FIELDS ON FIRE

IMPACTS AND ALTERNATIVES TO CROP RESIDUE BURNING

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INTRODUCTION:

India ranks second worldwide in farm outputs. As per 2018, agriculture employed over 50% of the Indian workforce and contributed 17–18% to country's GDP. With the assembly of crops there is crop residue production in an exceedingly million tones but efficient crop residue management practices are lacking in India. Field burning can effect soil physical, chemical and biological properties or degrade the soil fertility status and also shows drastic effects on environmental conditions. Additionally it causes loss of serious components like nitrogen, phosphorus, sulfur and potassium from the topsoil layer, making the land less fertile and unviable for agriculture for next generations. Removal of the paddy stalk that's still on the sphere is additionally a labour-intensive process.

IMPACT OF FIELD BURNING:

Burning of crop residue has devastative impacts on soil, environment and on whole ecological balance. Global climate change is one amongst most significant and under considerable example of burning waste and left over crop residues.

IMPACT OF BURNING ON SOIL:

Low intensity fires don't cause enough soil heating to produce significant changes to soil physical properties Intense burns may have detrimental effects on soil physical properties by consuming soil organic matter. Soil porosity can even be reduced by the loss of soil invertebrates that channel within the soil. The impact of fireside on site productivity is additionally related to intensity.

•Fire effects microbial activities within soil and suppress their growth.

•Biodegradation of organic types of Carbon and Nitrogen as stricken with fire.

•Nitrogen begins volatilizing out of organic matter at only 200° C, whereas Ca must be heated to 1240° C for vaporization to occur.

IMPACT OF BURNING ON ENVIRONMENT:

Burning of residues release various toxic compounds to the environment including nitrogen oxides, volatile organic compounds (VOCs), carbon monoxide, and particle pollution. The main adverse effects of crop residue burning include the emission of greenhouse

gases (GHGs) that contributes to the global warming, increased levels of particulate matter (PM) and smog that cause health hazards, loss of biodiversity of agricultural lands, and the deterioration of soil fertility.

1. Crop residue burning significantly increases the quantity of air pollutants such as CO2, CO, NH3, NOx , Non-methane hydrocarbon (NMHC).

2. The PM emitted from burning of crop residues in Delhi is 17 times that from all other sources such as vehicle emissions, garbage burning and industries. As such the residue burning in the northwest part of India contributes to about 20% of organic carbon and elemental carbon towards the overall national budget of emission from agricultural waste burning. Stubble burning in Punjab and Haryana and other meteorological factors pushed Delhi's air quality level down. On October 14, 2019, the air quality index (AQI) in the national capital was at 280, the upper end of 'poor' category, according to the Centre-run System of Air Quality and Weather Forecasting.

3.Impact on Human health: Crop residue burning causes breathing problems, skin related issues and effect the health of living organisms. Burning of Agricultural wastage leads to exposure of harmful gases in air cause eye and skin problems.

• Air pollution in northern India, mainly New Delhi and the neighboring states, is exacting a toll on the health of the residents, highlighting the severity. In northern India crop residue burning is banned by the Indian government in 2015 in Punjab, Haryana and Uttar Pradesh.

ALTERNATIVES OF FIELD BURNING:

Farmers in North India could increase their profits if they stop burning their rice straw and adopt no tillage practices to grow wheat. Alternative farming practices could also cut farmers' greenhouse emissions from on-farm activities by the maximum amount as 78% and helpower pollution.

1. Happy seeder: Punjab Agricultural University (PAU) Ludhiana designed a tractor mounted machine that cuts and incorporated the paddy straw into the soil. Indian Government banned burning of crop residue in Punjab, Haryana and neighboring districts. Happy Seeder could be a viable alternative to standard tillage.

2. PUSA Decomposer: Indian Agriculture Research Institute (IARI), PUSA have found an alternate to stubble burning in north India. This Decomposer is so cheap that each and every farmer However, for states such as Odisha and West Bengal the claim of zero suicides seems implausible. In Odisha, ground reports of farmer suicides, including data presented in the assembly, do not match NCRB data. Price of one decomposer capsule is simply Rs. 5. This capsule also helps to take care of the moisture of the sector for extended period of your time. 4 capsules are enough for one acre of land to decompose the residues of crops.

3. PAU Super SMS (Straw Management System): This machine will facilitate the in situ stubble management like Happy seeder. PAU SMS may be a unique technology for combine harvesters with cuts, chops and uniform spreading of straw coming after harvesting of crop.

4. Paddy straw cutter cum spreader:-The Punjab Agricultural University has entered into agreement with two industries namely Thind Mechanical Works, Amritsar and Amrik Agricultural Industries, Batala, for commercialization of PAU Cutter cum Spreader technology. The PAU Cutter cum Spreader is low cost and practically applicable technology for cutting, chopping and uniform spreading of paddy straw in combine harvested paddy fields.

5. Speed kompost: A Pune-based agri biotech firm has developed a microbial formulation that can recycle crop residue in the field rather than burning them away and thus help improve soil fertility. Speed Kompost, the microbial solution developed by Kan Biosys contains a cocktail of cellulose degrading, starch degrading, protein degrading bacteria and fungi.

GOVERNMENT POLICIES OR PLANS FOR MINIMIZING STUBBLE BURNING:

1.Indian Government banned Stubble burning openly. Government of Punjab and Haryana have announced a bonus of 2500 to those farmers for controlling stubble burning.

2.Government of UP has decided to set up two biofuel plants ,where farmers can sell their waste stubble for generation of electricity.

3.An incentive of Rs. 100 per quintal for small and marginal farmers who engage in the management of the residue of their non-Basmati variety rice crop in Punjab, Haryana and Uttar Pradesh.