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WASTE-TO-WEALTH AND CIRCULAR ECONOMY: A REVIEW

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ABSTRACT

The circular economic framework facilitates the reuse of wastes. Wastes were earlier disposed untreated, which not only paves the way for environmental pollution, but also promotes the singular use of products. The 'take-make-waste-dispose' approach, associated with the linear economic framework gives way to unidirectional use of products. As an alternative to such a wasteful system, circular economic framework is taken cognisance of. The circularity in the use of products turns down the singleton use of products. Rather it extends the life cycles of products through the application of the techniques of 'recycle and reuse'. Reusing of 'once wastes' through recycling to turn these into 'wealth' actually saves environment from pollution and creates values in the economic framework. The 'waste-to-wealth' approach throws weight behind the introduction of the circular economic framework.

The present paper intends to re-look into the effectiveness of the circular economic framework in promoting 'waste-to-wealth' approach in order to make development process serve the purpose of sustainability. It also attempts to analyse how far the circular economic framework ensures responsibilities in the process of development so that it could be able to serve the sustainable and inclusive purposes of development.

Keywords: Waste, Wealth, Sustainability, Reuse, Recycle, Circular economic framework, Values, Environmental pollution.

Introduction

The most significant dimension of development is to ensure overall changes of patterns of lives of one and all. The perspective of development is a macrocosm of all efforts to overhaul the existing situation on almost every parameter. In short, development refers to a kind of structural transformation (Friedman: 1938). However, the perspective of development has been re-looked and re-developed into a new aspect, which attaches tremendous importance to making the development process sustainable. In this connection, the United Nations has come up with the Sustainable Development Goals (SDGs) in 2015 with 17 goals and 169 targets. These goals aim at ensuring sustainability in the development processes and charting ways to improve the activities, leading to development process. It goes without saying that the aspect of environmental protection in association with development has been increasingly emphasized.

To continue development with due importance to environmental protection requires several innovative measures and turning wastes into some productive assets is one of such striking ways. Invariably, wastes, which have been disposed untreated, not only exhaust the life cycle of products too fast in the form of unidirectional use, but also harm environment for obvious reasons. Such harmful wastes must be recycled and reused to turning these into productive assets for the judicious use of resources. On the one hand, such transformation generates values and environmental protection is made possible on the other (Hill: 2014). Such an innovative measure has been gaining grounds with the increasing stress on the adoption of the circular economic system since 1980s, which gains popularity in the 1990s. The circular economic framework offers a construct where wastes are recycled and can be made reusable. It extends life cycles of

products through a marked rejection of the unidirectional linear economic framework. Furthermore, making wastes reusable in economic systems leads to value creation as many innovative products can be produced out of recycled wastes and these can be marketed in due course of time. This practice results in further value creation and creates demand for new products, which attracts new investment, leading to capital formation (Hasanagic: 2018). The manner in which the value creation out of waste products results in further creation of values, stimulating investment in a way or the other, drives home the point that environmental protection is thoroughly maintained as wastes are recycled and reused (Martins: 2016).

The recycling and reusing of wastes for value creation as well as environmental protection lay bare the fact that the circular economic approach constantly encourages an alternative development pattern, which takes into account both the cores of development and environment. It is a kind of capacity building technique for not only the present generation, but also for the future generation, as it is proposed by the World Commission on Environment and Development in 1987. Such an approach to sustainable development can be re-looked and assessed in the framework of the circular economy (Urbinati *et al.*: 2017).

To be more precise, the circular economic framework drives the adoption of waste-to-wealth approach for ensuring sustainable development in the true sense of the term. The notion of the 'waste-to-wealth' keeps pace with the protection of environment while continuing the development process (Hobson *et al.*:2016).

The attempts to evaluate the effectiveness of circular economy in ensuring sustainable development by means of 'waste-to-wealth' framework must be put in place to vindicate how far the adoption of circular economic framework makes real differences to put an end to 'take-make-waste-dispose' construct of the conventional linear economic system.

Literature reviews

Wasokinska(2016) has put emphasis on the adoption of the circular economic system as a replacement of the traditional linear economic system. He advocates for the adoption of the circular economic system, which has a strikingly positive impact on human beings at large. By mitigating the negative impacts posed by climate changes, the circular economic framework serves environment and benefits people. The importance of this alternative system in every policy issue has also been emphasized.

