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Problem of Stubble Burning in Punjab and Environmental-Legal Issues: A Study

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Abstract

Punjab is considered the 'bread basket' of India. It is estimated that out of the total production of wheat and rice in India, Punjab grows wheat and rice approximately 20 and 10 % respectively. Being an agricultural state, it has been the backbone of the Indian food security system. Post Green revolution, it has gone under tremendous change due to introduction of high yielding seeds, new technology, chemical fertilizers etc. These changes caused a huge rise in the grain production, from 3.16 million tonnes in 1960–1961 to 28.35 million tonnes in 2011–2012. High production of rice also caused another issue, i.e rise in rice stubble/residue after the harvesting is over. At present Punjab has about 2.722 M ha under paddy cultivation that produces roughly 16 to 17 million tonnes of rice straw and about three-fourth of the residue is disposed off in the field. As per different studies, burning of one tonne of rice straw result in loss of 5.5 kg of nitrogen, 2.3 kg of phosphorus, 25 kg of potassium and 1.2 kg of sulphur. There are number of other negative effects associated with burning of rice straws. For Exp: respiratory problems, Depletion of red blood cells, asthma, cough, bronchitis, skin ailments and conjunctivitis. The present research study will analyse the effects of straw burning on our environment and other legal provisions dealing with the same.

Keywords: Paddy Cultivation, Stubble Burning, Environmental Pollution, Punjab, The Environmental Protection Act, The National Green Tribunal.

Introduction

As per reports , Punjab has about 2.722 M ha of land under paddy cultivation that produces approximately 16 to 17 million tonnes of rice straw/stubble, out of which around three-fourth of the residue is disposed off in the field every year. Since the farmers have around 15 to 20 days to As per different studies, burning of one tonne of rice straw result in loss of 5.5 kg of nitrogen, 2.3 kg of phosphorus, 25 kg of potassium and 1.2 kg of sulphur. There are number of other negative effects associated with burning of rice straws. For Exp: respiratory problems, Depletion of red blood cells, asthma, cough, bronchitis, skin ailments and conjunctivitis. Although the Punjab government is promoting various measures to persuade the farmers not to burn the residue to save the environment and deter global warming, but due to financial crunch, lack of awareness among farmers and complex agrarian policies the desired result is not still achieved in Punjab.

Aim of the Study

The aim of the study is to analyse the present situation in Punjab regarding stubble burning, its negative effects, various factors contributing to the rising cases of stubble burning as well as to scrutinise the Government policies of the state of Punjab to regulate this growing ecological nuisance.

Review of Literature

Lohan, Shiv Kumar & Jat, H.s & Yadav, Arvind & Sidhu, H.S. & Jat, Ml & Choudhary, Madhu & Peter, Jyotsna & Sharma, Parbodh [1] in their research article has articulated the harmful effects of paddy burning and benefits of alternative disposal of paddy residue especially in Punjab. *Kumar Singh, Vikas & Kumar, Anand & Saini, Dinesh Kumar*[2] In their research article has shed light on the meaning and various reasons of stubble burning in India. *Yadav, Sunita & Koli, Pushpendra & Mina, Usha & Devi, Saroj*[3]. In the present study has highlighted the harmful physical

and environmental effects of stubble burning and how to tackle and put stop to this damaging practice in India. *Amandeep Kaur and Jyoti Rani*[4] In their paper has highlighted the major areas in Punjab where stubble burning is more rampant using remotely sensed images provided by the remote sensing department of Punjab Government.

Meaning

Stubble burning means the setting on fire to the rice straw or paddy stubble which is left after the harvesting is over in the fields. The crop cycle in Punjab is the reason why farmers hurriedly want to clear the field for the next crop. The rice crop is being harvested in the months of October and November, which leave the farmers with less time to clear the field for the next crop plantation. Besides that the farmers cannot afford to remove the straw manually due to financial constraints as well as time constrains. Since burning of stubble is time saving and money saving, usually farmers adopt this method in Punjab.

