

Influence of Social Capital on the Development of Agricultural Areas on Highland Peatlands in Humbang Hasundutan Regency

Tumpal Sipahutar¹, Zulkifli Nasution², Agus Purwoko³, Sortha Simatupang⁴

^{1,2,3,4}University of Sumatera, Indonesia

Abstract

The objectives of this study are (1) There are several social capitals owned by farmer groups in supporting the development of highland peatland agricultural areas in Dolok Sanggul District. (2) Measuring the level of social capital of farmer groups on highland peatlands in Dolok Sanggul District. (3) Analyzing the relationship between social capital and the development of agricultural areas in the Upland Peatlands in Dolok Sanggul District. The research method used is the interpretation of the logistic regression model to explain the functional relationship between the dependent variable and the independent variable and to define the unit of change in the dependent variable caused by the independent variable. The results of the research obtained that social capital for farmers who manage agricultural land in Dolok Sanggul District includes two interrelated categories, namely the structural category which includes social relations and solidarity, and the cognitive category which includes health, norms, trust and cooperation. Overall the average level of social capital of farmers in the peatlands of Dolok Sanggul District is 70.45% or moderate (>50-75%), where the level of social capital for social relations (75.9%), solidarity (76.1%), and cooperation (76.5%) included in the high level of social capital (75-100%), while the level of social capital for health (74.3%), norms (64.2%) and trust (55.7%)) is included in the moderate level of social capital (50-75%). The results of the analysis show that the relationship variable has a significant effect on increasing farmers' income on peatlands in Dolok Sanggul District. Likewise with social relations, the better the social relations between farmers, the higher the opportunity to increase farmers' income.

Keywords

social capital; agricultural area development; peatland



I. Introduction

Humbang Hasundutan Regency is one of the peatland distribution areas in North Sumatra. The area of peatland in Humbang Hasundutan Regency is about 1,042 ha spread over Lintong Nihuta, Pollung, and Dolok Sanggul sub-districts. Unlike peatlands in general which are found in the lowlands adjacent to the coast, peat in Humbang Hasundutan Regency is highland peat located at an altitude of 1000-1450 meters above sea level (Bappeda Kab. Humbang Hasundutan, 2009). At first the peatlands in Humbang Hasundutan Regency were only used as rice fields, but along with the increasing needs, many people have converted their rice fields into coffee plantations and horticultural crops (Sihite et al. 2013). Changes in the use of peatland from natural (forest) to non-forest will cause changes in the characteristics of peat, as has happened in Humbang Hasundutan Regency, where peatlands in general have been converted into paddy fields, plantations, and horticulture.

Peat soil has distinctive characteristics and properties. Peat soil is formed from piles of dead plant remains, both rotten and not. The characteristics of this soil include high organic matter and water content, low bulk density and low bearing capacity. Peat soil has the property of irreversible drying, so it cannot absorb water again when it is inundated. Peat soils can also experience subsidence (subsidence) due to the shrinkage of peat volume caused by drainage and the decomposition process. Other distinctive properties possessed include soil acidity and high adsorption capacity, but low exchange bases, and very low micro elements because they are not derived from mineral materials and if present, they will be strongly bound by organic matter so that they become unavailable to humans. Plants (Agus and Subiksa, 2008). Peatland development for agriculture faces various problems that need to be solved, including land biophysical, socio-economic and cultural. Land biophysical problems that often arise are the occurrence of subsidence, irreversible drying, acidification and nutrient deficiency. Socio-economic and cultural problems, among others, are still not widely understood the characteristics of peat as a whole, the strength of customs so that the adoption of technology is low, the availability of labor is limited, the access to locations and markets is limited, as well as counseling, farmer institutions and lack of guidance. Good peatland management with the application of the right technology, according to the characteristics of the peat can provide high and sustainable crop yields (Maftu'ah et al. 2014). The characteristics of peatlands vary, so that economic productivity seems to have to be supported by the existence of contextual farmer community social systems and institutions for each of the above characteristics. There are fertile peatlands, but there is also the opposite. Facing a situation like this, it is impossible for farmers to survive and succeed without cooperating with others within the context of contextual rooted local social organization. (Sumantri, G.R., 1995). Velicia (2021) stated that the economic slowdown resulted in a sluggishness which resulted in food and beverage companies experiencing a decline in their capital structure so that companies tried to find outside sources of capital.

