



Innovations for Sustainable and Green Environment

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ABSTRACT:

The concept of sustainable development has taken a centre stage in economics today .It lays emphasis on provision of an equal standard of living to our future generation. It is inter-related with the pollution free and green environment. Thus to create such an environment, there should be certain principles and goals to be followed. Reduce, reuse and recycling plays the major role in pollution free environment. 25% of unsustainability is the water pollution caused by coffee waste water. To create a sustainable environment, we should follow the guide lines to get the environment sustainable for better future .Some innovative technique like (coffee waste-water management) should also be followed to gain sustainability and every one should be involved in creating a sustainable environment .The information technology helps the people to get information about the present environment and steps which should be practised.

KEYWORDS:-sustainability, recycling, rain water harvesting, coffee waste water, information technology

INTRODUCTION:

MEANING OF SUSTAINABLE DEVELOPMENT:

According to reports sustainable development is a process of developing (land, cities, business, communities, etc.) that meets the needs of the present without compromising the ability of the future generations to meet their own needs”.

From the above definition, it is clear that sustainable development refers to economic growth and the expansion of the economy in the long run without using up natural capital for current growth at the cost of long term growth or future growth .in short, sustainable development means the proper use of the natural resources for the benefits of the human beings, which in turn, improves the economy of the country.

In a nutshell sustainability refers “to ensure that development meets the demand of the present without compromising the ability of the future generation to meet their own needs” .

GUIDELINES FOR ACHIVING SUSTAINABLE DEVELOPMENT:

- There should be change in methods of production and consumption to suit the sustainability of the environment.
- There should also be change in people’s attitudes and value system.
- Sustainable development requires that the development should last for generation, for which the present generation must be mindful of the future generation, while fulfilling its own needs.
- Every one should be involved in attaining sustainable development .It requires the industrial firms to manufacture more efficient and innovative goods, utilizing fewer resources and offering better values .



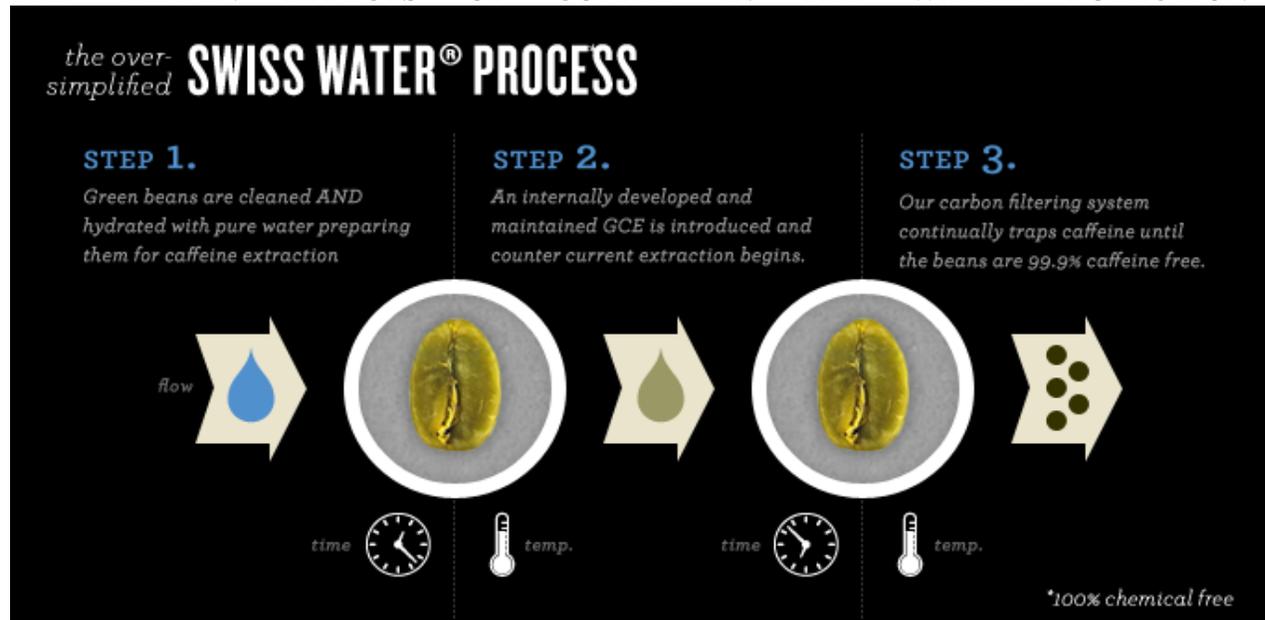
- It requires the government to set higher environmental standards in its energy consumption and conservation policies.
- There should be sustainable reduction in population growth rates.
- There should be provision for housing, health care and education for the poor.
- There should be education and empowerment for women, particularly in rural areas.
- There should be afforestation in cities and rural areas.
- There should be use of non-conventional energy resources by industries.
- There should be proper treatment of urban wastes and industrial effluence.
- There should be efficient use of resources avoiding wasteful and excessive

