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Photovoltaic Based Automatic Rice Thresher Machine To Help Farmers in Pandemi Covid-19

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***Abstract*—The rice thresher machine is an important part of the rice processing process. Before the harvesting process, the rice fields are drained for 7-10 days before the harvest period by using a sharp sickle to cut the base of the stems, then the harvest is stored in a container or lined place. The low application of cultivation technology can be seen from the large potential gap between production. With the creation of this system, the process of threshing rice from the stalks can be done automatically, so that this system is expected to be able to provide the process of threshing rice from the stalks to be faster, easier, more efficient and safety for workers. data from the presentation of rice thresher slender yields 223.17 S, at pully rpm the average value produced is 32.82 S, with an average voltage of 11 V and an average current of 0.18 A. 9.13 minutes, with initial grain weight of 15 kg with an average threshing yield of 6.6 kg, with a threshing capacity of 42.2 kg / hour. And the current and voltage data on the solar panel and the resulting charging, the highest voltage is 12 V with a current of 1.69 A which occurs at 12.30.**

Keywords— Rice Thresher Machine, Rpm, Voltage, Current, Threshing Capacity.

I. INTRODUCTION

Agriculture is one of the largest industries in the world. United Nations Food and Agricultural Organization (UNFAO) explained that in this sector, they employ approximately 1.3 billion people directly on agricultural land around the world (1). In Indonesia, agriculture is the highest sector in the economic sector, because in Indonesia it has two seasons, namely the dry season and the rainy season. Some of the methods of threshing rice are carried out by farmers, including by beating them using a pedal thresher and using a power trasher (2).

Rice thresher (thresher) machines are an important part of the rice processing process, because the threshing process and the machines used to thresh grain are one of the important factors so that the rice harvest can be obtained by farmers maximally (3). The harvest system affects threshing activities that will be carried out in the harvesting process, starting from cutting rice to threshing grain. There are 3 harvesting mechanisms for rice harvesting systems that have developed in the community, namely the "*ceblokan*" system, the individual or group system and the group system (4).

Before the harvesting process, the rice fields are drained for 7-10 days before the harvest period by using a sharp sickle to cut the base of the stems, then the harvest is stored in a container or lined place. The harvesting process using machine power will save time, with an automatic thresher harvesting can be done for 15 hours for each hectare, while with an automatic thresher harvesting can only be done for 6 hours for 1 hectare of rice fields (5). The low application of cultivation technology can be seen from the large potential gap between the production of research results and the field results obtained by farmers. This is because farmers do not fully understand and master the application of new technology packages so that the application of the technology is less efficient (6).

With this system, the process of threshing rice from the stalks can be done automatically, using a microcontroller (7). So that this system is expected to be able to provide the process of threshing rice

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from the stalks to be faster, easier, more efficient and safer for workers.

II. METHODS

The research methods that will be carried out in the research are described below:

1. **Initial research**
   In the initial study, observations were made to rice farmers during harvest during the current Covid-19 pandemic. It turns out that what happened in the field, many farmers at the time of harvesting rice still did not heed health protocols and there was a crowd to break the chain of the Covid-19 virus which had been confirmed by SATGAS Covid-19.
2. **Problem formulation and research objectives**
   From the initial research, the problem formulation and research objectives were to help farmers to develop the economic potential of farmers during the Covid-19 pandemic. The problem formula in this study is How to design an automatic rice thresher tool and implement it for the development of farmers' economic potential during the Covid-19 pandemic. In preventing the crowd of rice harvest times to break the chain of the Covid-19 virus, the aim of this research is to automatically design an automatic rice thresher tool to develop the economic potential of farmers during the Covid-19 pandemic to break the chain of the Covid-19 virus in preventing the crowd at harvest time, and improve the economic standard of farmers in these difficult times.
3. **Data collection**
   Data collection begins with preparing the electrical components needed in the design of the thresher machine which includes proximity sensors, relays, Dc motors, inverters, solar cells, batteries. However, for the mechanics it requires, angle iron, hollo iron, plate. Data collection focuses on the activities of farmers when harvesting rice so as not to cause crowds, the system is more sophisticated than manual so that it is completed faster and saves costs and time. So that it can increase the economic level of rice farmers.
4. **The design of the automatic rice thresher machine**
   The design stage of an automatic rice thresher machine takes a long time, because the design process is carried out by ordering components, designing, and designing the machine according to the needs of rice farmers at harvest time. As for the design of the tool, it can be seen in Figure 1.

