

THE USE OF DRIP-WATER IRRIGATION SYSTEM AND ITS EFFECTIVENESS IN INCREASING THE PRODUCTIVITY OF THE AGRI-HORTICULTURAL SOCIETY IN DESA HAMPARAN PERAK

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Abstract

Although the developments of technology has been grown rapidly, some farmers in North Sumatra are still trapped in traditional farming methods. The problem of limited funds has always been a classical reason for explaining the stagnancy. Interestingly, the farmer community of Hamparan Perak, North Sumatra, which is a partner of LPM UNIMED, actually has advanced knowledge in the management of horticultural crops. Simple innovation seem to be able to drive farm productivity and efficiency. The general purpose of this community service activity is to implement the drip-water irrigation system at Agro-Horticulture plantation of Hamparan Perak Farmer Community in Hamparan Perak, Deli Serdang, North Sumatera. In particular, this community service aims to: 1) improving the efficiency of agricultural production with the implementation of such technology; and 2) increasing farm productivity with improved irrigation system. This Community Service Activities using technical guidance methods to farmer community. Furthermore, efficiency and productivity are met through minimizing costs and increasing farmer income which observed during technical guidance. Based on ongoing observations, farmers acknowledge that the process of agricultural production becomes very efficient while the performance of the crops becomes more productive.

Keywords: Farmers, Horticulture, Efficiency, Productivity.

1. INTRODUCTION

Desa Hamparan Perak, District of Deli Serdang is one of the villages of agro-horticulture center in Province of North Sumatera which produce various vegetable and fruit plants. Hortus which is a compound word derived from Latin Hortus (garden plant) and Cultura / Colere (Cultivation) is generally defined as cultivation of garden crops (Wikipedia, 2017). Furthermore, as quoted from the same reference horticulture as branch of Agronomy focuses on the cultivation of fruit crops (pomofologi / frutikultura), floriculture plants, vegetable crops (olerikultura), medicinal plants (biopharmaka) and ornamental plants / gardens (landscape). However, the existence of Hamparan Perak is relatively unknown as some villages in Karo Regency which have long been widely known as agro-horticulture centers both nationally and internationally.

Currently, agro-horticultural products are produced by at least two farmer groups, namely farmer group IV and V-group farmers in Hamparan Perak Village. The horticultural activities carried out by the farmers are divided as follows:

- Frutikultura, including: papaya, banana, sweet potato, yams, cassava, and corn.
- Olerikultura including various types of superior vegetables such as: mustard greens, long beans, red spinach, green spinach, basil leaves, cucumber, eggplant, taro, pumpkin, soybean, red pepper, green chili, and cayenne pepper.

The production of agro-horticulture organized by the farmers belonging to the farmer group is an annual cycle that runs from February to July. This condition is due to the availability of land that has been idle post-harvest rice. The pattern of production is based on rainfed lowland system where the absence of irrigation and springs around Hamparan Perak village causes the farmers can only harvest rice 1 (one) time in the planting period for 1 (one) year. Specifically, the rice production pattern carried out by farmers in Desa Hamparan Perak for 6 (six) months consists of 2 (two) stages as follows:

Table 1 Farming Cycle

Stages	Cycles	Periods
1	Rice field	August – January
2	Agro-Hortikultura	February - July

According to Table 1, it can be concluded that the pattern of community activities of Hamparan Perak Village, especially the farmers, both individuals and groups incorporated in the Perak Berjaya Cooperative are grouped into 2 (two) production mechanisms.

Based on the observation results obtained specific problems faced by farmers in the Hamparan Perak, namely: 1) The process of irrigation, using a petrol engine pump engine; 2) The process of watering and maintaining (fertilizing) the plants using watering bucket manual watering (watering bucket); and 3) The process of spraying plants using manual pest spray tool. Various activities observed in peasant activity can be reviewed in Figure 1 below:



Figure 1. Irrigation System Before Community Service Activity

Based on the identification of the core issues described above, community service activities are conducted to improve the Effectiveness and Efficiency of Agriculture and Agro-Horticulture Activities in Hamparan Perak Village that can be observed in Table 2 as follows:

Table 2 Applicative Solutions Associated with Objectives

Objectives	Solutions
1) Improving the efficiency of agricultural production with the implementation of such technology	<ul style="list-style-type: none"> • Installation of modified "Drip Irrigation" according to the dimensions and area of area /garden owned by partners. • Facilitating of the use of Drip Irrigation for sustainable use.
2) Increasing farm productivity with improved irrigation system	<ul style="list-style-type: none"> • Assisting to develop business strategies of farmers and cooperatives to stimulate the continuous development of knowledge and business activities of its members and provision of funds to support institutional operations.