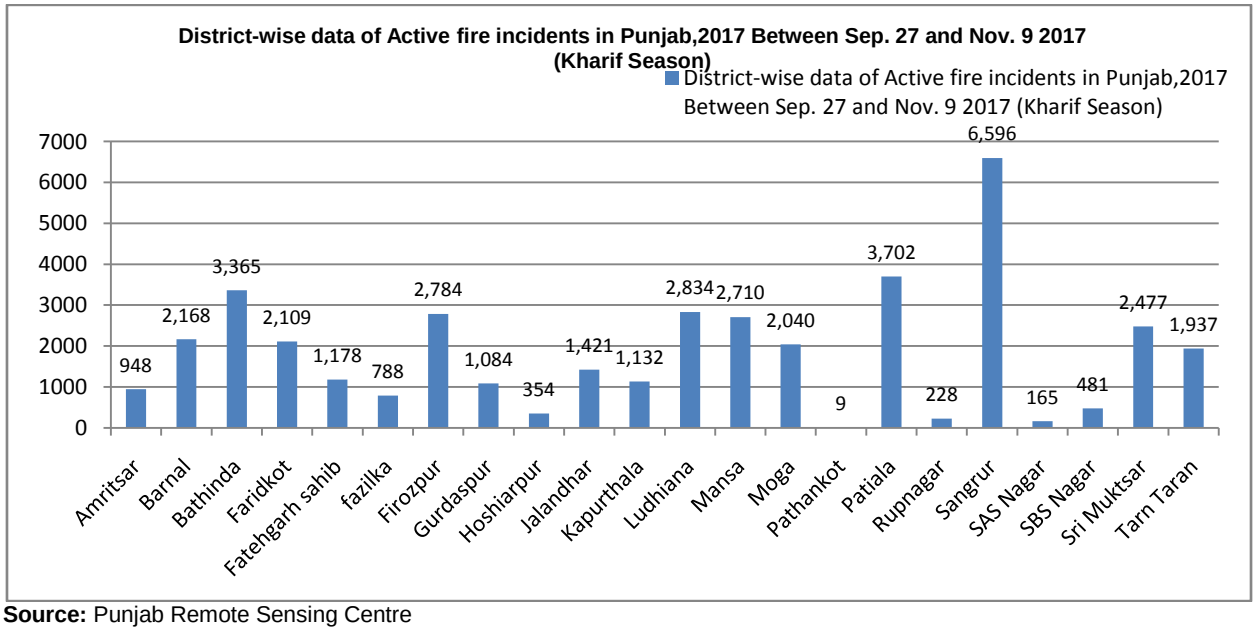
Effects of Stubble Burning

Stubble burning has twin effects; it is harmful to the Environment as well as to the health of the inhabitants. Burning allows for quick and whole residue elimination, particularly for those practicing twofold or triple cropping[5], but it could affect the constitution of major nutrients.[6] Furthermore, biomass burning is the second-largest source of trace gases and the largest source of primary fine carbonaceous particles in the global troposphere.[7] Burning of rice straw in the open fields which has moisture is considered as incomplete combustion which causes emission of large amount of pollutants such as dioxins and furans, volatile organic compounds (VOC), SO2, including toxic gases such as carbon monoxide (CO), carcinogenic polycyclic aromatic hydrocarbons (PAH), NOx , as well as fine inhalable bits.[8] As per one study it has been observed that due to intensive burning of agricultural wastes in many Asian countries such as India, Pakistan, China may significantly add to the development of Atmospheric Brown Cloud (ABC) that affects atmospheric visibility, Earth's climate and local air quality [9] which eventually leads to global warming through emissions of greenhouse gases (GHGs) such as carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O).[10] The negative health effect of stubble burning includes cough, respiratory problems, Depletion of red blood cells, skin ailments, asthma, bronchitis, and conjunctivitis name a few. Besides that the stubble burning induces a fog like situation and low visibility especially at night which many times lead to accidents in the State.

Reasons for Its Growth

After the green revolution there were number of changes that happened in Punjab. Rise in demand in agriculture production to become self dependent post independence led to over enthusiastic measures both on part of the central and state government have caused an indiscriminate use of technology, high breed seeds as well as harmful chemicals which resulted in over exploitation of the soil as well as ground water in Punjab. In order to get economic prosperity the farmers started to cultivate twin crop cultivation in a year. Rice cultivation risen and more land was began to be used every year for rice cultivation. The total area under rice increased from 0.24 million ha in 1960-61 to 2.16 million ha in 1995-96 which covered approximately 54 per cent area cropped during rainy season.[11] Similarly, the area under wheat has increased from 1.14 million ha in 1960-61 to 3.22 million ha in 1995-96 which comprises approximately 77 per cent of the total area during the post-rainy season.[12] More production causes more stubble and more difficulty for the farmers to clear the farms in time for the next crop. Besides that the manual collection of stubble in the fields is very extensive and time consuming for small scale farmers. Although government of Punjab is providing subsidy to buy the equipment which are helpful in disposing the stubble off in a proper manner, still due to lack of finances and awareness the stubble burning is going on in the region.

