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Learning from Community Practices: Social Capital of Farming Communities in Supporting Sustainable Agriculture

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Abstract

The use of chemical production facilities in farming, both food crops and horticultural crops, has an impact on agricultural land and human health, as well as causes damage to the environment, soil, water, air and living creatures. To achieve success in sustainable development, this is done by identifying social capital and developing farmer capacity. The research objectives are to identify sustainable agricultural practices carried out by farmers, identify community social capital in supporting sustainable agriculture. The research area was determined purposively in Pontang Village, Jember district. Determination of the research sample was carried out by simple random sampling on rice farmers. The research sample consisted of 106 respondents (margin of error of 10%). The data used in this research are primary and secondary data obtained from interviews, observations and document studies. Data analysis was carried out descriptively using scoring and categorization. Some sustainable agricultural practices carried out by communities in the research area are: organic agriculture, crop rotation and polyculture, soil management and agroforestry. Extension workers also conduct Field Schools (FS) for farmers. Farmers are given the knowledge and skills to utilize agricultural waste around them to make organic fertilizer. Extension workers also teach farmers in making PGPR, Beauveria bassiana, Pseudomonas fluorescens (Pf), Trichoderma, and planting refugia in rice fields. The social capital of the farming community in supporting sustainable agriculture is in the moderate category, as well as the supporting dimensions such as the social, norm and network dimension are also in the moderate category.

Introduction

The agricultural sector has an important role in Indonesia's national development. Various ways to increase agricultural productivity to achieve farmer welfare have been implemented, one of which is through the green revolution. The green revolution as the origin of advances in agricultural technology aims to increase agricultural production to meet human needs as one of the impacts of the development of the industrial revolution which is the cause of the reduction in agricultural land because it becomes industrial land (Abdullah, 2013) The technology developed is the use of superior seeds, chemical fertilizers, synthetic pesticides, and a good irrigation system (Anggita, 2013). The use of synthetic pesticides to suppress the population of plant pests (OPT) and the impacts they cause are detrimental to farmers, although the use of these pesticides continues to increase to this day (Anggreany & Rohaeni, 2020).

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Furthermore, Anggita (2013) stated that farmers have become dependent on the use of chemical fertilizers and synthetic pesticides. Fauzi (2019), the increasing and unwise use of chemical fertilizers and pesticides causes environmental damage to soil, water, air and living creatures. Similar things were expressed by Fendji et al. (2021) & Anggita (2013) people are less aware of the importance of preserving agricultural land resources which support the life of the Indonesian people. Rice fields are considered to remain fertile, productive and sustainable throughout the lifetime without requiring maintenance.

Agriculture is an activity full of risks which is characterized by various obstacles in the form of biophysical, economic and social constraints (Fukuyama, 2005). The role of the agricultural sector in national development is aimed at management that refers to sustainable development. Sustainable development is development to meet the needs of today's society and can also be maintained to meet the needs of future generations (Hadiwijoyo & Anisa, 2019). Characteristics of sustainable agriculture include applying ecological principles, reducing the use of chemical fertilizers and providing organic fertilizers, using organic pesticides and integrated pest control (Muharram, 2020; Lisa Navitasari & Latarus Fangohoi, 2020).

Sustainable agriculture uses soil and water conservation practices with an emphasis on crop rotation that conserves productive resources by using local inputs and organic methods for plant nutrition (Rachmanwatie, 2020). Sustainable agriculture is an option to maintain a quality life. Four things encourage the implementation of sustainable agriculture, namely changes in farmer attitudes, demand for organic agricultural products, linkages between farmers and consumers and policy changes (Rinardi et al., 2019). The success of farming activities must be strengthened by developing farmer capacity through strengthening community social capital so that it is sustainable (Fukuyama, 2005).

Social capital is the informal norms or values shared by a community group that can support cooperation between individuals. As a means of maintaining identity and increasing productivity, honest acts are used by a variety of different social groups (Rizkiyana & Setiawan, 2019), consists of various elements within a social group, including norms, networks, and beliefs (Tambunan et al., 2018). Social capital also makes a positive and productive contribution to improving the quality of farmers' work (Untung, 2001).

Social capital becomes a force in society as a unifier of communities, a link between communities as well as connections and access. Elements in social capital that provide benefits that can be accessed by the communities within it. These elements also certainly do not conflict universally because they have their own standards that apply according to the culture in a region. Social capital is a form of community support amidst obstacles that reduce social relations within community groups. Social capital needs to maintain its role in society, especially in supporting sustainable agricultural practices.

