Dissemination Technology Making Machinery Pematang Fields (Cultivator) for The Farmers Ngrapah Village
Suwarno Widodo, Noviana Dini Rahmawati, Yuris Setyoadi, Rumiyatun Istiyaningsih
Universitas PGRI Semarang
suwarno61widodo@yahoo.com

Abstract

Ngrapah is a village in Banyubiru District, Semarang Regency. Ngrapah village is located on the west end bordering Salatiga, which is directly adjacent to Rawa Pening, precisely directly adjacent to the Ambarawa. The distance from the capital city of Semarang Regency is around 10 km. The majority of Ngrapah villages are farmers and their paddy fields have not been used optimally because many are affected by river overflowing. In processing paddy fields and plantations in the village of Ngrapah, they still use conventional tools such as hoes, not yet using tools or machines to make paddy fields so that the results are not maximized. So that it is necessary to introduce ways to manufacture and use rice field machines that follow the demands of today's market. The activity of disseminating technology products to the public aims to improve the welfare of citizens through increasing agricultural products and using technology in rice fields and increasing the value of sales and marketing. Outputs to be generated from this activity include the development of a number of group members, training in the use and maintenance of rice field milling machines, training in the manufacture of rice field machinery products, good financial management training and product sales and marketing training. This activity is planned for 8 months starting from the approval of the submission of funds.

Keywords: Dissemination, Creative Industry, Cultivator

INTRODUCTION

Ngrapah Village is located in Banyubiru District, which is one of the Sub-Districts in Semarang Regency which is directly adjacent to the guava sub-district in the west, in the south with Banyubiru sub-district, in the east with Banyubiru and in the north bordering the Ambarawa sub-district. The land use aspect is also influential for Ngrapah Village. In each hamlet in the village of Ngrapah it has quite extensive fields, consisting of semi-technical irrigated rice fields with an area of 99 ha, rainfed rice fields with an area of 31 ha, and swamps of 40.88 ha (Village Monograph Data, 2016). The influence for Banyubirunya District is that there are some farmers who work in the rice fields of Ngrapah Village. The yields are also varied such as morning and corn, which if harvested will be distributed to the Banyubiru District and Semarang Districts.
In the aspect of tourism, in Setro Hamlet, a Nature Tourism Village will be planned which will become an attraction for the Ngrapah Village towards Banyubiru District.

Based on the Ngrapah Village Statistics data source, the Sleman School of Education in terms of education is known to be children who are kindergarten / equivalent as many as 198 people, graduated elementary school / equivalent as many as 149 people, graduated junior high school / equivalent as many as 970 people, graduated from high school as many as 256 people and universities as much 260 people, this shows that the potential of the human resources of Ngrapah village is quite adequate with many undergraduate educated residents.

Then based on the source of the Ngrapah village statistical data, Semarang University in terms of the economy, it is known that the population who work as farmers / farm laborers are as many as 547 people, 47 industrial workers, 97 laborers, 61 civil servants and 27 farmers 22 people, TNI / POLRI, 22 retirees and 74 entrepreneurs, the economic condition of the population in Ngrapah Banyubiru village is divided into three levels, namely the lower economic group (45%), the middle class (35%), and the upper class (20%). With such conditions the level of economic life of the Ngrapah village community in Banyubiru District can be categorized as a society that tends to be standard but still not so capable. Then the number of residents unemployed or laid off by factories due to the sluggish economic conditions of the factories in 2017 yesterday.

The economic conditions in the village of Ngrapah are developing poorly. One of them is related to not maximizing the natural resources of Ngrapah village which has abundant rice fields and plantations, so it needs to be done by community empowerment related to the abundant creative industry based on abundant natural resources by making rice field milling machines.

The abundant natural resources in the village of Ngrapah have not been maximized by the residents because of the lack of knowledge regarding the method of cultivating opponents of paddy fields to the maximum, so far only using simple tools in processing rice fields, based on a field survey. because it needs to be given a rice husk making machine that is very helpful for the agricultural process of the residents, then in the making of rice field milling machines and maintenance it has been
made at the University of PGRI Semarang so that it can be utilized maximally to help the community.

