International Journal of Social Science and Economic Research

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

COCOA FARMERS 'ADAPTATION CAPACITY LEVEL IN OVERCOMING CLIMATE CHANGE IMPACTS AND THE FACTORS THAT AFFECT IT

[1]Idawati, [2]Aida Vitayala S. Hubeis, [2]Anna Fatchiya, and [3]Pang S Asngari

[1]Department of Agribusiness, University of Andi Djemma, Palopo, South Sulawesi.

[2]Doctoral Extension Education Development Program, Graduate School, Bogor Agricultural University, Campus IPB Dramaga, 16680, Indonesia.

[3]Communications Science and Community Development Departement, Faculty of Human Ecology Bogor Agricultural University, Campus IPB Dramaga, 16680, Indonesia.

ABSTRACT

Climate change has a significant impact on cocoa farmers, so adaptive capacity is needed to overcome this problem. Adaptation capacity is supported by farmers' internal characteristics, extension support, government and private support. The objectives of this study are (1) to identify the level of adaptation capacity of farmers in overcoming the effects of climate change from two district; (2) to analyze the factors that influence farmers' adaptation capacity; and (3) to analyze the effect of adaptive capacity on business sustainability. The study was conducted from June to August 2018. Data collection was carried out through interviews with 282 farmers and five key informants. Descriptive statistical analysis in the form of frequency distribution table using excel program and Mann Whitney difference test using Statistical Product and Service Solution (SPSS) version 24. Inferential statistical analysis using Smart-Partial Least Square (PLS) 2. The results showed that the adaptation capacity of cocoa farmers from Luwu District and North Luwu in the high category. Managerial, socio-cultural and high-category while technical abilities are low and very different in the two districts. The adaptation capacity of cocoa farmers is influenced by the characteristics of farmers, extension support and government support. The level of adaptation capacity of farmers has been a positive and significant influence on business sustainability.

Keywords: Adaptive capacity, cocoa, climate change, farmers

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

INTRODUCTION

Climate change has a direct impact on the biophysical environment of the cocoa plant as one of the causes of the area of cocoa plantations producing decreased production compared to the existing land area (FAO 2014; Sumaryanto 2012; dan Sakiroh *et al.* 2015) [1]. Climate change has a direct impact on the biophysical environment of the cocoa plant as one of the causes of the area of cocoa plantations producing decreased production compared to the existing land area (*Natural Resources Development Center* 2013) [2]. This phenomenon is a condition and medium for the growth and development of cocoa plants as non-irrigated land plants whose source of water comes from rain. Changes in the rainy and dry seasons sometimes differ from previous predictions and become a natural phenomenon that is difficult to avoid so it is very important in seeing the potential of human resource actors. The impact of climate change occurs in Luwu and North Luwu Districts, South Sulawesi (Sakiroh *et al.* 2015) as one of the centers of cocoa plantations which reached 61.4 percent of the national cocoa area, and in the last three years there has been a 10-50 percent decline in production (Kementerian Pertanian 2017) [3]. This impact caused farmers to speculate in issuing costs for their farming as the majority of cocoa farmers, often experiencing losses because income was decreasing, while production costs were increasing (Dewi dan Noponen 2017; Swisscontact 2017) [4], so that adaptation efforts were needed to overcome these problems. Adaptation efforts in the form of response adjustments made if the situation and conditions allow in determining the type of treatment of farmers in applying the use of technology that is always developing (UNDP 2007; IPCC 2013) [5]. According to Lippitt et al. (1958) [6] that farmers have the potential to be changed through the paradigm of farmers first counseling to be more empowered and independent (Sadono 2008) [7]. Farmers have an adaptive capacity in the form of resilience and capability in the form of adjustment responses to anticipate, overcome changes, recover from the impact of dangerous events by minimizing vulnerability, both individuals, groups and communities in managing their farming and finding new ways based on uncertain climate change conditions technical, managerial and social culture towards sustainable farming (Nicholls et al. 1999; Gallopin 2006; Fatchiya 2010; UNISDR 2012; FAO, 2014) [8]. Therefore it is very important to analyze the level of adaptation capacity of farmers, the factors that influence which consist of internal characteristics such as age, education, length of trial, number of family members, land area, etc. as well as external farmers in the form of government and private support overcome the reactive impact of climate change on sustainable farming.