Social capital can be used by farmers to carry out agricultural activities while still paying attention to agricultural sustainability. Farmers can protect the environment by applying sustainable agricultural principles with a high sense of trust, strong network bond and norms that are still well maintained. Based on this reason, researchers are interested in reviewing and analysing community social capital in sustainable agricultural practices. The aim is to find out how social capital is applied by the community in Pontang village to support agricultural sustainability.

Methods

The research area was determined deliberately or purposively in Pontang village, Ambulu District, Jember Regency, Indonesia. The research sample was determined using simple

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random sampling, based on farmer groups in Pontang Village.The research sample consisted of 106 respondents (margin of error of 10%). The data used in this research are primary and secondary data obtained from interviews, observations and document studies. Data analysis was carried out descriptively using scoring and categorized into high, moderate and low.

Results and Discussion

Sustainable Agriculture Implementation Practices

Sustainable agriculture is resource management maintaining or improving environmental quality and conserving natural resources. Sustainable agriculture depends on returning nutrients to the soil by minimizing the use of non-renewable natural resources such as natural gas (which is used as a raw material for fertilizer) and minerals (such as phosphate). The most important factors in utilizing natural resources on land are soil, sunlight, air and water. Sustainable agriculture is the implementation of the concept of sustainable development in the agricultural sector. Sustainable agriculture is suitable to be implemented to support today's modern agricultural systems. Some sustainable agricultural practices carried out by communities in the research area are:

Organic Agriculture

Organic farming is an agricultural method that only uses natural pest control and biological fertilizers used in farming, without using chemicals or pesticides. This method optimizes energy and nutrient cycles in agricultural ecosystems. Fertilization increases organic carbon in the soil, which causes the release of large amounts of CO2 into the atmosphere. Organic farming practices will help farmers to reduce nitrous oxide and methane emissions from the soil. Therefore, the use of organic materials has a positive impact on the water, surrounding wildlife, soil, atmosphere, and farmer's health in the long term.

Crop Rotation and Polyculture

Crop rotation is an agricultural strategy that involves cultivating different types of crops on the same land in consecutive seasons. By applying this method, diseases that attack plants and vegetables can be reduced. In addition, the use of crop rotation and polyculture methods can reduce the number of pesticides and chemical fertilizers needed to be environmentally friendly.

Soil Management

Tillage is a process of mechanical agitation of the soil to prepare it for crop production. Farmers can optimize land processing operations to reduce GHG (greenhouse gas) emissions. This method is done by turning, digging and stirring the soil. Reducing tillage will lead to reduced consumption of fossil fuels. Therefore, this method can reduce GHG (greenhouse gas) emissions in the long term.

Agroforestry

Sustainable agricultural practices are using agroforestry techniques. Basically, agroforestry is growing woody perennials on the same land used for agriculture. Farmers in Pontang village have implemented sustainable agricultural practices using organic materials in their farming activities. Sustainable agricultural practices have been implemented in one years of planting season for both food crops and secondary crops. Extension workers also conduct Field Schools (FS) for farmers. During these field school activities, farmers are given the knowledge and skills to utilize agricultural waste around them to make organic fertilizer. For example, corn cobs are used as organic fertilizer, as well as livestock manure (cows and goats) is used as solid organic fertilizer and liquid organic fertilizer (derived from livestock urine).

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Apart from that, in field school activities, extension workers also teach farmers in making PGPR, Beauveria bassiana, Pseudomonas fluorescens (Pf), Trichoderma, and planting Refugia in rice fields; (1) Plant Growth Promoting Rhizobacteria (PGPR). PGPR is a bacteria that lives by colonizing around plant roots. The function of PGPR is to stimulate plant root growth, as fertilizer, and to control pests and diseases in plants; (2) Beauveria bassiana. Beauveria bassiana is a fungus that benefits cultivated plants. Beauveria bassiana functions to control pest attacks from types of insects such as palm grasshoppers, caterpillars, planthoppers and grasshoppers; (3) Pseudomonas fluorescens (Pf). Pseudomonas fluorescens (Pf) is an antagonistic bacterium that can control pathogenic fungi that cause disease in plants. The benefit of Pf bacteria is that it can control wilt diseases such as bacterial wilt on chili plants and fusarium wilt on tomato and eggplants; (4) Trichoderma. Trichoderma is a fungus that functions to kill other fungi that are detrimental to plants. The benefits of Trichoderma are to control disease attacks such as root rot and blast; (5) Refugia planting. Refugia is a plant with strikingly colored flowers so that it can attract the attention of pests away from the main cultivated crops such as rice and corn. Refugia functions as a micro-habitat/place for natural enemies, so that natural enemies can control pest attacks and refugia plants can also be a source of food for natural enemies.