Another problem in peat management in Humbang Hasundutan Regency, especially in Lintong Nihuta Subdistrict so far is the existence of peatland mining for the purpose of making charcoal carried out by the surrounding community. This mining activity has an impact on the function of peat as water storage, carbon storage and biodiversity conservation will be disturbed or degraded, even though peatland is a marginal and fragile ecosystem that is easily damaged. Peatlands that have been damaged will be difficult to renew. Many studies on highland peatlands have been carried out, but most of the research is based on soil aspects (Purba, Mukhlis and Supriadi, 2016; Nasution, Z. and Mansor, 2004) and technical aspects of cultivation (Adriani A., 2015). Meanwhile, research from social and economic aspects is still very limited, especially studies on farmer's social capital in agricultural development on peatlands. This means that there is still very limited information that can be used as a reference regarding the role of social capital on the success of an agribusiness cluster.

In fact, in farming practices and also in marketing agricultural products, agricultural commodities are known to have inhomogeneous qualities and are easily damaged, so they are very susceptible to fraud in their transactions when not accompanied by the presence of social capital. Meanwhile, the practice of farming management (on farm) also really requires various collaborations both between farmers and between farmers and traders. In these various collaborations, the presence of social capital is very much needed so that the partnerships that are built can take place in a sustainable manner. In fact, a deep understanding of the role of social capital in facilitating cooperation between agribusiness institutions (actors) is very important and strategic for planning and implementing agricultural development.

II. Review of Literature

2.1 Social Theory of Capital

According to Fukuyama, (1996) social capital is the relationships that are created and the norms that shape the quality and quantity of social relations in society in a broad spectrum, namely as social glue that maintains the unity of members of the community (nation) as a whole together. Social capital is transmitted through cultural mechanisms, such as religion, tradition, or historical customs. Meanwhile, the World Bank (2003) defines social capital as institutions, social relations, networks, honesty, formation of quality norms and quantity of social interaction with the community. From these definitions of social capital, it can be simply said that social capital is a characteristic of social organization which facilitates coordination and cooperation for mutual benefit.

Social capital has four dimensions (Nasdian, 2014), namely:

- 1) The first is integration, which is a strong bond between family members and the family and their neighbors. For example: ties based on kinship, ethnicity, and religion.
- 2) The second is linkage, namely ties with other communities outside the original community. For example: networks and civic associations that penetrate differences in kinship, ethnicity, and religion.
- 3) Third, organizational integrity, namely the effectiveness and ability of state institutions to carry out their functions, including creating legal certainty and enforcing regulations.
- 4) Fourth, synergy, namely the relationship between leaders and government institutions with the community (state-community relations). The focus of attention in this synergy is whether the state provides a wide space or not for the participation of its citizens.

Furthermore, Nasdian (2014) states that the first and second dimensions are at the horizontal level, while the third and fourth dimensions (plus the market) are at the vertical level.

2.2 Social Capital Concept

Uphoff (2000), social capital is more usefully understood by separating it into two interrelated categories, namely structural categories and cognitive categories. Structural categories are related to various forms of social organization, in particular the various roles, rules, procedures, and precedents that contribute to cooperation, especially on actions for the common good. Cognitive categories originate from mental processes and produce thoughts/understandings, reinforced by culture and ideology, especially values, norms, attitudes, and beliefs that contribute to cooperation and action for the common good.

Table 1. Two complementary categories of social capital

	Structural	Cognitive
Sources and manifestation	<ul style="list-style-type: none">▪ Roles and rules,▪ Procedures and precedents,▪ Network and other interpersonal relationships.	<ul style="list-style-type: none">▪ Norms,▪ Values▪ Attitudes▪ Beliefs.
Field (realm)	Social organization	Citizen culture
Dynamic factors	<ul style="list-style-type: none">▪ Vertical relationship▪ Horizontal relationship.	<ul style="list-style-type: none">▪ Trust,▪ Solidarity▪ Cooperation,▪ Generosity.
Source of elements general	Expectations that drive cooperative behavior that benefits all parties.	

Source: Uphoff (2000).

2.3 Social Capital Parameters

One method that can be used to measure social capital is through the survey method. The substance is a measurement of the degree of trust and cohesion in society. Empirical evidence shows that measuring social capital can be done either through quantitative or qualitative instruments. Social capital assessment or the Social Capital Assessment Tool/SCAT. Broadly speaking, the SCAT consists of three parameter components, namely community profiles, household profiles, and organizational profiles as shown in Table 2.

