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Design and Development of Screw Type Granules Organic Fertilizer Composer Elvin Hasmang, Naswir", Irwan Ag Agneldrisrai frigim.vnng Department, Polnanht Per anion Negeri Poyukumhan, Jalan Rani Nowa KM 7 Tanjunp Pail. Kota. 26171, Ingiurnmiu E-mail• eifinhalM0101%110,00.CO hi ABSTRACT 7771s research was conducted 10 develop granular organic fertilizer composer The machine produces organic fertilizer in gramdar form so that can he carried umi applied to the land easier. The machine. was designed to have capability ill prfices.s

organic materials that available around die agricultural area in order to overcome the problem of shortage iif, erfilizer. nix study used junctional and .structural approach. Technical dams of lite machine was 6th8Ox 141) in dimension, the 24 hp engine that attached to the machine has speed 1200 rpm, the transmission was 1: 6 and 188 kg by weight. Performance test showed the following results; Lifective capacity for granulation way 409.94 kg per hour al 198.2

rpm; It produced granular 6 mm in diameter mm and 6-10 mm in length, motor power used was 3.052 Hp which generale muise level 97.4 dB so that operaws can operate the machine fi.ir 3 hours without having a bad influence on them. The results of economic analysis engine got value cow of good= Rp 35,34 / kg: Break Event Point - 4013,067kg per year; BC ratio - 1.414 and NW' - 28,4746 million.

This research is everted could spur the development of organic fertilizer and agricultural mechanize), irAPI industry in West Sumatra and also creating new 'ohs for the community Keywords— Granular organic fertilizer, screw type machine. INTRODUCTION One of the unresolved issues in increasing agricuhural production is the problem of fertilizer.

Availability of non-organic fertilizers at any time at reasonable prices is one determinant kelansungan agricultural production in the country, which in rum means the assurance of food security. Because of the importance of fertilizer for agricultural growth, since the '60s to the present government provides fertilizer subsidies. In fact, subsidized fertilizers diminishing its availability_

Pir The use of organic fertilizer increased along with the rise of organic farming, so there is no other alternative for the farmer but to use organic fertilizers.

This organic fertilizer is very hard work and requires considerable time to produce organic fertilizers to fertilizer is ready to. use if done manually. Preivious research which is conducted by elvin ct all (2015), has managed to create organic fertilizer in powder form. The problem that arises is difficulty bringing a product of fertilizer to be applied to land.

It also poses problems in determining the amount of fertilizer because fertilizer scattered the powder form. To overcome these problems, then try to make granultor machine that will make organic fertilizer powders into granules or granular earlier. In order to process the transportation and stocking of fertilizers so much easier for farmers.

The availability of this engine will ease the work and granular organic fertilizer production costs and does not I) depend on the problem of shortage of labor in agriculture_ Besides., with the fulfillment of the
mired for fertilizer for farmen to increase agricultural production v.o that Indonesia truly self-giallicient in other agricultural commodities.

Another advantage of the availability of these machines can reduce agricultural waste problems around us, can diversify the products, the increase in business, the development of business vialurne and market expansion in the future. Community wealthwill further increase, the increase In local revenues, will open new jobs for the community and reduce unemployment and further schen the function prototype workshop Politani as producer alsintan applied limegirch Objectives This research is expected to produce a granular organic fertilizer production technology aipsopriate to be applied by farmers in the field.

The purpose of this study is to create a granular c fertilizer making machine (granulator) the type of screw that operates continuously to iminets organic fertilizer into organic granular fertilizer. The specific objectives of this study are as follows: 1 Develop a unit maker of granular organic fertilizer. 2 Conduct technical and economic evaluation of the performance of the engine are made.

I Generate granular organic fertilizer that is easily applied by farmers_

So that there are some advantages will be obtained are: Support the accelerated improvement of the economic standard of farmers mainly due to more optimal production, and costs for fertilization can be suppressed. Overcoming the limitations of availability of labor for the production of organic fertilizers and the process will save on production costs.

The production technology and machinery repair easily done dibengkel alsintan usual. Encouraging growth agricultural machine workshop that manufactures took and applied agricultural machinery

RESEARCH METHODS Implementation of this study using multiple methods approach from functional and structural approaches depending on each phase or work.