Utilization.

- There should be people's participation in conservation and improvement of environmental quality.

GREEN INITIATIVES

- Save our fresh water is the utilization of rainwater harvesting. Water harvesting is the process of collecting rainwater that falls on our property and storing it in water tanks for future use.
- Farmers in Central America generate energy from coffee waste water: UTZ certified energy from coffee waste water project has proven that it's possible to generate energy to tackle climatic change and protect water resources by treating discharges from coffee mills.
- Cleaning of waste materials floating in the ocean prevents us from the radiations passed on it due to the Japan nuclear bomb blast.
- High barrier materials must be used to block the penetration of small molecular gas (such as O₂, CO₂, N₂, and water vapor), aroma and other organic solvent vapor prominently..
- Once worn out tires are taken off of automobiles, they are considered scrap tires. In simpler terms, we can use recycled tires for playground cover, as building materials, erosion control and even as an alternative fuel.
- Certain components of cell phones are highly recyclable, while others need to be properly disposed of due to their hazardous nature. While cell phones are not generally collected curbside, it's still fairly easy to recycle them by utilizing take-back.
- Even coffee can also be recycled. Certain components of cell phones are highly recyclable, while others need to be properly disposed of due to their hazardous nature. While cell phones are not generally collected curbside, it's still fairly easy to recycle them by utilizing take-back.

**THE HIDDEN EFFECTS OF COFFEE IN THE WATER POLLUTION****THE COFFEE PROJECT**

Waste water generated from coffee wet-mill processing, which uses large amounts of water to remove the fruit of the seed, is often discharged untreated into the environment. This process pollutes ground water, basins and soils and affects rural communities' drinking water, as well as local fauna and flora, and marine life in coastal areas. What's more, it has also been discovered that coffee waste water generates a considerable amount of greenhouse gases, particularly methane. But coffee waste water is rich in organic matter, which can be used to generate energy via anaerobic decomposition.

At present, the negative environmental impacts of waste water are not considered in the cost of coffee, and neither are the economic benefits that extracting its energy potential could bring. Newly developed processes for generating energy from coffee waste water treat the fluid by-product to ensure that it re-enters the biosphere without causing damage. These processes essentially create a circular economy.

According to this excellent study, coffee's water footprint is 140 litres (or 37 gallons) per cup. Coffee production generates a great amount of wastewater, which is regularly released untreated into rivers, affecting the aquatic wildlife as well as downstream communities. Additionally, coffee wastewater comes with lots of organic waste and high toxicity, which affects the soil and generates considerable amounts of greenhouse gas emissions. UTZ's Energy from Coffee Wastewater project tackles each of these issues by taking a sustainable, holistic and integrated approach to resolving them.



INNOVATION: BIOFUEL DERIVED FROM COFFEE PROCESSING WASTEWATER

FOUR-YEAR SUSTAINABILITY PROJECT REVEALS THAT FARMERS IN CENTRAL AMERICA WERE ABLE TO EXTRACT BIOFUELS FROM THE WASTEWATER PRODUCED BY COFFEE MILLS.

Who knew that the process associated with the production of something so sublime as coffee — that essential beverage that helps caffeine lovers around the world jump-start their day each morning — could generate copious streams of wastewater? Seems incongruous, but it's true. But there is a silver lining: As it turns out, all that aromatic effluent can be utilized as a viable fuel source for energy.

