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CAUSES OF CROP RESIDUE BURNING IN PUNJAB: AN EVALUATION OF POLICY AND LEGAL MECHANISM

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Abstract

Agriculture residue burning is an environment and health policy issue at the international, regional, national and state level and is a serious nuisance and a health risk. Aim of this research paper is in regard to environment protection and to by observing the seriousness of the problem and to attract policy makers. This research work try to make some feasible and cost effective implications not only for the state of Punjab, but also all the states, which are facing the problem of crop residue burning. This paper discusses the causes and effects of crop residue burning and the effects of laws in prevention the pollution from crop residue burning. Specifically the work covers the reality of the causes and reasons associated with the problem along with the role of existing statutory provisions and administrative control and management of the problem.

***Keywords**: Administrative Mechanism, Causes of Crop residue burning, Environment Pollution, Statutory Provisions*

Introduction

Crop residue burning is a cheap and easy method of crop residue management used by the farmers in India. Farmers of the Punjab also used to take advantage of this method of management. In general it can be defined as the burning of materials that are wholly produced from growing and harvesting crops or raining animals for the primary purpose of providing a livelihood. Recently, attention towards agricultural residue and its effects have increased. It leads to emission of trace gases like CH4, CO, N2O, NOx, SO2, and hydrocarbons. Burning of straw also emits large amount of particulates that are composed of a wide variety of organic and inorganic species. One tone straw on burning releases 3 kg particulate matter, 60 kg CO, 1460 kg CO2, 199 kg ash and 2 kg SO2. These gases and aerosols consisting of carbonaceous matter have an important role to play in the atmospheric chemistry and can affect regional environment, which also has linkages with global climate change (Gupta et al., 2004).

Therefore, Crop residue burning is now recognized as an important source of pollutant emissions after Industrial Pollution and affects resulting from crop residue burning now

considered in most negative form in context to life and health loss, economic loss, environment loss, biodiversity loss, depletion of natural resources and more appropriately violation of fundamental right to life guaranteed under the Constitution of India.

A number of reasons may be considered responsible for this problem e.g. Technological advancement or using of machineries for crop harvesting, less number availability of laborers, insufficient number of active plants for taking the residue of crops, less support of government institutions and insufficient laws and ineffective executive mechanism are few of the concerns. To find out the strength and reality of all the reasons a survey was conducted in some of the villages of subdivision Talwandi Sabo, District Bathinda Punjab. The survey was done keeping in view the limitation of time and resources and also the sensitivity of the issue.

Conceptual framework of the Problem

Punjab, which has been a torchbearer of the green revolution almost five decades ago, seems to be the first state in India which is suffering from the adverse consequences of green revolution as well. As more and more states in the country follow the agricultural practices adopted by Punjab, including crop residue burning consequently increasing the pollution and emissions of various harmful pollutants. Rice, wheat and Cotton are important cropping system in this region of Punjab. It occupies maximum of land and accounts of food production and economic activities of the farmers. Grain being the economically important part is collected by the farmers from all three crops and the remaining plant biomass (stubbles, straw etc.) are generally burnt. Even though wheat-straw is a common dry fodder for animals, an estimated 75% of rice straw and 20% of wheat straw are burnt. Where rice and wheat in respective seasons harvested by combines, 20-30 cm high stubbles are left in the field. Also, chaff is thrown and discarded by the combine as it moves forward all over the field. This is expensive to collect and store and transportation again need heavy cost. Farmers do not incorporate straw, stubbles and dry part of plants into the soil because that would require additional cost of labour, irrigation and tillage and hence burn it. Farmers find it easy to burn the biomass and clear their field for next sowing and hence the problem. Also, farmers have a myth that the burning of stubbles would give them more benefits in the form of saving crop from insects.

The changing pattern of agriculture and maximum use of machines at the time of harvesting as less numbers of laborers, a very few day time between two crops and many more reasons are associated with the problem of crop residue burning. Therefore there is a need to rethink

on the management issues of the problem including the draft of laws and making of suitable policies.

