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Community Empowerment through Humic Acid Training in Sukodono Sidoarjo District

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ABSTRACT

Sukodono District, Sidoarjo, experienced soil degradation due to the excessive use of chemical fertilizers without the accompaniment of organic fertilizers. As a solution, a training on making humic acid made from water hyacinth was carried out in Plumbungan Village on May 14-23, 2025. This activity aims to improve farmers' knowledge and skills in processing local organic matter into environmentally friendly liquid fertilizer. The training included socialization, leaflet distribution, and direct practice of fermenting water hyacinth with additional rice washing water, brown sugar, and MOL. The results of the activity show an increase in farmers' understanding and enthusiasm for the use of plant waste as organic fertilizer. Humic acid is considered to be able to improve soil structure and increase agricultural yields. This program is the first step to encourage sustainable agriculture and make farmers more independent in using local resources productively.

Contribution to Sustainable Development Goals (SDGs):

SDG 2: Zero Hunger

SDG 12: Responsible Consumption & Production

SDG 13: Climate Action

SDG 15: Life on Land

1. INTRODUCTION

Sukodono District is one of the areas in Sidoarjo Regency where the majority of the population works as farmers, especially in the cultivation of crops on rice fields. The success of cultivation depends heavily on soil fertility, as the soil structure conditions affect the growth and yield of the crop. Soil fertility is important because agricultural land is the source of livelihood for the community as well as the primary medium for farming. However, land use that has not paid attention to soil conditions is often an obstacle to increasing productivity. One of the efforts to improve soil quality is the use of humic acid, which is an organic

compound that can improve soil structure, increase cation exchange capacity, and stimulate plant root growth. This step is important to manage land more sustainably and productively, as fertile soil greatly determines the success of agriculture [6].

Agricultural land in Sukodono District is experiencing worrying degradation, characterised by a decrease in the content of organic matter due to the continuous use of chemical fertilisers without being balanced with the provision of organic fertilisers. This condition is exacerbated by intensive tillage practices, which cause soil structures to deteriorate, water absorption to decrease, and the activity of soil microorganisms to be disrupted. As a result, the soil becomes less fertile, not optimal in supporting plant growth, and increasingly unresponsive to fertilization.



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These challenges threaten the sustainability of agricultural production and demand fundamental improvements in land management so that soil quality can be restored and maintained.

One of the strategic efforts that BPP Sukodono can undertake to increase plant productivity is training in the production of humic acid from water hyacinth. This training is important because humic acid has been proven to improve the physical, chemical, and biological properties of the soil, thereby increasing soil fertility in a sustainable manner. According to Mindari [4], humic acid is an alternative organic material that is effective in small quantities but has a large impact, making it suitable for application on large-scale land without being constrained by the cost and availability of conventional organic fertilizers. In addition, water hyacinth (*Eichhornia crassipes*) is known to have beneficial nutrient content in supporting plant growth [1], so its use as a raw material for humic acid is an economical and environmentally friendly solution.

The purpose of community empowerment activities through training in making humic acid in Plumbungan Village, Sidoarjo, is to increase the knowledge and skills of farmers in processing local organic matter into quality liquid fertiliser. Humic acid, which is part of humic substances and the main constituent of humus, can stimulate biological and physiological processes in the soil so that it functions as an excellent soil improver [5]. With this training, farmers are expected to understand the importance of using organic fertilisers to maintain the availability of nutrients in the soil in a sustainable manner, as well as support more efficient, productive, and environmentally friendly agricultural practices.

2. RESEARCH METHODS

Community empowerment through Humic Acid Training was carried out in Plumbungan Village, Sukodono District, Sidoarjo Regency. This activity took place from May 14, 2025 – May 23, 2025. The counseling participants were farmers from GAPOKTAN Sukodono District. The Community Empowerment Method through Humic Acid Training is carried out through several stages, namely as follows:

2.1. Planning Stage

Initial preparations were made through observation and dialogue with farmer groups to identify the problems that exist in the rice fields. All group members play an active role in gathering opinions, suggestions, and issues that they want to solve together. The results of this identification highlight the need for training in humic acid manufacturing, which is further a major concern in the empowerment program.

2.2. The Implementation

Stage of this activity will be held precisely on Tuesday, May 20, 2025. The implementation of this activity is carried out in a non-physical and physical way [3]. Non-physically, it is carried out through counselling, which includes providing leaflet media and delivering materials. Physically, assistance was carried out in the field on how to make humic acid using water hyacinth plants.

2.3. 3. Evaluation

The assessment stage will be carried out after the implementation day, which is between May 21 and 23, 2025. This assessment process includes hands-on observation during the event, as well as interactive discussions. The results of this assessment will be the basis for improving extension methods and materials in the future, so that the program can continue to grow and provide wider benefits to farmers and support sustainable agriculture.

3. RESULTS AND DISCUSSION

Humic Acid is a complex organic compound resulting from the decomposition of organic matter, especially from plant residues. Humic acid is a major component in the structure of humus that has an important role in improving the physical properties of the soil, such as improving soil fertility and water storage ability. In addition, humic acid also functions as a mediator in the process of nutrient absorption by plants and supports the activity of soil microorganisms that contribute to overall soil fertility. In community empowerment activities in Sukodono District, training in making humic acid is carried out simply by utilising local organic materials, namely water hyacinths.