Related to the description above, the purpose of this study is (1) to identify the level of adaptation capacity of farmers in overcoming the impacts of climate change from the two districts; (2) analyze the factors that influence farmers' adaptation capacity; and (3) analyze the effect of adaptive capacity on business sustainability.

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

RESEARCH METHODS

The study was conducted in June to August 2018 in Luwu District and North Luwu, South Sulawesi Province. Determination of the study area was stratified sampling in two districts, four sub-districts and eight villages. Each district consists of two sub-districts and four villages. The study population was cocoa farmers with the criteria of farmers who spent more time managing cocoa farms and as decision makers in farming, namely as many as 960 farmers. The number of research samples was determined using the Slovin formula as many as 282 farmers spread in Bupon District; Kamburi and P. Tujuh Villages, Kamanre District; S. Paremang Selatan Village and S. Paremang, Sabbang District; Batu Alang and Bakka Villages, Baebunta District; Mario and Tarobok villages.

Primary data came from research respondents through structured interviews using questionnaires and in-depth interviews with five related informants such as extension agents, private partnership coordinators (Mars Sustainability Indonesia), climate officers (BMKG), community leaders and related officials at the Agriculture Service agencies and other agencies. The collected data was tabulated and analyzed descriptively in the form of a frequency distribution table of farmers 'adaptation capacity using the excel program and Mann Whitney difference test using Statistical Product and Service Solution (SPSS) program version 24. Inferential statistical analysis of factors that influence farmers' adaptive capacity cacao in overcoming the effects of climate change and the sustainability of farming using Smart-Partial Least Square (PLS) 2 and qualitative data is used to provide an explanation of quantitative data.

RESULTS AND DISCUSSION

Capacity Level of Farmer Adaptation

The results of the analysis of the adaptation capabilities of the cocoa farmers from the two districts in Table 1 show that the technical, managerial and socio-cultural capabilities are very different. The technical capability in Luwu District is a low percentage with an average of 17.20 (low) from two districts. This is due to the age of the old cocoa plants and is a legacy plant of parents who still apply traditional farming methods. Farmers have not yet carried out the indicators in this study consisting of soil pH measurements, land suitability tests and calcification to neutralize the acidity of the soil which has been saturated with the use of chemicals. In addition, indicators of technical capabilities such as the use of organic fertilizers, spraying, pruning, shade plants, manual cutting of grass, procurement of water resources and cacao skin sanitation as an adaptation effort to overcome the effects of climate change are no longer routinely carried out by farmers. Technical care is not routinely carried out by farmers in Luwu District compared to North Luwu Regency with a high percentage and the total number of

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

respondents who answered was 36.88 percent. This is because the income received by farmers is not sufficient for the maintenance costs needed. The technical capability of farmers when associated with the presence of agricultural extension agents as the spearhead of agricultural development, according to Amanah et al. (2008) [9] that extension services have focused mostly on farmers' technical capabilities, procurement of product facilities while non-formal education, group development, gapoktan and awareness of changes in farmer behavior are forgotten. This is a problem for farmers in this location, besides being constrained by the high price of production facilities, the low selling price of commodities and the extension activities being stopped. Extension activities stopped, for example the mentoring program had ended, government extension workers focused on food crops, lack of infrastructure and competency of extension workers, lack of demonstration plot locations, and implementation of regional autonomy with the enactment of Law No. 23 of 2004 which looked at education as a less strategic activity.

Table 1: The distribution of cocoa farmers is based on their level of adaptive capacity in Luwu and North Luwu Regencies, South Sulawesi.