Table 2. Parameters of social capital

Parameter	Sub-parameter
Community profile	a) Community boundaries and assets, b) community collective action, c) Governance and decision-making processes, d) local organization, e) Relationships between communities and organizations, f) Institutional network.
Household profile	a) household characteristics, b) Genogram (relationship between household and community), c) Structural dimensions (membership in the organization, solidarity, cooperation, expectations, and d) exclusion/exception), e) Cognitive dimensions (norms, values, attitudes, beliefs/beliefs, trust/trust, and reciprocity), f) Cognitive dimensions (solidarity, mutual trust and cooperation, and conflict resolution).
Organization profile	a) Organizational characteristics (history, membership, etc.), b) Institutional capacity (leadership, participation, etc.), c) Institutional relations with other organizations (government and non-government).

Source: Sunarsih et al. (2013).

2.4 The Role of Social Capital in Agricultural Development

Social capital is needed to create the kind of moral community that cannot be obtained as in the case of other forms of human capital. The acquisition of social capital requires getting used to the moral norms of a community and in that context simultaneously adopting virtues such as loyalty, honesty, and dependability. Social capital is based more on general social virtues, which is a melting pot of trust and an important factor for a country's economic health, which rests on cultural roots (Fukuyama, 1996). Agricultural commodities are known to have inhomogeneous qualities and are easily damaged, so they are very susceptible to fraud in their transactions when they are not accompanied by the presence of social capital. Meanwhile, the practice of farming management (on farm) also really requires various collaborations both between farmers and between farmers and traders. In these various collaborations, the presence of social capital is needed so that the partnerships that are built can take place in a sustainable manner. Social factors that become priority parameters include; in what fields property is developed, independently or in cooperation, if the cooperation to which party is invested, and so on (Martinelli et al, 2019).

III. Research Method

The research location is in Humbang Hasundutan Regency, North Sumatra, with an altitude between 1338 - 1414 m above sea level. The peat area 1 is located in the Lintong Nihuta sub-district. The peat area in this area is partly pristine (flooded) and some have been used by the local community by taking wood that has not been completely decomposed. The wood is usually used by the community as fuel for cooking stoves. Peat area 2 is located in Dolok Sanggul sub-district. Peatland in this area is used by the community for agricultural land which has three different land uses in one area. The three land uses in question are, among others, paddy fields, annual crop fields (coffee), and seasonal crops (horticulture) such as tomatoes, chilies, onions, and various types of vegetables. Peat area 3 is located in Pollung sub-district. All of the peat land in this area has been processed and used by the community as agricultural land. Agricultural land in this area is dominated by rice fields and only a small part is planted with coffee.

The interpretation of the logistic regression model is used to explain the functional relationship between the dependent variable and the independent variable and to define the unit of change in the dependent variable caused by the independent variable. The logistic regression equation and is a hypothesis in this study is formulated as follows:

$$\ln (P / 1 - P) = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + \gamma_5X_5 + b_6X_6 + b_7X_7$$

IV. Results and Discussion

4.1. Identification of Social Capital for Agricultural Area Development Groups in Upland Peatlands

a. Category structural

Farmers in highland peatlands are divided into groups, where in one group there is a chairman, secretary, and treasurer. Generally one group has twenty members. Apart from joining farmer groups, residents in Dolok Sanggul sub-district also join organizations other community organizations. The existence of organizations in the community reflects the dynamics of the social life of local community members as seen from the system of certain cooperative relationships that have been developed (Lenggono 2004). Apart from formal organizations, there are also informal organizations whose existence is not intentional. This organization does not have a definite organizational structure, usually formed because of repeated meetings and is always the basis for meeting the same interests and experiences. Most of the residents in Dolok Sanggul sub-district joined farmer groups (99%) and began to join with groups from 2000 to the present.

The results of data analysis on the structural category aspects of the respondents' social capital which includes the level of social relations and the level of solidarity between farmers can be seen in Table 20 below.

