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Climate Village Adaptation in Sindang Jaya Village and South Manokwari Waroser

Rony Gerrits, Rudi A. Maturbongs, dan Rima Herlina S. Siburian

University of Papua, Manokwari West Papua, 98314, Indonesia
Email: r.siburian@unipa.ac.id

Abstract

The purpose of writing is to compare the implementation of climate village program adaptation activities in Sindang Jaya and Waroser villages, South Manokwari Regency. This study uses a descriptive method with multiple regression analysis to determine the factors that most influence the implementation of adaptation activities in these two adjacent villages. This study indicates that in Kampung Sindang Jaya and Kampung Waroser, there are several adaptation activities, including drought, flood, and landslide control, actions to increase food security, and disease control activities. The age variable is a value that partially negatively affects climate change adaptation activities in Sindang Village. In contrast, for Waroser Village, age, education, and information media variables significantly affect people's attitudes towards climate change adaptation activities.

Keywords: Adaptation, Climate village, Sindang Jaya village, Waroser village

Introduction

Climate change that is happening at this time can cause the risk of an increase in environmental temperature, which has an impact on natural disasters such as droughts, floods, and landslides, sea-level rise, tidal waves, seawater intrusion, abrasion, or erosion due to wind, high waves, malaria, and dengue fever outbreaks:, and various other risks (UNDP, 2007). In addition, threats to the agricultural, socio-economic and political sectors can also be affected. Changes in the biodiversity value of an area as a result of changes in land use are also the impact of climate change (Siburian et al. 2020).

Efforts to adapt to climate change have now become a necessity that is integrated with environmental management activities carried out by the community at the local level by taking into account climate risk factors and the impacts of climate change. All efforts carried out by the community need to be correctly inventoried and recorded so that their contribution to the achievement of emission reduction targets and national adaptation capacity can be measured. Data collection on local actions to adapt to climate change can be carried out through a bottom-up approach, namely by encouraging various parties to collect information on activities that have been carried out by the community and can provide tangible benefits to efforts to deal with climate change. The data collection and measurement of these benefits are limited to a particular area using "Climate Village" terminology. Climate Village is a location for the community to carry out activities to adapt and mitigate climate change in a measured and sustainable manner. The climate

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village's area is determined through a series of assessment processes carried out through the Climate Village Program.

Since 2017, West Papua Province has carried out the Climate Village Program activities. This program was carried out for the first time in the government area of the South Manokwari Regency. Sindang Jaya Village and Waroser Village are two villages that also received the climate village program in Oransbari District, South Manokwari Regency. However, based on the assessment results carried out in 2019, these two villages occupy different class categories where Sindang Jaya village is in the Main climate program category, while Waroser village is in the Primary village category. To see these problems, it is necessary to conduct research related to various adaptation activities carried out in these two villages.

Research methods

This research was conducted in Sindang Jaya and Waroser villages, as shown in Figure 1, for 2 (two) months in order to obtain complete data regarding the programs implemented in these two villages.

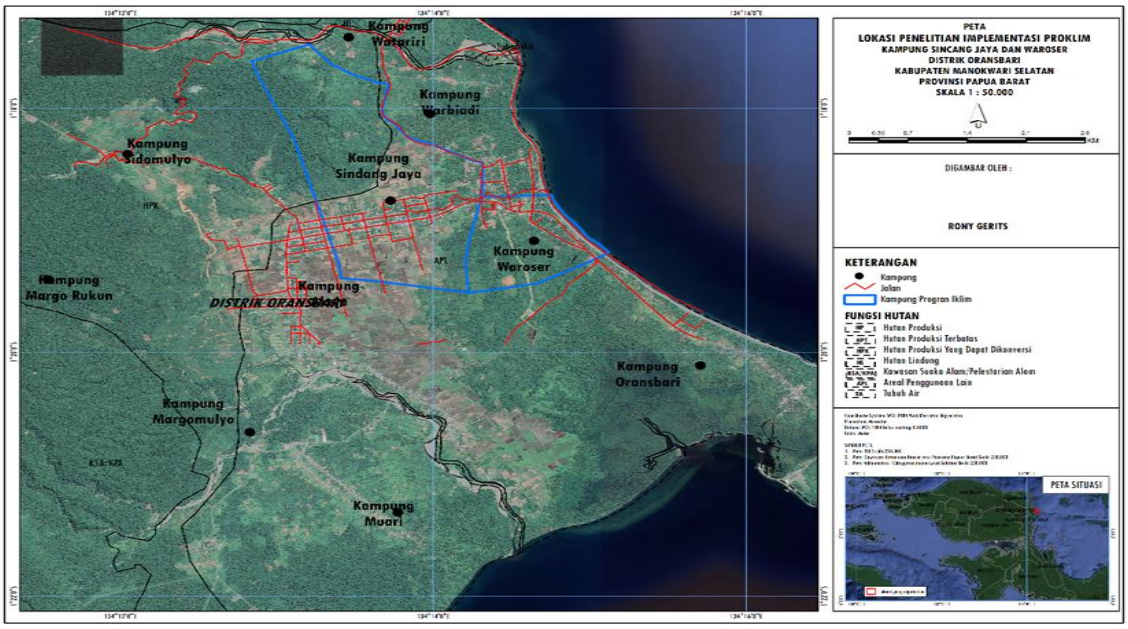

Figure 1 Research site map

In this study, a comparative analysis (differential test) was carried out for adaptation activities in each village, while to determine the level of understanding and obstacles in this activity, multiple linear regression analysis was carried out with the following regression equation:

$$Y = a + b_1X_1 + b_2X_2 + \ldots.. + b_nX_n$$

Where:

X_1 = Knowledge
X_2 = Age
X_3 = Work duration
X_4 = Education

Doi http://doi.org/md.v13i2.911

X_5 = Income
X_6 = Information Media
X_7 = Work experience

Public understanding is assessed based on the Likers scale, where respondents are asked to answer questions with a score of 5 = very understand, 4 = understand, 3 = enough, 2 = do not understand, 1 = do not understand. in measuring obstacles, especially in communication, resources (human, equipment, budget, and authority), disposition (executive attitude), bureaucracy (standard operating standards/SOPs), assessed based on the Likers scale, where respondents were asked to answer questions with an answer value as the following 4 = strongly agree, 3 = agree, 2 = disagree, 1 = strongly disagree.

Results and Discussion

The implementation of climate change adaptation activities that have been carried out in Waroser and Sindang Jaya villages include several activities such as controlling drought, floods, and landslides, actions to increase food security, and disease control activities. In managing flood and landslide drought control activities, these two villages have carried out several activities as presented in Table 1.

Table 1. Drought, Flood, and Landslide Control Activities in Climate Change Adaptation Actions

No	Component	Type of activity	Village Waroser		Village Sindang Jaya	
			Yes	If not	Yes	If not
a	Rainwater harvesting	Rainwater catchment hole (RCH)	√		√	
		Irrigation		√	√	
		Water reservoirs	√		√	
b	Water infiltration	Biopore hole		√		√
		Infiltration wells		√	√	
		Waterfall building		√	√	
		Rorak	√		√	
		Sewage	√		√	
c	Spring protection	Construction of spring protection structures	√		√	
		Planting vegetation around the spring location	√		√	
		Making local regulations that ensure the springs stay alive	√		√	
d	Water usage savings	Reusing water that has been used for certain purposes	√		√	
		Restrictions on water use	√		√	
e	Flood control facilities and infrastructure	Construction and regulation of flood dams and reservoirs		√	√	
		Flood embankment	√		√	
		water catchment areas		√	√	
		Flood control water pump		√	√	
		Operation of "Flood Warning System" which can monitor water level & water discharge		√	√	
		Evacuation route	√		√	
		Using traditional/modern communication tools	√		√	

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No	Component	Type of activity	Village Waroser		Village Sindang Jaya	
			Yes	If not	Yes	If not
f	Design wake up adaptive	Elevating house foundation	√		√	
		Applying the stilt house design	√			√
g	Terrace construction (including infiltration channels, drainage channels, terrace reinforcement plants)			√	√	

The management of water and land resources in an area is closely related to the fulfillment of community needs for water, the quality and quantity of managed water, and the cycle of its use (Arief et al., 2019). This is inseparable from the socio-economic factors of the people who care it. Of the 7 components and 23 droughts, flood and landslide control activities, 2 activities were not carried out by Sindang Jaya Village and 9 activities that Waroser Village did not carry out. However, the pattern developed in these two villages emphasizes the village's needs for these activities (Choresyo et al 2017).

Other adaptation activities carried out in these two villages increase food security, as presented in Table 2.

Table 2 Improving Food Security in Climate Change Adaptation Activities

No	Component	Type of activity	Village Waroser		Village Sindang Jaya	
			Yes	If not	Yes	If not
a	Cropping system	Application of cropping patterns (rice plants – rice plants crops, rice-palawija-rice)		√	√	
		Application of heterocultural cropping patterns (intercropping)	√		√	
b	Drainase	The area of rice fields that have received irrigation facilities		√	√	
		Irrigation system innovation (irrigation management, irrigation management institutions, and human resources)		√	√	
c	Integrated farming (mix farming)	Integrated agriculture (combining agriculture, animal husbandry, fisheries, forestry, & other sciences related to agriculture in one area, Minapadi technology)	√		√	
		The existence of agricultural and forestry activities Management of local potential (protection, development and utilization of local plants and animals that can support increased food security, hybridization or crossbreeding)	√		√	
d	Diversity crops	Diversification of food crops	√		√	
		Selection of climate-resilient commodities (e.g. water-saving rice, high salinity resistance, etc.)		√	√	
e	Utilization of yard land (cultivation of crops, livestock, and fish in the yard)		√		√	

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Based on the above, there are 5 components and 9 activities to improve food security, in which Waroser Village carries out 5 activities, while Session Jaya Village carries out 9 activities.

