

## **Stubble burning as an enviornmental hazard: A study**

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### **Abstract**

Agriculture remains to be the backbone of indian economy due to its larger share in the indian economy and employment. Wheat and rice cropping system are the most followed cropping systems in india. In some of the indian northern states especially punjab, uttar pradesh and haryana most of the farmers harvest their crops by using the combine harvesters and it leaves a huge amount of stubble which took lots of time to get decompose in soil. The farmers burn a substantial portion of stubble on the farm. It causes an environmental pollution but it also troubles the human health and it directly affects the quality of air. It also causes problems in breathing, headaches, cough, eye irritation, some chronic problems like bronchitis, asthma, lung infections, and increase in the cardiac problems and also causes carcinogenicity causing congestion in the chest. *Apart from that*, the most dangerous visibility will be lower due to its burning and weather becomes smoggy which increases the events of road accidents. The stubble burning is against the human rights as it directly affects the health and environment and it clearly violates our human right i.e., the right to life. The clean and healthy environment is one of the basic essential human rights of individuals. There are enormous efforts done by the governments to curb this problem. *Despite* of the various rules and regulations the problem of stubble burning cannot be tackled. The punjab government has started the stubble treatment plant at sangrur. It seems that this problem is difficult to be solved by *technical or legal interventions* alone. There is a need to identify the determinants of certain behaviors to change them. *Further*, we will discuss in detail about the reasons, consequences, legislatives provisions and suggestions related with the stubble burning.

**Keywords:** Agriculture, stubble burning, human rights, health, environmental pollution.

### **Introduction**

The stubble burning is a general farming practice around the world and a foremost reason of air pollution. It is a general practice trailed by farmers to prepare the fields for the sowing of wheat in the month of November because the time left between the sowing of wheat and the

harvesting of paddy is very less. It is an outdated and old method which is widespread in the wheat and rice belt states of the India which are Punjab, Haryana and Uttar Pradesh. It is one of the leading reasons of causing air pollution in the area, specifically in the New Delhi. The state governments are enthusiastically working to decrease and eventually eradicate stubble burning, but the journey is long ahead. In some of the Indian northern states specially Punjab, Uttar Pradesh and Haryana most of the farmers harvest their crops by using the combine harvesters and it leaves a huge amount of stubble which took lots of time to get decompose in soil.

The farmers burn a substantial portion of stubble on the farm. It causes an environmental pollution but it also troubles the human health and it directly affects the quality of air. It also causes problems in breathing, headaches, cough, eye irritation, some chronic problems like bronchitis, asthma, lung infections, increase in the cardiac problems and also causes carcinogenicity causing congestion in the chest. *Apart from that*, the most dangerous visibility will be lower due to its burning and weather becomes smoggy which increases the events of road accidents. The stubble burning is against the human rights as it directly affects the health and environment and it clearly violates our human right i.e., the right to life. The clean and healthy environment is one of the basic essential human rights of individuals. There are enormous efforts done by the governments to curb this problem. *Despite* of the various rules and regulations the problem of stubble burning cannot be tackled.

The Punjab government has started the stubble treatment plant at Sangrur. It seems that this problem is difficult to be solved by *technical or legal interventions* alone. There is a need to identify the determinants of certain behaviors to change them. *Further*, we will discuss in detail about the meaning, reasons, consequences, the impact of stubble burning on the environment, legislative provisions and suggestions related with the stubble burning.

#### **Meaning of stubble burning:**

Stubble burning is the determined burning of the crop residue (stubble) from the field and after that they prepare the field for the next. In simple words, we can say, that the stubble (parali) burning is a **technique of eliminating paddy crop remains** from the field to sow another crop i.e., wheat. Stubble burning is a **method of setting on fire the remaining**

**straws of stubble** which are remained left afterwards the harvesting of the grains i.e., wheat, paddy etc. It is basically essential in those areas where the method of combined harvesting is used and which left the crop residue behind.

