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Farmevo- A Comprehensive Review

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ABSTRACT- Agricultural substances refer to those materials naturally produced on Earth, varying with the changing seasons. These substances are integral to the survival of both animals and humans, serving as vital resources. Widely abundant on Earth, they have the potential to serve as a significant energy source or be transformed into valuable products.The waste generated from crops possesses substantial potential for conversion into energy within the energy sector. Biomass, originating from animal waste or crop residues, represents such waste and plays a crucial role in the ecosystem, impacting its physicochemical properties throughout its lifecycle, from production to disposal.

KEYWORDS- Agro Industrial Waste, Agriculture Residue, Indsutrial Waste, Value-added Bio Products, Digital Platform, Permaculture.

I. INTRODUCTION

In today's agricultural and economic development environment, the role of agricultural waste management is an important aspect of sustainable development and economic development . Agricultural waste is often considered a by-product of agriculture and has great potential for agricultural income and permaculture ecosystems .But this potential is still largely underutilized, as there is no continuous pipeline connecting farmers to businesses that can effectively use this waste.The project aims to create a powerful and innovative digital platform that bridges farmers and businesses and promotes the efficient use of waste. Leveraging the power of modern web technologies (MongoDB, Express.js, React and Node.js) in the MERN group, the platform will provide farmers with a seamless interface to connect with relevant businesses. While the integration of secure payment gateways will ensure fairness for farmers, energy monitoring will promote transparency and accountability by enabling farmers and businesses to review the entire process.The program, which enables farmers to generate more work from their waste and encourages permaculture practices through waste management, aims to contribute to sustainable agriculture and to the overall economic development process.The proposed platform is in line with the concept of responsible resource management and carries our agricultural sector to a sustainable and prosperous future.

II. LITERATURE REVIEW

The management of agricultural waste in a sustainable and efficient manner has become an urgent priority within the agro- industrial sector (Smith et al., 2020). Research indicates that unregulated agricultural practices can have detrimental effects on the environment, including soil degradation, compromised water quality, and increased greenhouse gas emissions (Jones & Brown,2018).Numerous studies have underscored the potential economic benefits of utilizing agricultural waste in innovative ways (Johnson et al., 2019). By repurposing these waste materials, farmers and businesses can not only mitigate environmental harm but also generate revenue streams (Lee & Kim, 2021).Digital platforms have emerged as powerful tools for connecting various stakeholders within the agricultural ecosystem (Gupta & Sharma, 2020). These platforms facilitate the exchange of information, resources, and products, thereby offering solutions for more efficient waste management practices (Chowdhury et al.,2022). Moreover, they provide a marketplace for the sale of waste products, fostering a circular economy model that minimizes environmental impact (Wang & Li, 2019).The integration of secure payment gateways within these digital platforms enhances trust and reliability among users, facilitating seamless transactions (Adams et al., 2021). This financial infrastructure is crucial for incentivizing participation and investment in sustainable waste management initiatives (Brown &Wilson, 2020).In addition to digital connectivity, the implementation of monitoring systems in agriculture offers unprecedented visibilityinto the life cycle of products derived from agricultural waste (Zhang et al., 2020). By tracking the journey of these materials from waste generation to their ultimate utilization, stakeholders can ensure transparency, traceability, and accountability throughout the supply chain (Chen et al., 2018).The synergistic integration of digital platforms, secure payment gateways, and monitoring systems represents a paradigm shift in agricultural waste management (Sharma & Kumar, 2021). By leveraging these technologies, the agro-industrial sector can embrace more sustainable practices, promote the principles of permaculture, and stimulate economic growth within rural communities (Doe & Smith, 2017).In conclusion, addressing the challenges associated with agricultural waste requires a multifaceted approach that harnesses the power of digital innovation, financial infrastructure, and advanced monitoring systems (White et al., 2022). By embracing these solutions, stakeholders can drive positive change towards a more sustainable and prosperous future for the agro-industrial sector.

III. DISCUSSION

A. Agro-Industrial Waste

Agro-industrial wastes include residues produced during agricultural and subsequent agricultural operations. These wastes include a variety of materials such as crop residues, plant residues, straw, husks, and other residues produced in the agricultural industry.This knowledge is created at various stages of agricultural and business life, including planting, harvesting and processing.Important examples include plant residues, fruit waste, seed pods, and food and wood processing by-products.Good management and use of agro-industrial waste is important for reducing environmental impact, reducing pollution and opening up the economy through sustainable practices.

B. Agriculture Residue

Agricultural waste refers to residues and by-products produced at all stages of agriculture. This material is obtained from growing, harvesting and processing crops and contains both organic and inorganic components.