Adaptive Capabilities of Farmers	Category	District		Total	Mann Whitney Different Test
		Luwu (%)	North Luwu (%)	282 (%)	
Technical Ability Average = 17.20	Very Low (8-13)	14.84	30.52	23.40	**0.002****
	Low (13,1-18)	**43.75**	23.38	32.62	
	High (18,1-23)	25.78	**46.10**	**36.88**	
	Very High (23,1-28)	15.63	0.00	7.09	
Managerial Ability Average = 12.40	Very Low (5-8.25)	7.81	5.19	6.38	**0.000****
	Low (8.26-11.50)	**55.47**	21.43	36.88	
	High (11.51-14,75)	21.88	**55.84**	**40.43**	
	Very High (14.76-18)	14.84	17.53	16.31	
Socio-cultural Ability Average = 18.73	Very Low (10-13.5)	12.50	2.60	7.09	**0.000****
	Low (13.51-17)	21.09	8.44	14.18	
	High (17.1-20.5)	**49.22**	**54.55**	**52.13**	
	Very High (20,51-24)	17.19	34.42	26.60	

* significantly different at the level 0,05

** very real difference at the level 0,01

Table 1 shows that the adaptive capacity in managerial abilities differs very significantly, as well as the percentage of the two districts with an average of 12.40 (high). Managerial capabilities in indicators of financial records and setting aside capital for farming needs such as fertilizer use, working capital, and directing labor for farmers in Luwu Regency are in the low category with the total respondents being 40.43 percent. Farmers do not calculate fertilizer use, not record in an expenditure book but only assess fertilizer needs by looking at the amount of sacks per hectare.

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

In addition, due to lack of income, farmers reduce fertilizer use and sometimes even no longer fertilize. Farmers are pressed into the basic needs of families with low income so that farming needs are no longer fulfilled. The managerial ability for respondent farmers in North Luwu Regency is in the high category, with greater income with extensive land support so that they are able to set aside money for working capital for the next season. According to Mehdi et al. (2011); Chia (2014) [10], in building community skills as a strategy for developing managerial capabilities of farmers, needed the role of NGOs, PT through personality training and participatory farming management, empowerment, communities to strengthen relationships between farmers, markets and initiate rural development.

The socio-cultural ability of the Whitney test results (Table 1) is very significantly different in the indicators of farmer activity following the activities of partner companies that have been intensifying cacao cultivation counseling to marketing. The livelihood of farmers in Luwu Regency in participating in counseling from both the private sector and the government is very low. Extension programs were not carried out in Kamburi and Padang Tujuh villages from four villages in the study area in Luwu Regency while in North Luwu District the four research villages were still active. In addition, because the culture of indigenous people who have the next generation with a high level of education is oriented towards becoming civil servants and their parents stop cultivating their own land and work on a revenue-sharing system by migrants such as Bugis, Makassar, Enrekang, Java and Toraja. Indigenous cocoa farmers feel that they are no longer able to start their cocoa farming while migrant tribes do not have venture capital. Besides that the age of farmers who are getting older influences the physical and work ethic and there is no regeneration of farmers who continue their farming. The high percentage of the two districts is also the same as the number of respondents who answered is 50.23 percent in trust in extension officers so that it can be an input to move more active farmers' institutions to attend meetings (Soepriadi 2014) [11]. Farmers still have tolerance with active activities in the community, actively seeking information not only with extension workers but with fellow farmers.

Factors Affecting the Capacity of Adaptation of Cocoa Farmers

Evaluation of the measurement and structural models conducted on the results of the PLS analysis shows that the factors that influence the adaptive capacity of cocoa farmers are the characteristics of farmers, extension support and government support. The characteristics of farmers have a greater influence than the other two factors. The structural model equations that influence the adaptation capacity of cocoa farmers are Y1 = 0.368X1 + 0.198X2 + 0.253X3 + 0.012X4. The measurement model (outer model) is presented in Figure 1, while the structural model (inner model) is presented in Table 2.