Present scenario



Source: Punjab Remote Sensing Centre

Environment laws in India

There is plethora of legal enactments in India to regulate and control the Environmental issues. The major source of environmental protection laws can be found in The Constitution of India which provides that it is the duty of every citizen of India "to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures."[13] Also there is a provision under the Directive Principles of State Policies, chapter four of the Constitution which stipulates that "the State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country."[14] In 1972 after the Stockholm Conference [15] Indian government established the National Council for Environmental Policy and Planning under the guidance of the Department of Science and Technology authorised to formulate regulatory framework to govern environment-related issues which later became the Ministry of Environment and Forests in 1985.[16] At present the Ministry of Environment and Forests is currently the apex governmental body for the regulation and protection of the environment[17] which works in collaboration with the Central Pollution Control Board (CPCB), the State Pollution Control Boards (SPCBs) for the protection and preservation of our environment.[18]

The Environment Act is the major source of number of subsequent environmental laws and regulations in India.[19] Environment Act stipulates the majority of the fines for violations of its various rules and regulations.[20] As per the provisions of the Environment Act the term "environment" include water, air and land as well as the interrelationship, which exists between water, air, and land, and human beings, other living creatures, plants, micro-organisms, and property.[21] [22]

Under the Environment Act, the violator will be punished with imprisonment up to five years or with fine up to Rs 100,000 or with both.[23] In case of persistent violation, an additional fine of up to Rs 5,000 will be imposed for each day during which the contravention continues in addition to the conviction for the first offence is levied. Additionally, if the violation continues up to one year after the initial date of conviction, the offender shall be imprisoned for a term which may extend to seven years.[24]

The National Green Tribunal Act, 2010[25] was enacted to establish the first National Green Tribunal in India to efficiently and prompt disposal of the cases regarding environmental protection and forest conservation.[26] The Green Tribunal has been granted the jurisdiction to hear cases for the enforcement of any legal right that entails the environment issues and gives relief and compensation for damages to persons and property as well as similar matters.[27] The Act establishes the Green Tribunal in order to decide disputes or issues relating to air and water pollution, the Environment Protection Act, the Air Pollution Act; the Water Pollution Act; the Environment Protection Act.[28]

Environmental provisions/ Regulatory authorities in Punjab

Punjab Pollution Control Board (PPCB)

It was constituted in the year 1975, under Section 4 of the Water (Prevention and Control of Pollution) Act, 1974.[29] The PPCB in Punjab is entrusted with the task of making sure that the national ambient air quality standards are maintained as per the required criteria. This agency has been established to work in close coordination with the Government of Punjab, to clear out any obstacles or hazards in order to maintain the clean air in Punjab.

The Punjab State Council for Science and Technology

The Punjab State Council for Science and Technology was established on 21 July 1983,[30] with the aim of imparting scientific knowledge to general people.

Punjab Energy Development Agency (PEDA)

This agency was established with a view to promote and develop non-conventional and renewable energy programs or projects in the state of Punjab in the year 1991.[31]

The Punjab Pollution Control Board

(PPCB) is the nodal agency in Punjab which works a s a umbrella agency for planning a comprehensive projects for the deterrence, manage and abatement of pollution in Punjab. PPCB has taken a range of courses to limit the sum of industrial pollution in the state but not much has been prepared to deal with agricultural pollution.

Efforts by the Punjab Government

There are number of measures adopted by the Punjab Government to control the rising problem of stubble burning in Punjab.

Crop Residue Management Budget

During the budget of 2018-19 the government of Punjab has allocated the amount of 100 crores to manage the harmful effects of stubble burning.[32]

Agriculture Diversification

Paddy and wheat monoculture is one of the major reasons for the decrease in soil quality as well as decrease in water level in Punjab. In order to address this issue, in the year 2005–2006, the Punjab state government established the Agricultural Diversification Fund to address the problem of, depletion of water reserves, faster erosion of the micronutrients reserves, degradation of soil health, caused due to the paddy wheat crop rotation.

The Sum of Rs. 10 crores was allocated for the establishment of an 'Agricultural Research and Development Fund' during the year 2005–2006.[33] The funds were utilized for the expansion of better quality of substitute agricultural harvest, enhanced agricultural training and better post harvesting administration activities. Besides that, the government also introduced novel programme in the Annual Plan of 2006–2007, 'Agriculture Production Pattern Adjustment Programme in Punjab for Productivity and Growth'[34] with a budgetary provision of Rs. 24 crores per annum for four years till 2010 under the 12th Finance Commission.