2. COMMUNITY SERVICE ACTIVITY

To achieve the purpose of this activity, it is required the participation of various parties in contact with the activities of Dusun Group 4 and Dusun 5 and Perak Berjaya Cooperative. Besides, the implementation of training and mentoring activities of the implementing team also involves the students as a forum for learning.

Since the initial activity to explore the problems and formulate the activities that will be carried out by the executing team has been involved in the involvement of the Head of Dusun Group 4 and Dusun 5 and Perak Berjaya Cooperative namely Pak Sugeng, Pak Suhendrik, and Pak Helmi. The involvement of the partners is done so that the activities undertaken are in accordance with the needs of the partners, while the contribution of the implementing team to ensure

that the activities are carried out in accordance with the LPM Unimed agenda and the innovation needs of the agricultural aspects. Discussions and FGDs conducted with partners have succeeded in producing the formulation of activities as described in the previous section.

Furthermore, on the implementation of the activity, the implementing team involves 1) the Chairman and the Dusun Group 4 and Dusun 5 and the Perak Berjaya Cooperative as participants, 2) the hamlet head as the community leader, and 3) The student as the support team. Members of farmer groups and cooperative managers are the main participants in this activity. Participants are expected to internalize the knowledge transferred during this activity. Such knowledge is expected to improve the efficiency and productivity of agricultural activities so as to reduce the cost of effort to increase farmers' income. Meanwhile, the involvement of community and community elements is done to gain understanding and synergy between stakeholder objectives and farmers operating in the stakeholder environment. Furthermore, the involvement of students is considered necessary as a learning for students and add the repertoire of knowledge they have.

In general, Partners in this program play a role to 1) provide information on the problems faced by partners; 2) Provide feedback and feedback on the solutions offered; 3) Provide a place of implementation of the agreed program; and 4) Assist providing raw materials. Meanwhile, specifically on the implementation of the training and consultancy activities of partners act as participants required to 1) participate actively in the training; 2) Discussion and FAQ about business activities that are being held; 3) Participate in internal and external monitoring and evaluation activities; and 4) Conducting business activities and participating in cooperatives on an ongoing basis and maintain the technology that have been transferred to participants.

3. METHOD

The community service is conducted to improve the effectiveness of this farming through revitalization of governance, human resources, and irrigation management in farmer group of Perak Berjaya Cooperative members beginning with field orientation, followed by problem identification, literature study, and operational activities. Furthermore, the issue of revitalization of governance and human resources above is focused on business efficiency and productivity. Efficiency is operationalized with the implementation of technology in the form of Backpack Sprayer and Drip Water Irrigation System. Implementation of the technology will reduce the use of human energy (cost of effort) and reduction of processing time because the energy is transferred to the technology which used. On the one hand this activity will also increase the productivity of farming, because unused man power can be used for other productive activities .

Tabel 3. The Summary of Community Service Activity

No.	Activities	Methods	Outcome	Partners Participation	Date
1.	Observation to identify the initial situation	Conduct field observations and interviews with partners	Partner profile, problem identification, preliminary documentation	Prepare the data for in-depth interview and meeting room	May, 24 th 2017
2.	Solution Formulation	Internal FGDs between the proposing team; and subsequently offered to partners.	The agreed solution	Partners provide feedback on the solutions offered, cooperate, and reach agreement with the proposer team.	May, 31 st 2017
3.	Providing theoretical training and technical simulation of the business strategy of agriculture and cooperatives	Participatory, focus group discussion and Consultancy	Efficiency and business productivity; Judging from the reduction of work time and income increase	<ul style="list-style-type: none"> • Provide training space • Take part and play an active role during the event 	July, 6 th -7 th 2017
4.	Procurement and Installation of Appropriate Technology for Water Resources Management effectiveness.	Handing over, installation, trials and demonstrations	Application of Drip Irrigation for irrigation management in the corp.	Signing an instrument submission report	8 th -9 th , July 2017

Field orientation and problem identification are ways to better recognize the problems faced by members of the Perak Berjaya Cooperative, so as to identify the appropriate problem-solving alternatives. The next activity is to formulate solutions to problems experienced by business actors based on literature studies and adaptation approaches that are considered appropriate to the state of partners. Last is the implementation of agreed solutions between the proposing team and partners. The solution is training and mentoring of financial governance, human resource governance, and management of garden irrigation. In addition, this devotional activity also facilitates partners for the provision of appropriate technology to assist the management of irrigation and also facilitate installation in partner farms. Most of the activities are conducted with correspondence and consultation with communication media. Meanwhile, formal activities and direct interaction remains the main agenda in this devotional activity. Various face-to-face activities and training executions were held in May and July. Schematically, the implementing team describes the implementation and implementation of activities that have taken place in Table 3.