Chiappetta *et al.* (2018) lay stress on the application of the circular economic system to business models. Conventional business models often promote wastages and there is no provision of recycling and reusing these. The new framework, which encourages recycling of wastes and afterwards reusing these into new products in a bid to create value as well as safeguard environment must be put in place. They are of the opinion of emulating circular economic framework to a large extent.

Ritzen *et al.* (2017) explain and elaborate the probable barriers that come in the way of circular economic framework. They lay stress on the importance of adopting the circular economic framework and lavish praise on how recycling and reusing of wastes has made effective changes. The changes in behavioural patterns of people, provision for creation of values through waste products and the subsequent waste-to-wealth approach are instrumental in increasing acceptance of circular economic framework, although such adoption has run into certain specific problems. However, the adoption of the circular economic framework brings forth changes for the betterment of the world.

Hobson *et al.* (2016) have advocated for the adoption of the circular economy. Circular economic framework, as illustrated and elaborated, gives way to diversification of the economic activities, which lead to value creation to a large extent. The application of the circular economic framework results in the radical social transformation in terms of the behavioural change of people. The wastes are transformed into value-creating resources through the processes of recycle and reuse.

Murray *et al.* (2015) have analysed the application of the circular economic framework in the global context. They have dwelt on how circular economic framework brings about innovations in the production and consumption process so that resources can be judiciously utilized. The judicious and economic utilization of resources, no doubt, will preserve the stock from quick exhaustion and the subsequent fast extinction. The circular economic framework, as demonstrated by the authors, lead to recycling of wastes to reuse these in economies, which results in environmental protection as well as extended product life cycle, contributing to new products. The contribution of the circular economy regarding this is quite laudable.

Case study: An illustrative example of waste-to-wealth

- **Latiaboni village: A hotbed of fly-ash pollution**

The researcher has taken up a case study in order to find out how effective the circular economic framework is to turn wastes into wealth through value creation. Case study is also undertaken to demonstrate how environmental protection can be ensured through the application of the circular economic framework.

The researcher has taken up Latiaboni village, which falls under Gangajalghati block of the district of Bankura in the state of West Bengal. It is 198 kilometres away from Kolkata.The village has been considered to be the most potent research area in this respect because it is affected largely by the fly ash pollution caused by the nearby Mejia Thermal Power Station (MTPS).

The MTPS is located at Durlavpur in the district of Bankura, West Bengal. It has four units of 210 MW each and two units of 250 MW. The daily emission of the fly ashes clocks 7000 tonnes. People across ages in the village in the said village suffered from breathlessness, itching, skin bleeding, tuberculosis and even cancer. The dumping of fly ashes untreated causes a loss of fertility of soil of nearby land areas, especially agricultural lands, affecting crops.

Mejia Thermal Power Station affects the adjoining villages through fly ash pollution

Source: Photo captured by G. Arora

One of the residents of Latiaboni village has shown the marks of skin diseases because of fly ash pollution.

Source: Photo captured by G. Arora

The fly ash pollution, one of the important forms of pollution has caused death to many people in the Latiaboni village. Many families, who have been affected adversely by fly ash pollution has started migrating from the village.

Latiaboni village wore a deserted look following the migration of people from the village, fearing more adverse effects from fly-ash pollution.

Source: Photo captured by G. Arora

The village has experienced the harms of fly-ash. The agricultural damage, damages of constructions and damages flora and fauna of nearby water-bodies are a few to be cited.

There is some important harm caused by the fly ash:

a. Pollution of ground water and drinking water.
b. Nervous system damage and cognitive defects.
c. Enhancement of vulnerability to develop lung diseases, kidney diseases and gastrointestinal diseases.
d. Loss of fertility of the soil.

Such damages are caused fly-ash pollution, which have long-term impact on inhabitants of the village as well as the adjoining places.

- **Fly-ash is turned into wealth: A path-breaking story**

  The fly ash pollution has not bogged down the inhabitants of the village, though they are adversely affected by it. The application of circular economic framework has made the real difference. Once the polluting components, fly ashes are now used in brick construction. The adjoining brick kilns and brick kilns located in neighbouring areas have been largely benefited by the fly ash bricks.