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

Table 2: Significant value of the latent variable of adaptation capacity of cocoa farmers

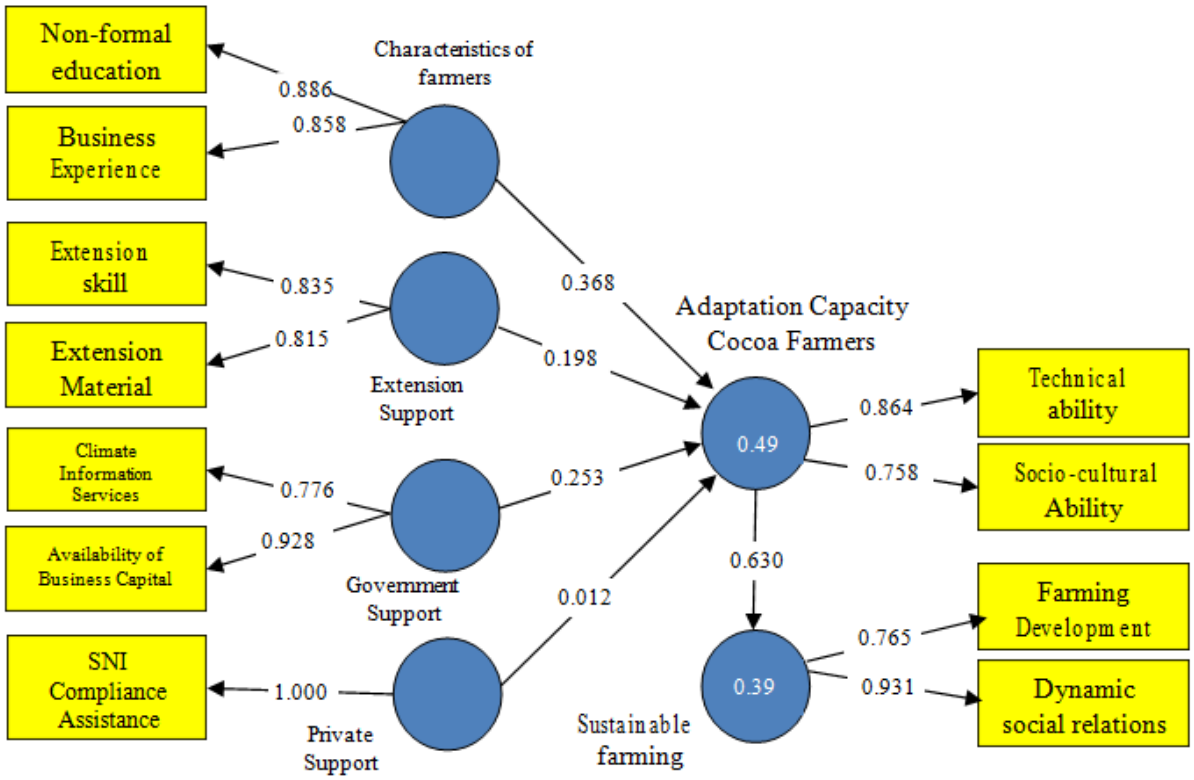
No	Relationship of Latent Variables	Path Coefficient	T Statistics	Cuts off ($\alpha = 10\%$)	Signifikansi
1	Characteristics of Farmers => Capacity for Adaptation of Cocoa Farmers	0.368	2.995	≥ 1.64	Signifikansi
2	Extension Support => Capacity for Adaptation of Cocoa Farmers	0.198	1.779	≥ 1.64	Signifikansi
3	Government Support => Capacity for Adaptation of Cocoa Farmers	0.253	2.043	≥ 1.64	Signifikansi
4	Government Support => Capacity for Adaptation of Cocoa Farmers	0.012	0.093	≥ 1.64	Tidak Signifikansi
5	Capacity for Adaptation of Cocoa Farmers => Sustainable farming	0.630	7.312	≥ 1.64	Signifikansi

Keterangan: nilai t-hitung > nilai t-tabel (1.64) = signifikan, α = 10 persen

R^2 of 0.499 means the value of R^2 = 50 percent, the model can explain 50 percent of the diversity of data involved in the model for cocoa farmers' adaptive capacity influenced by the factors studied in this study while 50 percent is influenced by other factors outside of research. Based on the value of R^2, the resulting model belongs to the moderate category. This refers to Sarwono and Narimawati (2015) [12] that the R^2 value of the endogenous latent variable is divided into four, namely 0.19 (weak); 0.33 (moderate); 0.67 (substantial) and> 0.70 (strong).

