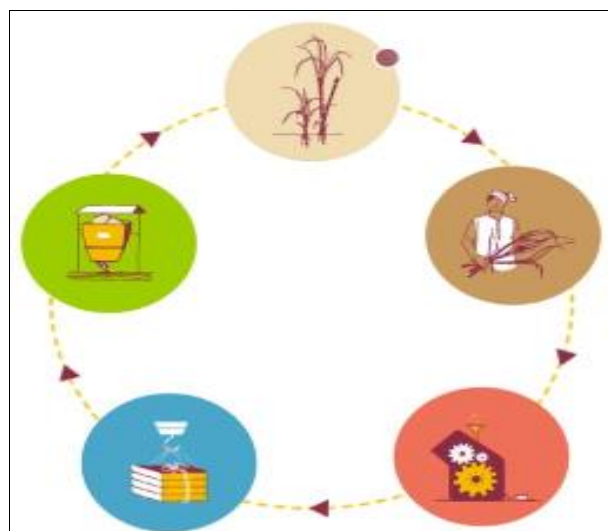
Research Methodology: The data used is secondary data.

Understanding Chuk’s circular economy: Chuk comprises of group of individuals who want to impact the community and the planet. They have continuously innovated to solve environmental problems and use zero

fossil fuel in production.

They have embraced the circular economy to reduce garbage, replace plastics with non-toxic alternatives and leave the earth a better place. For over three years they have been manufacturing eco-friendly food packaging for restaurants, doing their bit to reduce pollution from food packaging materials. They make their tableware from their agro residue.

Stages involved in CHUK circular economy



Growing: Growing sugarcane, which is widely grown in India and used to make sugar, is the first step in the process.

Harvesting: From their farming plot, farmers gather the sugarcane crops. Every farmer brings their produce to the

sugar mills, where the pulpy material known as bagasse is left behind after the juice is extracted. This is what we need.

Processing: We take the sugarcane stalk and squish it, mosh it, wrangle it and stomp it until we have the pulp to

make CHUK compostable tableware. Turns out, the short fibres of sugarcane are the best in the world for curving around all the shapes we need for plates, bowls and trays. We leave our products the natural shade so we don't need to use any harmful bleaching chemicals. No human hands touch the product in our state of art facility which ensures total hygienic products.

Distribution: After that, our group of village women from the surrounding area pack up the CHUK products and send them to a distributor in your area. They wait for a quick service restaurant, corporate canteen, caterer, or even you to start using environmentally friendly tableware.

Consumption and Composting: The customer throws away their plate after eating their pizza, sandwiches, or biryani. But hold on! What sets CHUK tableware apart is that it decomposes into compost after 180 days. That completes the circle.

Observations: Purchasing tableware that is biodegradable has many advantages:

1. It lessens the quantity of waste dumped in landfills and the ocean, which lessens pollution and harm to wildlife.
2. By establishing circular economy, a closed loop system where waste is valued as a resource, it encourages the use of resources.
3. Biodegradable or renewable materials, such as sugarcane bagasse, are used to make eco-friendly food plates, which lessen their negative effects on the environment and encourage sustainability.
4. Using compostable tableware saves money over time.

Conclusions

1. By emphasizing resource efficiency and waste reduction, the circular economy offers a sustainable and cost-effective substitute for the linear economy. It can address environmental issues while yielding economic gains. Adhering to the circular economy's tenets is imperative for enduring sustainability and a prosperous future.
2. Bagasse is an environmentally friendly material used in the food service industry that is both biodegradable and compostable, making it a great substitute for products like plastics.
3. We may lessen waste, promote resource efficiency, and help create a more sustainable future by selecting eco-friendly tableware like CHUK. One such green food delivery service is CHUK, which uses renewable or biodegradable materials like bagasse and encourages responsible disposal in order to prioritize environmental sustainability in their production process.

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