EDITORIAL

STUBBLE BURNING

Cause of Worsening Air Pollution

Farmers in India set their fields on fire to get rid of paddy stubble before wheat crop is sown. These fires release trace gases and particulate matter which pose a serious health hazards. Fires raging across Punjab and Haryana leave the neighbour Delhi gasping and wheezing. Air pollution in NCR of Delhi is recorded at 500 level- mark on Air Quality Index. In certain areas of Delhi, AQI shot up to 900 mark in November 2019 which forced government to declare it a Public Health Emergency. AQI between 100-200 mark is considered "Moderate". Ministry of Earth Sciences found that Delhi's pollution is worsened by 35 per cent due to stubble burning. Supreme Court of India, however, stated that Agricultural Burning added only 4 per cent to the environmental pollution of Delhi (15 November, 2019). There is a study carried out by Union Ministry of Agriculture and Farmers Welfare which has reported that Punjab contributed 83 per cent of harmful emissions from stubble burning during 2018. Here, farmers race against the short turnaround time to immediately sow the next crop of wheat after machine harvest of paddy crop. As the residual stubble are still moist after the rainy season, some farmers spray 'used machine oil' to hasten the spread of fire. It further aggravates the pollution load. Some 2 lakh farmers are involved in stubble burning in India. Remote Sensing Centre at Ludhiana has revealed that a total 21,978 fires were recorded in Punjab during 2018. Similarly, Haryana Space Application Centre at Hisar registered a total of 4257 fires in Haryana during the same period. Apparently, stubble trouble lies more in Punjab.

According to World Air Quality Report-2019, there are 30 most polluted cities in the world of which 21 are in India. The 21 Indian cities are listed below in order of their ranking:

1.Ghaziabad	8. Bulandshahar	15. Patna
2.Delhi	9. Muzaffarnagar	16. Palwal
3.Noida	10. Baghpat	17. Muzaffarpur
4.Gurgaon	11. Jind	18. Hisar
5.Greater Noida	12. Faridabad	19. Kutail
6.Bandhwari	13. Coraut	20. Jodhpur
7.Lucknow	14. Bhiwadi	21. Moradabad

Ghaziabad is found to have the dubious distinction of being the Most Polluted City in the World. Ghaziabad is followed by Hotan in China and then Gujranwala and Faisalabad in Pakistan. Delhi is at 5th place. Country-wise data show that India is ranked 5th in most polluted countries

in the world with Bangladesh taking the top spot followed by Pakistan, Mongolia and Afghanistan. The CEO of IQAIR Frank Hammes has commented that air pollution is a silent killer contributing nearly 7 million deaths per year.

Premature deaths caused by modern sources of pollution created by industrialization and rapid urbanization are alarming in India. In a Report titled as "The Pollution and Health Matrics" published by Global Alliance on Health and Pollution (GHP), India is placed on the top at 2.3 million premature death in 2017 followed by China at 1.9 million.

CHINA, US ALSO IN TOP 10
Premature Pollution-Related Deaths Per Year

India	2,326,771
China	1,865,566
Nigeria	279,318
Indonesia	232,974
Pakistan	223,836
Bangladesh	207,922
US	196,930
Russia	118,687
Ethiopia	110,787
Brazil	109,438

- Modern pollution is caused by industrialization and urbanization. It includes ambient air pollution, soil and chemicals pollution, and pollution at the workplace.
- Traditional pollution refers to indoor air pollution caused by poor ventilation and smoke from cook stoves and heating fires, and water pollution from unsafe sanitation.

Data presented in the above table further indicate that even the developed countries like USA and Russia are in the grip of premature deaths due to pollution as 0.19 million and 0.11 million people respectively died there because of pollution. The reason behind the highest number of premature deaths in India and China are obviously because both the countries have billion-plus population.

Diversification:

Long-term solution to the problem of stubble burning lies in diversification. Instead of paddy cultivation, successfully diversify into maize, cotton, basmati rice, and other crops. The success of diversification

sustainability, however, depends on proper MSP and procurement of the crops' produce by the Government on the pattern of wheat and paddy. In about 15 per cent of the farm lands, paddy be alternated with potato and vegetable crops in which case farmers usually take away the waste out of the fields.

Incentives:

There are two types of incentives beneficial to the farmers. One is subsidies in farm machinery. Lack of access to farm equipment for in-situ straw management has been a major hindrance. Government launched a scheme in 2018 for agricultural mechanization by way of providing subsidy in the purchase of required machinery such as Happy Seeder (Roto-Seeder), Zero Till, and Mulcher. Farmers demanded that this subsidy should also be given on tractors of more than 45 HP capacity, a necessity for operating heavy-duty machine such as Happy Seeder. At the same time, subsidy scheme be extended beyond March 2020. Subsidy incentive on farm equipment is not only effective in checking straw burning but will also favourably impact farm productivity. But the prices of farm machinery are exorbitant even after the subsidies ranging from Rs. 50,000 to Rs. 3 lakh. This is out of reach of most farmers especially the small land-holders. Secondly, these machines are barely in use for 20 days in a year. Once the season is over, these will lie idle. Thirdly, the cost of diesel in farm operations comes to somewhere around ₹2000 /- per acre. Ordinary farmers cannot afford such expensive farm operations. Economically viable option before the Government is to establish Custom Hire Purchase Service Centres for letting out the tractor and farm equipment to farmers for doing mechanized farming. One Village One CHPS Centre is called for in public interest. Better if some Not-For-Profit Organization like Section-8 Company is engaged for operation and management of these Centres. Second type of incentive is compensation by cash to those farmers who stop stubble burning and adopt some alternative practices. In this connection, Supreme Court has ordered (7.11.2019) that such farmers be compensated by cash at the rate of Rs. 100/- per quintal of their produce to prevent them from setting their fields on fire and to get rid of agriculture residues. This incentive is in addition to MSP given by the Central Government.