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"



Picture 1: Measurement model (*outer model*)

The adaptation capacity of cocoa farmers is reflected by their technical abilities and socio-cultural abilities because they have a loading factor above 0.7 while managerial capabilities have a factor loading value below 0.7 so they cannot reflect the adaptation capacity of cocoa farmers. The characteristics of cocoa farmers positively and directly have a significant effect on the adaptation capacity of cocoa farmers. Characteristics of cocoa farmers are reflected by non-formal education and farming experience. The more active non formal education according to the coordinator of PT. Mars Sustainability Indonesia Mr. Mohd. Hussin Purung said that "the existence of private sector and government extension workers in North Luwu Regency, synergized and actively provided assistance to cocoa farmers and the longer time they tried farming would increase farmers' adaptive capacity. This is supported by Siagian (2002); Peranginangin et al. (2016) [13] that the longer a person goes through a business, the more experience will be gained and the more experience gained in the field even though the farming experience is not always measured in the long run in carrying out farming.

Positive counseling support directly affects the adaptive capacity of cocoa farmers. Extension support is reflected by the capacity of the instructor and the material presented. The results of the

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

research by Humaedah et al. (2016) [14] shows recommendations for improvement with a structural approach through increasing synergy between related institutions in increasing the capacity of extension agents and sources of information. An synergy of extension services is needed with information sources needed by users according to the conditions of farmers and the commodities of the target area. This is expected to encourage an increase in the role and capacity of extension agents at the Agricultural, Fisheries and Forestry Counseling Center (BP3K) in managing information with a functional approach through re-design of extension capacity development activities. Development of extension capacity related to the utilization of climate information, with a focus on improving accessibility, managing information, intensity, selecting materials and methods of education. According to Amanah and Farmayanti (2010) [15], the need for an appropriate extension approach is not only a technology transfer, but needs to prioritize learning from and by the farmers themselves, find their own solutions to the problems faced, so the principle of self-help or help people to help themselves become important. Extension agents can play more roles as facilitators, consultants, partners, and bridging between communities and related parties. In addition, extension agents must understand the socio-cultural environment of local farmers in order to understand their needs and problems.

Positive and direct government support significantly affects the adaptation capacity of cocoa farmers. Government support is reflected by climate information services and availability of farming capital. The use of climate information is still very limited to plantation crops as annual crops that are considered not dependent on weather conditions so that the current state of cocoa farming is time to focus on climate information services. Similarly, the existing cocoa cultivation calendar from the private sector continues to be adjusted to the local weather conditions. This is supported by the results of the study of Oktavia et al. (2017) [16], the strategy of involvement of various communities, reducing the gap between knowledge and field practice, and handling climate change at the level of policy planning can help build capacity to overcome climate uncertainty and help formal institutions to achieve goals. According to Humaedah et al. (2016), an implementation approach for re-design of extension activities is needed. Extension agents need to be provided with climate information at the study site, both in the form of climate workshops, regular meetings, and information dissemination through various media. This activity can be used as material for the extension staff to be forwarded to farmers to jointly apply this information. Furthermore, government support for the availability of farming capital according to Hanafie (La Jauda et al. 2016) [17] that capital is needed in business, without the existence of business capital, certainly the business cannot be done well. The ease of getting assistance is sometimes still lacking by farmers with the existence of rules and limits on loans and must be accompanied by business guarantees. Loans between parties from government banks such as BRI compared to private parties such as PNPM are sometimes a dilemma for some farmers. The head of the household (husband) takes a loan from the government bank

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

(BRI) and then the wife takes the savings and loan funds from the private sector (PNPM) so that it experiences difficulties in repaying the loan especially when the farmer's income decreases.