4. IMPACT OF ACTIVITIES

This activity has resulted in several outcomes in accordance with the details of the implementation of the activities in Table 2.1 above plus the outcomes that are billed on this community service grant. The description of the outcomes can be reviewed as follows:

1. Application of Drip Irrigation: This technology has been installed in the farmer's group farm 4 and 5 and has been used for garden operations.
2. Backpack Sprayer Application: This technology has been delivered as much as two pieces, 1 unit as an asset of farmer group and 1 unit as a cooperative asset.
3. Production Efficiency: The above technology is used for farmer production activities. From interviews after the use of both tools by 4 and 5 dusun farmers, the members of the farmer group felt the process of gardening spraying and pest spraying took 2-3 hours from the usual 5-6 hours. Meanwhile, irrigation drip irrigation can be controlled from one point, farmers do not need to go around the garden to irrigate crops. Therefore, farmers feel that this technology application makes farmers' work very efficient.
4. Productivity: Handover Backpack Sprayer to cooperatives intended for cooperatives have productive assets. The assets are used as rental products that can be rented by farmers for the operational needs of the garden. Revenue from equipment leasing is still used for machine maintenance and business development in Hamparan Perak. From the internal evaluation conducted by the implementing team through interviews and observation. It appears that the business activity is beginning to work and the cooperative starts to have income through the activity.



Figure 2. Irrigation System After Community Service Activity

5. CONCLUSION

From the activities undertaken by the community service implementation team of Dusun 4 Farmer Group, Dusun 5 Farmer Group, and Perak Berjaya Cooperative, highly strategic aspects that can be improved is the efficiency of production through the implementation of appropriate technology. Besides, the awareness of farmer groups to start a cooperative can support the growth of farmers economic power. Unfortunately the readiness of management knowledge about good cooperative management is still very limited. Especially in terms of how to maximize the management of capital goods into economic resources. Besides, cooperatives also have limitations in administrative activities, recording, and management of human resources. However, with the initiative of the farmer group the problem can be slowly overcome if there is a goal congruence amongst fellow management and with a companion (Community Service Implementation Team) to produce follow-up targeting the more crucial aspects of cooperative governance. So from these findings then:

1. The proposing team will direct the proposed grant of dedication to the Community Partnership Program scheme. Because the program provides opportunities for the implementation of activities more freely from the perspective of the budget and of course it will support the achievement of a more concrete objectives.
2. In the subsequent service activities, it is necessary to provide assistance on the implementation of technology that supports the implementation of technology that have been installed. One of them is the development of a water bank that can be used by farmers in general, considering the main problem of 4 and 5 hamlet farmer groups in the Hamparan Perak is the limited availability of water.
3. Furthermore, to increase the productivity of cooperatives in collecting funds, it is necessary to internalize the management of cooperative management which is focused on cash flow management, human resources management, and capital goods management. These three aspects are seen as a key aspect to be able to determine what strategies cooperatives can undertake to realize the capital goods or knowledge they have. Proper strategic decision making from cooperatives can not only improve the welfare of the cooperative and its members but also can improve the welfare of society through the emergence of new entrepreneurs through ideas emerging from the cooperative and then offered to the public. These circumstances will enhance the strategic position of the cooperative in building the people's economy.

6. RECOMMENDATION

The agricultural sector is a major and historic sector that has long contributed to Indonesia's economic growth, Indonesia has long been known as an agrarian country and should have attracted the attention of scientists, practitioners, academics, and bureaucrats to be given serious attention and be seriously developed again . On the other side of the cooperative, derived from the word cooperation, as proclaimed Moh. Hatta, seeks to unite the power of society and is well organized for entrepreneurship so as to enhance the economic growth of its members and in turn can prosper society. From concepts and outcomes that have been done then the proposing team recommends:

1. Farmers should be able to absorb technology not only to improve the efficiency and effectiveness of production, but also to be able to control risk and maximize farm produce.
2. Farmers should be able to absorb various development of knowledge both in the management of corps and in the organizations. Because the organization is potential to be a forum for knowledge sharing and knowledge creating.
3. Stakeholders (Scientists, Academics, Practitioners, Government) should be able to support the farmers to implementing every innovation from later research. Furthermore, the participation should be able to increasing farmer welfare.