The stubble that remains in the fields entices the termites and some other form of pests that can harm the successive yields. The stubble burning is mainly essential in those areas where the methods of combined harvesting is used and due to that the crop residues are let behind in the fields. This practice is mainly followed by the peasants of punjab, haryana and uttar pradesh but instead of these the farmers of all over the world followed this practice. The crop of paddy in punjab and haryana is harvested in between the last and the first week of the month of october.

The peasants after that sows the crop of wheat between the first week of the month of november and in the mid of the month of december. *Consequently*, in the month of october, after the half harvest of the crop of paddy, the remaining stubble in the fields is burned so that the fields are prepared for the subsequent harvest of the crop of rabi i.e., wheat. *Similarly*, in the first week of the month of april, after the rabi the wheat is harvested generally from the month of april to the month of may, the stubble burning took place and then the fields are ready for the half harvest for the crop of paddy *i.e rice*.

The stubble is the grass or straw residue left after the harvesting of the crops i.e., wheat, paddy and some other crops of the different types of grains. After the harvesting of the main crop, they still remain in the fields and took a lengthy time to get decomposed. After the harvesting of the crop of paddy, the farmers cut down the topmost part of the crop which is precious and valuable and left the rest that remains in the form of stubble in the fields. The stubble makes it tough to sow seeds for the other next crop and it also interrupts the growing cycle. *Additionally*, it is not eatable for the human beings and it is a poor source of the fodder or can say feed for the animals. Stubble has many other usages as well, but they are very costly and most of the peasants cannot afford them. *Therefore*, stubble seems to be a nuisance for the farmers, and they have only practical option to burn it. In the northern india, despite a prohibition by the punjab pollution control board the burning of stubble is still done since the 1980s.

### **Reasons of stubble burning:**

Following are the few reasons due to that the farmers opt to choose the burning of stubble:

**1. Agricultural modernization:** the modern harvesting machinery extracts the grains of rice, from the standing crop and left only the large residues. The harvesting by manually is not an easy option for the farmers to choose because of the enormous costs of the labor and time.

**2. Deficiency of awareness:** farmers are usually not aware that they burnt the insects which are soil friendly and also the organic matter causing important losses of the gases i.e., potassium and nitrogen. The farmers believed that if it is not burned down, these remains will float in the seedbeds of the fields of paddy, parting that in the gentle saplings and it also damages the crop when the strong winds will be blowing.

**3. The substitute is expensive:** the government of the punjab uses the tractor mounted happy seeders to cut down the stumps of rice and will sow the seeds of the wheat at the similar time, *nevertheless*, most of the farmers felt that the prices and the rents for these types of machines are very high. So, they choose to burn the stubble instead of using the modern methods of the removal of stubble. If any farmer chooses to use these machines, he has to pay the rent of the machine according to the area of his field as well as the amount of the diesel should also be paid by the farmer which seems to be very expensive for the normal farmers. So, they mostly prefer to choose the burning of the stubble.

**4. Compact usage of the stubble:** in the previous times, mostly the farmers used stubble as grass or hay which helps to keep the animals and the homes warm and they can even use the stubble for the purpose of cooking as a fuel. *Though*, the usage of this stubble nowadays, becomes outdated. *Similarly*, the straws of the rice crop are considered not to be suitable for the feed of animals as it contains the high amount of silica content.

### **Consequences of stubble burning:**

The activities of the production and the consumption are always producing waste and the pollution. The waste can be absorbed by the environment up to a certain limit reliable on

the assimilating capacity in the specific environmental region. Agriculture is also one of the utmost significant production activities and in the same way, the stubble burning produces a substantial amount of the air pollution. *Subsequently*, if the activities of the burning of stubble remains limited within the assimilating size, then the pollution does not generate injurious effects. So, in the preliminary stages, when the activities of production and the burning are restricted, pollution produced due to these activities was not considered as a problem. *Though*, because of the advancements in the technology in the agricultural sector, the waste absorption has left beyond the assimilating capacity of the environmental limit, thus changing the balance. The stubble burning has become a chief reason of the atmospheric pollution in northern india throughout the paddy harvesting season. Many of the farmers has lost their lives due to the spreading of fire during burning of stubble. The burning of the stubble leads to the following consequences.

