**INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI**
**SHORT ABSTRACT OF THESIS**

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Thesis Title: Development of Roller Rake Weeder with Special Emphasis on Developing a Novel Mechanism for Intra-Row Weeding

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| Name of Thesis Supervisor(s) | : | Prof. Karuna Kalita |
| Thesis Submitted to the Department/ Center | : | Yes |
| Date of completion of Thesis Viva-Voce Exam | : | 16.06.2025 |
| Key words for description of Thesis Work | : | Mechanization, Intra-row weeder, Wetland-Paddy, Farm power |

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## SHORT ABSTRACT

Hand weeding, despite its effectiveness, poses significant challenges due to its labor-intensive nature and time-consuming process. In contrast, mechanical weed extraction holds the promise of saving both time and money on labor. Recognizing the limitations of current weeders, efforts have been directed towards innovation. One such solution is the development of the 'Roller Rake Weeder,' featuring a fixed rake and a roller with spikes as soil-engaging components. This proposed alternative aims to address the shortcomings of existing weeders and offer a more efficient and practical solution. Testing of the 'Roller Rake Weeder' has revealed promising results, with weeding efficiency ranging from 88.5% to 95.4% and a field capacity between 0.038 and 0.04 ha/h. These figures surpass the performance of manually operated weeders currently in use, signaling the potential for significant improvements in weed control practices.

In addition to the inter-row weeds, intra-row weeds pose significant losses in crop yield. This study also aims to design and develop a mechanism that could eradicate weeds in the inter and intra-row zones in a single pass. To achieve this, critical components of the weeder such as the power source, trapezoidal and lateral plates, cutting blades, rotor shaft, and various support structures were meticulously considered from a design perspective. Finite element analysis (FEA) was employed to assess the structural integrity of these components, utilizing theoretical equations to derive numerical values. Subsequently, a comprehensive 3-Dimensional (3-D) CAD model of the paddy field weeder was developed, incorporating all design elements and structural features. The designed model was then fabricated in the workshop. Lab testing shows that the developed inter cum intra-row weeder works satisfactorily as per the design.