  The gradual acceptance of fly ash bricks over the usual red clay bricks has the following advantages (Dutta *et al.* 2019):

  a. Fly ash bricks are more porous than red clay bricks.
  b. Fly ash bricks are lighter and less expensive than red clay bricks.
  c. Fly ash bricks are made of waste materials, which come from the combustion of coal in thermal power plants but red clay bricks are made of clay, collected from fertile land or the top soil. It has made it more preferable than clay bricks.
  d. Fly ash bricks are uniform in shape as these are manufactured in moulds.

For such advantages, there is a huge demand of fly ash bricks in the market.

- **Recycling and reusing fly ash : Value creation in phases**

Fly ashes are collected and these are recycled. The entire process, beginning from the collection of fly ashes as raw materials of brick manufacturing units to marketing of the manufactured fly ash bricks involves the value creation. Fly ashes are used extensively in the brick manufacturing as part of turning wastes into wealth.

Collection and packaging of fly ashes for the use in different brick kilns involves people from Latiaboni village as well as the adjoining villages. Chiefly, the workforce is predominantly arranged from Latiaboni village. The packaging cost of fly ashes pegs at Rs. 30 -50 a tonne. Those involving in packaging activities are paid Rs. 200- 250 per day. It is invariably a potent source of employment for the local people. Many from the local populace have opened up some mechanized facilities for packaging and also this paves the way for employment of local populace. People are engaged on contractual basis, giving room for employment on a large scale.

After collection and packaging, comes the transportation of the packaged fly ashes to brick kilns in adjoining as well as faraway places. Many transportation companies come up and subsequently run by local people pose to be utterly helpful in this. Such companies not only create opportunities for local people (owners), setting up and running these, to get employment, but also people from adjoining places experience ample opportunities to be employed in these transportation companies. A few of these include Karmakar Transportation, Mukherjee Transportation etc. For fly ashes to be trucked in for taking these to brick kilns also require many local people, who are engaged in this activity, leading to another vital room for job opportunities.

When fly ashes are transported to various adjoining brick kilns as well as faraway ones, these are to be unloaded. This involves the engagement of local people of these places, which makes room for employment.

The employment of people in terms of their engagement in the process, right from unloading of bricks to marketing, can be classified into three segments:

1. People involving the unloading of fly ashes.

2. People directly involved in manufacturing bricks (brick kiln workers).
3. People associated with various activities of manufacturing bricks, such as carrying out works of taking raw materials to the targeted place etc.
4. People involved in trucking in the fly ash bricks for marketing.
5. People directly engaged in marketing the bricks.

That is why, the manufacturing of fly ash bricks engages a number of local people in the making of these.

When it comes to marketing the bricks made of fly ashes, the demand for this is continuously rising. The market share of such bricks is growingly overshadowing the share of the conventional red clay bricks.

The rising demand for fly ash bricks over the red clay bricks sheds ample light on the changing patterns of the choices of consumers for economic reasons (as the fly ash bricks cost Rs. 4- 5 apiece whereas red clay bricks cost Rs. 6-7 apiece (Haque 2013) as well as for environmental concerns (Weber *et al.* 2001). The changing pattern of the behaviour of consumers is thoroughly driven by economic as well as environmental issues.

Conclusion

Latiaboni village, earlier affected adversely by the fly ash pollution, has used fly ashes productively. The application of the circular economic framework in terms of recycling and reusing waste products has worked wonders in terms of not only the protection of environment, but also generation of employment to a large segment of people. Fly ashes are effectively used in brick construction and the fly ash bricks are in great demand in markets. The changing share of fly ash bricks in markets, which has overshadowed the red clay bricks, bears testimony to a change in the pattern of consumption of people in the direction of the protection of environment. Such a change is a welcome move in terms of ensuring sustainable development. The embrace of circular economic construct is a clear indication of encouraging the waste-to-wealth approach.

It is indubitable that the increasing transformation of wastes into reusable goods in the circular economic framework is serving both economies and environment. The effective implementation of the circular economic framework leads to the transformation of wastes into wealth productively. Thus, embracing circular economic framework ensures sustainable development.

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