A large number of statute and policies are in existence but the impact is very low as various reports of International and national level agencies are showing the impact of the problem. Governmental, Non-Governmental Organizationand individuals are working to manage the problem but the problem is as it is, even the recommendation of the National Green Tribunal to curb on straw burning with the help of satellite- based monitoring remained ineffective.[1]

Objectives of the Research

This research paper is basically to see the reality of the reasons of the crop residue burning in the area of study. Therefore, this work, tries to find out and scrutinize the reasons why farmers of this region burn crop residue, while it can be used for commercial and non-commercial purposes and also to see the reasons for ineffectiveness of policies and administrative measures.

Database and Methodology

This study is based on analysis of the facts based on the data collected during field survey in various villages of sub-division. Since the matter is deeply concerned with a popular practice by the farmers, therefore a specific set of questions was prepared to collect data on the causes in issue and opinion of the farmers have also been considered during discourse of this research paper. In this work two surveys have been done in different crop seasons and field survey has covered twenty-five villages in one year in two seasons- wheat season (May - June month) and paddy season (October-November month). The first season has incorporated eleven villages and forty-eight farmers (respondents) and the second season has covered fourteen villages and forty-four farmers (respondents).

Discussions and Outcomes of the Research

The study analyzes the problem of crop residue burning as it is towards the description of reasons to the problem, to find out the impact of residue burning on the environment and effect on natural resources, directly or indirectly with remarkable evaluation and on the reasons of the problem followed by results on the basis of data analysis.

The Paddy and Wheat are the major crops in study area and the reasons behind the crop pattern are easy water availability, lack of industry to absorb the commercial crops, Minimum

[1] Gaurav Vivek Bhatnagar. *High Pollution Levels from Straw Burning Shows Green Tribunal Orders Were Neglected* available at, https://thewire.in/77776/straw-burning-pollution-green-tribunal/, accessed on 05 march 2016.

Support Price (MSP) and climatic conditions etc. In the months of October, rice crop gets its maturity. October to mid of November, cases of crop residue burning can be seen in this region and similarly, the cases at the time of wheat crop maturity. All this is resulting, environmental pollution, loss in soil fertility, loss of biodiversity, health issues etc.

Views on the Problem of Residue Burning

Table 1. depicts views of farmers on the direct and indirect losses of the crop residue burning. The major reasons according to farmers of crop residue burning are time and cost factors.

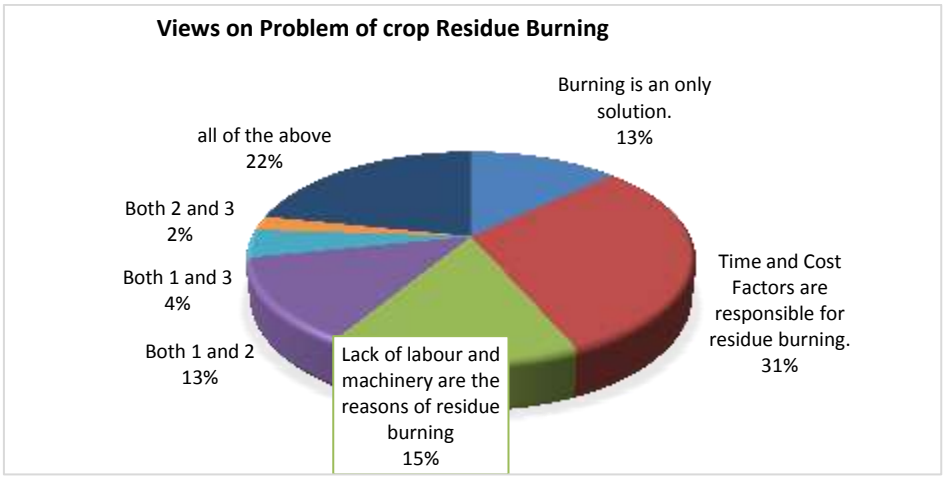
Table 1. Views on the Problem of Residue Burning

S. No.	Views on Problem	No. of Respondents	Percentage Share
1	Burning is an only solution.	12	13.04
2	Time and Cost Factors are responsible for residue burning	28	30.43
3	Lack of labourers and machinery are the reasons of residue burning	14	15.22
4	Both 1 and 2	12	13.04
5	Both 1 and 3	4	4.35
6	Both 2 and 3	2	2.17
7	all of the above	20	21.74
	Total	92	100.00

Source: Author's Calculations Based on Field Survey.

