



Major policy initiatives to deal with agricultural pollution in India

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Abstract

Recently, the food production has increased dramatically worldwide which has resulted in high demand of food specifically in developing nations. The abundance of agricultural endeavors enhances the production of agro-products, which has resulted in an overall rise in waste generation and environmental pollution. The degradation or contamination of environment as a result of agricultural bi-products which are biotic and abiotic in nature and may incur injury to humans and their economic interests which is known as agricultural pollution. In the recent times agricultural pollution has become a major issue worldwide. The increasing variety of pollutants and their after effects has become cause of concern. These can have both direct and downstream effects, greatly affecting the quality of water, agricultural soil, air and even the health both animals and humans. In spite of having plethora of laws and policies implemented by the Indian government we are not able to bring down agricultural pollution leaving the countrymen at the mercy of God. This paper will throw a light on the basic concept and causes of agricultural pollution and what are the consequences. Along with this it will also discuss the various policies and laws which have been implemented by the Indian government to curb this evil and suggesting some more stringent measures and polices which can help us to solve this issue.

Keywords: agricultural pollution, environment policies, environment, environment laws, pollutants

Introduction

The global economic expansion is significantly influenced by the agricultural sector. The published literature, however, only briefly discusses the handling of agricultural waste. It can be connected to the fact that the agricultural sector is not subject to the same regulations as municipal solid trash.

With limited engagement from the public sector, agrarian byproduct is typically managed by the owners of the agricultural land, who are primarily in the primary sector. Food production has increased dramatically worldwide as a result of the rising food demand in developing nations. Therefore, agro-based firms are lucrative ventures in both developed and developing nations. The abundance of agricultural endeavours enhances the production of agro-products, which has resulted in an overall rise in waste generation and environmental pollution. The type of operations carried out and the trash produced depend on the geographical and cultural characteristics of a nation. Due to advancements in water administration systems, contemporary agro-technologies, and extensive pesticide deployment, extensive areas of wasteland have been transformed into agricultural lands^[1]. These actions have raised the complexity of disposing of agricultural waste and polluted the environment worldwide. To manage these wastes, including their conversion to reusable resources, national agencies are continuously creating policies and other potential approaches. As per the Indian Ministry of New and Renewable Energy (MNRE), India produces 500 million tonnes (Mt) or more of crop leftovers annually and the bulk of this green manure is actually used as fuel for other home and industrial uses, as well as fodder. Nevertheless, there is still a 140 Mt surplus, of which 92 Mt is incinerated annually^[2].

Agricultural pollution can be termed as degradation or contamination of environment as a result of agricultural bi-products which are biotic and abiotic in nature which may also cause injury to humans and their economic interests. The effects of these pollutants can have both direct and downstream effects. Agricultural pollutants vastly hamper water quality and can be traced in lakes, rivers, and groundwater. Farming pollutants may cover pathogens, pesticides, metals, and salts^[3]. Whereas on the other hand Animal agriculture has a sizeable impact on pollutants that goes into the environment such as bacteria and pathogens in manure can make their path into water streams and groundwater^[4]. Air pollution caused by agriculture through land use changes and animal agriculture practices have a tremendous impact on climate change, and addressing these concerns was a central part of the IPCC Special Report on Climate Change and Land^[5]. Agricultural pollution has many different sources.

1. Nitrogen-based fertilizers produce potent greenhouse gases and can overload waterways with dangerous pollutants;
2. Chemical pesticides with varying toxicological effects can contaminate our air and water or reside directly on our food.

3. Indirect pollutants like methane—another significant contributor to global warming—released through the digestive systems of cows ^[6].

People are able to exist in the world due to the development of farming and agricultural methods. Without it, there would be famines all across the planet. It is a fundamental means of survival. Agriculture was a sustainable industry that lasted for thousands of years without endangering the environment. In actuality, land might be passed down through many generations of farmers and remain as fruitful as ever. However, agricultural pollution has already begun as a result of contemporary agricultural methods. Due to the current agricultural byproducts, this process degrades the ecology, the land, and the environment.

Today, air pollutants have become an international health problem and are ranked as one of the top environmental hazards by groups such as the World Health Organization (WHO) and governments around the world. Increased awareness of both gaseous and solid pollutants is one of the world's greatest health risks, and according to the latest records released by WHO, indoor and outdoor air pollutants were 60 in 2012. It is responsible for the deaths of 3.7 million elderly people under the age of 60. The Global Burden of Disease Report ranked outdoor air pollutants as the fifth leading cause of loss of life in India and indoor air pollutants at 0.33. It is categorized as the main reason. Outdoor air pollutants are responsible for 620,000 deaths in 2010, a six-fold increase from 100,000 deaths in 2000. In addition, studies by researchers at the University of Chicago, Harvard, and Yale found that the average life expectancy of 660 million Indians living in large cities was reduced by about 3.2 years for particulate matter (PM). I predict that it is due to over-recognition ^[7].