Private support in the model has a direct effect on farmers' adaptation capacity but has no significant effect. Private support is reflected in farm purchases, SNI assistance and program organizers. This support can be reflected in extension support consisting of government, private and self-help counselors. Through the role of private instructors and self-help (cocoa doctors) who have been trained by the private sector in providing assistance and training, information and technology to farmers can increase the adaptive capacity of cocoa farmers. According to SCPP (2014) [18], the implementation of good training practices (Good Training Practices-GTP) was developed and periodically held key training for SCPP field staff, government extension agents, selected farmers called cocoa doctors with knowledge, skills and facilities and expected to be able to provide useful training for other farmers.

Effect of Capacity Adaptation of Cocoa Farmers on Business Sustainability

The results of the PLS analysis show that there is an influence on the adaptation capacity of cocoa farmers to sustainable farming. The higher the level of adaptation capacity of cocoa farmers, the higher the sustainable farming. The structural model equation is Y2 = 0.630Y1. R^2 of 0.397 means the value of R^2 is 39.7 percent, the model can explain 39.7 percent of the diversity of data in sustainable farming is influenced by the factors studied in this study while 60.3 percent is influenced by other factors outside of research. Based on the value of R^2, the resulting model belongs to the moderate category. In this study, the results of loading factors indicate that there are two indicators that reflect sustainable farming, namely indicators of farming development, and dynamic social relations of farmers. Other indicators must be removed from the model because the value is below the loading factor (0.7).

The indicators of the development of farming in this study consisted of the number of yields, the level of profits, the selling price of cocoa beans, the amount of labor used, and the area of land owned. This is supported by the results of the Ruhimat study (2015) [19], there are seven attributes in the economic dimension that have the potential to affect the sustainability of farming, namely the level of economic effectiveness, stability of selling prices of crops, sources of farming capital, sale of products, diversification of income sources, systems sale of yields and total farmer income. Besides that, it actually provides a fair advantage for the perpetrators, in the present and future with increasing productivity, profits and scale of business. The development of farming in the two districts with the purchase of wet and dry seeds around the farmers provided by the private sector, can still be a benchmark for business sustainability, although in Luwu the land area is decreasing with a lot of plant rejuvenation and land conversion

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

that affect the decrease in labor used, decreased productivity and farmers' profits. So that it is necessary to increase entrepreneurial capacity through side businesses such as cocoa nursery businesses, intercropping annual crops on rejuvenated cocoa fields, in order to maintain the sustainability of the lives of farmers and their families and build a sustainable cocoa sector. According to Swisscontact (2015) [20], that without innovations that help farmer capacity (especially in the context of increasing productivity and profits, better land management, availability of labor, the amount of land owned by farmers and funding of farmer organizations or cooperatives, will difficult to guarantee the sustainability of the cocoa sector). In addition, the situation of the export market increasingly demands commodities produced with more attention to the elements of social and environmental protection.

The sustainability of cocoa plantations in South Sulawesi requires a holistic approach from all stakeholders both government and private in developing cocoa farming. Pest attacks cause a decline in production by an average of 50-90 percent and have involved all parties starting from policy makers, researchers, agribusinesses, field supervisors and farmers to perfect the PBK pest control program. However productivity is not yet in line with the total area of land, especially in Luwu Regency, so support is needed in preparing participatory government extension workers to assist farmers with a partnership with the private sector in capacity building for extension workers through intensive and sustainable training according to the capacity and guidance area of BP3K . In addition, the provision of working capital for farmers and the purchase of cocoa beans originating from village funds involves the BUMDES and farmer groups as well as activating the farmers' corporation according to Minister of Agriculture Regulation No. 18 of 2018 in each regency / city that is fostered by government extension agents and cocoa doctors, improving various infrastructure and other supporting infrastructure such as irrigation, water resources on cocoa fields and continuous assistance to farmers by extension agents (Ministry of Agriculture 2018) [21] .

Sustainability in farmers' social relationships is dynamic with indicators consisting of trust in extension officers, water officers, climate officers, companies, customs rules and tolerance among citizens. This relationship shows that from the two districts, the adaptability of cocoa farmers can be done by combining dualism between understandings that explain that humans perceive the symptoms and effects of natural changes so that humans need to manage and control nature (Asante et al. 2005; Hirons et al. 2018) [22]. Relations that realize resilience that reflect the form of the social-ecological system between nature and culture. The resilience of human culture in the form of the ability of groups or communities to overcome the pressure and disruption of environmental change. Access to business capital is needed for the adoption of technological transfer innovations, institutional capabilities, partnerships, and social capital as a community that builds trust in its partners, stakeholders who are involved, tolerance between

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

citizens and uphold customary rules in adaptive environmental management in supporting sustainability cocoa farming (Adger 2005; Idawati et al. 2018) [23].