According to majority of farmers, they have very less time between harvesting of the crop and sowing of the new crop. The residue burning is the only solution to deal with the problem. In other methods it takes a lot of time to deal with the residue. The cost factor is also a major contributor of the problem. The burning is the cheapest way to deal with the residue. In other methods it needs the expensive machinery and a huge consumption of diesel, which is not economically viable for the farmer.

Figure 1.



Source: Author's Calculations Based on Field Survey.

Further as shown in figure thirteen percent of respondents are simply saying that burning is an only solution to deal with the residue. According to fifteen percent of the respondents' lack of labourers and machinery are the factors responsible for the residue burning. Twenty two percent respondents have the views that due to time and cost factor and lack of labourers and machinery the burning is only solution to deal with the residue.

Direct and Indirect losses of Crop Residue Burning

Most of the respondents of primary survey are aware about the negative impacts of residue burning, even after the lack of education in respondents.

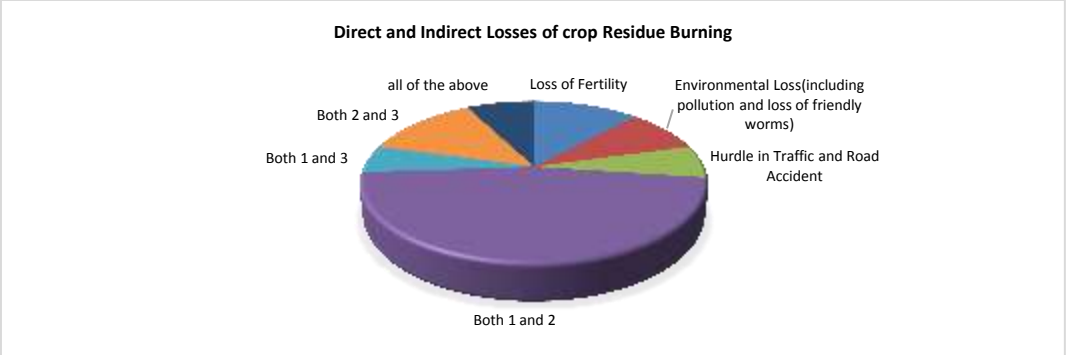
Table 2. Direct and Indirect losses of Crop Residue Burning

S. No.	Views	No. of Respondents	Percentage Share
1	Loss of Fertility	11	11.96
2	Environmental Loss(including pollution and loss of friendly worms)	8	8.70
3	Hurdle in Traffic and Road Accident	6	6.52
4	Both 1 and 2	43	46.74
5	Both 1 and 3	5	5.43
6	Both 2 and 3	12	13.04
7	all of the above	7	7.61
	Total	92	100

Source: Author's Calculations Based on Field Survey.

According to field survey responses- loss of fertility, environmental loss (including pollution and loss of friendly worms) that is loss of biodiversity and the problem of hurdle in traffic and road accidents are the major direct and indirect losses of crop residue burning. The health issue is not considered even by the single respondent.

Figure 2.



Source: Author's Calculations Based on Field Survey.

Majority of respondents that is 46.74 percent respondents have the view that the loss of fertility and environmental loss (including pollution and loss of friendly worms) are the major negative impact of the crop residue burning.

Role of Government and Non-Government Organizations

Further the opinion of respondents on the role of Government and Non-Government Organizations are taken from the field survey. Some of the organizations can be seen active in the matter of environmental pollution control in the state of Punjab. Therefore, this is also required to know whether any NGO is involved in this area for the preventions by way of awareness.

