



Action Plan for Biomass Management

Introduction

The farm burning, specific to the paddy-wheat cultivation cycle in the rural regions of **Northern and North-Western states** of India, has been identified as a major source of air pollution. It not only affects the air-quality in rural areas but also causes an episodic rise in air-pollution during October and November in Delhi-NCR.

CII-NITI Aayog '**Cleaner Air Better Life**' initiative aims to bring together all relevant stakeholders for designing a set of solutions to the identified sources of air pollution. For this initiative, the findings of **IIT-K study** are being considered as **basis of designing** the action plans.

Anchored by the **Ministry of Environment Forests and Climate Change**, the task force on Biomass Management has identified certain avenues for the alternate usage of paddy straw/crop residue

The task force has suggested a two-pronged approach to tackle the issue:

From the farmers' end

- **In-situ utilisation or soil incorporation of crop-residue** (that remains standing in the field after combine harvesting) needs to be prioritised and popularised among the farmers. This is important, not only to ensure that crops are not burnt but for long-term conservation of micro nutrients in the soil.
- **In-situ utilisation of straw** which remains rooted in the soil, requires a change in farming practices. For this purpose, specialised machinery is required at different stages of farming.
- Apart from directly **ploughing and mixing (mulching)** the residues back into the soil, on-farm management techniques (**composting, pyrolysis or biochar**) are effective in bringing the nutrients back to the soil
- There is increasing evidence that **soil incorporation** has long-term benefits for improving the quality of soil, increasing water-use efficiency and reducing the intensity of fertilisers being used.

From the government's end

Table 1: Actions to combat air pollution by subtle burning

Immediate action	Medium and long-term actions				
	Impact fund for Air-pollution	Upscale technologies	Reward and Monitor at local level	Regulatory support	Awareness tools
<ul style="list-style-type: none">▪ Incentives to farmers through Direct	<ul style="list-style-type: none">▪ Set-up clean impact fund to support clean	<ul style="list-style-type: none">▪ Service-based shared infrastructure	<ul style="list-style-type: none">▪ Reward for panchayats INR 1 Lakh per panch	<ul style="list-style-type: none">▪ Reassessing fuel for criteria	<ul style="list-style-type: none">▪ Awareness campaign for farmers

Benefits Transfer s.	technologies and link it with the national clean Energy Fund	(with 50% capital subsidy on select implementations). <ul style="list-style-type: none"> ▪ Process-based incentives ▪ Accelerated depreciation for farm implementations. 	hayats with zero burning. <ul style="list-style-type: none"> ▪ Monitoring through advanced remote sensing data and mobile base app for general public. 	for briquettes/ pellets From paddy-straw. <ul style="list-style-type: none"> ▪ Directive to thermal power plants to produce paddy-straw briquette/ pellets ▪ Removing the size limitation for bio-power captive generation 	<ul style="list-style-type: none"> ▪ Farmer recognition programme. ▪ Manuals and information tool for in-situ mulching and on farm management
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Table 2: Solutions and technologies for utilisation of farm waste

S. No	Utilisation Methods	Applications	Barriers	Enablers
1	Biochar	<ul style="list-style-type: none"> ▪ Soil conditioner ▪ Bio remediation ▪ For making value added products 	<ul style="list-style-type: none"> ▪ Lack of financial support ▪ Lack of equipments 	<ul style="list-style-type: none"> ▪ Awareness on benefits ▪ Market development for biochar products ▪ Research and development
2	Briquetting	<ul style="list-style-type: none"> ▪ Fuel in gasification furnace, heaters, hot-water boilers, industrial boilers ▪ It is a very good substitute for furnace oil, coal or direct wood. 	<ul style="list-style-type: none"> ▪ Lack of availability of dry biomass because of dew in winter season. ▪ Lack of transportation facilities 	<ul style="list-style-type: none"> ▪ Proper recognition for industry and those using briquettes.
3	Pelletisation	<ul style="list-style-type: none"> ▪ It has good potential for being used as fuel in cooking stoves and heating applications in domestic as well as industry. 	<ul style="list-style-type: none"> ▪ Availability of raw materials crucial for business model. ▪ Often has a large size that leads to a high storage and transportation cost. 	<ul style="list-style-type: none"> ▪ Subsidy on cook stoves targeting specific users for replacing wood or coal usage.
4	BioCNG	<ul style="list-style-type: none"> ▪ Commercial-hotels, canteens, bakeries, 	<ul style="list-style-type: none"> ▪ Lack of financing. ▪ Organized supply 	<ul style="list-style-type: none"> ▪ Funding support to entrepreneurs

		resorts, residential clusters. <ul style="list-style-type: none"> Industrial-glass and ceramic, cement, metal process, textiles, food processing, 	chain-Transportation of raw material from farmer to biogas plant needs to be streamlined.	willing to establish 2G biogas/ Bio CNG units under NABARD soft loan scheme. <ul style="list-style-type: none"> Exemption of GST on Biogas/Bio CNG and capital equipment and installation Tax breaks
5	Liquid fuels	<ul style="list-style-type: none"> The petrol and diesel produced through this method will conform to Bharat VI norms and can be used directly in cars, trucks, engines etc 	<ul style="list-style-type: none"> Varying feedstock costs (collection and transportation costs might vary). Storage and transportation 	<ul style="list-style-type: none"> Effectiveness and efficiency needs to be proven Monetize urban/rural wastes (assigns economic value to wastes)
6	Bio-ethanol	<ul style="list-style-type: none"> It could pave a way in the future for second generation biofuels derived from crop-residues 	<ul style="list-style-type: none"> Lack of investments 	<ul style="list-style-type: none"> Pre-treatment of paddy straw is being deployed at commercial scale and viability gap funding can be explored for such projects