Agricultural Waste and Residue Burning: Issues and Challenges from the Ratia Region, Haryana

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Abstract - Ratia is primarily an agricultural region. About 70% of residents in Ratia region are engaged in agriculture. Major crops of Ratia region are rice, wheat, cotton, jowar, bajra, maize, mustard, vegetable and pulses. Ratia is self-sufficient with increase in food production and significant amount of agro-waste, also known as agricultural residues also increasing. In the Ratia region, stubble burning is a serious issue. Ratia is an agricultural region dominated crop is rice and wheat are prone to crop residue burning. To clear the land in a rice-wheat cropping system for the timely seeding of the following crop, the majority of Indian farmers use residue burning techniques. Open field burning not only results in the destruction of numerous farms at the conclusion of the harvest season, but it also adversely affects soil health and contributes to air pollution. They affect human health due to general degradation in air quality resulting in aggravation of eye and skin diseases In the Ratia region policies on agricultural waste management are either weak or not well-enforced. This results in the lack of better alternative methods leads to the open-field burning of crop waste by farmers.

In this review paper, we examined the economic potential of agricultural waste management options available to Ratia region by reviewing the literature for crop establishment practices in which planting crops in standing stubble, implementing in-situ approaches along with composting methods, biofuel generation and use of waste as feedstock for value added products. This is done by taking the case study of Ratia region, which is an important agricultural region in the state of Haryana, India.

Key Words: Agricultural Waste, Agricultural Residues, Stubble Burning, Residue Burning, Open-Field Burning, Composting

I. INTRODUCTION

Agriculture holds a vital place in human civilization, serving as the livelihoods of billions across the globe. Nonetheless, it generates a substantial amount of waste that, if mismanaged, can present environmental and health risks (Anandita, et al., 2024). Agricultural wastes can be defined as the byproducts of the production and processing of agricultural products, including fruits, vegetables, meat, poultry, dairy, and crops. They are the leftovers of the production and processing of agricultural products that may contain components which are useful for living things if they use it in an effective way. They might be in the form of liquids, slurries, or solids, and their composition will vary depending on the type of agricultural activity. Waste from animal (manure, animal carcasses), waste from food processing industries (only 20% of maize is canned, and 80% is waste), crop residue (corn stalks, sugarcane bagasse, drops and culls from fruits and vegetables, pruning), and hazardous and toxic agricultural waste (pesticides, insecticides, and herbicides, among other things) are all included in agricultural waste, which is also known as agro-waste (Obi, et al., 2016).

The Indo-Gangetic plain region comprises of states of Punjab, Haryana, plains of Jammu & Kashmir Haryana is primarily an agricultural state [2]. About 70% of residents in Haryana are engaged in agriculture. The state is at second position in food grain production in the country. Wheat and Paddy are the major crops. Haryana is self-sufficient in food production and the second largest contributor to India's central pool of food grains [3]. Major Kharif crops of Haryana are rice, cotton, jowar, bajra, maize, mustard, jute, sugarcane, sesame and groundnut (Hardeep, et al., 2015).

Agricultural waste is a critical aspect of sustainable farming, with significant implications for environmental health, soil quality, and air pollution. The Indian Ministry of New and Renewable Energy (MNRE) states that India produces a total of 500 Million Tons (Mt) of crop residue each year. Part of this 500 Mt of agricultural residue has been used for fodder and other purposes; however, the rest of the residue (92 Mt) is still burnt in different agricultural fields across India. (NPMCR) National Policy for

Management of Crop Residues (2019) highest in the state of Uttar Pradesh (60Mt), Punjab (51 Mt) and Maharashtra (46 Mt). Primary reason behind managing agricultural waste is to make good sense both environmentally and economically (Dharmaraj, et al.,2020).