Table 3. Structural categories

Social Capital	Value	Index
Social Relations	75,9	High
Solidarity	76,1	High

Table 3 above shows that the level of social relations between farmers in the Dolok Sanggul peatland location is quite high, namely 75.9. This can happen because almost all respondents in one village have kinship relations, both in terms of clans and from involvement in informal organizations, especially local cultural activities. While the level

of solidarity between farmers is in the high level category, this shows that the norms for helping others, togetherness, attitudes of obedience and loyalty to the group and the belief that other members will also carry out these norms are quite high. This shows that the farmer will be committed to the joint effort if it also benefits him and others.

b. Categories cognitive

Table 4. Cognitive categories

Modal Sosial	Value	Index
Health	74,3	Currently
Norm	64,2	Currently
Trust	55,7	Currently
Cooperation	76,5	High

The form of social relations that is often carried out by farmer groups on peat land in Dolok Sanggul District is interaction with other farmers, both within one group and outside the group. Forms of social relations that are sometimes carried out by farmer groups include: gotong royong, technical assistance from extension workers, and the use of technical consulting assistance.

Trust is one of the elements of social capital that can be the glue for lasting cooperation in the community. In a community where mutual trust among members is stronger, the opportunity to achieve prosperity is greater when compared to a community with a low level of trust. From the results of a survey in the field, it is known that between farmers there is still mutual trust and the level of trust over the last few years is felt to be constant, but certain needs that traditional farming communities want to achieve, are still met through family assistance. For example, when suddenly they have to leave for some time, farmers usually ask for help from family members to take care of the farmland. The confidence of farmers in terms of maintaining their agriculture can be seen in Table 2.

Table 5. Trust in managing agriculture for a while

The party responsible for managing peat	Number of respondents	Percentage
Other family members	45	64,4 %
Neighbors/friends	8	11,4 %
Someone who is paid for a purpose	15	21,4 %
No one	2	2,8 %
Total	70	100 %

Source: Primary Data Processed (2018)

Farmers still place a high degree of trust in their own family members in taking care of their farmland when they are left for some time. Apart from other family members, farmers are also more likely to entrust their farm management to someone who is paid (21.4%). Only 11.4% of farmers entrust their farms to be taken care of by neighbors/friends when they are away.

Table 6. Contribution of farmers to activities that are not directly profitable

Contribution of time/energy to activities that are not directly profitable	Contribution of money to activities that are not directly profitable		
	Didn't contribute the money	A little contribute the money	A lot contribute the money
Did not contribute time/energy	-	1 (1,4%)	2 (2,8%)
Contribute a little time/energy	-	4 (5,7%)	5 (7,1%)
Contribute a lot of time/energy	-	26 (37%)	32 (48%)

Source: Primary Data Processed (2018)

Table 7. Social capital of farmer groups on peat land in Dolok Sanggul District

Capital component social	Parameter	Community Condition
Norm	There is a relationship or social interaction	Farmers in upland peatlands maintain good relations (interactions) with other farmers, both in their own territory and outside their territory. This relationship or interaction is generally in the form of exchanging experiences about agriculture or discussing problems faced in the environment
Social relations	The existence of a distinctive typology according to the characteristics and orientation of the group	cooperation to obtain cheaper facilities and infrastructure. The high need for farmers on peatlands to join groups is because groups are a place to ask questions, share knowledge, and get information about agriculture.
Trust	Willingness to take risks in social relationships and believe that others will not act to the detriment of oneself and the group	Farmers still place a high degree of trust in their own family members in taking care of the farm when they are left for some time rather than entrusting their farms to be taken care of by neighbors/friends when they leave.
Solidarity	Passion to help and put the interests of others	The solidarity of farmers on Peatlands in Dolok Sanggul District can be seen from the willingness to help others when experiencing difficulties (eg when a family member or neighbor experiences crop failure).
Cooperation	Tendency to cooperate and provide each other with materials, labor, information, and adherence to existing procedures	Most of the farmers (89.5%) contributed a lot of time or energy and money when there were activities that were not directly profitable for them. For example when repairing or building roads, and repairing irrigation canals.

Source: Primary Data Processed (2018).