If farmers are unable to process PGPR, Beauveria bassiana, Pseudomonas fluorescens (Pf), Trichoderma to be applied to their farming because the farmers are busy with their farming activities, these organic ingredients are already available at BPP Ambulu, farmers can buy them at the BPP office at low prices. By using organic ingredients and avoiding chemicals to be applied to farming, both food crop farming and horticultural crops, it means that farmers have carried out sustainable agricultural practices. In this way, sustainable agricultural practices can be carried out by farmers by utilizing the natural resources around them.

Social Capital

Social capital is believed to be one of the main components in driving togetherness, mobility of ideas, mutual trust and mutual benefit to achieve mutual progress. The theory of social capital is mainly rooted in the ideas of trust, norms and informal networks(Claridge, 2020).

Based on the results of data analysis, social capital in the community is in the moderate category (figure 1), as much as 57.55% stated that farmers support government's programs by starting to reduce the use of chemical fertilizers, and using organic fertilizers to improve the condition of land which is currently increasingly damaged. due to the continuous use of chemical fertilizers and has been going on for more than 42 years.

The results of data analysis regarding sustainable agricultural practices are in the medium category, this is because farmers have only used organic materials in the last 1 year. This can be interpreted that Pontang village farmers have sufficient social capital to implement and support sustainable agricultural practices. As stated in Auer et al. (2020) theory, social capital is the features of social life, networks, norms and beliefs that enable participants to act together more effectively to pursue common goals.

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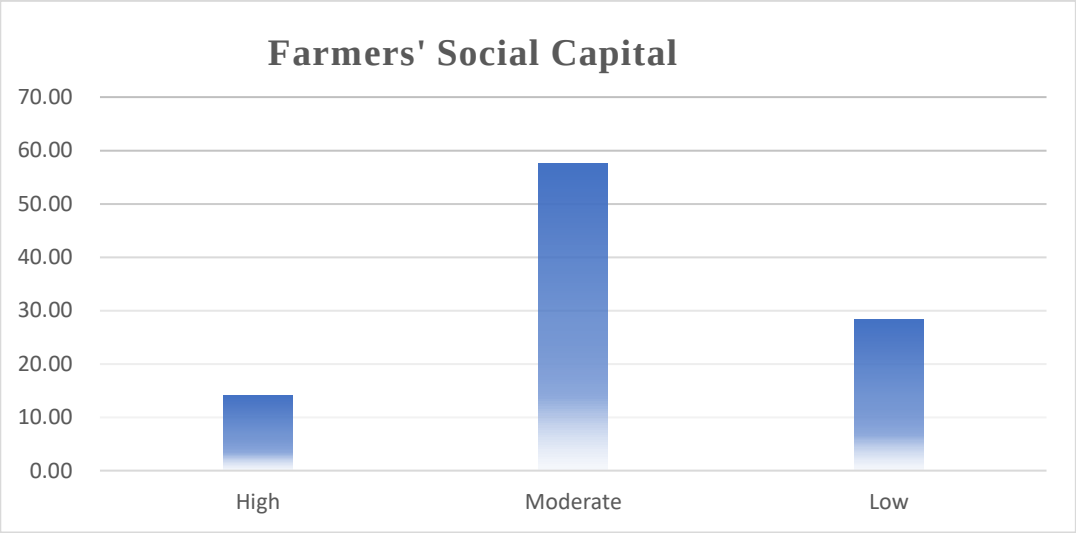

Figure 1. Farmers' Social Capital in Supporting Sustainable Agriculture in Pontang Village, Ambulu District

Social capital is formed based on 3 dimensions, namely the social dimension, the norm dimension and the network dimension. Farmers' social capital in implementing sustainable agriculture is in the moderate category, as presented in the following figure:

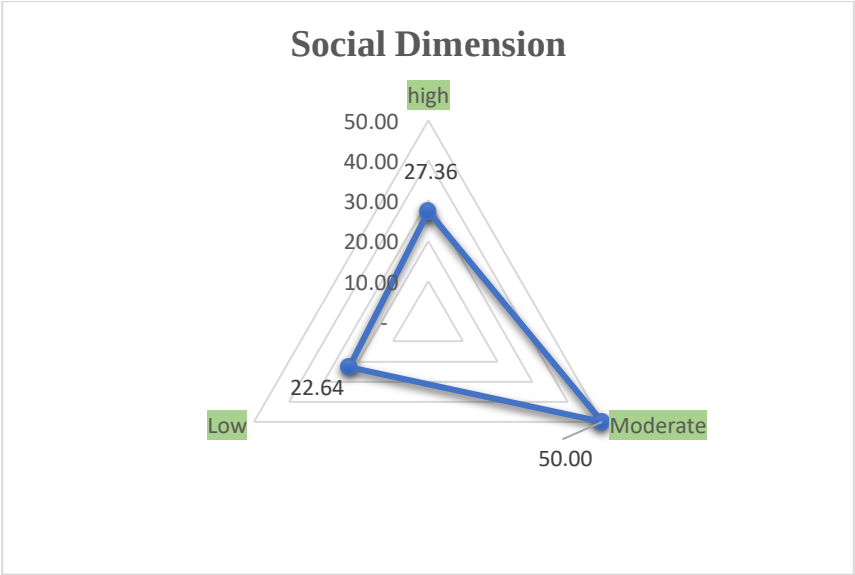

Figure 2. Social Dimensions of Farmers in Supporting Sustainable Agriculture

Based on the results of data analysis, the social dimension is in the medium category, namely 50% of respondents answered that they carry out sustainable agricultural activities by applying organic fertilizer to their farming land. All farmers have fertilized using organic fertilizer obtained from producing it themselves with group members or buying it at agricultural shops. Even though implementing sustainable agriculture does not involve purely organic farming, farmers are starting to reduce the use of chemical fertilizers in their farming activities.

One of the reasons why farmers are starting to reduce the use of chemical fertilizers to organic fertilizers is because of government policy which reduces fertilizer subsidies given to farmers. If previously farmers received subsidies for urea, NPK and SP 36 fertilizers, when this research

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was conducted, subsidies for urea and NPK fertilizers were reduced by the government while there were no subsidies for SP 36 fertilizers.

The social dimension is a form of concern between individuals or groups in supporting sustainable agriculture. This happens because there is the same feeling to improve and protect the environment, especially in agricultural management, both food crops (pajale : paddy, cord and soybean) and horticulture, so that the land used is healthy again and produces agricultural products that are safe for human health.

The social dimension also occurs because of the cultural bond that exist in society, such as mutual cooperation activities in supporting sustainable agriculture, that carried out by farmer groups in Pontang village, such as by making solid organic fertilizer with group members, and after it has become organic fertilizer, the fertilizer is distributed to group members to apply on their agricultural land. So far, the group has produce organic fertilizer to meet the group's needs, but it has not been produced for sale.

The norm dimension is the rules inherent in the social relations of farming communities which function as control of an activity. These rules are institutionalized, not written but are understood as determining patterns of good behaviour in the context of social relations in society and there are sanctions if members of the community violate these norms.