Utilization of agricultural waste requires a careful attention and a proper management technique for a sustainable future. Managing the waste produced from agricultural activities are essential for having an eco-friendly environment. Agricultural waste management refers to the practices and strategies employed to handle and dispose of waste generated in agricultural processes while minimizing environmental impact. They affect human health due to general degradation in air quality resulting in aggravation of eye and skin diseases. By burning crop residue, hazardous chemicals like CO2, CH4, N2O, H2S, O3, and smog are released into the air, causing air pollution. The destruction of beneficial soil microorganisms has a significant impact on daily life and alters the physical, biological, and chemical aspects of the soil. A solution to the problem of air pollution can be found by implementing efficient agricultural waste management, which will also improve crop inputs (Patel, et al., 2020).

This involves reducing waste generation, reusing and recycling materials, and safely disposing of unavoidable waste. Agricultural waste has the potential to be a massive source of biomass, which could meet about 33 percent of the energy needs of developing nations. In India, around 75 percent of the rural energy needs are met by agricultural waste (Singh et al., 2023). Effective agricultural waste management requires collaboration between farmers, policymakers, researchers, and industry stakeholders. Sharing best practices and research findings is crucial for the development of advance technologies, improve infrastructure and address barriers to adoption. Conversion of this waste into wealth is important for effective resource optimization and proper waste management while maintaining environmental sustainability Educational and awareness campaigns are very essential for changing perceptions and attitudes of farmers toward crop residue burning. Can also discusses government policies, technology for developing a circular economy in the agriculture sector. Hence, there is an urgent need of innovative solution approaches for dealing with the challenge (Sharma and Paul, et al.,2024).

II. INFORMATION ABOUT THE STUDY AREA OF THE RATIA REGION

Ratia town is on Bhadra-Bhattu-Fatehabad, Ratia-Bhudlada-Sardulgarh-Ratia and Ratia-Tohana road. This town is situated at a distance of 40 kilometres from Tohana and 23 kilometres from Fatehabad. It is located at 29^0-42' north latitudes and 75^0-34' east longitudes. Estimated population of Ratia in 2023 is 191,325. According to the 2011 census of India, total population is 148,438 people are living in this Tehsil, of which 77,324. The climate of the district is of a tropical type with intensively hot summer and cool winter, with a temperature of 40-50 degree Celsius in June and 5 to 10 degree Celsius in December and January. The average rainfall of the ratio is 400 mm (DDP, et al.,2021).

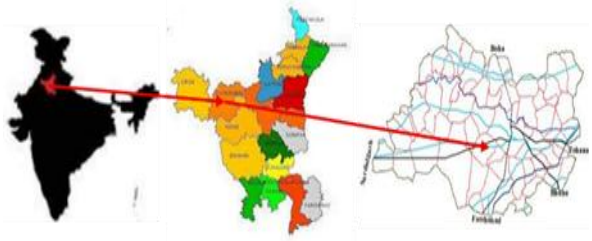


Figure 1, Location of Ratia Region
Source: www.indiagrowing.com

Ratia is primarily an agricultural region. About 70% of residents in Ratia region are engaged in agriculture. The Ratia region in Fatehabad, Haryana, is heavily reliant on agriculture, with a diverse range of crops and livestock. The area is known for its fertile land and favorable climate, supporting the production of cereals like wheat, rice, and corn, as well as fruits, vegetables, and dairy products.

In the Ratia region of Haryana, the dominant cropping system is rice-wheat rotation, according to the Haryana Agricultural University. This system involves growing rice during the Kharif season (monsoon season) followed by wheat during the Rabi season (winter season).While not dominant, other crops like maize, pulses, and vegetables can be included in diversification efforts to enhance soil health and farmer income, particularly in the Kharif-summer season (Kamboj, et al.,2023). In Ratia,

Haryana, local agricultural waste management practices primarily involve utilizing crop residues for traditional purposes like animal feed and domestic fuel, or burning them in open fields due to limited affordable disposal alternatives. While open-field burning served as primary means of waste disposal, it often entails environmental and socio-economic issues that need to be addressed. On the other hand, mulching, composting, and use as fodder appear to be reasonable solutions for waste utilization, especially to further advance local agricultural practices specific to local conditions and farming systems (Sudharshan, et al.,2025).