As long as there are still a few who make rice fields in the village of Ngrapah, because the process of making rice fields is still simple, namely by using manual carpentry tools, it is necessary to need a more renewable tool or machine for making rice fields, with the cultivation of rice fields (Cultivator) as follows:

The birth of Quick Claw Steel is an answer to the need for mechanization of agricultural equipment that is needed to improve agricultural products in Indonesia. Steel Quick Claw has advantages with relatively light weight so that it is easy to handle, especially when moving land. Quick Claw Steel works the soil using a rotating claw knife. The Gear Box design, which is more rigid and cast-made, makes the main axle bearings not easily damaged, and the small turning radius provides easy maneuverability and minimal vibration, making the Steel Quick Claw comfortable when operated. The steering handlebar can be adjusted to suit the user, there is a choice of road clutch by using automatic or non-automatic facilities to facilitate the operator's operation.

Quick Claw Steel is equipped with several Main Blade gear used to process the land. The width and depth of the soil can be adjusted, the forward speed and rotation of the blade are easily regulated and easily controlled so that the soil will be completed in processing. The Main Blade is divided into three types with different land specialization. There are also a number of other tools to maximize the work of Quick Claw Steel.

The main target of the technology product dissemination program to the community is to improve the economy of the community independently and can foster the interest of people who have not joined the farmer and farmer blossoming groups, so that this business group can grow rapidly. With training programs and increased knowledge about the use of appropriate technology, namely the use of rice field milling machines that can increase agricultural production according to the demands of the present.

**IMPLEMENTATION AND METHODS**

The parties involved in this technology dissemination activity are
administrators and members who are coordinated by the Chairperson of the Group "blooming peasants and farm works". This group consists of 20 people, the majority of whom are housewives and teenagers who do not work. And LPPM UPGRIS is a LITBANG institution and a Proponent Team. The methods and stages in applying technology are shown in the following table:

Table 1. Method and Stages

<table>
<thead>
<tr>
<th>No</th>
<th>Kegiatan</th>
<th>Metode</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Identifikasi Kebutuhan Masyarakat</td>
<td>Wawancara dan Observasi</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pemahaman</td>
</tr>
<tr>
<td>2</td>
<td>Penyusun</td>
<td>Diskusi, Drill and practice</td>
</tr>
<tr>
<td>3</td>
<td>Pembuatan</td>
<td>Nostalisis, praktik dan diskusi</td>
</tr>
<tr>
<td>4</td>
<td>Uji Operasi</td>
<td>Pengamalan</td>
</tr>
<tr>
<td>5</td>
<td>Pendampingan Operasional</td>
<td>Diskusi, praktik dan tanya jawab</td>
</tr>
<tr>
<td>6</td>
<td>Diseminasi teknologi tersebut kepada masyarakat/institusi</td>
<td>Diskusi, praktik dan tanya jawab</td>
</tr>
</tbody>
</table>

**RESULTS AND DISCUSSION**

The production process of the component of Pematang Sawah Making Machine is carried out at the Mechanical Engineering Laboratory of the University of PGRI Semarang, the production process is carried out by welding, grinding and painting of the components of the making of rice fields, the sequence of production processes can be seen in the following figure:

Picture 1. The Process of Welding the Rake Frame Component

Picture 2. The Process of Welding Singkal Plow Components

Picture 3. Iron Wheel Component Welding and Grinding Process

Picture 4. Gelebeg Component Grinding Process

Picture 5. The Process of Painting the Pematang Sawah Components
The main parts of the hand tractor are three, namely:

a. Motor drive power
b. Framework and transmission or successor to hand tractor power
c. Control lever

Motor driving power, in hand tractors, the type of driving force that is often used is a diesel motor. In addition to diesel motorcycles, some use gasoline or kerosene or kerosene motors. By using a single cylinder, the power produced is less than 12 hp. In the frame installed a drive motor with four fasteners bolts. The bolt hole on the frame is made elongated so that the position of the motor can be moved back and forth. The aim is to obtain the balance of the tractor and to adjust the size of the vbelt used. The crank is used to turn on the diesel motor, while the gasoline and kerosene motors use starter straps.