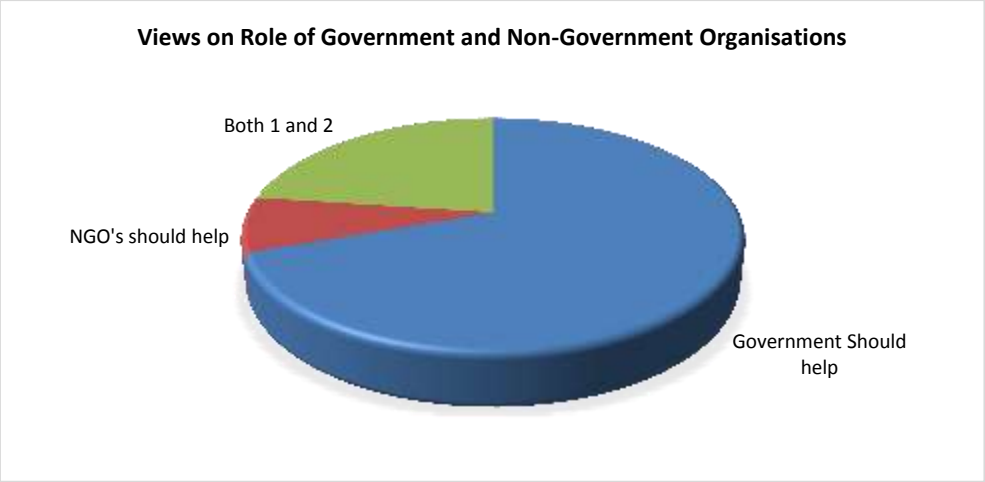
Table 3.1. Views on Role of Government and Non-Government Organisations

S. No.	Views	No. of Respondents	Percentage Share
1	Government Should help	64	69.57
2	NGO's should help	7	7.61
3	Both 1 and 2	21	22.83
	Total	92	100

Source: Author's Calculations Based on Field Survey.

Table 3 presents that the majority of respondents hold the views that Government should help the farmers to deal with the problem of crop residue. Only a few respondents says that the NGO's should play the role to solve the problem of crop residue.

Figure 3.1.



Source: Author's Calculations Based on Field Survey.

Figure 3.1 shows that 69.57 percent respondents want Governmental help for the problem of crop residue, 22.8 percent respondents say that both Government and Non-Government Organizations should play a positive role to help the farmers in dealing with the problem of

crop residue and only 7.61 percent respondents have given the answer that NGO's should help the farmers.

Table 3.2. Type of Help Required to Deal the Problem

S. No.	Views	No. of Respondents	Percentage Share
1	Financial Help	47	51.09
2	Machinery and Tools	29	31.52
3	Other	16	17.39
	total	92	100

Source: Author's Calculations Based on Field Survey.

Table 3.2 explains the views of farmers for the type of help they require. 52.09 percent respondents say that there is requirement of financial help to deal with the crop residue in efficient manner than burning, because other method needs a lot of resources, which need finance that should be provided by the government in the form of subsidies. 31.52 percent of respondents want the help in the form of modern machinery and tools to solve the problem of crop residue in more environment friendly manner.

Figure 3.2.

Source: Author's Calculations Based on Field Survey.

Only 17.39 percent of respondents want the other help like awareness and training programme as shown in the figure 3.2.

Views on MGNREG Scheme, if it will Linked with Farmers

The next question of the study includes the views of farmer on a situation when the MGNREG scheme will linked to the farmers.

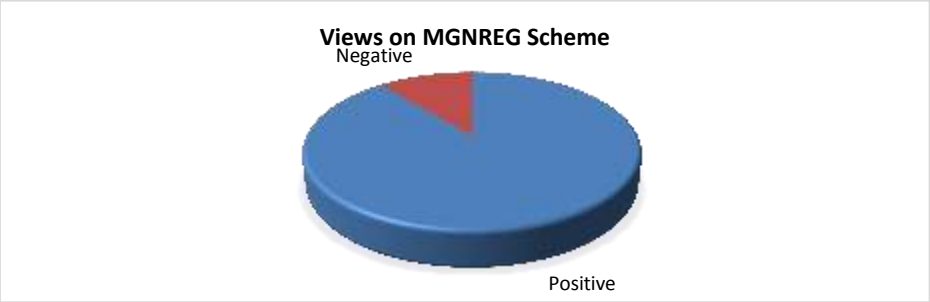
Table 4. Views on MGNREG scheme

S. No.	Views	No. of Respondents	Percentage Share
1	Positive	82	89.13
2	Negative	10	10.87
	Total	92	100

Source: Author's Calculations Based on Field Survey.