III. RESEARCH METHODOLOGY

The paper uses the case study approach as research design. The case of Ratia region is presented and the fieldwork for this research paper was conducted in January-February 2023. This study is based on a sample of 63 villages in the region. The data was collected by primary survey including direct observation, semi-structured interviews and secondary survey. This paper relies on the analysis of archives and government documents. Govt. Policies and Programs related to agriculture waste management and crop residue, Agricultural annual crop yield data (2021-22) by circle Patwari of Ratia block.

IV. OBJECTIVE OF THE STUDY AREA

- To analyze the problem and potential for utilization of Agricultural Waste and Residue Burning as energy resources in the Ratia Region.
- To analyze strategies for attaining sustainable agriculture and reducing the negative effects of waste on the earth through analysing their environmental, economic, and social implications in Ratia Region.
- Emphasizing on the principles of reduce, reuse, and recycle.
- Protecting environment from air pollution and preventing loss of nutrients and soil micro-organisms caused by burning of crop residue.
- Study objective change in overall knowledge of farmers regarding waste, agriculture waste, agriculture waste generation, problems due to agriculture waste, and agriculture waste management techniques.

V. THE EXTENT OF AGRICULTURAL WASTE GENERATION IN RATIA

Ratia is a Town and Tehsil in Fatehabad district of Haryana state in India. Total number of villages in this Tehsil is 63. Total area of the region is 51200 hectares.49128 hectares area comes under agriculture ,336 hectares in circulation,31 hectares in water bodies and 1705 hectares in built-up area. Total agriculture land is 44379 acres in the region. Total 14,752 Cultivators are depended on agriculture farming out of 13,346 are cultivated by men and 1,406 are women. 15,809 people works in agricultural land as a labour in Ratia, men are 13,268 and 2,541 are women (DDP, et al.,2021).

- Ratia, part of the Fatehabad district, is an agrarian region with crops such as wheat, rice, mustard, and cotton.
- Other crops, including fodder, vegetables, pulses, junglat are also grown.
- These crops generate various residues:Crop Residues: Stalks, stems, seed pods, straws, leaves, and husks after harvesting.
- The Ratia (Fatehabad district) had a large paddy harvest in 2024, resulting in a significant amount of paddy stubble.

The Amount and Type of Waste Being Burned

Coming specifically to the agriculture waste scenario, the region total agriculture land is 44379 acres and waste generates 1,348,845 tonnes of annually. Major Waste Contributors of Rice (44%) and Wheat (39%) together account for 83% of the total agricultural waste. Total land under rice is 39520 acres, generates 592800 tonnes of waste wheat is 40342 acres, generates 530125 tonnes of waste. Rice has the highest waste generation despite slightly less land used than wheat. These are likely staple crops with high processing waste (e.g., husks, straw). Moderate Contributor of Cotton (10%) contributes significantly despite occupying much less land (just 3,360 acres). Total land under cotton is 3360 acres, generates 126000 tonnes of waste. Smaller Contributor of Fodder (7%) also shows notable waste levels relative to its area. Fodder is 1969 acres generates 98450

tonnes of waste. Negligible Contributors of Vegetables, Junglat (likely forest crops), Musturd (Mustard), and Pulses under land 490 acres, generate 1470 tonnes of waste contribute virtually no measurable waste (0% each). This could be due to efficient utilization, smaller scale production, or limited processing waste (Refer table,1).

Table 1 Agriculture Waste Generated by Crops (Tonne)

Crops	Land (Acres)	Waste (Tonne)	% of Total Waste
Wheat	40,342	530,125	39%
Rice	39,520	592,800	44%
Cotton	3,360	126,000	10%
Fodder	1,969	98,450	7%
Vegetables	354	885	0%
Junglat	77	289	0%
Mustard	42	262	0%
Pulses	17	34	0%

Focus areas for waste reduction could be in Rice and Wheat sectors. Each year, millions of tons of agricultural residues like rice husk, wheat straw, sugarcane bagasse, and cotton stalks are generated, especially in agrarian regions Ratia, Haryana. Unfortunately, a significant portion of this waste is either burnt in open fields contributing to air pollution or left unused, adding to environmental degradation. (Gattuwala, et al.,2025).