Framework and transmission or successor to hand tractor power, the function of the frame is as the seat of the driving motor, transmission, and other tractor parts. The framework functions as the seat of the driving motor, transmission and other tractor parts. The tractor part is associated with a frame using several fastening bolts. Power from the motor in the form of shaft rotation is channeled through the pulley and v-belt to the
main clutch to be forwarded to the gear so that it moves the wheel shaft and PTO shaft. The gear also functions to regulate the speed of rotation of the wheel shaft and PTO shaft. Then, power is supplied to the rotary engine. The main clutch is operated from the main clutch lever. When the lever is pulled to a neutral position, the motor power is not supplied to the gear. As a result the tractor will stop, even though the driving motor condition is turned on.

Next to the main clutch, there are two steering clutches to move the tractor right or left. The hand tractor can also move back and forth at a certain speed because the rotation of the drive motor shaft is channeled to the wheels. There are three types of wheels used in hand tractors, namely: tire wheels, iron wheels, floating wheels or cage wheels. The tire wheel serves to transport and process dry land. Iron wheels are used for piracy on dry land. Floating wheels are used when processing wet soil. Wheel size is adjusted to tractor specifications. The size of the wheel will affect the speed of the tractor.

The control lever is used to control the running of the tractor. The hand tractor has many control levers to simplify work. As a result, the tractor becomes heavier and the price is more expensive. Therefore, many tractors are now produced which are equipped with only a few control levers for a lighter price.

The hand tractor's main gear lever, this lever functions to move the gear arrangement on the gear so that the ratio of the rotating speed of the drive motor shaft and wheel shaft can be adjusted. Complete hand tractors usually have 6 forward speeds and 2 reverse speeds. This speed can be chosen according to the type of work being carried out. One speed for plowing the ground with a rotary engine. Speed two to plow the land with a plow / dish. Three speeds to hijack inundated rice fields. Four speeds to walk on ordinary roads. Five and six speeds for pulling trailers / carts. Back one is used when the operator is running. A two pull back is used when the operator is riding on the trailer / cart.

The gear lever is slow hand tractor, this lever is not always there. If the main gear lever consists of only 3 forward speeds and 1 reverse speed, usually the hand tractor is equipped with a fast gear lever. The function of this gear is to separate work from processing land with transportation work (walking and pulling trailers / carts). With the lever slow, the possibility of choosing the wrong gear position can be reduced. Hand tractor main clutch lever, the main clutch lever functions to operate the main clutch. When the lever is released in the tide or on position, the motor power will be connected to the gear. Conversely, if it is pulled to a neutral or free or off position, the motor power is not channeled to the gear. When
pulled again, the main clutch lever will be connected to the brakes at the main clutch house. Gear lever rotary hand tractor engine, this lever serves as a regulator of PTO shaft rotational speed. If the expected processing results are smooth and loose, then place the position of the rotary gear lever in a fast position and vice versa. Rotary blade rotary speed can also be adjusted from the position of connecting chain installation.

The steering gear lever, the steering gear lever on the hand tractor are two, each on the left and right. This lever is used to operate the steering clutch to the right and left. If the right steering clutch lever is pressed, the rotation of the gear gear is not connected to the right wheel shaft so that the right wheel will stop and the tractor will turn left. Vice versa if the left clutch is pressed. Steering handlebar and helper steering, steering handlebar is used to help turn the tractor. Even though there is a steering clutch lever, but for the turn of the tractor to be sharper, it needs to be assisted by steering handlebar. Steering handlebar is also used to lift implemen during operation. Helper steering is used to place the operator's shoulder. That is to add to the burden of the back of the tractor so that the results of soil processing can be deeper.