Table 4 explains the view of farmers on the pattern of working of workers under MGNREG scheme. 89.13 percent respondents say that the scheme has effected the agriculture work. Now there is very less availability of labourers for agriculture work and situation become worse in the crop yielding seasons. 10.87 percent of respondents have different opinion on the negative effects of scheme on agriculture. Actually it seems here that if the farmers and labourers or small scale farmers have different opinion here. But the same scheme can be connected with the agriculture and some of the amount may be taken from farmers. This will fill the gaps between farmers and labourers and also monitoring will be easy on all the issues of MGNREG scheme.

Figure 4.



Source: Author's Calculations Based on Field Survey.

Existing Laws and their Implications

In India a number of laws exist in various enactments to tackle environmental pollution. The Indian Penal Code, the Criminal Procedure Code, The Factories Act, The Indian Forest Act, The Merchant Shipping Act, etc. have provisions for regulation and legal action for some specific environmental issues. Some of the laws to control crop residue burning are as following:

1. Constitutional Provisions for the protection of Environment
2. Air Act, 1981
3. Environment Protection Act, 1986
4. Biological Diversity Act, 2002
5. National Green Tribunal Act, 2010
6. Cr. P. C. (S- 144)

There are some regulatory agencies and policies which are also in existence to control crop residue burning as listed below:

1. Punjab Pollution Control Board

2. Punjab State Science Council for Science and Technology
3. Punjab Energy Development Agency
4. Dept. of Agriculture (Multi crop multi-year farming scheme in 2002)
5. Dept. of Animal Husbandry
6. Dept. of Rural Development and Panchayat
7. Punjab State Farmers' Commission
8. Special Task Force
9. Punjab Agriculture University
10. Eminent Scientist and their participation
11. Educational institutions and researcher participation
12. Role of Research institutions
13. Community and social activist
14. Technology as remote sensing

However, with country's emerging environmental scenario with industrialization in the post-independence era, these were found either inadequate or being not effectively applicable to check the degradation of our environment. After the Stockholm Conference on Human Environment in June, 1972, it was considered appropriate to have uniform laws all over the country for broad environmental problems endangering the health and safety of our people as well as of our flora and fauna. The Water (Prevention and Control of Pollution) Act, 1974, is the first enactment by the Parliament in this direction. This is also the first specific and comprehensive legislation institutionalizing simultaneously the regulatory agencies for controlling water pollution. The Pollution Control Boards at the Centre and in the States came into being in terms of this Act. Another related legislation enacted was the Water (Prevention and Control of Pollution) Cess Act, 1977 in order to conserve this vital natural resource and to augment the finance of these regulatory agencies.

Thereafter, The Air (Prevention and Control of Pollution) Act was likewise enacted in the year 1981 and the task of implementation of this legislation was also entrusted to the same regulatory agencies created under the Water (Prevention and Control of Pollution) Act, 1974. As the Water (Prevention and Control of Pollution) Act and the Air (Prevention and Control of Pollution) Act were designed to deal with only water and air pollution problems, it was in the year 1986 that the Parliament enacted a comprehensive or umbrella legislation for environment in its entirety. This is the Environment (Protection) Act, 1986. The responsibility for implementation of provisions of the Environment (Protection) Act has to a

large extent been entrusted to the same regulatory agencies created under the Water (Prevention and Control of Pollution) Act, 1974. National Green Tribunal Act, 2010 (NGT) is an Act of the Parliament of India which enables creation of a special tribunal to handle the expeditious disposal of the cases pertaining to environmental issues. It was enacted under India's constitutional provision of Article 21, which assures the citizens of India the right to a healthy environment. Other agencies besides the Central and State governments are also entrusted with the responsibility of implementing specific provisions of this Act and the Rules made thereunder depending on their operational requirements.

