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"Competing pathways for equitable food systems transformation: Trade-offs and synergies"

Climate protection and biodiversity resources conservation through water-run renewable-energy recovery-system in off-grid forest-reserves and farms

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Abstract

A major uptake has occurred in the last decade in various forms of renewable energy as a viable commercial alternative to the common fossil-fuel based energy generation. Water can be substituted for petroleum fuels and/or coal in energy recovery generation from waste materials which are readily available and even problematic in many rural and semi-urban settlements worldwide. The recycling nature of this water-run renewable energy system makes it to simultaneously solve the problems of waste pollution and electricity generation with low carbon footprint from the fossil-fuel substitution. Its independence of fluctuating fossil fuel prices makes it economical for sustainable transformation of agri-food systems, and flexible with possibility of hybridisation for peak demand from its reliable base load supply. While some countries in other continents: Europe, North America and Australia have used this emerging clean climate-friendly technology, global south countries the most vulnerable to both biodiversity and climate change are yet to adopt this renewable power generation for the transformation of their agri-food systems.

This study details the design methods or features, environmental implications, biodiversity resources conservation and investment analysis for this redeployable energy generation (ReGen). Within this decade, there are new investments in renewable energy by over 20 % increase by the end of 2020, with many countries now coming to clearly understand the benefits of utilising renewable energy as a source of meeting off-grid and distributed demand. The study revealed some special features of this ReGen power system as; redeployable, robust multi-fuel grates, low pressure operation (5 bar) through ORC system, low water consumption and high reliability, with off-grid power supply application. A comparable analysis shows that ReGen electricity business is profitable economically, environmentally and ecologically for biodiversity resources conservation and agri-food systems transformation.

Since ReGen power-systems facilitate alternative energy supplies to forest reserves, farms, households and industries, enhance circular economy green growth and improve resource-efficiency, a national to regional waste-to-resources strategy should be collaboratively developed and implemented by relevant Stakeholders in the global south to accelerate access to clean energy / environment and sustainable transformation of agri-food systems.

Keywords: Biodiversity conservation, Climate-friendly, Energy efficiency, Sustainable agri-food systems, Waste-to-Resources

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