

3.7 Creating value from waste – opportunities and challenges from the valorisation of rice straw

In India, rice straw stubble burning is commonly practised by farmers to clear fields for the next crop. Harmful pollutants are released with detrimental effects on health and the environment. Rice straw valorisation is seen as a solution for sustainable rice straw management providing economic, environmental, and social benefits.

Waste generated by a growing population, the rise in consumerisation particularly within the middle-classes, and the current linear “make-consume-dispose” supply model is unsustainable.

The re-use of agricultural by-products such as waste straw stubble, as an input feedstock in industrial value chains offers opportunities for local value-adding processes, local material supply security and pollution prevention. However, whilst such reuse of waste materials can support circular supply chains, and sustainable economic growth, the evaluation of technical and commercial feasibility is complex. Furthermore, the multi-entity partnerships (farmers, industrial partners, public sector bodies) requires public-private coalition building.

A TIGR²ESS research team led by the University of Cambridge, explored the potential of straw-stubble waste valorisation. By mapping alternative ‘waste’ valorisation production processing routes, the team identified industrially scalable economical solutions and collaborations to address the rice straw burning challenge.

Identifying products and partnerships

Two pathways were selected for further exploration for their potential for scalable valorisation, namely *straw pellets* and *furniture panels*. Discussions with supply and demand-side actors (e.g. farmers, MNEs, start-ups), production processing equipment providers and institutional bodies provided supply network design inputs regarding local feedstock collection, production process technologies, and multi-entity contractual partnership options.

The research demonstrated how supply chain configuration analysis can be used to explore scalable solutions for the reuse of ‘waste’/by-products of agriculture. It provides practitioners and policy makers with a methodology for the design and evaluation of valorisation options for local ‘waste’/by-products, including the partnering arrangements between public and private entities. Moreover, it highlights the importance of organisational intermediaries required for the creation of circular supply chains where both public and private inputs are needed.

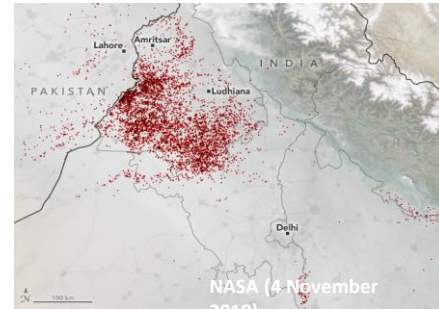
Going forward

The valorisation of straw waste products has been shown to be a viable option for use in the furniture industry, with products currently being tested by partners at IIT Ropar. Researchers will continue to validate the principles established through the TIGR²ESS programme by exploring opportunities with other waste by-products.



(Business Standard, 2019)

Farmers clearing the fields



Fire locations from NASA satellites

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