The Hon'ble Supreme Court of India appointed Environment Pollution Control Authority (EPCA) which directed Punjab and Haryana to ensure a complete ban on the environmentally hazardous practice of burning paddy stubble in open fields within two years. Punjab has been asked to immediately issue a notification making agriculture residue burning an offence in the state. EPCA discuss smog that engulfed the NCR region for nine days at a stretch and Punjab and Haryana were told to promote alternative use of paddy stubble such as power generation and bio-methanation in the next two years. EPCA directed these States to issue notification under Section 19(5) of the AIR (Prevention and Control of Pollution) Act, 1981. The EPCA would monitor progress in compliance of these directions every six months. The Central Government directed the Indian Institute of Technology, Kanpur, to study the causes and phenomenon of smog as well as to come out with remedial measures. The study earlier conceptualized for just Delhi will now look at the entire northern region.

The Hon'ble Punjab and Haryana High Court in C.W.P. No 10138 of 2006 and 7501 of 2007 decided on 16th April 2012, pertaining to the formulation of a policy by the States to ban the burning of wheat/paddy stubble as such a process pollutes the environment. The Court said that this is an issue where promulgation of a law banning such activity possibly may not yield the desired result. A flat or a diktat by an authority necessarily involves penal consequences upon its violation and booking the farmers for violating the ban on burning of wheat/paddy stubble would hardly be a situation which any government and citizen would want. It has also to be understood that a farmer feeds a nation and, therefore, holding him responsible alone would not be a reliable idea. The issue, therefore, has to be seen from the perspective where the society and the government, who are beneficiaries of the industrious activity of a farmer, take proactive measures by providing solutions to a farmer which are affordable and readily available and thus save both the farming community and also the general public from the hazards ensuing the polluting activity of burning straw. The government reaches out to the

farmers at the grass-root level who are not only to be educated but are to be given alternatives to get rid of this problem.

Punjab Government ban on sowing paddy before 10th June to check falling of groundwater level and to save at least burning of one out seasoned (Sathi Munji) crop residues. The State Govt. has banned stubble burning. District authorities are invoking Section 144 of Cr.P.C. (imposed for preventing disturbance and maintaining law and order) to register cases against farmers who burn stubble on their fields. A case is made out under Section 188 I.P.C. for violating of this order. There are reports of FIRs being registered in various districts. The Punjab Agriculture University and state Agriculture Department have been regularly issuing guidelines and alerting farmers against stubble burning but with limited impact due to lack of economically viable alternates.

Conclusion

The study has been an attempt to understand the serious problem of Crop residue burning in the region. A general perception is that only farmers are responsible for this problem but the reality is that the modern system of agriculture, the less availability of labourers and the anti-farmers governmental policies and ineffective implementation mechanism, are widely responsible for it. Further on the basis of the experience in this field the following suggestions (based on adoption of new technologies and legal as well as administrative mechanism) are being made to adopt:

Promotion of Happy Seeder technology and alike technology – Happy Seeder is a machine having good potential to solve the problem of CRB with immediate results. With the help of this machine farmers can sow wheat crop directly after harvesting paddy without the need to burn the paddy residue. It saves time, water as well as is environmental friendly way to the problem of crop residue burning. One more technology, which bundled/bricks the crop residue may be given to cooperative-societies in enough number for use on nominal cost. And state should bear the purchase cost of these machines, while the running cost may be collected from the farmers.

More observatories to measure pollution level and capacity building programmes, especially in rural areas – Awareness among all the stakeholders is very essential to solve any problem and which can be done through direct meetings and by organizing capacity building programmes. There is a need to make people aware about the negative effects of crop residue burning. There is need for more observatories to know the exact level of

pollution caused by CRB in particular arrears at particular period of time and more research on the basis of these data collection from fields.

Incentives to farmers, those are adopting alternatives uses of crop residue in place of burning – The farmers who adopt environmental friendly alternatives regarding the issue must be rewarded economically to give boost to their efforts and to encourage more farmers to implement those ideas. Sometime farmers avoid the use of alternative due to increase in the cost of management. Some kind of financial incentives may help in the use of alternatives.

