

## 5. Modernization of Rice Cultivation in Assam and Its Impact on Air Pollution

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### **Abstract:**

*Rice cultivation is an integral part of the life of every Assamese farming family. Since ancient times, a major portion of rural Assamese people has been relying on rice cultivation for their economic status. Traditional hand tools like Nangol, Juoli, Moi, Lahoni, Ukhon, Mukhora etc. are easily available in every Assamese house. But the picture is not remaining the same. Rapid modernization of agriculture is putting an impact on these things. All these traditional hand tools are being replaced by tractors; threshing machines etc. The modernization of rice cultivation has also had an impact on pollution. The present study aims to evaluate the effect of the modern agricultural practices on air pollution in rural areas of Assam. For this purpose, several secondary data available on internet, news articles were analysed.*

**Keywords:** *Rice cultivation, Modernization of Agriculture, Air pollution, Air quality index, Assam.*

### **5.1 Introduction:**

Assam is traditionally a rice growing area. Rice plays a pivotal role in the socio-cultural life of the people of the state [1]. While most other states in India are gradually moving away from their traditional agriculture-based economy toward industry or service oriented economy, Assam is a state in Northeast India, still heavily dependent on the agricultural sector. The agriculture sector in India specifically Assam utilizes manual power. In traditional. Agriculture, hand tools play an important role. Farm workers in Assam utilized hand and animal-drawn equipment's to carry out their agricultural practises [2]. Modernisation of agriculture is a process of transforming agriculture from traditional labour-based agriculture to technology-based agriculture [3]. During last decade, the agricultural practices are gradually modernizing in Assamese rural areas. Ploughing paddy field with nangol, threshing crops using bare feet or animal etc. are being replaced by the use of tractors, threshing machine etc. The modernisation process and technological change are regarded as the driving force behind economic growth [4]. But we can't ignore the fact that these machine operated agriculture tools are becoming the sources of increasing air pollution. Therefore, this present study will analyse the present air pollution scenario of Assam, the modernization of agriculture sector specifically rice cultivation and its impacts on Air pollution.

### **5.1.1 Objectives:**

The objectives of this study are:

- a. To investigate the current scenario of air pollution in Assam.
- b. Impact of modern agriculture practice on Air pollution.

### **5.1.2 Methodology:**

Secondary data was gathered from different published research papers, government websites, published article in newspapers etc.

## **5.2 Current Scenario of Air Pollution in Assam:**

Air pollution is contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere. Household combustion devices, motor vehicles, industrial facilities and forest fires are common sources of air pollution. Pollutants of major public health concern include particulate matter, carbon monoxide, ozone, nitrogen dioxide and sulphur dioxide. Sources of air pollution are multiple and context specific. The major outdoor pollution sources include residential energy for cooking and heating, vehicles, power generation, agriculture/waste incineration, and industry Policies and investments that support sustainable land use, cleaner household energy and transport, energy-efficient housing, power generation, industry, and better municipal waste management can effectively reduce key sources of ambient air pollution [5]. Assam is the one of the States of seven sisters including Sikkim of north eastern India, which was almost an environmental friendly region with large number of green trees. But, at present with the growth of industry, number of vehicles, population of human, and the concentration of various pollutants in the atmosphere has increased [6]. A Delhi –based Centre of Science and Environment (CSE) recently warned that the problem of air pollution is growing steadily in Assam and also in other northern eastern states, posing a threat to the concept of pristine blue skies and clean air in this region .The high level of air pollution resulting from massive motorization, traffic congestion, and use of solid fuel is causing a public health crisis in the hilly terrains and valleys of the northeaster states. But, at present with the growth of industry, number of vehicles, population of human, the concentration of various pollutants in the atmosphere has increased[7].The air quality index (AQI) is one of the significant paraphernalia accessible for investigating and representing air quality status consistently [8]. According to a data retrieved on 12.12.2022 at 8.00 pm, Air quality index in Assam was 178. Concentration of PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, CO, Ozone and NO<sub>2</sub> were 108 µg/m<sup>3</sup>, 201 µg/m<sup>3</sup>, 9 µg/m<sup>3</sup>, 1014 µg/m<sup>3</sup>, 4 µg/m<sup>3</sup> and 4 µg/m<sup>3</sup> respectively. Guwahati, Assam ranked 92 among the world's most polluted hundred countries [9].

## **5.3 Impact of Modern Agriculture Practice on Air Pollution in Assam:**

Over the last decade the scenario of Assam's rice cultivation is completely changed. Like Punjab and Haryana, farmers of Assam have also started to use modern machines for rice cultivation instead of traditional hand tools.

Government has launched several schemes for the benefit of farmers. Utilization of these modern tools has definitely increased production volumes in agriculture however the negative aspects of utilising these tools cannot be ignored. Agricultural machinery is an important non-road vehicle source that can emit multiple pollutants and make a primary and secondary contribution to air pollution. These types of agricultural machineries use a large quantity of fuel and their emissions cause significant air pollution [10]. These types of vehicles mostly use diesel fuel, which has proven to be a major source of nitrogen compounds (NO<sub>x</sub>) and particulate matter (PM). Air pollutants, such as PM, NO<sub>x</sub>, CO, volatile organic compounds (VOCs), etc., emitted by agricultural machinery and diesel internal combustion engines have a great impact on the surrounding environment [11].

In 2017, a study from Korea recorded yearly amounts of CO, NO<sub>x</sub>, SO<sub>x</sub>, TSP (PM<sub>10</sub>), PM<sub>2.5</sub>, VOCs, and NH<sub>3</sub> emitted from agricultural tractors were calculated as 3300 Mg, 9110 Mg, 4 Mg, 567 Mg, 522 Mg, 759 Mg, and 33 Mg, respectively. The yearly amounts of total air pollutants emitted from one unit of walking tractors and small, medium, and large riding tractors were estimated to be 7.0 kg, 20.5 kg, 34.6 kg, and 46.3 kg, respectively [12]. Similarly, the tremendous use of these non-road agricultural vehicles in Assam is contributing air pollutants to the atmosphere along with other on road vehicles.

#### **5.4 Conclusion:**

In this 21<sup>st</sup> century, use of modern machinery for paddy cultivation by Assamese farmers is a welcoming step. One can't deny the economic benefits got by the farmers by using these tools. But we should also consider the environmental aspects. Like the cities of Assam; air pollution is also increasing in rural areas. Limiting the negative effects on atmosphere is possible if modern agriculture practises are applied in accordance with the principles of pollution act. The farmers should be trained about the preventive measures of air pollution. The educated youth from rural areas can play an important role in this regard.

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