CONCLUSIONS AND SUGGESTIONS

1. The level of adaptation capacity of farmers to technical capabilities in the low category in Luwu Regency due to extension support, low government.
2. Adaptation capacity of cocoa farmers to private support does not significantly influence but is reflected in extension support
3. The level of adaptation capacity of farmers to environmental sustainability does not significantly affect the sustainability of cocoa farming.

SUGGESTION

1. Government support to prioritize cocoa plants by strengthening institutions through farmers' corporations
2. Participatory extension counseling approach and partnership pattern through Extension Re-Design
3. Sustainability with a comprehensive approach of public and private stakeholders in the development of human resources to improve their understanding of environmental change

REFERENCES

Food and Agriculture Organization of the United Nations [FAO]. 2014. *Sustainability Assessment Of Food And Agriculture Systems* (SAFA).

Sumaryanto.2012. Capacity Building Strategies for Adaptation of Food Crop Farmers to Climate Change. *Agro Economic Research Forum.* 30(2): 73–89.

Sakiroh, Sobari I, dan Herman M. 2015. Technology Reduces The Impact Of Climate Change On Cocoa On Dry Land. *Industrial Plant Research Institute and Freshener*, 55–66.

Natural Resources Development Center. 2013. Modules: The Concept of REDD + and its Implementation. Jakarta (ID): Nature Conservancy.

Ministry of Agriculture. 2017. Indonesian Plantation Statistics. Jakarta (ID): Directorate General of Plantation.

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

Dewi, G. A. F., M. Noponen. 2017. Pocket Book of Cocoa Farmers Responds to Climate Change. Cocoa Revolution Project: Cocoa Gardens Respond to High Production Climate Change. Denpasar (ID): Rainforest Alliance.

Swisscontact. 2017. The Media Series Training Guide for Certification Facilitators.

United Nations Development Programme [UNDP]. 2007. *Making Globalization Work for All. Annual Report 2007*. New York (US): United Nations Development Programme One United Nations Plaza.

IPCC. 2013. *Climate Change: The Physical Science Basis*. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge (UK): Cambridge University Press.

Lippitt R, Watson J, Westley B. 1958. *Dynamics of Planned Change*. New York (US): Harcourt, Brace & World.

Sadono D. 2008. Farmer Empowerment: A New Paradigm of Agricultural Extension in Indonesia. *Extension Journal*. 4 (1): 65-73.

Nicholls RJ, Hoozemans FMJ, Marchand M. 1999. Increasing Flood Risk and Wetland Losses Due to Global Sea-Level Rise: Regional and Global Analyses. *Global Environmental Change Journal*, 9(1): 69-87.

Gallopin GC. 2006. Linkages Between Vulnerability, Resiliensi, and Adaptive Capacity. *Journal Global Environmetal Change*. 16: 293-303.

Fatchiya A. 2010. Level of Capacity of Fish Cultivators in Managing Sustainable Aquaculture Businesses. *Extension Journal*. 6(1):74-83.

United Nations Inter-Agency Secretariat of the International Strategy for Disaster Reduction [UNISDR]. 2012. *How To Make Cities More Resilient: A Handbook For Local Government Leaders*. Geneva (SW): United Nations Publication Switzerland.

Amanah S, L. Endang, Hastuti, Basuno E. 2008. Socio-cultural Aspects in Implementing Counseling: Cases of Farmers in Marginal Land. Sodality of the Transdisciplinary Journal of Sociology, Communication and Human Ecology. 2(3):301-320.