Hand tractor gas lever, this lever is connected to the gas lever on the moving motor. This lever is used to change the rotation speed of the drive motor shaft according to the power required. This lever also functions to turn off the tractor motor, if the position is placed in the stop position. Light switches and hand tractor bells, sometimes, tractors are used at night, so lighting is needed. The bell button is needed if the tractor is run on the highway. With this light switch and bell, the tractor motor must be equipped with a coil as a source of electric current. Front support lever, this lever moves the front support. If the lever is pushed it will push the front support down to support the tractor. The hand tractor only has two wheels. If the tractor is stopped, then supporting the tractor is needed.

Some things to consider before turning on the tractor:

a. The tractor is placed in a flat place with good air ventilation.

b. The tractor has been checked and in good condition.

Turn on the hand tractor:

a. The main clutch lever is positioned off or brakes so the tractor does not run when turned on.

b. All gear levers are neutral for safety.
c. Open the fuel faucet so that fuel flows into the combustion chamber.
d. The gas is raised in the starting position so that there is a large amount of fuel (diesel) in the combustion chamber.
e. The decompression lever is pulled with the left hand to remove the pressure in the combustion chamber when the crank is rotated.
f. The crank is inserted into the crankshaft, then turn the crank clockwise several times so the lubricant can flow up lubricating the tractor parts. Usually equipped with indicators to indicate the flow of lubricant.
g. Speed up the crank rotation so that it will generate enough power to turn on the motobike.
h. Remove the decompression lever to produce pressure, while the crank is still rotating until the motor is on.
i. After the motor is on, the crank will detach itself from the crankshaft caused by the slanted shape of the crank hook.
j. Slide the position of the gas lever at idle or stationary position.
k. Turn on the motor without a load of approximately 2-3 minutes so that the lubrication process can run well.
l. The tractor is ready to operate.

Some things to consider when and after turning off the tractor:
a. Gas does not need to be scaled back before it is turned off.
b. Do not rush to turn off the motobike.
c. All levers are neutral

Turning off the hand tractor:
a. Remove the motor load.
b. Reduce the gas to the idle or stationary position so that the engine speed will slow down for 2 minutes.
c. Slide the gas lever in the stop position until the motor turns off because there is no fuel flow to the combustion chamber.
d. Close the fuel faucet.

Picture. 9 Use of Rice Field Making Machine by Farmers

CONCLUSION
Conclusions and Suggestions that we get from the Dissemination of Technology of the Pematang Sawah (Cultivator) Making Machine for the Ngrapah Village Farmers Community as follows:

1. Mechanization of Agriculture a tool used by farmers can more easily process large areas of agriculture and plantations, problems with availability of workers that are less manageable, costs incurred will be lower (high costs only at the time of first purchase of
machinery), quality and quantity of work can be better, the time to complete the land processing project is faster, and the profit from the production is greater.

2. By processing land using this tractor, it is expected that farmers will more easily produce better crops. "So that food needs can be met and even with increasing yields will support government programs on national food security.

Suggestion
To use the Pematang Sawah (Cultivator) Making Machine, it is easy to learn. Because every agricultural and plantation tool always has a socialization from the Dissemination team and the goods company. And always given a manual for using the tool. But what we must always remember is that every time work, make sure to use the Self Protection Equipment installed. Then ask those who are more experienced using the tool. In our Indonesian country there are still few farmers who use conventional tools, so the results obtained are not satisfactory both in terms of quality, quantity, and economy. This happens because of tripping in terms of cost limitations. There are also many farmers who expect assistance from the government to overcome all the shortcomings that exist in Indonesian farmers.

Acknowledgements
A big thank you to KEMENRISTEKDIKTI for providing a useful program for the community so that the Dissemination of Technology for the Pematang Sawah (Cultivator) Making Machine for the Ngrapah Village Farmers Community can be realized.

BIBLIOGRAPHY
Ananda, 2013. Teknologi dan Pengguna Program digital di Era Modern, Rhineka Chipta: Bandung
Tasrifin M., 2011, Modul 4 Manajemen Usaha dan Keuangan UMKM