That's according to **UTZ Certified**, which recently published the results of a four-year project on coffee wastewater treatment in Latin America.¹ According to the company, the region produces around 70 per cent of the world's coffee and is, incidentally, the continent where 31 per cent of the world's freshwater resources are located. Yet, coffee production generates a great amount of wastewater that is regularly released untreated into rivers, affecting aquatic fauna and flora as well as downstream communities. Additionally, coffee wastewater comes along with tons of organic waste and high toxicity, which affects the soil and generates considerable amounts of greenhouse-gas emissions — particularly methane. (As greenhouse gases go, methane is more potent than CO₂.)

THE PROCESS



Coffee processing is an energy intensive process and a potential source of contamination, according to UTZ Certified. Coffee waste (e.g., pulp, and waste water that leave the coffee processing units) are rich in organic matter, posing a threat to natural water bodies if not treated correctly. During the “wet method” process — which is prevalent among Latin American coffee plants — enormous amounts of waste are generated in the form of pulp and residual water.

According to UTZ, this wastewater boasts a ‘chemical oxygen demand value’ that varies between 18,000 and 30,000 milligrams per litre. Oxidation of the organic matter in the water is done by means of microflora of bacteria that feed on the matter while consuming oxygen. In cases of substantial discharge of wastewater into natural water bodies, the oxygen is significantly depleted (anaerobiosis) thereby destroying the aquatic fauna and flora.²

An investigation into using wastewater to produce biogas as an alternative energy was explored as a means to mitigate the aforementioned negative impacts. Specifically, the Energy from Coffee Wastewater project focused on the methane generated by anaerobic methanogenic bacteria as a source to create electrical energy. In application, research figured that up to 70 per cent of the fuel used by diesel generators in a pulping machine could be substituted with this coffee-based biogas. This energy also generates a substantial amount of the heat needed to dry the processed coffee and, theoretically, could replace other fuels such as those used in kitchen stoves.

THE PARTICIPANTS



The Energy from Coffee Wastewater project, which began in 2010, entailed the installation of customized coffee wastewater treatment systems and solid-waste treatment mechanisms in eight coffee farms varying in size in Nicaragua, ten in Honduras and one in Guatemala. ‘Pilot’ sites for the first coffee season of this project included: **CISA**, a large exporter with its own processing plant; **CECOCAFEN**, a cooperative with a central processing plant; and **El Polo**, a cooperative where smallholders process their coffee themselves.

CISA and CECOCAFEN focused on the challenges of substantial water usage during the wet method process for extraction and the negative environmental impacts as a result of insufficient treatment of the wastewater. (High energy costs were also addressed). Meanwhile, El Polo focused on environmental impacts created by insufficient treatment of wastewater discharged to the river, deforestation resulting from chopping firewood for preparation of food and the health issue of inhaling the smoke.

THE RESULTS



At the CISA pilot site, located in Diriamba, Nicaragua, operators were able to generate an average of 200,000 kW of power using biogas from the coffee wastewater. According to Gilberto Monterrey, technical director of the biogas plant, this represented savings of \$40,000 annually. Furthermore, not only is the wastewater management process he adopted more modern, but it also allows more efficient treatment, which ensures less pollution, Monterrey said. And to add the proverbial icing on the crumb cake, the new facility also allows a more optimal use of water to wash coffee, reducing it to less than 66,000 gallons per year.

The benefits didn’t end there. Other tangible results of the Energy from Coffee Wastewater project ranged from the prevention of local deforestation of native trees to better indoor environments for families who were able to replace firewood with domestic gas stoves — using, of course, the converted coffee wastewater as a fuel for cooking.

According to Han de Groot, executive director at UTZ Certified, the Energy from Coffee Wastewater project has proven that is possible to simultaneously generate energy, tackle climate change and protect water resources by treating discharges from coffee mills.

“Coffee production is only environmentally sustainable when water is used efficiently and polluted water from the wet-mill process is treated,” de Groot explained. “Local ecosystems do not have the capacity to clean the large amounts of contaminated fluids. Furthermore, rural communities and coffee production depend intrinsically on a ready supply of fresh water. So, if we want to talk about coffee produced in a sustainable manner, then wastewater must be treated when released into the environment.”