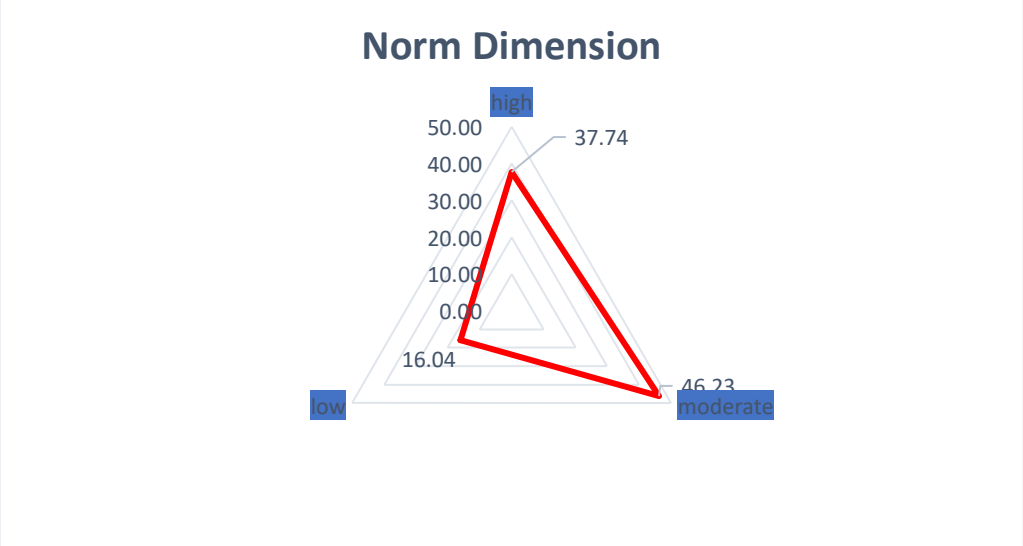

Figure 3. Dimensions of Farmer Norms in Supporting Sustainable Agriculture

Based on the results of data analysis, the dimension of social norms is in the moderate category (46.23%) of respondents from 106 farmers stated that because the implementation of activities using organic materials has only been carried out in one planting season, it is still not 100% carried out organically. Farmers still mix chemical fertilizers, especially chemical pesticides, with organic materials, so that until the activities/research are carried out, the implementation of activities to support sustainable agriculture is still in the process of ongoing socialization.

On the one hand, farmers are aware of the negative impact of using chemicals in their farming, so currently farmers are in the process of making their farming land healthy again by using organic fertilizers and organic pesticides by buying them at kiosks or BPPs. Several farmers have produced solid and liquid organic fertilizer using their livestock waste.

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The social network that exists in the farming community in Pontang village is a social relationship that exists regularly, consistently and has been going on for a long time, this relationship not only involves individuals but many individuals, for example in farmer groups.

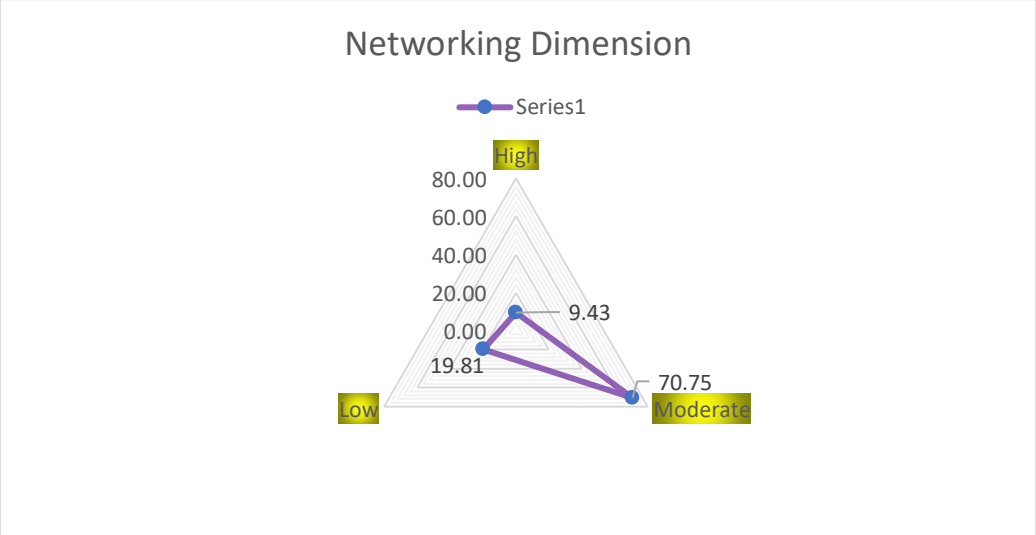

Figure 4. Dimensions of Farmer Networks in Supporting Sustainable Agriculture

Based on the picture above, the majority of farmers/respondents 70.75% stated that sustainable agricultural activities are carried out through group activities or group collaboration. This is proven by activities in making solid organic fertilizer which are carried out together with members of farmer groups.

Fertilizer made by the group is not traded but is used to meet the needs of group members, especially now that chemical fertilizer subsidies are reduced and some even have no subsidies, such as SP36 fertilizer. Apart from that, farmers produce their own organic fertilizer, both solid organic fertilizer and liquid organic fertilizer, because currently solid organic fertilizer is no longer available. But farmers produce their own organic fertilizer together with members of farmer groups, and this causes family network bond to become stronger. When meeting with group members, farmers can discuss with each other to convey their experiences to other members regarding the use of organic fertilizer. Several farmers or informants said that by using organic fertilizer, pest attacks that usually attack plants are now decreasing. So, it can be concluded that farmers in Pontang village support sustainable agricultural activities based on the social capital possessed by the farming community in Pontang.

Conclusion

The social capital of the farming community in supporting sustainable agriculture is in the medium category, as well as the supporting dimensions such as the social dimension, norm dimension and network dimension are also in the medium category. This is because practices in the field of sustainable agriculture have only been implemented in one planting season, however, farmers have started to implement sustainable agricultural practices in their farming, because farmers believe that the current land has been damaged so it must be returned to healthy land by applying materials. organic.

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