The Link Between Current Waste Practices and Their Observed Impacts on Soil Fertility and Local Environment

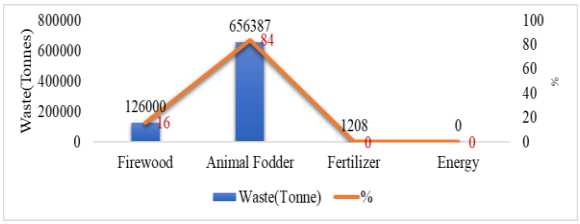
Total Agriculture Land (44,379 Acres) area used for agricultural purposes in the Ratia region and total generated Agriculture Waste (1,348,845 Tonnes). It includes all kinds of crop residues and by-products from farming activities. In Ratia, Haryana, local agricultural waste management practices primarily involve Utilized Waste (756,045 Tonnes) crop residues for traditional purposes like animal feed and domestic fuel, or burning them in open fields due to limited affordable disposal alternatives. Un-Utilized Rice Waste (592,800 Tonnes) this is the portion of the agricultural waste specifically from rice production that remains unused. This can be a potential environmental concern and also an opportunity for resource recovery (Refer table,2). While open-field burning served as primary means of waste disposal, it often entails environmental and socio-economic issues that need to be addressed (Rekha, et al.,2023).

Table 2 Utilized and Unutilized Agriculture Waste

Description	Value	Unit
Total Agriculture Land	44,379	Acres
Total Agriculture Waste	1,348,845	Tonne
Utilized Waste	756,045	Tonne
Un-Utilized Rice Waste	592,800	Tonne

Out of 100 %, utilized agriculture waste 44% and 56 % waste is not utilized. 126000 tonne (16 %) waste utilized in firewood,656387 tonne (84%) Utilized in animal fodder,1208 tonne utilized in fertilize and 0 % utilized in energy resource out of total utilized agriculture waste in the region.

Figure 2, Agriculture Waste Utilization in Different Purposes (Quantity and (%)



Wheat waste used in livestock food, cotton and mustard waste used in cooking purpose, vegetable, junglat and pulses waste used in organic fertilizers. Rice waste is not utilized because more space required for storage the waste land so people burning the stubble (Refer figure,2).

VI. ISSUES WITH CURRENT AGRICULTURE WASTE MANAGEMENT PRACTICES

- The lack of proper infrastructure for collection, processing, and disposal of agricultural waste results in open dumping and burning of crop residues and other waste materials. This practice is prevalent due to the lack of alternatives and financial limitations.
- Open burning releases harmful pollutants like particulate matter, carbon monoxide, and greenhouse gases (CO2, methane) into the atmosphere, contributing to air pollution and climate change. Runoff from improperly managed waste can also contaminate water sources, leading to water pollution.
- No effort by the local govt. on its own has been made to initiate composting, recycling or any other useful ways to deal with the agriculture waste.

- Continuous burning and removal of crop residues deplete soil organic matter, reducing soil fertility and making it more susceptible to erosion.
- Farmers often lack the resources to invest in sustainable waste management practices, making burning a cheaper and easier option.
- Limited awareness about the benefits of sustainable waste management practices and the availability of technologies like composting or bioenergy production hinders the adoption of better methods.
- While technologies like anaerobic digestion and composting exist, their adoption is limited by a lack of access to technology and training for farmers.
- Transporting and storing bulky agricultural waste, especially in areas with inadequate infrastructure, poses significant challenges.
- Improper handling and storage of agricultural waste can expose workers to biohazards and harmful gases. Ritik Kumar et al. (2024)