4.2 Analysis of the Relationship between Social Capital and Development of Agricultural Areas on Peatlands

The dependent variable in this study is the income of the peatland farmer group in Dolok Sanggul, while the independent variable is the variable that is thought to be the factors that affect the income of the farmer group. After processing using the SPSS 16.0 program (see Appendix 3), the results are as follows:

a. Testing the Parameters of the Logistic Regression Model

Based on the results of the analysis of the output of Variables in the Equation Table 26, there is only one variable that has a significant effect on increasing income (variable Y). There is one independent variable with a P value of Wald's test with a significance below 0.05 ($\text{Sig} < 0.05$), meaning that this variable has a significant partial effect on increasing income (Y) in the model. At the 95% confidence level, it can be concluded that the social relationship variable has a significant effect on the variable of increasing the income of peatland farmers (Y).

b. Model Suitability Test

To determine whether the model formed is correct or not, the next test is carried out, namely by calculating the value of the Hosmer and Lemeshow Test which is the Goodness of Fit Test (GoF) test. The model can be said to be correct if there is no significant difference between the model and the observed value and Lemeshow Test can be seen in Table 27 below. The significance value of the model suitability test based on Table 27 is 0.218 (> 0.05) which indicates that the model can be accepted and hypothesis testing can be carried out because from the results of the Goodness of Fit Test (GoF) there is a significant difference between the model and the observed values.

Furthermore, to see the ability of the independent variable in explaining the dependent variable, further testing is carried out by calculating the Cox & Snell R Square and Nagelkerke R Square values as can be seen in Table 28. These values are also called Pseudo R-Square or if in linear regression (OLS) is better known as the R-Square. From the test results on the value of Nagelkerke R Square, a value of 0.366 is obtained and the test results for the Cox & Snell R Square value is obtained a value of 0.269. The results of the Cox & Snell R Square and Nagelkerke R Square values indicate that the ability of the independent variable to explain the dependent variable is 0.366 or 36.6% and there are $100\% - 36.6\% = 63.4\%$ other factors outside the model that explain the dependent variable.

c. Interpretation of Models

After obtaining the exponential value or better known as the odds ratio, then the model will then be ready for interpretation. The interpretation results between the quantitative independent variables will be different from the qualitative independent variables. For quantitative independent variables it will be read as larger or smaller (depending on the sign) while for qualitative variables it will be read as the level of comparison. The model obtained is as follows:

$$\ln P/1-P = -42.06 + 0.07X_6$$

Based on the explanation above, it is known that the independent variable that influences the dependent variable is the social relationship variable. The explanation of these variables is as follows:

Social Relations (X6)

For variable X6: Exp value (X6) = 1.07 the better the social relations of the farmer group, the greater the opportunity for increasing income, which is 1.07 times. This social relationship variable has a significant effect on the 95% confidence level. The Wald test coefficient of 8.00 with a p-value of 0.00 and an Odds ratio coefficient of 1.07 means that the better/increasing the social relations of the farmer group, the farmer has the opportunity to experience an increase in income of 107 times compared to if the social relations of the farmer group are not good.

V. Conclusion

From the results of research and data analysis, several conclusions can be drawn as follows:

- 1) Social capital identified in farmers who manage peatland agriculture in Dolok Sanggul District includes two interrelated categories, namely the structural category which includes social relationships and solidarity, and the cognitive category which includes health, norms, trust and cooperation.
- 2) Overall the average level of social capital of farmers in the peatlands of Dolok Sanggul District is 70.45% or moderate (>50-75%). ,1%), and cooperation (76.5%) are included in the high level of social capital (75-100%), while the level of social capital for health (74.3%), norms (64.2%) and trust (55 ,7%) are included in the moderate level of social capital (50-75%).
- 3) The results of the analysis show that the social relationship variable has a significant effect on increasing farmers' income on peatlands, Dolok Sanggul District. Likewise with social relations, the better social relations between farmers, the opportunities for increasing farmer income are also higher.

References

- Agus, F. and I.G.M Subiksa. 2008. Peatlands: Potential for Agriculture and Environmental Aspects. Soil Research Institute and World Agroforestry Center (ICRAF), Bogor. Indonesia.
- Agus, F., Gunarso, P. And Wahyunto. 2014. Dynamics of Peatland Use. In: Indonesian Peatlands. Formation, Characteristics, and Potential to Support Food Security. IAARD Press. 2014.
- Andriesse, J.P. 1994. Constraints and Opportunities for alternative use option of tropical peat land. In B.Y. Aminuddin (Ed). Tropical Peats; Proceedings of the International Symposium on Tropical Peatland. 6-10 May 1991, Kuching. Sarawak, Malaysia.
- Azvi, T. S, Manshor, M., and S. M. Rezaul Karim. 2011. Vegetation Composition and Diversity of Highland Peats in Toba Plateau, North Sumatra, Indonesia. Scientific Research and Essays Vol. 6 (14), pp. 2895-2903
- Bappeda Kab. Humbang Hasundutan. 2009. Regional Spatial Plan for Humbang Hasundutan Regency and Detailed Spatial Planning for Dolok Sanggul City.
- Bogor Agricultural University Team, 1974. Soil Productivity Survey Report and Agricultural Development in the Palangkaraya Region, Central Kalimantan. Bogor.
- BPS Kab. Humbang Hasundutan. 2014. The Humbang Hasundutan in Figures 2014.
- BPS Kab. Humbang Hasundutan. 2017. The Correspondence of Insults in Figures 2017
- Coleman, James S. "Social capital in the creation of human capital." American journal of sociology (1988): S95-S120.