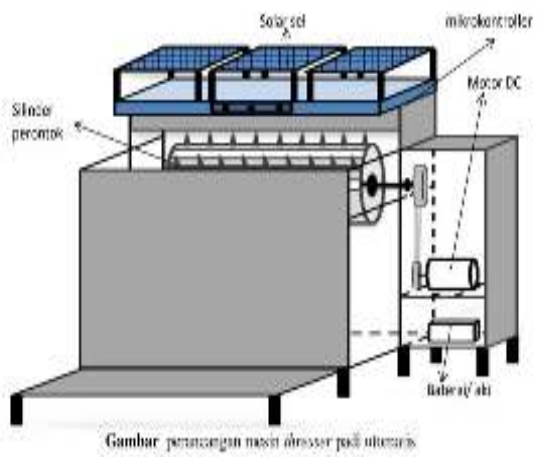

Figure 1. Solar Cell Based Automatic Thresher Machine

5. **Implementation of the design results of the automatic rice thresher machine**
   The implementation of the design results is the process of designing a machine that is assembled from components and materials to be assembled into an automatic rice thresher machine for farmers to use in harvesting rice.

Figure 2. Implementation of Automatic Rice Thresher Machine

6. **Testing of automatic rice thresher machine**
   Testing of the automatic rice thresher machine is carried out after the design process is complete and ready for use. The machine testing is carried out by farmers who are experienced in using thresher so that it can be assessed and corrected so that an evaluation will be carried out.

III. RESULT AND DISCUSSION

A. Serving Data of Rice Tresher Slender (No Load)

The data test for the presentation of the Rice Thresher Slender was carried out to determine the output speed of the DC motor and grain thresher cylinder. This test compares the speed measured on the tachometer and the speed read on the LCD.

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Table 1. Data on the Results of Serving Rice Thresher Slender

No	INITIAL RPL (NO LOAD)			
	DC Motor RPM	RPM Pully	Voltage (V) No burden	Current (A) No Load
1	286	31.9	11	0.18
2	212.4	32.18	11	0,21
3	171.1	34.4	11	0,15
AMOUNT	669.5	98.48	33	0.54
AVERAGE	223.17	32.82	11	0.18

In table 1 data it can be seen that the average rpm of the DC motor produced is 223.17 S, at the rpm pull the average value produced is 32.82 S, with an average voltage of 11 V and an average current of 0.18 A.

B. Rice Threshing Capacity Data

In the trial testing of the rice thresher machine to determine the feasibility of the rice thresher machine in threshing rice and to determine the ability of the machine to thresh rice efficiently. The testing process on this rice thresher machine, the time needed in the trial to thresh rice is 30 minutes. The test is carried out by 1 person as an operator, with the conclusion looking for the average weight value in the trial.

Table 2. Threshing Capacity Result Data

No	Initial Weigh (Kg)	Threshing Time (Minute)	Grain Weight Result of Threshing (Kg)	Threshing Capacity (Kg/Jam)
1	**15**	**,9,2**	**6,7**	**41,2**
2	**15**	**8,8**	**5,9**	**37,8**
3	**15**	**9,4**	**7,2**	**47,5**
AMOUNT	**45**	**27,4**	**19,8**	**126,5**
AVERAGE	**15**	**9.13**	**6,6**	**42,2**

It can be seen in table 1. That the rice threshing process is carried out for an average of 9.13 minutes, with an initial grain weight of 15 kg with an average threshing yield of 6.6 kg, with a threshing capacity of up to 42.2 kg / hour.

C. Current and Voltage Data for Solar Panel and Charging

Data retrieval is done using a multimeter as a measure of the current and voltage stored in the battery. Voltage and current data can be seen in table 3.

Table 3. Current and Voltage Data on Solar Panels and Charging

Hour	Pv Array		Charging the Battery	
	Current (A)	Voltage (V)	Current (A)	Voltage (V)
10.09	1.15	10	0,30	9
10.39	1,08	11	0,28	10
11.10	1.10	11	0.30	11
11.30	1.67	12	0,30	11
12.00	1.65	12	0,28	12
12.30	1.69	12	0,28	12

From table 3. It can be seen that the highest voltage is 12 V with a current of 1.69 A which occurs at 12.30.

CONCLUSIONS

From the results of the testing process carried out on an automatic rice thresher machine, it can be concluded that the data on the results of serving the rice thresher slender is 223.17 S, at pully rpm the average value is 32.82 S, with an average voltage of 11 V and an average current of 0,18 A. With the results of threshing capacity data, the average yield is 9.13 minutes, with an initial grain weight of 15 kg with an average threshing yield of 6.6 kg, with threshing capacity reaching 42.2 kg / hour. And the current and voltage data on the solar panel and the resulting charging, the highest voltage is 12 V with a current of 1.69 A which occurs at 12.30.

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