Participation of all the stakeholders in decision making process on the issue of crop residue burning - There is a need to involve the entire stakeholder in the process of decision making on the issue such fixation of MSP on crops.

Fixing of responsibility of the Biomass based power plant operators to collect crop residue from the farmers within specified areas near the plant – There is a good scope to use crop residue as fuel for biomass power plants. But the problem is of transportation of crop residue from the fields of the farmers to biomass plant. Crop residue is light in weight and bulky and transportation cost is high as compared to price of the residue. The management of such biomass plants can be instructed to collect the crop residue from the fields specified by the authorities.

More focus on public awareness regarding the issue of crop residue burning – Public awareness about all the possible negative effects of CRB is very essential to control this problem.

To build a strategy for the promotion of diversified use of crop residue– It also suggested that the strategy comprises promotion of diversified uses of crop residue for purposes such as power generation, production of bio-ethanol, packing material for fruit and vegetable, utilization for paper industry, composting and mushroom cultivation in public private partnership mode[2].

Legal and Administrative setup- A legal and administrative setup by including a penal of technical, social and legal experts, needs to be structured. It can look upon the policy of distribution of the crop residue management expenses to the farmers and also for the monitoring for that management. Village level committees can help in awareness for the management methods of crop residues. Since the area of study in issues is having various

[2] Available at, http://www.thehindu.com/todays-paper/tp-national/tp-newdelhi/ngt-for-measures-to-snuff-out-crop-residue-burning/article6588808.ece, accessed on April 3, 2015.

industries in its jurisdiction, therefore the amount under corporate social responsibility may also be utilized to curb the problem by way of making a model framework.

References:

Cullet Philippe, Water Law in India Overview of Existing Framework and Proposed Reforms, available at, http:// www.ielrc.org/content/w0701.pdf.

Deepak Kumar. Impact of Laws for Prevention of Pollution from Crop Residue Burning: In Context to the State of Punjab. IRJMSH Vol 6 Issue 3 [Year 2015] ISSN 2277 – 9809 (0nline) 2348–9359 (Print).

Government of Punjab. Agriculture Policy and Restructuring, Punjab, Chandigarh: Advisory Committee on Agriculture Policy and Restructuring, 2002.

Government of Punjab. Diversification of Punjab Agriculture, Punjab. Chandigarh: Committee on Diversification of Punjab Agriculture, 1985.

Government of Punjab. Statistical Abstracts of Punjab, Punjab, Chandigarh: Government of Punjab, 2012.

Joseph. W. Dellapenna & Joyeeta Gupta. The Evolution of the Law and Politics of Water. Dordrecht: Springer Academic Publishers, 2009.

Kailash Thakur. Environmental Protection Law and Policy in India. New Delhi: Deep & Deep Publication Pvt. Ltd., 2013.

Parmajit S. Jaswal, Nishtha Jaswal and Vibhuti Jaswal, Environmental Law. Faridabad: Allahabad Law Agency, 2015.

Pathak, B.S. (2006). Crop Residue to Energy, In Environment and Agriculture, Chadha, K.L. and Swaminathan, M.S. (Eds.), Malhotra Publishing House, New Delhi.

Pathak, H., Bhatia, A., Jain, N. and Aggarwal, P.K. (2010). Greenhouse Gas Emission and Mitigation in Indian Agriculture – A Review, ING Bulletins on Regional Assessment of Reactive Nitrogen, Bulletin No. 19, (Ed. Bijay-Singh), SCON-ING, New Delhi.

Pathak, H., Singh, R., Bhatia, A. and Jain, N. (2006). Recycling of Rice Straw to Improve Wheat Yield and Soil Fertility and Reduce Atmospheric Pollution. Paddy Water Environ. 4.

Punjab State Council for Science and Technology (PSCST). State of Environment, Punjab, Chandigarh: PSCST 2007.

S. Dharmendra S. Sengar. Environmental Law. New Delhi: PHI Learning Private Limited, 2012.

Santha S. Kumar. Introduction to Environmental Law, 2nd Edn. Nagpur: Lexis Nexis Butter Worths Wadhwa, 2010.