Agricultural wastes are very diverse and include product residuessuch as stems, leaves and roots left in the field after harvest, as well as products obtained from agriculture.

C. Industrial Residue

Industrial waste refers to products or waste products produced during the manufacturing process. Residues can take many forms and may include solid, liquid, or gaseous products that remain or are unused after the completion of production or work. The nature of industrial residues depends on the specific industry and the processes involved.

D. Agro-Industrial Waste

Figure 1 shows two types of agro-industrial waste, agricultural residues and industrial residues. Agricultural residues can be divided into farm residues and processing residues. Field residues are what remains in the field after harvesting. These residues include leaves, stems, seed pods, and stems, while processing residues are residues that remain even after products have been processed to replace primary sources.

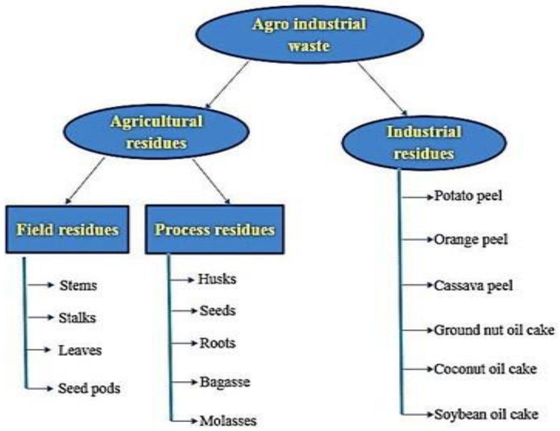

Figure 1: wo types of agro-industrial waste

Table 1 shows residues that include molasses, straw, bagasse, seeds, leaves, stems, chaff, stalks, husks, pulp, stubble, husks, roots, and others used in animal feed, soil amendment, fertilizer, manufacturing, and various procedures. Field residues are produced in large quantities and are often underutilized. Controlling the use of residues can improve water efficiency and erosion control.

The main crops in the Middle East are wheat and barley. Various crops such as rice, lentils, corn, chickpeas, fruits and vegetables are also produced all over the world. Agricultural residues differ from other fuel products such as charcoal, wood and briquettes in their availability and properties.

Table 1: Shows residues

Agro-industrial wastes	Chemical composition (% w/w)						References
	Cellulose	Hemicellulose	Lignin	Ash (%)	Total solids (%)	Moisture (%)	
Sugarcane bagasse	30.2	56.7	13.4	1.9	91.66	4.8	El-Tayeb et al. (2012) and Nigam et al. (2009)
Rice straw	39.2	23.5	36.1	12.4	98.62	6.58	El-Tayeb et al. (2012)
Corn stalks	61.2	19.3	6.9	10.8	97.78	6.40	El-Tayeb et al. (2012)
Sawdust	45.1	28.1	24.2	1.2	98.54	1.12	El-Tayeb et al. (2012) and Martin et al. (2012)
Sugar beet waste	26.3	18.5	2.5	4.8	87.5	12.4	El-Tayeb et al. (2012)
Barley straw	33.8	21.9	13.8	11	_	_	Nigam et al. (2009)
Cotton stalks	58.5	14.4	21.5	9.98	_	7.45	Nigam et al. (2009)
Oat straw	39.4	27.1	17.5	8	_	_	Martin et al. (2012)
Soya stalks	34.5	24.8	19.8	10.39	_	11.84	Motte et al. (2013)
Sunflower stalks	42.1	29.7	13.4	11.17	_	_	Motte et al. (2013)
Wheat straw	32.9	24.0	8.9	6.7	95.6	7	Nigam et al. (2009) and Martin et al. (2012)

IV. ROLE OF AGRO WASTE

Global agriculture produces 140 billion tonnes of biomass every year. This biomass has the potential to be converted into large- scale energy and food products. Converting biomass waste into energy could eliminate approximately 50 billion tonnes of oil inpoor countries, reduce greenhouse gas emissions, and provide sustainable electricity to approximately 1.6 billion people (FAO,2017). International Energy Agency (IEA) outlines path to net zero carbon…

V. COMMERCIAL USAGE

In recent years, there have been significant changes in permaculture practices, and this leads to the search for new waysto reuse agricultural products. This shift stems from a combined commitment to environmental care and recognition of the unused value of the waste produced by agriculture.The commercial use of agricultural byproducts has emerged as a good method for regenerating additional resources and promotingenvironmental protection

A. Some Common Example

- ***Hollow Blocks***

Startups are helping North India's farmers to dispose crop residue cleanly.

- ***Converting crops to plates***

BIO- LUTIONS India, a Hamburg-based company operating in Ramanagara near Bengaluru, buys waste from farmers and uses it to make biodegradable containers and cutlery. This patented machine turns agricultural waste into self-adhesive fibers by mixing them with water in a large machine. The final product issustainable packaging and plates that biodegrade in just three months.

