

**Strategic Selection of Best Fit Heavy Equipment for Food Estate Project,
Balancing Efficiency and Cost with Excavators and Farming Dozers**

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



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ABSTRACT

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Indonesia's Food Estate initiative, aimed at enhancing national food security through large-scale agricultural development, has encountered recurring challenges due to inadequate planning, poor equipment selection, and inefficient implementation strategies. This research proposes a strategic framework for selecting the most suitable heavy equipment, specifically excavators and D21 farming dozers to optimize cost efficiency and operational effectiveness in Food Estate projects. By analysing both operational and lifecycle costs, this study aims to determine the best-fit machinery for varying soil conditions and agricultural tasks such as land clearing, soil preparation, and irrigation. Ultimately, this research contributes to improving the effectiveness and sustainability of Food Estate programs in Indonesia. The best model for land clearing application on paddy field is PC135F-10M0 with productivity 0,1 Ha/hr and fuel consumption 11,19L/hr, the mode used is Economy Mode. Levelling application the best unit is D21Pl-8 with productivity 0,66Ha/hr and fuel consumption 4,66L/hr. This study explores the optimization of heavy equipment configuration for land clearing in the agricultural sector. By comparing the existing setup (3 units of PC135F-10M0) with a best-fit configuration (2 units of PC135F-10M0 and 1 unit of D21PL-8), the results show a significant improvement in operational efficiency. The best-fit setup reduced the average cycle time per hectare by approximately 36% and fuel consumption by around 24%.

Keywords: Heavy Equipment, Food Estate Project, Excavator, Farming Dozer, LCCA, Cost Efficiency.

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DEDICATION

I dedicate this work to My Beloved Family, whose unwavering support and prayers have been the foundation of my journey, lately. I also dedicate it to my lecturers and colleagues, whose guidance and collaboration have shaped the path of this research. May this work contribute, in its own small way, to the advancement of engineering practice and the future of Indonesia.



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