VII. CHALLENGES ASSOCIATED WITH AGRICULTURAL WASTE MANAGEMENT IN RATIA REGION

- Lack of Infrastructure*:* After harvesting mature paddy, farmers have a tight window of 30-40 days to prepare the land and sow new seeds. The entire process of harvesting crops is done on 1,000 acres of land which can often be a challenging time frame for farmers. The harvested paddy needs to be cut and stored quickly, but this requires a set of 10- 12 machines that cost ₹1.8 crore per set. Most farmers can't afford such an investment, especially since they need these machines within the limited window. This inadequate infrastructure makes it a huge challenge for farmers to manage both harvesting and storage effectively.
- Issues in Pricing Policy: The cost of collecting, transporting, and processing agricultural waste often exceeds the revenue generated from selling the end products. In India, farmers do not have huge acres of land which often leads to a lack of stability and issues with pricing, therefore, to make agricultural waste management more economically viable, there needs to be a review of pricing policies. Governments can play a key role by setting minimum price guarantees for agricultural waste, similar to the minimum support prices (MSP) set for crops. This would provide farmers and companies focusing on waste management with a predictable revenue stream and reduce the financial risks associated with fluctuating market prices. Additionally, creating a market for agricultural waste-derived products, such as bioenergy, biofertilizers, and compost, can help improve profitability
- Lack of knowledge and awareness among farmers: A significant barrier to effective agricultural waste management is the lack of knowledge and awareness among farmers. Many farmers, especially in rural areas, are not fully informed about the benefits of proper waste management techniques or the economic opportunities they offer. This resistance to change and lack of education hinders the widespread adoption of sustainable agricultural waste management practices.
- Transportation and storage: Transporting and storing agricultural waste poses substantial challenges, especially in rural areas with inadequate infrastructure. Agricultural waste, such as straw, husks, and other residues, is bulky and difficult to handle. The costs associated with transportation are high, and finding proper storage facilities that prevent spoilage or degradation is often problematic. Without efficient transportation and storage solutions, much of the agricultural waste goes unused or is improperly disposed of, contributing to environmental issues and economic loss for farmers. (Rajaram ,et al., 2024).

VIII. FINDINGS

- In the Ratia region there is huge amount of paddy waste, farmers have no option except burning the stubble in in-situ farm land due no availability of bailer machine, bundling of waste, proper collection and transportation facilities, waste storage plant and alternative source for waste management.
- In current Ratia region there is no utilization of agriculture waste in energy and bio-fuel production because of no Agriculture Waste

management infrastructure availability in the region.
- As storage of waste in-situ land cover more space, resulting in loss of agriculture land and mouse living under the waste bundle destroy the standing crops.
- Stubble burning directly effects human health due to general degradation in air quality resulting in aggravation of eye and skin diseases.

Agriculture waste has a potential of waste management system in business model as a production of electricity with 90 % efficiency in co-generation plant rather than coal plants and CBG used as bio fuel utilization for diesel vehicles to reduce the dependency on conventional sources like petrol, diesel etc. After utilization of biomass as energy, produced waste is used as an organic fertilizer in agriculture.

IX. AGRICULTURAL RESIDUE AND MANAGEMENT STRATEGIES

Agricultural Ministry (DAC&FW) in 2018–19 assigned a task to Indian Council of Agricultural Research (ICAR) with 21.29 crores funded project, it has been implementing in 60 KVKs in Indo-Gangetic plains, and all of them 22 placed in Punjab, 14 in Haryana, 01 in Delhi and 23 in Uttar Pradesh, KVKs provide training and technology assessment to manage the crop residue [25]. A report was projected different technologies to avoid the agricultural residue burning in Punjab, Haryana, Delhi region and west Bengal, coded technologies were Super straw management system, happy seeder, hydraulic reversible M.B. plow, rotary mulcher, shrub master, paddy straw chopper/shredder (Ministry of Agriculture and Farmers Welfare, 2019). In the north-western parts of India, farmers preferred to burn the leftover in-situ, it pollutes the environment, agricultural fields and involved severe human health risks. Management of the crop residue had a key role in nutrient recycling into the soil, plants, and atmospheric entities. ICAR developed various technologies to manage the crop residue in Indo-Gangetic plains, happy seeder, and super straw management system are sowing spatial zero-till drive, sowing with seed cum fertilizer drill, sowing with rototill drill [32]. To overcome the crop residue burning problem, happy seeder (HS) is one of the most believable options among all of the tillage practices, it saves investment, water, facilitates time for wheat sowing after rice harvesting, and leads to sustainable development [33]. Happy seeders reduce GHGs emission, loss of soil nutrients, and loss of soil micros [34].