3.1. Production of Humic Acid Fertilizer

The process of making humic acid in extension activities in Plumbungan Village is carried out through a simple method, using water hyacinth plants. The use of water hyacinth plants as the primary raw material in the manufacture of humic acid is based on the abundance of water hyacinth plants in Sukodono District. The production of humic acid is carried out by fermenting water hyacinth with several natural additives that play a role in supporting the activity of microorganisms and accelerating the decomposition process.

The ingredients used in the manufacture of humic acid are

1. Eceng Troubles 3 kg
2. 3 liters of rice washing water
3. Brown sugar 200 grams
4. MOL 1/2 liter

The process of making humic acid is carried out through the following stages:

1. The hyacinth is cleaned first, then cut into small pieces and mashed until smooth,



Figure 1. Hyacinth cut into small pieces and mashed

2. Mix MOL, brown sugar, and rice washing water into a bucket,



Figure 2. Mixing MOL, brown sugar, and rice washing water

3. Put the water hyacinth into a bucket containing a mixture of active ingredients (MOL, brown sugar, and rice washing water)



Figure 3. Water hyacinth mixed with active ingredients (MOL, brown sugar, and rice washing water)

4. Water hyacinth that has been mixed with the active ingredients (MOL, brown sugar, and rice washing water), then put in a sealed container



Figure 4. Water hyacinth is put in a container

4. Once all the ingredients are mixed, the mixture is ready to ferment for 4 weeks.



Figure 5. Humic acid is ready for fermentation

3.2. Extension Process to Farmer Groups

The extension activity began by observing agricultural land in Sukodono District, where it was found that many areas experienced an alarming decline in quality during this observation. This can be seen from the reduced level of organic matter due to the continuous use of chemical fertilizers without the application of organic fertilizers. In addition, farmers also submitted complaints regarding their crop yields declining.

Counseling activities for the production of Humic Acid were held as a solution to agricultural problems faced by farmers, especially related to the condition of rice fields. This counseling was carried out in one of the villages in Sukodono sub-district, namely in Plumbungan Village, in response to farmers' reports and complaints submitted to the extension team from the Sukodono Agricultural Extension Center (BPP), related to dry soil conditions and declining crop yields. Humic acid was chosen as an extension material because it offers significant benefits and can improve soil structure that has been degraded due to the continuous use of chemical fertilisers.

Community empowerment programs involving socialisation, training, and support in the production of humic acid have received a very positive response. Farmers are showing interest in using plants that are usually considered weeds to be useful products for agriculture. As a first step, socialization was held to provide an initial understanding of the importance of humic acid in improving soil quality and agricultural yields.

This counselling activity is designed to determine the schedule for training in humic acid production, adjusted to the community's wishes and availability. From this initial activity, several problems faced by the community in Sukodono District were identified, namely:

- a. The community has not fully grasped the benefits of humic acid in enhancing soil structure and improving fertilizer efficiency.
- b. Low level of knowledge related to the process of making humic acid using local ingredients such as water hyacinth.
- c. Lack of skills in utilizing the potential of weeds and agricultural waste as raw materials for the manufacture of humic acid that is more environmentally friendly and economical.

Community empowerment is one of the methods carried out to increase community capacity for the sake of achieving

community progress. This empowerment activity through counseling is a strategic step to improve the knowledge and skills of farmers, especially in processing water hyacinth waste into value-added products, namely humic acid. The activity began with the distribution of leaflets as an information medium containing important explanations about innovative technology for processing water hyacinths. The initial distribution of leaflets aims to introduce and open farmers' insights to the topics to be discussed in the extension.

Furthermore, the material was delivered interactively using simple and communicative methods, adjusted to the level of community understanding. The material presented included the definition of humic acid, its benefits in increasing soil fertility, its role as a liquid organic fertilizer, and how to apply it on agricultural land. During this session, farmers were given space to discuss and ask questions, especially those related to the effectiveness and application of humic acid in the field. This active interaction creates a participatory learning atmosphere and supports deeper understanding.

Following the presentation of the material, the activity proceeded with a direct demonstration of humic acid production using readily available natural ingredients from the surrounding environment, including water hyacinth, rice washing water, brown sugar, and MOL (local microorganisms). The demonstration is designed to provide participants with hands-on experience, so they can independently apply the technology on their land.

In this practical session, participants were directly involved in every stage of the process, starting from the enumeration of water hyacinths, mixing ingredients, to the fermentation process. The hands-on approach has proven to be effective in improving farmers' technical understanding, as they not only listen to the theory but also actively participate in the process of making humic acid.

The Community Empowerment Program, which includes Humic Acid Training in Sukodono District, Sidoarjo, has been well implemented and received a positive response from farmers. This activity is a strategic step in supporting the use of local plants, especially water hyacinths which have been considered as weeds, to be processed into something of useful value. This training not only encourages the creation of sustainable agricultural solutions but also increases the economic value of the surrounding environment's potential. More than that, this program is part of efforts to empower farmers to be more independent in managing local resources. Through this counseling, it is hoped that farmers will not only be beneficiaries but also able to become agents of change in their communities.

4. CONCLUSION

Empowerment activities through counseling on humic acid production in Plumbungan Village, Sukodono District, have a positive impact on improving farmers' knowledge and skills in managing local organic waste, especially water hyacinth. Through a participatory approach and simple methods, farmers not only understand the theory of the benefits of humic acid for soil fertility, but are also able to put the manufacturing process into practice directly. This program has succeeded in changing the public's perception of water hyacinths, which have been considered a weed, into a resource that has practical and economic value. The success of this training is expected to encourage farmers' independence in producing liquid organic fertilizers and support sustainable agricultural practices based on local potential.

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