Manual Harvesting:

Farmers especially in Punjab rely on combine harvesters. It leaves behind a significant length of straw and stubbles. Burning these residues is an easy way for farmers to clear the fields for wheat sowing. Use of combine harvester, however, is not feasible in small land holdings. In states like Uttar Pradesh, land-holdings are smaller and labour is easily available. Hence, farmers here harvest paddy with hands. Manual

harvesting leaves little or no crop residue. When there are no stubble in the field, the question of burning them does not arise. Crop cutting with simple hand-tools, therefore, is a good alternative. It is not only feasible but also economical especially in small land holdings. To deal with the menace of stubble burning, some farmers use stubble as bed for animals during winters. It keeps animals warm. It is a good use of stubbles.

Bio-Fuel Plants:

The air pollution woes have made it necessary to find out immediate measures to stamp out the stubble burning. On its own, Chhattisgarh Government has devised a mechanism according to which paddy husk and rice straw are used to produce "Bio-Fuel Ethanol". Chhattisgarh is known as "Rice Bowl of India". Rice straw and paddy husk are available here in abundance. These two waste products are significant source of cellulose-rich biomass which are converted into bio-ethanol. Chhattisgarh government has set up several Bio-Fuel Plants in the state to produce ethanol. Paddy husk and rice straw are now being sold to these plants. Thus, the mechanism has not only stopped stubble burning but has also generated additional income to farmers and at the same time employment to unemployed youths. Farmer won't burn anything if he knows that every part of his produce will be bought. Chhattisgarh has, therefore, advised Central Government to popularize the Bio-Fuel Units to curb the stubble burning. A survey by The Economic Times has suggested that the use of crop residues be promoted as an alternative fuel in local industries, brick-kilns, and hotels to stop burning of the harvest wastes.

Power Plants:

Punjab Chief Minister shared his views and expressed that his Government has already initiated several alternative uses of paddy stubble such as power plants, biogas plants, animal fodder, and bio-ethanol. To begin with, 9 Power Plants with a capacity of 72 MW have already been set up. Similarly, Biogas Plants based on paddy residues are being encouraged under Investment Policy 2017. There is huge volume of about 15 million tonnes of paddy residues in Punjab every year. Punjab Government has set aside $ 1 million (roughly ₹75 crore) for any agency which could take care of this massive amount of paddy waste. A technically feasible, economically viable, and Non-Mechanical Project Proposals are invited for the management of paddy residues. Ex-situ straw management needs to be tried at small scale options as well as large scale industrial use of the residues such as composting, biogas, fodder, fertilizers, fuel and fible boards. The R & D for the entire straw value chain is required to develop business models for rural entrepreneurs supported by Corporates, Government Departments, State Agricultural Universities, Farm Communities and Volunteers so that farmland could be made free

from stubble burning.

Decomposition:

NITI Aayog rolled out "Technology of Decomposition" of straw in-situ. Idea is to use decomposers either in the form of liquid that can be sprayed on the fields or use capsules that can decompose the paddy and wheat straw on the farm itself in three to four weeks after which they can be ploughed back into the soil. Aayog is working out a Fiscal Package for quick adoption of the technology. The cost is equally shared between the Centre and States. A clean up act indeed for breathing easy. Farmers must come forward to adopt the new-tech. Stubble burning will thus steadily be curbed by the process of decomposition. Decomposing in-situ as an alternative practice saves fine particulate matter released in the air and add nutrients to the soil. Immediate tangible benefits to the farmers are time saved in field preparation and sowing operations by 7 to 10 days, reduction in weedicides application by 50 to 70 per cent and lower irrigation requirement by 40 per cent. Yield levels in wheat remain comparable with traditional fields and overall production cost decrease in general.

Mass Awareness Drive:

Lack of knowledge among farmers is a key deterrent. Farmers require real-time support and hand holding for taking action specific to their terrain, soil conditions, rainfall patterns and crop variety. It is critical to strengthen Farmers Advisory Services so that right kind of knowledge inputs could be given at the right time. In this drive, effective communication and outreach extension services to farmers are essential. Farmers Cooperatives, farmer-producer organizations and community platform such as Panchayats be harnessed in this Mass Awareness Drive. Similarly, trained government officials, volunteers, state agricultural universities and KVKs be involved in giving technical training in alternative systems of stubble burning. All the farmers are well aware of the ill effects of stubble burning, yet a comprehensive awareness drive for giving incentives to farmers to undertake alternative methods need to be strengthened.

The air that we breathe is for all. All of us, therefore, must work collectively to ensure that it remains clean and healthy. Air pollution laments lack of welfare measures to deal with common man's problems. Action plans, therefore, are sought after to curb the pollutants like stubble burning.

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Farmers burning stubble in a paddy field on the outskirts of Amritsar – AFP

STUBBLE TROUBLE

A farmer in Haryana's Hisar district burns his field

UNBREATHABLE: According to the World Air Quality Report 2019, India ranked fifth in the world's most polluted countries, with Bangladesh taking the top spot, followed by Pakistan, Mongolia and Afghanistan

A Farm Woman is burning the Sugarcane trash locally known as "Paatti/Purali". After the harvest of Sugarcane Ratoon, an early maturing variety of Wheat is sown in first week of January across Haryana, Punjab, and Western Uttar Pradesh.