Machinery in agriculture and its sustainable aimed designs to manage different agricultural tasks and crop residue management, it reduces time, cost, and effort in agriculture fields, the machinery intervention in farm field leads towards sustainability in agriculture development [37] (Mallikarjuna Rao, et al., 2024).

STRATEGIES FOR THE MANAGEMENT OF STUBBLE BURNING

Following strategies for the management of stubble burning are appropriate to adopt:
- The foremost step should be spread awareness among the farmers to enlighten them about the environmental concerns, economic benefits by managing the stubble.
- Government can provide stubble collecting machinery to farmers on rent or subsidy basis.
- All the pulp, paper, biomass, construction and power industries should be forced by the government to use stubble as raw materials.
- Biomass fuel can be set up to generate fuel.
- Some packaging industries can be contacted to collect the stubble for packaging the boxes.
- Machine like happy seeder can be used by the farmers.
- Farmers should be encouraged for diversification of crops.

X. SUSTAINABLE MANAGEMENT PRACTICES FOR CROP RESIDUE AND WASTE MANAGEMENT

1. Biogas Production: Biogas is composed of methaneCH4, carbondioxideCO2, and low quantities of other gases. It is created in a state of oxygen less atmosphere by anaerobic fermentation of organic matter. The type of feedstock, as well as the production technique used, determine the precise composition of biogas. Biodegradable waste, such as agriculture residues, animal manures and degraded organic fraction of the Municipal Solid Waste may be used to produce biogas. In rural areas, it can be used for

cooking and electricity production as well as to repel mosquitoes and heat (Sharma, et al., 2023)

2. Biochar Production: Crop residues can be converted to prepare biochar through pyrolysis or other techniques. It has the ability to act as a soil conditioner to enhance soil fertility, water retention, and nutrient retention. (Rai, et al., 2023).
3. Composting: Composting has always been done with crop wastes. Crop leftovers are piled in dung pits and utilised as animal bedding for this purpose. Each kilogramme of straw in the animal shed can hold two to three kilogrammes of urine. After composting, the leftover rice crop from a hectare of land yields roughly 3 tonnes of farmyard manure (FYM), which is similarly nutrient-rich. In order to produce high-quality compost, the Indian Agricultural Research Institute (IARI), New Delhi, has created a biomass-composting plant. Waste biomass and agricultural residues produced on the IARI farm are used effectively by this mechanised facility. It takes 75–90 days for organic matter to decompose; this process is sped up by a group of bacteria (Bhagawati, et al., 2020).
4. Supplementary feed for Animal: Animal feed can be made from agricultural waste. Byproducts and leftovers from crops can be used to supplement animal feed. (Rai, et al., 2023).
5. Eco-friendly material construction: From agricultural waste, like rice husk ash and straw can be used in the manufacturing process of bricks, panels and other eco-friendly building components. (Rai, et al., 2023).
6. In-Situ Management with Mechanical Intensification: In-situ application of the crop residue is adopted by many farmers as it is a natural process. This method also imparts certain benefits to the soil. There are two main way of conducting field applications, but both methods involve leaving crop residue on the farmland after harvesting. How they differ is based on what happens with tillage in the next season. In the first method, planting in the next season is carried out without tillage or with less tillage and in the other method crop residue is incorporated into the soil by mechanical means during tillage [92]. While in-situ management of crop residues can offer long-term cost savings on equipment and labor, both methods need special (new) equipment, e.g., machinery for crop residue incorporation into soils or no-till seeing equipment. The National Policy for Management of Crop Residue [7] specifically mentions in-situ management through methods such as direct incorporation into soils and mulching as methods that should be promoted in India not only to control crop residue burning but also to prevent environmental degradation in the croplands (S Bhuvaneshwari, et al., 2014).

