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SECTORS

Harnessing biomass: A sustainable path to bioeconomy

Leveraging India's abundant biomass resources for sustainable growth, economic benefits, and climate action is crucial for a greener and self-reliant future.

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India is an agrarian country with 160 million hectares of arable land, and 70 percent of its rural households still depend primarily on agriculture. Biomass generated from Agri residues and Agri processing industries is a potential

India's Potential of Agricultural Crop Residue

The annual availability of biomass in India is estimated to be approximately 770 million metric tonnes. There is an estimated surplus biomass availability of approximately 178 million metric tonnes per year for agricultural residues.

Developing a Sustainable and Economically Viable Biomass Supply Chain

Within the domain of biomass supply chain management, there exists a captivating interplay of coordination and optimisation. This intricate orchestration presents us with an exhilarating puzzle to solve the problem of subtle burning. Let us embark on a thoughtful journey to explore the pathways that guide us toward the realisation of a sustainable and thriving biomass supply chain.

- Fragmentation of Biomass Resources: India's biomass resources are often decentralised across various regions and fragmented among small-scale farmers and industries. This dispersion makes collection and aggregation challenging, leading to inefficiencies in the supply chain.
- Seasonal Availability and Storage Infrastructure: Many biomass resources, such as agricultural residues, are available only seasonally. This intermittency poses difficulties in maintaining storage and reliable supply of biomass feedstock throughout the year.
- Availability of Biomass collection Machinery: Though the Agri infrastructure and machinery (Baler, Racker, Tractors, etc) schemes have been launched for biomass collection still there is a need to implement them at the ground level.
- **Transportation and Logistics**: Biomass collection and transportation over long distances can be costly and logistically challenging, especially in rural areas with challenges in infrastructure.

• Quality of Biomass

: Biomass feedsock often has varying moisture content and chemical composition, and varies the efficiency of conversion processes. This also plays an important role in the storage of biomass.

Way Forward

To make sustainable and economical biomass supply chain in India, several solutions can be implemented:

- **Built Supply Chain Models**: Implement various supply chain models to optimise biomass collection, transportation, and supply.
- **FPO (Farmers' Producer Organisations)**: Promote the formation and involvement of FPOs to strengthen the supply chain management.
- **Village Level Entrepreneurs**: Encourage and support entrepreneurs at the village level to facilitate biomass collection and local processing.
- Decentralised Storage:
- Panchayat Level: Establish decentralised depots at the grassroots level for efficient biomass storage to cater strategic distribution of biomass resources.
- **Biomass Banks by States**: Set up biomass banks to regulate biomass trade and ensure fair prices for both suppliers and buyers.
- **Digital Platforms for Biomass Trading**: Create online platforms, similar to Amazon, for biomass trading to streamline transactions and connect buyers with suppliers.
- Agricultural Infrastructure and Machinery: Provide specialised machinery for biomass harvesting, collection, and storage to enhance efficiency and reduce losses.
- State and Central Supportive Mechanisms:

• **Subsidies/Incentives for Projects**: Provide financial incentives and subsidies for biomass-based projects to promote investments and widespread adoption of biofuel technologies.

Benefits to The Nation

An effective biomass supply chain can bring numerous benefits to the nation, contributing to various aspects of social, economic, and environmental development. Some of the key advantages include:

- 1. **Doubling Farmer Income (Waste-to-Wealth Approach)**: By selling their agricultural residues and other biomass resources, farmers can earn extra income, making agriculture a more viable and profitable venture.
- 2. **Rural Employment Generation**: Development of biomass-supply chain will create new job opportunities across rural and urban areas.
- Development in Rural Economy: The growth of biomass-based industries stimulates economic activities in rural regions, driving local economies and uplifting living standards.
- 4. **Atmanirbhar Bharat (Self-Reliant India)**: A thriving biomass supply chain aligns with the Atma Nirbhar Bharat initiative, promoting indigenous energy sources and reducing the need for energy imports.

By realising these benefits, an effective biomass supply chain plays a crucial role in fostering sustainable development, creating a cleaner and greener energy future, and promoting inclusive growth for the nation as a whole.

Addressing Climate Change Using Biomass Supply Chain

The biomass supply chain holds significant potential in addressing the pressing issues of climate change. By focusing on key points, it can contribute to sustainable solutions:

1. Energy Security and Reduced Dependence on Fossil Fuels

- Subsidies/Incentives for Projects: Offering subsidies and incentives for biomass-based projects encourages investment in biofuels. This support promotes the development of biomass technologies, leading to increased adoption and a cleaner energy system.
- 3. **Environmental Benefits**: Utilising biomass as a bioenergy source reduces crop residue burning practice and related air pollution issues. Effective utilisation of crop residue to produce biofuels, can greatly reduce GHG emission.

Conclusion

An effective utilisation of biomass and its supply holds the key to a sustainable and green future. By harnessing biomass resources for low-carbon biofuels, promoting rural development, and addressing climate change, it offers a myriad of benefits. From empowering farmers and creating employment opportunities to reducing greenhouse gas emissions and enhancing energy security, farm-to-fuel application of biomass paves the way toward a greener, cleaner, and self-reliant nation. Embracing this approach is crucial in building a strong circular bioeconomy and sustainable world for generations to come.

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