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Simulation of Harvesting and Wrapping Forage Rice using a Rice Whole Crop Harvester and a Bale Wrapper

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Abstract

Much attention is being focused on growing rice not for human consumption but for cattle feed as whole-crop silage (WCS) in Japan. Rice WCS is a wholesome cattle feed that meets demands for safe feed from domestic sources. Furthermore, growing rice for WCS in paddy fields helps preserves them and satisfies the rice production adjustment policy.

A self-propelled rice whole crop harvester and a self-propelled bale wrapper are preferred for harvesting and ensiling the crop, because of their higher adaptabilities to wet soil conditions, rather than conventional tractor-mounted forage-harvesting implements. But, on the other hand, work efficiencies of these machines are lower than those of tractor-mounted implements.

A simulation model of these machines working in a field was developed to analyze the total working time, which depends on the harvesting path plan and the allocation of the machines to convey specific bales. In case all bales are to be conveyed to the entrance side of the field, an optimum sharing line of the allocation can be calculated, with bales on the entrance side of the line being conveyed by the bale wrapper and bales on the other side being conveyed by the harvester. In a 1-ha field (125×80m), the optimum sharing line was calculated to be 84m from the entrance side of the field, which improved field capacity by 33% over other working methods. The results can be used to optimize the work allocation between the two machines, increasing work efficiency.

Key words

[Rice whole crop silage](#), [Harvest](#), [Whole crop harvester](#), [Self-propelled bale wrapper](#), [Field capacity](#), [simulation](#)

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