Government Intervention and Other Preventive Measures

Sustainable Agrarian practices have to maintain an equilibrium environmental health and profitability in order to promote equity. Thus, stewardship of both natural and mortal coffers is of high significance. In simple language, "Sustainable husbandry involves the processes that will enable us to meet the contemporary and incessant societal requirements for food and fibre, while escalating benefits through the conservation of natural coffers and conservation of ecosystem functions. The precedence of exalting mortal capabilities at the existent (planter) position and icing food security at the public position, through effective and indifferent use of coffers are compatible with the conception of Sustainable husbandry.

The Indian government has made multiple attempts to promote and inform the agrarian communities about the best methods for managing waste material through government initiated projects. Environmental activists and government representatives also created a number of forums and suggestions to reduce crop residue burning and encourage the use of substitute sustainable management techniques ^[8].

Some of the legislations that are framed and implemented pertaining to crop residue burning are like section 188 of Indian Penal Code, section 144 of the Code of Criminal Procedure Code to ban paddy residue burning, The Air Prevention and Control of Pollution Act, 1981, The Environment Protection Act, 1986, The National Tribunal Act, 1995 and The National Environment Appellate Authority Act, 1997. Particularly, in the states of Rajasthan, Uttar Pradesh, Haryana and Punjab stringent measures have been taken by the National Green Tribunal (NGT) to limit the crop residue burning ^[9].

National Policy for Management of Crop Residue (NPMCR): This policy has following major objectives:

- a. Control of burning of crop residue to prevent environmental degradation and loss of soil nutrients and minerals by promotion of in-situ management of crop residue;
- b. Diversified use of crop residue for various purposes like charcoal gasification, power generation, as industrial raw material for production of bio-ethanol, packing material, paper/board/panel industry, composting and mushroom cultivation etc.;
- c. Capacity building and awareness about ill effects of crop residue burning and its effective utilization and management; and
- d. Formulation and implementation of suitable law and legislative/policies.

The Indian administration has also taken a significant step by implementing biogas technology in its crop burning and pollution prevention programmes. They have been popular since the 1970s, and the National Biogas and Manure Management Program-off grid biogas power generating programme runs a number of initiatives to generate renewable energy for different uses. The "waste to energy mission" was the umbrella term used by the government to undertake these schemes. This is also a component of India's climate change action plan ^[10].

Paddy chaff and other agricultural residues besides manure and vegetable waste can now be used for biogas generation in an integrated manner thanks to recent technological advancements. As an innovative step toward green energy, Urja reported the establishment of a biogas plant combined with industrial farms and processing facilities in Fazilka, Punjab. This facility uses bio-methanation technology to produce biogas from rice straw. The biogas plant produces around 4000 m³ of biogas from 10 tonnes of agricultural waste and has received certification from prestigious academic institutions including the Indian Institute of Technology, Delhi, and Punjab Agricultural University ^[11].

Several measures included in the Bio-Composting Policies include as a part of its 11th Five Year Plan, the Indian government created the Rashtriya Krishi Vikas Yagna (RKVY), State Plan Scheme of Additional Central Assistance, in August 2007. In accordance with the plan, eight training and demonstration projects were constructed in various villages around the eastern Uttar Pradesh districts of Azamgarh and Marhath Bhanjam.

Around 456 farmers received training in the production of bio-compost and the bio-conversion of agro-waste. These extensive efforts helped farm owners acquire financial benefits^[12].

The National Mission for Sustainable Agriculture (NMSA), which is one of the eight operations under the National Action Plan on Climate Change (NAPCC) seeks to address issues regarding 'Sustainable husbandry' in the environment of pitfalls associated with climate change by contriving applicable adaption and mitigation strategies for icing food security, indifferent access to food coffers, enhancing livelihood openings and contributing to profitable stability at the public position. The National Mission for Sustainable Agriculture (NMSA) is imaged as one of the eight operations under the National Action Plan on Climate Change (NAPCC) with the ideal of promoting Sustainable husbandry. The thrust areas to be addressed under this charge are dry-land husbandry, access to information, bio-technology and threat operation. NAPCC has made a clarion call to concoct strategies to make Indian husbandry more flexible to climate change with focus on perfecting productivity of rain-fed husbandry. This National Mission would cover both adaption and mitigation measures in the sphere of crops and beast husbandry, including exploration. The Mission would further concoct applicable strategies by relating crucial confines of sustainable husbandry and formulating a programme of Action (PoA) for adaption and mitigation measures covering exploration and development, technology and stylish practices, structure and capacity structure. This will be supported by synergizing traditional knowledge, agrarian heritage and ultramodern technology and exploration^[13].