Awareness Camps

Around 5,117 number of farmers camps were held in the year 2008–09[35], at district, block and village level by department of agriculture to create awareness about the advantages of reincorporation of the crop residues, adoption of zero-till-drills, Happy Seeders, rotavators and distribution of new agricultural implements on financial assistance by the state Government.

Subsidy on Equipments

Government also distributed 2,659 rotavators, 1,383 Zero-till-drills, 2 Happy Seeders and 448 straw Reapers were distributed to the farmers during the year 2007–2008[36] in all, on subsidy. In order to promote the diversification of crops, the government has increased the area from for basmati rice cultivation from 1.5 lakh hectares to 3.5 lakh hectares in the past 5 years under which the stubble of basmati rice can be used as a fodder for animals.

Energy Production

The crop waste is an efficient product to be utilised in the production of electricity .Punjab Energy Development Agency (PEDA)[37] has been assisting in establishment of 29 power projects with total installed capacity of 330 MW on Build, Own, Operate (BOO) basis to private developers. The plants operated by private companies produce electricity with the combustion of mixed waste such as cotton stalks , paddy straw, and other agro remains existing in the state. There were two such plants established in Punjab, One is of 14.5 MW and other is of 8 MW commissioned in the Sep, 2009 and Mar, 2009 respectively.[38]

Punjab Agriculture University (PAU),

Which has been a pioneer agency to develop and promote latest agro technologies has been working towards efficient usage of paddy straw for maintaining an Ecological balance. The major equipments developed by PAU are: (i) Happy Seeder Machine for planting in standing paddy stubbles; (ii) Tractor Operated Paddy Straw Chopper; (iii) Straw Collector and Baler; (iv) Residue Incorporation in Soil; (v) Compositing Techniques using Paddy Straw[39]

Department of Rural Development and Panchayats

Department of Rural Development and Panchayats is helping in making popular the alternative techniques proposed by the Department of Agriculture and PEDA and had helped setting up of biomass projects in villages by granting 33 years lease of panchayati land of five villages for setting up such units.

The department of Agriculture, Government of Punjab is promoting "Zero Tillage Technique"[40] since 2001–2002 in areas of state where wheat is sown after harvesting of rice. This technique is beneficial for the farmers as the soil retain its natural fertility, nutrients and moisture as well as increase the profit of the farmers by by Rs. 2,200–3,000/- per hectares and increasing the productivity.

The government of Punjab also organised a workshop on 'Agricultural stubble burning-issues and options' in Chandigarh on 8th January, 2015[41] to spread awareness regarding the harmful effects of stubble burning as well as to invite different alternatives for the proper management of the crop waste.

In the year 2018-19 also, Government of Punjab is planning to make exceptional endeavour to diminish the reliance on wheat/paddy rotation and diversify the cropping mould. The aim of the government is to help around 7000 farmers and 10000 acres cultivable area to be brought under diversification during the year 2018-19.The finance Minister of the State Mr. Manpreet Badal has specified in his budget speech that Rs. `55 crore has been allocated under National Horticulture Mission during the year 2018-19 to promote horticulture and agriculture diversification.[42]

Ban on Stubble burning

Punjab government has banned the stubble burning in a cumulative effect of decisions made through Central government, Punjab pollution Board and NGT, in the wake of rising pollution levels in Punjab, Haryana and National capital Region, Delhi.[43] In order to check the burning of wheat residue, PPCB in 2017 imposed fines of Rs. 1.7 lakh on farmers in 198 cases of fire, while in 2018 a fine of Rs. 2,500 was imposed as 29 cases of fire were reported from Mohali district.[44] The Chief Minister of Punjab Capt. Amarinder Singh launched three mobile applications in 2018 with the objective of checking stubble burning and spreading awareness about its effects on the environment and human health. The three Android mobile applications are: *i-Khet Machine* for helping farmers to have access to the agriculture equipment or gear for in-situ management of crop remains; *e-PEHaL* for observing tree plantation; and *e-Prevent* to have timely and precise information about occurrence of stubble burning, and these apps have been developed by Punjab Remote Sensing Centre (PRSC).[45] Punjab remote sensing centre has been entrusted with the task of collection of data with the help of satellite access regarding monitoring the burning of stubble across Punjab and send the compiled data to Punjab Pollution board for further actions in this regard.