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

Mehdi, M., Safa, M. S., & Yaseen, A. (2011). The Role of NGOs for Agribusiness Enterprises Development in Pakistan: Current Scenarios and Future Implications. *Jurnal of Agricultural Science and Technology* AI. (1): 793–801.

Chia J. 2014. Are Regional Communities Communicating, Developing Social Capital And Tapping Into The Network Society Reflections And Considerations From A Qualitative Community Study. *Asia Pacific Public Relations Journal*. 15(1): 7-21.

Soepriadi, D. S. dan I. F. 2014. Farmers' Social Capital and Industrial Development in the Sentra Pertanian Village of Subang Regency and Karawang Regency. *Regional and City Planning Journal.* 25(1):17-36.

Sarwono J, Narimawati U. 2015. *Making Thesis, Thesis and Dissertation with Partial Least Square SEM (PLS-SEM).* Yogyakarta (ID): Andi.

Siagian S. 2012. *Human Resource Management*. Jakarta (ID): Bumi Aksara

Peranginangin MI, Silalahi FRL, Chandra Y. 2016. Motivation of Farmers in the Application of Cocoa Plantations (Theobroma Cacao l.) Sustainability in the District of Padang Gelugur. *Agrica Ekstensia Journal*, 10(1): 27-46.

Humaedah U, Yulianti A, Sirnawati E, Effendi L. 2016. Model of Extension Capacity Building in Utilizing Climate Information in Indramayu Regency with a Sustainability Analysis Approach. *Agricultural Informatics*. 25(1): 131-144.

Amanah S dan Farmayanti N. 2010. Strategy for Empowering Fishermen Based on the Uniqueness of Agroecosystems and Institutions. Symposium of the Indonesian Coastal Management Association (HAPPI).

Oktavia, Muljono P, Amanah S, Hubeis M. 2017. Relationship between Communication Behavior and Capacity Development of Freshwater Fisheries Agribusiness Actors in Padang, West Sumatra. Extension Journal. 13(2): 157-165.

La Jauda R, Laoh OEH, Baroleh J, Timban JFJ. 2016. Analysis of Income of Cocoa Farming in Tikong Village, Taliabu Utara District, Sula Islands Regency. *Agri-socioeconomic Journal*. 12(2): 33-40.

SCPP. 2014. *Annual Report*. Indonesian Sustainable Cocoa Production. Swiscontact Annual Report. Makassar (ID): Swiss Confederation

ISSN: 2455-8834

Volume:03, Issue:12 "December 2018"

Ruhimat IS. 2015. Status of Sustainability of Agroforestry Farming in Community Land: Case Study in Rancah District, Ciamis Regency, West Java Province. *Journal of Forestry Social and Economic Research.* 12 (2): 99-110.

Swisscontact. 2015. *Environmental Management Module Good Environmental Practices (GEP Module).* Makassar (ID): Swiss Confederation.

Ministry of Agriculture. 2018. Grand Design Plantation plantation area. Jakarta (ID): Directorate General of Plantation ¬ and Center for Regional Planning and Development Studies (P4W) LPPM - Bogor Agricultural University .

Asante W.A, Acheampong E, Kyereh E, Kyereh B. 2017. Farmers' Perspectives On Climate Change Manifestations In Smallholder Cocoa Farms And Shifts In Cropping Systems In The Forest-Savannah Transitional Zone Of Ghana. *Land Use Policy*. 66: 374–381.

Hirons M, Boyd E, McDermotta C, Asarec R, Morel A, Mason J, Malhia Y, Norris K. 2018. Understanding Climate Resilience In Ghanaian Cocoa Communities-Advancing A Biocultural perspective. *Journal of Rural Studies.* 1-10.

Adger, W. N., Hughes, T. P., Folke, C., Carpenter, S. R., & Rockström, J. 2005. Social and Ecological Resilience : Are They Related ? *Science*. *309*(5373): 1036–1039.

Idawati, Hubeis AVS, Fatchiya A, Asngari PS, Tjitropranoto P. 2018. The Implication Of Climate Adaptation and Mitigation Research : Capacity Adaptation Of Rice Paddy Farmers To Climate Change. *Earth and Environmental Science, 200*: 1–6.