Not only did the four-year project reveal that a significant amount of biogas could be generated and used as an energy source, but it also provided benefits in terms of resource conservation. According to de Groot, the mills that participated in the study were able to ultimately all of the wastewater generated

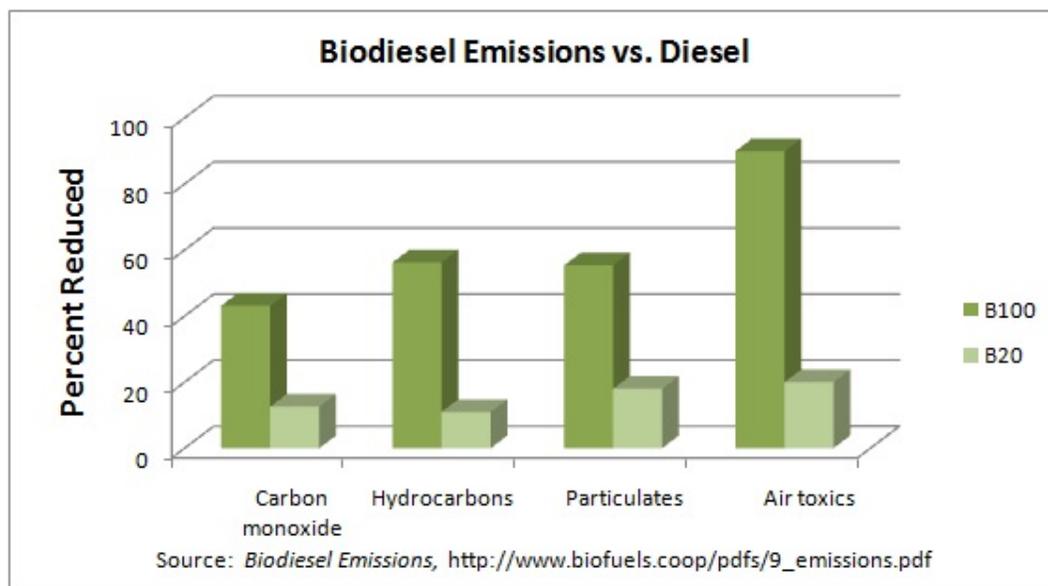


in processing the coffee. Further, the plants found that they were able to reduce water consumption by 50 per cent. These steps, according to UTZ Certified, resulted in the prevention of the release of greenhouse-gas emissions into the atmosphere.

The positive impact of the project on over 5,000 people in the region where the project was conducted has inspired UTZ Certified to replicate the Energy from Coffee Wastewater initiative in other countries. In fact, UTZ Certified is currently introducing the wastewater treatment technology in Peru and Brazil. UTZ hopes to get further funds and industry's support to replicate the initiative in Africa and Asia.

UTZ Certified stands for sustainable farming and better opportunities for farmers, their families and our planet. The UTZ program enables farmers to learn better farming methods, improve working conditions and take better care of their children and the environment.

Treatment thus provides not only a solution to waste disposal, but also an alternative fuel for electricity



generation, so that, in the absence of adequate “costs” imposed on polluted effluent discharge and on the use of water, positive returns on investment are obtained through replacement of bio-gas. The company aims to process over 30,000 tonnes of coffee grounds a year, which would make a significant dent into the 200,000 tonnes of waste produced by the London coffee industry

Conclusion

- The future of mankind is intimately interwoven with ecology. Humankind should realize that his future on this earth is bleak if he do not use nature resources rationally and does not take immediate steps to repair the damage already done to ecosystem may lead to various problems.
- The biggest problem is to balance the unpredicted rate of human consumption of food, fuel, fodder, fibre and fertilizer (5’ f’s) against their production; both through natural regeneration in the wild and the field under cultivation (i.e. Organic farming)
- For any ecological development, our objective must be very clear and precise and those involved in it .The villagers who are the ultimate analyzers are both the end –users and the guardians of our ecology.

“THERE IS NO ACTUAL EARTH OF PLANS, BUT THE TIME HAS COME FOR IMPLEMENTING AND TRANSLATING THIS INTO REALITY.”



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