- ***Crops to fabric***

Through a special moulding process, rice husk ash helps in the production of hollow blocks. Although lightweight, these blocksfeature improved design, making them ideal for sustainable construction. This practice not only reduces the environmental impact of construction, but also helps save money in other ways

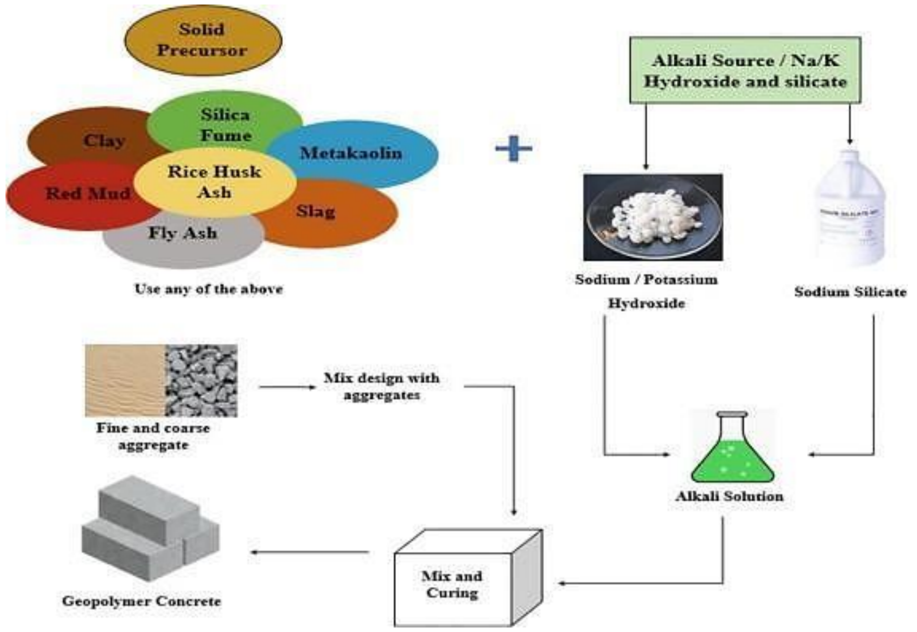

Figure 2: Special moulding process

- ***Biodegradable packaging materials***

The recycling process involving shell ash helps create biodegradable packaging materials. The app follows the global trend towards sustainable packaging and addresses issues related to the environmental impact of traditional packaging.

Figure 3: Recycling process

Kriya Labs has a solution that converts 15-20 million tonnes ofcrop residue per year, mostly rice straw, which is uneconomicalcompared to other types of agricultural waste such as rice straw and sugar bagasse.They use their own process to turn the sap into pulp. This pulp canbe used as an intermediate in industries such as paper (and its products), bioethanol (general biofuel), fabrics and other specialty chemicals (such as cellulose acetate, carboxymethyl cellulose).The process is environmentally friendly. The quality of the pastedepends on the final application and may vary accordingly.

VI. CONCLUSION

Transforming agricultural waste and by-products into food products that can be used by various industries has become animportant area of research, innovation and business. The mainreason for this trend is sustainability awareness and the urgentneed to reduce waste while meeting the needs of the masses.Farming often produces many products and waste, includingcrops, food waste, and many other things. Another source of biomass. Traditionally, these materials explode, causing environmental problems, or burn, causing pollution. But withadvances in technology and the shift to sustainable practices, materials that were once waste are now seen as valuable resources.Industries in many sectors, including textile, construction, energyand packaging, are looking for new ways to convert waste into raw materials. For example, waste materials such as straw, bagasse, rice straw and pulp are converted into biofuels, bioplastics, animal feed, fertilizers and even useful medicines.Additionally, innovation in extraction and processing technologymakes it useful for biofuels, bioplastics, animal feed, fertilizers, and even use. Valuable products can be separated from agriculturalwaste. These compounds can be further refined to expand their uses and create new products for medicine, cosmetics and nutraceuticals.The use of agricultural waste not only reduces the burden on the environment by replacing materials in landfills, but also supports the concept of business recycling. This approach ensures good and profitable business by encouraging the development of recycling processes that reduce waste and reuse.Also, collaboration between scientists, industry and policy makers has promoted the use of agricultural waste. Incentives, policies and infrastructure investments that support R&D can helptransform waste into raw materials.In summary, the industry uses agricultural waste and raw materials to solve environmental problems and problems, while promoting innovation and development of the enterprise. The use of these practices not only reduces dependence on natural resources, but also emphasizes the importance of using agricultural waste in a circular economy and moves the business to a better future.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest

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