**Air pollution:** the burning of agricultural residue is a chief source of the air pollution in most of the parts of northern india, that is worsening the quality of air. The stubble burning by the farmers in the states such as punjab, haryana and uttar pradesh in northern india is supposed to be a major reason of air pollution in new delhi and its adjoining areas. It also contributes a lot of the greenhouse gas discharges. The winter smog during the burning of stubble also occurs in that region.

**Soil fertility:** the fertility capacity of the soil is also getting diminished due to the heat that generates due to the burning of straw and then it penetrates into the soil, that kills the friendly bacterial and fungal population which are very useful for the productive land. The burning of stubble also destroys the other bacteria's that are present in the topmost layer of the soil.

**Penetration of heat:** the burning of stubble leads to the generation of heat and that heat when penetrates into the soil the moisture and other useful microbes which are very useful for the productive crop became less.

**Whether the stubble burning is beneficial for farmers or not?**



The burning of stubble undoubtedly has some advantages to the farmers because of them they burn the stubble. *Here in brief*, i am going to discuss few of them it helps to clear the weeds, rodents and pests from the field. It also diminishes nitrogen accumulation. *Though*, the major benefit and motive behind the burning of a stubble is finances. It took a lot of time in the collection of stubble, after the collection of stubble the next is to transport it and then they will sell it and that is not worth the effort, time or money for the farmers. The profession is agriculture is considered to be a low-income profession and farmers are already struggling with that and then adding to more of the expenses i.e., they need a specific number of laborers for the collection of stubble. So, they thought that the burning of stubble is the rapidest way of the clearance of their field before the next crop.

### **Alternatives for stubble burning**

The burning is not only the method to clear the field of standing stubble. There are some of the following alternatives in which stubble can be used as in other forms instead of burning which are as:

1. It can be preserved to make bio fuel and the particle boards.
2. It can be used as cattle feed for the animals.
3. It can also be used as the manure, compost, for roofing, packaging purposes and also for the animals to sit on it to feel warm.
4. The incorporation of residues of crop in soil can improve the moisture in soil and also helps to activate the development of microorganisms in soil for the better growth of the plant.
5. It can also be **used to make the products** including paper and cardboard.
6. The crop residues can be used for the many other purposes like **gasification of charcoal, generation of the power and also used as a raw material** in the industry for production of the bio-ethanol.

### **Stubble burning as an enviornmentl hazard**

The burning of stubble has many injurious effects on the environment. It generates the gases which are very toxic and that makes difficulty in breathing for the residents who are residing nearby and it also increases global warming. The approximations that the burning of stubble has mostly released the *tons of carbon monoxide (co)*, *tons of carbon dioxide (co2)*, *tons of oxides of black carbon*, *tons of particulate matter* and also *tons of sulphur (sox)*. these above said hazardous gases directly contributed to an environmental pollution and they are also accountable for the formation of fog and can say haze in *new delhi* and due to that *himalayan glaciers* are melting.

When the straws of paddy crop are burning it generates heat that will penetrate 1cm into the soil and the temperature rises to *33.8 - 42.2 degree celsius*. That kills and harms the fungal and bacterial populations which are dangerous for a productive soil.

Due to the burning of crop residues, it also causes a lot of injury to the other micro-organisms which are present in upper layer of soil and it also harms to the organic quality of the soil. Because of the damage to the friendly pests the number of pests which are not friendly to the productive soil can also say enemy pests has enlarged and the effect is on the crop is that they became more prone to the diseases. The productive volume of the top layers of the soil has also been abridged.

There are lots of cases of patients are reported during the season of stubble burning and most of the patients are infected with that and people are suffering with the various health problems due to an increased incidence of smog. It can be an irritation in the nose, eyes and throat, increase in cough, wheezing, asthma etc. Due to that lots of expenses of the public who are suffered by this stubble burning spent on the medications and treatments.