In this work focused on designing and Milaufacturing screw-type granulator machine to produce a machine that really feasible to paodoce granular organic fertilizer_ Functional and structural approach used for the selection of caotronents and materials so that the right engine gained highly efficient machine for producing stamular organic fertilizer. After that tested the technical and economic performance of the engine and analysis.Granulator machine pmtorype will be designed to have a major component ma the form of screw, which serves as a stirrer and a pressure of raw materials to product release chaonel.

On the outside of the duct outlet. equipped with cutting blades granular out in accordance with the desired length. Machines driven by using the motor size 24 Hp engine to drive a screw, a transmission system and granular cutting blade. Pictures of the preliminary design of the machine can be seen in Figure I

/ _al-ipper and additive material b. Outlet granular e. Screw press. _ _Figure I .

Granulation machine _ _ _ =Mb Machine technical evaluation The technical evaluation will be made to: I identify the characteristics of the machines made tennis. /. Determine the performance ofthe machine in the manufacture of granular. .3. To analyze the economical engine in the form of products; Cost Principal. BC ratio. BEP and eakulated with the interest rate prevailing Bank.

RESULT AND DISCUSSION The limits of the implementation of research activities in ihe field, nuking machinery maker IO gosular organic fertilizer screw type has been successfully implemented, and the machine has
billowing technical specifications; Length 160 cry) - Width cm : 140 ern - Entine : 24 lip RPm 1200 Trapittrnision : I: 6 belt B2 X 64 " C2ght : 188 kg

1, Granular results obtained from this machine is still not uniform.

There is a long granular 4 Engine Noise Level 3, Used Motor Power 1 The results of performance testing on the machines in the Field can pengranularan performance machine with a capacity of organic fertilizers on average amounted to 409.94 kg per hour on average engine rpm 198.2. This result is quite high considering the Tbc results; of the measurement of engine noise levels were measured using a detector noise sound level meter, obtained engine noise levels of 97.4 dB.

Based on the provisions of the The result of the calculation, the motor power is used, the result for the manufacture of granular used power is equal to 3.052 HP. The power available to the motor based on the specification is 24 HP. So the power available at the motor is still large enough to be used pamitted noise level on the operation of the machine, pengranularan with granular machine for granular fertilizer maker. This means that the engine performance can he improved further. accordance with the granular 6 mm made to granular form produced spherical.

For that magnitude of the source of raw materials that can be processed into granular organic expected an improvement in the construction of a cutter to obtain a granular cutting results that came out of the hole outlet with a uniform size of 6 mm. fertilizer in the field. The high capacity of the machine is expected to solve the problem of waste organic materials that exist in the field. still at 10 mm.

While the results of granular expected length of 6 mm diameter hole in (a) (b) 1 (c) ' Figure 2, (a) and (b) Machine performance test. (el Granule production_ Machine Performance Test. '41' ,413K4 r-tit . 0 . JP •

can he operated mechanically for 3 hours without a detrimental effect on the operator. However, after working for 3 hours the operator must rest. S. Economic analysis engine.

The results of economic analysis of the products of organic granular fertilizer machine found that the cost of goods. BC ratio, BEP and product NVP is equal; Cost of Gond = Rp, 35.34 1 kg: BE? = 4011067 kg; B 1 C ratio = 1414; NVP = 28.4746 million These results indicate that the use of granular making machine for the manufacture of organic fertilizer is mechanically suitable to be developed and applied to society for producing granular organic fertilizer.

CONCLUSIONS AND RECOMMENDATIONS From the icsi results and analysis of economic performance of the machine results of this research activity can be included as follows: Granulation engine capacity of 409.94 kg per hour on engine rpm 198,2 trim. Granulation engine specification is; Length; 125 cm; Width: 95 cm; Height: 140 cm: Engine drive: 24 Hp Motor power used is 1052 HP, the noise level was 974 dB The results or the economic analysis of the products obtained results; BP = Rp. 1534 1 kg; BEP 4013.067 kg; Bi C ratio - 1.414; NVP - 28.4746 million e Overall the machine for the production of granular organic fertilizer is feasible to he developed and disseminated to the public.

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