CASE STUDIES

1. Mushroom Cultivation: Rice is the primary crop in Nagaland that flourishes in low land areas, occupying around 70% of the total cultivation area during the rainy season. The paddy straw has been being put into multiple uses in Nagaland and more noticeable of them is Mushroom cultivation. The small and marginal farmers of the state have been able to generate good source of additional farm-based income from Mushroom cultivation using the paddy straw. The small farmers were able to enhance their net revenue by Rs. 27,540.00 in a 250-bed mushroom growing chamber with a 3m x 6m thatched roof. (Dharmaraj, 2022).
2. Success story of vermicompost. Sri Dinesh Prasad Singh is an enterprising farmer from Banka district of Uttar Pradesh. He has constructed 96 pits of 20ft length,4th width, 3.5 ft. Depth in which he produces about 7500 quintals of enriched vermicompost per pit. His new venture in vermicompost has earned him about 10 Lakh annually over the years. He is now the leading vermicompost producer in Banka district. (Dharmaraj, 2022)
3. Paddy Straw Management in NE and Assam: In the North East rice is a major crop cultivated and it is the staple food of the region. During the harvest of paddy, the Paddy straw is produced as a by-product. Every year, around 51.5 thousand tonnes of rice straw is produced in Assam. Due to lower level of farm mechanisation and small agricultural landholding by the farmers in the NE States, paddy straws are not normally left over in the paddy fields and burnt unlike Northern states of India like Uttar Pradesh, Haryana, Punjab. The diverse applications of paddy straw in the Northeastern regions of India are widely

recognized. Paddy straw serves various purposes, including construction materials, animal rearing, fuel, mulching, handicrafts, and mushroom cultivation. Furthermore, it has a traditional role in the preparation of alcoholic beverages, such as Apong in the Mishing Community of Assam, which holds significant social, cultural, and religious importance for the local inhabitants. Additionally, straw ash has been historically employed for cleaning utensils and creating washing materials for hair and clothing. Paddy straw plays a crucial role in numerous agricultural activities, encompassing land preparation, cultivation, plant protection, storage, and animal rearing. Moreover, it has a traditional use in various household applications like thatching, wall construction, cooking fuel, and as a raw material for crafting handicraft products, particularly in Assam and Manipur. (Bidyalakahmi, et al. 2022).

XI. CONCLUSION AND RECOMMENDATIONS

In the Ratia region, problems arising from increased generation of agricultural waste and its preparation of crops subsequent changes are foreseeable in the near future. Existing agriculture waste collection and disposal systems will not be able to meet the needs of sustainable agriculture waste management. Agricultural waste management is a major problem. The farmer continuously burns the residue on field due to sowing of next crop, lack management practices. The release of various type emissions from burning cause health, environment, soil hazards. So, we all are aware about stubble burning and to give the new suggestions of farmers. Alternative approaches can be taken to solve the problem of stubble burning by encouraging and making the farmers aware by trainings, workshops, or through Kisan camps etc. The state government make the policies and take the strict action against farmers. The other practices for control of burning like happy seeder, biochar production, biofuel, composting, mulching, used in industries, incorporation into soil etc various practices used results to balance the ecology, fertility of soil, health issue etc. As opposed to burning, the stubbles can be used to create ecologically benign and advantageous products like compost or biochar. They may also be used as raw materials to make cement and bricks, as fuel for power plants, as biomass for biofuel production, or for cement and gasoline materials and used to make paper and pulp. While adopting these new technologies of agriculture conservation it can help in improving the soil health, quality, reducing pollution and enhancing the sustainability. The most of farmers in North India, to lack the knowledge then best choice is to burn it.

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