It was also considered appropriate to take instantaneous legislative action to establish a Commission for Air Quality Management in National Capital Region and Adjoining Areas, which would replace old panels to streamline citizen interest, intra - state collaboration, professional involvement, and sustained scientific research. This was done in order to establish a long-term solution and a self-regulated, democratically surveilled framework for combating air pollution in the NCR. 2021 saw the passage of the Commission for Air Quality Management in National Capital Region and Adjoining Areas Bill. The measure that repeals an identical ordinance proposes for the creation of a commission as the single body in charge of managing air quality. The creation of this commission is anticipated to put an end to the blame-trading and buck-passing that have been occurring recently regarding the monitoring and control of the region's air quality. Farmers who burn stubble to cause air pollution may be required to pay environmental compensation, at the rate and in the manner specified by the commission.

Powers of the Commission include limiting actions influencing air quality, investigating and engaging in studies associated with environmental pollutants impacting air quality, making ready codes and recommendations to save you and manage air pollutants, and issuing guidelines on subjects which includes inspections, or law to be able to be binding at the worried individual or authority. Contravention of provisions of the Bill, or orders and guidelines of the Commission may be punishable with imprisonment of as much as 5 years, or excellent of up to 1 crore rupees, or both. The Bill excludes farmers from the scope of those penalties. However, the Commission can also additionally accumulate an environmental reimbursement from farmers inflicting pollutants through stubble burning. This reimbursement may be prescribed through the principal government. Appeals in opposition to the Commission's orders will lie with the National Green Tribunal^[14].

The main goal is to prevent contaminants with high levels of nitrogen and phosphorus from leaching into freshwater resources close to fields and livestock facilities. Never attempt prevention on your own. For the purpose of controlling and eliminating farming-related water pollution, state governments, farmers' associations, communities and enterprises, academic institutions, and conservation groups must collaborations. Runoff can be decreased by strategically applying fertiliser at the proper time, in the proper amount, and using the proper techniques. Cultivating specific grasses that can take in the extra nutrients, recycle them, and stop soil erosion In a similar manner, planting rows of trees and bushes around fields and along the edges of lakes or streams is beneficial. In order to prevent soil erosion and compaction, excessive tilling of the soil must be avoided. The proper management of animal waste disposal and the exclusion of farm animals from bodies of water will lessen nitrogen contamination of the water. Lagoons, anaerobic digestion, solid liquid separation, composting, and solid liquid separation are some methods for managing animal waste. The most efficient of them is anaerobic digestion. Heat and anaerobic microorganisms are used in the process. The end products of this procedure are a fertiliser-rich liquid and methane gas which can be utilized to generate electricity.

Conclusions and Suggestions

Especially for emerging nations like India with rising populations, production rates, and economic expansion, the sustainable management of agricultural waste has become a significant concern. Due to their enormous volume and lack of management capabilities, crop residues are one type of agricultural waste that has presented unique issues. Given that rice and wheat, which typically produce the majority of crop residue, are the two main staples in India, the large-scale cultivation of these crops to feed the nation's constantly growing population has undoubtedly resulted in the generation of large quantities of crop residue, which the nation is unable to handle.

The Indian government has made numerous attempts to reduce the quantity of crop leftovers burned through various programmes. Beyond such worries, advocacy and encouragement may try to employ crop leftovers as raw components in the electrical sector. The Indian Ministry of New and Renewable Energy (MNRE) and the Indian Agricultural Research Institute (IARI) are continually promoting research and creative solutions to deal with crop leftovers without incineration. The Federal Government recently produced the National Coverage for Crop Residue Management (NPMCR), which establishes norms and criteria for neighbours to follow for

programmes to prevent crop burning and move toward effective conservation techniques. As a result, the National Remote Sensing Agency (NRSA) and Central Pollution Control Board (CPCB) are now revealing crop burning via aerial surveillance and penalizing those who burn crops. However, there may be little evidence in the literature presented to guide efficient management of the situation. Probably due to paucity of education, awareness campaigns and stakeholders involvement in the imposition of rules and projects. Ongoing air pollution, especially in November and December, indicates that the above rules could not completely prevent stubble burning.

They tend to avoid sectoral thinking and move towards nexus thinking as much as possible. Individual small farmers do not have the ability to establish a permanent solution. Local governments, communities, or farmers' unions need to fill this gap and set up community support programs such as Equipment rental, waste transportation, and the possibility of connecting waste to where it is needed as raw material. Educating the agricultural community and other relevant stakeholders is essential to free them from the generational belief that waste management is not their responsibility. Providing them technical and socio-economic support is even more important. They need to be educated about the benefits of reducing pesticide costs through the use of compost and the additional income that can be generated from other types of recovery programs such as energy production. The final but perhaps the most important part of the puzzle is sector thinking, which limits the problem of crop residue incineration to the agricultural and energy sectors. This sectoral thinking can be overcome by nexus thinking, which promotes a greater level of integration across subject boundaries.

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