- Dariah, A., E. Maftu'ah., and Maswar. 2014. Characteristics of Peatlands. In: Guidelines for the Sustainable Management of Degraded Peatlands. IAARD Press.
- Driessen, P.M. and H. Suhardjo. 1976. On the defective grain formation of padi rice on peat. Soil Res. Inst. Bulls. 3: 20 – 44. Bogor.
- Driessen, P.M. and Soepraptohardjo 1974.Organic soil.In: Soil for Agricultural expansion in Indonesia. ATA 106 Bulletin. Soil Research Institute Bogor.
- Eva Cox. 1998. Social Capital and Economics Development: Toward a Theoretical Synthesis and Policy Frmaework. Theory and Society, Vol 27, 151-208.
- Fukuyama, Francis (1995), Trust: The social virtues and the creation of prosperity. New York: the Free Press
- Halim, A. 1987. Effect of Mixing Mineral and Alkaline Soil with Peat Soil in Central Kalimantan in Soybean Cultivation. Dissertation Faculty of Postgraduate, IPB. Bogor. 322 pp.
- Hartatik, W, I G. M. Subisa, and Ai Dariah. 2011. Chemical and physical properties of peatlands. page. 45-56. In Neneng L. Nurida, A. Mulyani, and F. Agus (Eds.). Sustainable Management of Peatlands. Soil Research Institute. Bogor.
- Hasbullah J. 2006. Social Capital (Towards Excellence in Indonesian Human Culture). Jakarta (ID):Mr-United Press.
- Hosmer D.W. and S. Lemeshow. 2000. Applied Logistics Regression. Second Edition. John Wiley and Sons. Inc. 375 p.
- Irawan, and E. Maftu'ah. 2013. Farming Business Model on Peatlands. Guide to Sustainable Management of Degraded Peatlands. http://balittanah.litbang.pertanian.go.id/ind/documentation/juknis/panduanpeat_degraded/irawan_usahatani.pdf. Access Date October 29, 2015.
- Kusumastuti, A. (2015). Social Capital and Adaptation Mechanisms of Rural Communities in Infrastructure Management and Development Social Capital and Adaptation Mechanisms of Rural Communities in. Journal of Sociology, 20(1), 81–97.
- Kyoma, K, and M. Mitsuchi. 1985. Wet Andisols. In Wetland Soils: Characterization, classification, and utilization. proc. of workshop held on 26 March to 5 April 1984 under the joint sponsorship of International Rice Research Institute, Soil Management Support Service Agency for International Development and United States Department of Agriculture. Bureau of Soils Philippines Ministry of Agriculture. IRRI, Los Banos, Laguna, thr Philippines.
- Leiwakabessy, F. M. 1978. Nature of available land in transmigration areas. Seminar on Consolidating Development Efforts in Transmigration Areas by JTKI-PPSM.
- Lenggono PS. 2004. Social Capital in Peat Management (Case Study on Peat Peat Community in Muara Pantuan Village In Anggana District, Kutai Kertanegara Regency) [thesis]. Bogor (ID): IPB.
- Maftu'ah, E., M. Noor., W. Hartatik., and D. Nursyamsyi. 2014. Management and Productivity of Peatlands for Various Crop Commodities. In: Indonesian Peatlands. Formation, Characteristics, and Potential to Support Food Security. IAARD Press. 2014.
- Martinelli, I., et al. (2019). Community Economic Development Prospect Based on Wakaf Funds. Budapest International Research and Critics Institute-Journal (BIRCI-Journal), 409-423.
- Masganti. 2013. Innovative technology for sub-optimal land management of peat and acid sulfate to increase food crop production. Agricultural Innovation Development 6(4):187-197.

