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APPLICATION OF MATERIAL FLOW ANALYSIS TO IMPROVE RESOURCE EFFICIENCY OF GHANA

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Abstract

From oil imports and gold exports to cocoa fields that provide food for millions, Ghana's mining, energy, and agricultural industries drive the country's progress. However, they also produce enormous amounts of waste: farms throw away crop leftovers that could improve soil, energy systems inefficiently lose fuel and heat, and mining leaves behind enormous piles of tailings. These problems are revealed by application of Material Flow Analysis, which is a straightforward method of mapping what enters, what remains, and what exits the country's economy. It also identifies waste-to-energy solutions that are rational for each sector. In order to alleviate environmental stress, stabilize the power supply, create new jobs, and ultimately lower the unemployment rate, this report highlights innovative eco-friendly methods that convert waste into energy.

Keywords

Material-Flow Analysis, waste-to-energy, valorisation, composting, veolia-style method, cocoa husk, shea leftovers.

ПРИМЕНЕНИЕ АНАЛИЗА МАТЕРИАЛЬНЫХ ПОТОКОВ ДЛЯ ПОВЫШЕНИЯ РЕСУРСНОЙ ЭФФЕКТИВНОСТИ ГАНЫ

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Аннотация

От импорта нефти и экспорта золота до какао-плантаций, питающих миллионы жителей, горнодобывающая, энергетическая и сельскохозяйственная отрасли Ганы обеспечивают экономическое развитие страны. Однако они также генерируют огромные объемы загрязнения: фермерские хозяйства выбрасывают растительные отходы, которые могли бы улучшить почву, энергетические системы неэффективно расходуют топливо и теряют теплоту, а горнодобыча оставляет гигантские хвосты пустой породы. Эти проблемы выявлены с помощью анализа материальных потоков (MFA) – метода картирования входов, запасов и выходов из экономической системы страны. Выявлены решения по превращению отходов в энергию для каждого из рассмотренных секторов. Для снижения экологической нагрузки, стабилизации энергоснабжения, создания новых рабочих мест предложены экологически чистые методы переработки отходов в энергию.

Ключевые слова

Анализ материальных потоков, переработка отходов в энергию, валоризация, компостирование, метод компании Veolia, шелуха какао-бобов, отходы производства масла ши

Although these industries have expanded quickly over the years, waste levels are still high. More than half of the materials used in mining are discarded tailings. A large portion of energy is lost as heat or inefficiency. A third of biomass produced by agriculture is wasted due to inadequate storage or burning.

To begin with, Ghana's energy mix is beset by high fossil imports and droughts that damage hydro dams. There will be a consistent and clean power supply by combining crystalline solar panels with hydrothermal plants for dependable base-load power, such as expansions close to Bui Dam [1].

Secondly, mining dominates with gold and bauxite, but muddy leftovers and tailings accumulate and contaminate the land and water. Valorisation could be used to recover clean water, extract residual metals, and even produce energy [2]. This Veolia-style method reduces the need for new inputs by reusing enormous amounts of water each year and extracting valuable minerals.

Last but not least, the agricultural sector which produces tons of cocoa husks and Shea leftovers most often burned or buried can also be used to generate organic fertilizers which are very friendly to soil [3]. Composting these husks and leftovers turns them into rich fertilizer via simple aerobic or anaerobic methods, sold affordably to northern indigenous farmers who value it over chemicals.

Material Flow Analysis uncovered substantial waste in Ghana's mining, energy, and agriculture sectors. The suggested improvements will lead to new energy reduce unemployment and provide farmers with organic fertilizers. In a long run environmental pollution drops markedly. By doing this, Ghana will be in line with international environmental standards and amongst one of the pioneering countries in Africa transitioning to clean energy and sustainable practices. Government agencies like the Ministry of Food and Agriculture, the Energy Commission, and the Ministry of Lands and Natural Resources will serve policy regulators and main actors to make it all happen.

Literature

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