Judicial Approach

The Hon'able Supreme Court of India has issue directions in the case of *M. C. Mehta Vs Union of India & Others*[46] to manage the rising air pollution in Delhi NCR caused by stubble burning in Punjab, Haryana and Western Uttar Pradesh and asked all stakeholders to look into the matter of rising straw burning issue and take appropriate actions to control it.

The Delhi High Court, had taken suo motu cognizance[47] of the deteriorating air quality in the Capital and the National Capital Region (NCR) stating that "*We cannot have another gas chamber situation*," directing the four states to "strictly" implement "in letter and spirit" the notifications issued by their respective governments under the Air Pollution Act banning such activity.[48]

Hon'ble National Green Tribunal, New Delhi[49] in the case of *Vikrant Kumar Tongad Vs Environment Pollution (Prevention & Control) Authority & Others*[50] has issued that all three states of

Punjab, Haryana, U.P and NCT Delhi shall instantly take measures to, apprise, inform and counsel the farmers through newspapers, T.V and online medium, Gram-Panchayats and Corporations that stubble burning is very harmful to human wellbeing, causes grave air pollution and is now barred or forbidden by law.[51]

The Hon'ble Punjab and Haryana High Court [52] also ordered on 16th April 2012, that government must formulate appropriate policy to ban the burning of wheat/paddy stubble as such a process pollutes the environment.[53]

Recommendations

1. Ecological farming. A place named Kedia has adopted organic farming where the farmers do not blaze stubble; rather they utilize it as a source to boost organic carbon in the soil and perk up its vigour. The farmers make a composition of local products such as *Sheera*, *Jeevamrit* and*Amrit Pani* for speeding up the process of decomposition of the stubble. These products are easily available locally such as cattle urine and dung, besan, jaggery and leaves of some plants which is very efficient in decomposing the paddy straw within a span of 45-60 days, also helpful in conserving nitrogen and nutrients back in the soil. Punjab government should also promote this method in villages to promote eco-friendy farming.
2. Generation of more awareness among farmers about the harmful effects of stubble burning on the soil fertility, environment, crop production and human health
3. Introduction of financial assistance, subsidy to the farmers for buying machines such as happy seeders for proper disposal of Crop residue
4. Introduction of various schemes, incentives, reward to the farmers, who comply with the orders and employ more eco-friendly means while disposing off crop residue.
5. Promote research and development projects in inventing new and economic methods which can be employed by farmers in place of stubble burning especially belonging to lower financial strata.
6. Raise awareness about the alternative usage of crop residue such as animal fodder, biogas production, manure and electricity generation.
7. Development of scientific techniques to monitor the activity in the region relating to stubble burning at night.
8. Support and develop various trade and commercial activities involving usage of stubble in villages and town areas and make financial assistance available to people who want to start such establishment.
9. In order to employ suitable technique for lowering air pollution, It is also essential to have precise quantity of RSPM, black carbon (soot) in the ambient air, measurement of meteorological constraints like temperature profile, wind pace, and moisture etc., in the villages to kick off policy actions to evade the same.
10. Imposing ban on burning legally alone is not sufficient unless the farmers are made aware that not burning the crop residue is for their own benefit with the help of documentary to be shown in rural areas on regular basis.
11. Government should promote through media advertisements, TV programmes and mobile applications about various alternatives usage of the collection and transportation of agricultural residues, gasification as a fuel for the boilers, converting into briquettes and designing of suitable harvester.
12. Government should promote the usage of new machines like the use of disc plough, disc harrow, rotavator, zero tillage and happy seeder can help in mulching the crop stubble in swift and economic method.
13. Government should establish various plants in the rural areas to ask farmers to deliver the crop residue at such plants for making compost, organic manure to improve soil fertility, and gasification for use as a fuel or for power generation; night soil to produce biogas and manure.
14. Invention of such machines, thresher which can cut the stem from the root level itself using indigenous techniques.

Conclusion

Balancing the economic growth and environment protection is a complex issue that is critical for the sustainable development of any country. Destroying the environment for economic prosperity is not worth it. A human being can live without fancy cars, gazettes, sky high buildings and novel inventions but it is impossible to live without air, water and nature. Punjab is paying the price of Green revolution by compromising its environment, health, youth and mental well being. The issue of stubble burning is one of the consequences of introduction of innovative technology in farming which is combine harvester that leave a huge quantity of stubble during harvesting. The government of Punjab is taking many steps but these are inadequate to deal with the mounting problem of paddy straw residue burning. As recommended above, the government needs to formulate a comprehensive policy to deal with this issue comprising various financial, technical, legal and social impediments to get rid of stubble burning in Punjab for good.

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