- Mulyani, A., S. Ritung, and Sukarman. 2014. Distribution and Allocation of Utilization of Degraded Peatlands in Relation to the RTRW of the Provinces: Riau, Jambi, Central Kalimantan and West Kalimantan. BBSDLP. Unpub.
- Nasution A. 2015. The Role of Social Capital in Reducing Rural Household Poverty in Indonesia [thesis]. Bogor (ID):IPB.
- Nasution Z, and Mansor M (2004). The Effect of Mining on Highland Peats of Toba Plateau North Sumatra. In: Tropical Peatswamps, SafeGuarding a Global Natural Resource. (Mashhor, M., Ahyaudin, A., J. Rieley, A. H. Ahmad and A. Mansor eds), Published by Universiti Sains Malaysia, pp. 220-227.
- Noor, M., Masganti., and F. Agus. 2014. Formation and Characteristics of Indonesian Tropical Peat. In: Indonesian Peatlands. Formation, Characteristics, and Potential to Support Food Security. IAARD Press. 2014.
- Parish, F., Sirin, A., Charman, D., Joosten, H., Minayeva, T., and Silvius, M. (Eds.). 2007. Global Environment Centre, Kuala Lumpur and Wet Land International, Wageningen.
- Portes, Alejandro. 2000. The Two Meanings of Social Capital, Sociological Forum, Vol. 15, No. 1.
- Radjagukguk, B. 1997. Peat soil of Indonesia: Location, classification, and problems for sustainability.pp. 45-54. InJ.O. Rieley and S.E. Page (Eds.).Biodiversity and Sustainability of Tropical Peat and Peatland. Proceedings of the International Symposium on Biodiversity, Environmental Importance and Sustainability of Tropical Peat and Peatlands, Palangkaraya, Central Kalimantan 4-8 September 1999. Samara Publishing Ltd. Cardigans. UK.
- Ritung, S., Wahyunto, K. Nugroho, Sukarman, Hikmatullah, Suparto, and C. Tafakresnanto. 2011. Indonesian Peatland Map at 1:250,000 Scale (Indonesian peatland map at the scale 1:250,000). Center for Research and Development of Agricultural Land Resources, Bogor. Indonesia.
- Sabiham, S. 2006. Management of Indonesian Peatlands Based on Unique Ecosystems. IPB. Bogor.
- Salampak, 1999. Increasing the Productivity of Peat Soil in Rice Fields by Providing Ameliorant Materials for Mineral Soil with High Iron Content. Postgraduate Dissertation Program, Bogor Agricultural University.
- Schmidt, F.H. and J.H.A. Ferguson. 1951. Rainfall Types Based on Wet and Dry Period Ratios for Indonesia, With Western New Guinea. Ministry of Transportation, Department of Meteorology and Geophysics. Vert. No. 42.
- Sihite, L. W., P. Marbun., and Mukhlis. Classification of Topogenous Peatlands Converted to Rice Fields and Converted to Arabica Coffee and Horticulture.
- Stevenson, F.J. 1994. Humus Chemistry. Genesis, Composition, and Reactions. John Wiley and Sons. Inc. New York. 443 p.
- Subagyo, H. 2006. Tidal Swamp Land. PP 23-98. In. Swamp Land Characteristics and Management. (Eds.). Didi Ardi S., Invite Kurnia, Mamat H.S., Wiwik Hartatik, and Diah Setyorini. Bogor. Center for Research and Development of Agricultural Land Resources.
- Suhardjo, H. and I P.G. Widjaja-Adhi. 1976. Chemical characteristics of the upper 30 cms of peat soils from Riau. ATA 106. Bull. 3: 74-92. Soil Res. Inst. Bogor.
- Suharta, N. And B.H. Prasetyo. 2009. Mineralogical and chemical characteristics of spodosols in Toba Highland, North Sumatra. Indonesia. J. Agric. science. 10(2): 54-64.

- Syahyuti (2008) The role of social capital in agricultural trade. *Agro-Economic Research Forum* 26(1):32–43.
- Velicia, et al. (2021). The Effect of Company Size, Profitability, Liquidity and Sales Stability on the Capital Structure of the Food and Beverage Subsectors Manufacturing Companies Listed on the Indonesia Stock Exchange in 2014-2019. *Budapest International Research and Critics Institute-Journal (BIRCI-Journal)*. P. 421-431.