### **Suggestions**

Here in brief, now we are going to discuss some suggestions which are following:

1. The farmers can manage the crop residue more efficiently by employing an agricultural machine such as:

- Happy seeder which is used for the sowing of a crop even when the stubble is standing in the field.
  - Zero till seed drill which is used for the preparations of land and then the farmers can directly sowing of the seeds of new crop in the standing stubble of the preceding crop.
  - Rotavator which is also used for the preparation of land and amalgamation of the crop stubble in the soil.
  - Paddy straw chopper which is used for the cutting of a paddy stubble so that it will be easily mix with soil.
  - Baler is used for the collection of straw and after that making the bales of paddy stubble.
  - Reaper binder which is also used for the purpose of harvesting paddy crop stubble and after that making into bundles.
2. The above-mentioned machines are very costly so i suggest that the state governments should provide a subsidy on these machines so that the farmer can afford these costly machines.
  3. On the place of burning of stubble, farmers can convert the stubble into the other useful things or products such as papers, animal feed and cardboard.
  4. The state governments should provide subsidiary and inspire the industries which are involved in altering stubble into the saleable viable products.
  5. The combined harvesters must be improved so that the farmers can use it harvest their crops. The machines that are used by the farmers left large amount of residue. The technology that is used in these machines should be also be upgraded so that the residue remain will be less.
  6. **The** farmers must be educated so that they came to know about the cons of burning stubble, its negative effects and also provide them the knowledge about the other attractive alternative.



7. The stubble can also be used **as a manure**. Like in a village named pala which is at outside delhi, there the nandi foundation has purchased 800 mt of the paddy residues from farmers and then turned it into the manure.
8. The incentives should be given to those farmers who do not burn stubble in their field and on the other hand, the government should impose penalty upon those farmers who burn stubble in their field.

## **Conclusion**

The burning of stubble is definitely an environmental hazard for the reason that it releases a substantial amount of injurious pollutants into the environment which includes carbon dioxide, nitrogen oxide, sulphur dioxide and particular matters. These are the pollutants that contributes to air pollution and may have harmful impacts on the human health, principally for those people who are diagnosed with respiratory problems. It also contributes to the smog formation, which decreases visibility and can also have some of the grave consequences for air and road transport. The smog also deteriorates the quality of air and can also leading issues related with the respiratory system and other problems related with the health.

Furthermore, the stubble also releases greenhouse gases which contributes to the global warming and climate change. The carbon dioxide released from burning of the agricultural residues enhances to the general greenhouse gas absorption in the atmosphere. Additionally, it can have tragic consequences for the health of soil and its fertility. The burning of the crop residues and the organic matter contents in the soil reduce the essential nutrients that are present in the soil and disturbs natural microbial ecosystem of the soil. Due to this the agricultural productivity of the soil gets reduced. Generally, the burning of stubble poses a noteworth environmental hazard, affecting the air quality, soil health and climate change. Implementing the other alternate practices i.e., the stubble management methods, agroforestry or using the crop residues for the purpose of bioenergy production that can help to mitigate these risks and encourage sustainable agriculture. the burning of the stubble principally effects the environment and as well as human health, mostly because of the air pollution. On the other hand, human rights are generally denoting to the fundamental rights

and liberties enabled to every individual of the nation. Although, the adverse impacts of the burning of stubble on the health of the humans can indirectly related to the certain features of human rights i.e., the right to a clean and safe environment. It is vital to address the ecological and health apprehensions related with the burning of stubble to certify the well-being and rights of the individuals, but the human rights include a comprehensive range of the issues beyond this practice.

**Endnotes**

- Analysing farmer stubble burning by govind kumar allahabad publications
- Available at: [https://en.wikipedia.org/wiki/stubble\\_burning#](https://en.wikipedia.org/wiki/stubble_burning#): last visited on 15<sup>th</sup> jan, 2025.
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