Table 3. Climate-Related Disease Control Activities

No	Component	Type of activity	Village Waroser		Village Sindang Jaya	
			Yes	If not	Yes	If not
a	Vector control	Implement malaria prevention by reducing mosquito nests (draining, stockpiling, closing)	√		√	
b	Sanitation and Clean Water	Improve the environment so that there are no puddles	√		√	
		Putting fish in ponds/plant pots	√		√	
		Mosquito larva monitor		√	√	
		Implementation of an early warning system to anticipate the occurrence of diseases related to climate change	√		√	
		Clean water supply	√		√	
		Efficient management of human, animal and industrial waste		√	√	
c	Clean and Lifestyle Healthy	implementation of a Clean and Healthy Lifestyle Healthy	√		√	
		Have a house with good air circulation	√		√	

Based on table 17 above, there are 5 components and 9 climate-related disease control activities in climate change adaptation actions. Of the total 9 activities mentioned above, Waroser Village carried out 7 activities, and 2 were not carried out. Meanwhile, Sindang Jaya Village carried out all these activities.

Analysis of Climate Change Adaptation in Sindang Jaya Village

Table 4 Regression analysis of people's understanding of climate change adaptation

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	37,63	16,03		2,347	,025
Knowledge (X1)	,628	,348	,308	1,805	,079
Age (X2)	-1,239	1,382	-,154	-,896	,376
Work duration (X3)	2,370	3,252	,197	,729	,471
Education (X4)	-,330	1,687	-,035	-,196	,846
Income (X5)	-,494	2,434	-,052	-,203	,840
Information media (X6)	,355	1,768	,036	,201	,842
Dummy employment (D1)	780	2,875	,073	,271	,788
Dummy gender (D2)	739	2,994	,043	,247	,806
Dummy ethnic (D3)	5,412	3,554	,234	1,523	,137

Doi http://doi.org/md.v13i2.911

The test results using multiple regression showed that knowledge (X1), length of work (X3), media (X6), job dummy (D1), gender dummy (D2) and ethnic dummy (D3) were positive, while age (X2) , an education level (X4) and income (X5) are unfavorable. The age factor (X2) is -1.239 indicating that the age level has a negative effect of -1.239 on the level of community understanding regarding climate change adaptation. This indicates that the higher the age of a person, the level of their understanding in climate change adaptation activities will decrease. A person in the productive age of 30-50 years will have a greater responsibility in supporting himself and his family than those under 30 years old or over 50 years old. In this age range, farmers reach maturity in farming because they have been engaged in it since a young age, and include productive periods. The age of the workforce is sufficient to determine success in doing a job, both physical and non-physical. Older workers have weak and limited physical strength, whereas younger workers have solid physical abilities (Mustangin, 2017). The regression analysis results for the education factor (X2) with the level of understanding in climate change adaptation activities are negative (b= -0.330); this means that the higher the level of education, the level of community participation in climate change adaptation activities will decrease. This is because the status of a person's education does not affect the implementation of a workout. Those with higher education are relatively faster in carrying out government recommendations/extensions. Low and high levels of education generally do not like innovation so that the mental attitude to increase knowledge, especially agricultural science, is lacking. Education is considered not to affect a person's perspective in deciding what is best for them to participate or not in development programs (Rasmikayati and Djuwendah, 2015).

The results of the multiple regression equation on the income factor (X4) is -0.494, indicating that the income level has a negative effect of -0.494 or -49.4% on the level of community understanding regarding adaptation to climate change. This means that a person's income is low or low. High for a month does not affect the level of knowledge of climate change adaptation actions, increasing adaptation activities.

Waroser Village Adaptation Analysis

Table 5 Table 5 Regression results of people's understanding of climate change adaptation

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	23,353	10,658		2,191	,037
Knowledge (X1)	,311	,494	,109	,629	,534
Age (X2)	-1,285	1,390	-,173	-,924	,363
Work duration (X3)	2,184	1,624	,236	1,345	,189
Education (X4)	-,463	1,574	-,070	-,294	,771
Income (X5)	4,175	1,937	,519	2,155	,040
Information media (X6)	-1,190	1,687	-,171	-,706	,486
Dummy area (D1)	3,570	1,681	,451	2,123	,042
Dummy employment (D2)	450	2,624	,028	,172	,865
Dummy geder (D3)	3,263	5,470	,104	,597	,555

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The test results using multiple regression showed that knowledge (X1), length of work (X3), income (X5), region dummy (D1), job dummy (D2), and gender dummy (D3) were positive. At the same time, age (X2), an education level (X4), and information media (X6) are unfavorable. The age factor (X2) is equal to (b= -1.285), indicating that the age level has a negative effect of -1.285 on the level of community understanding regarding climate change adaptation. This suggests that the higher the person's age, the lower their knowledge of climate change adaptation activities. A person in the productive period of 30-50 years will have a greater responsibility in supporting himself and his family than those under 30 years old or over 50 years old. In this age range, farmers reach maturity in farming because they have been engaged in it since a young age and have a productive period. The age of the workforce is sufficient to determine success in doing a job, both physical and non-physical. Older workers have weak and limited physical strength, whereas younger workers have solid physical abilities (Fekri, 2018). A person's age also affects a person's perception and mindset. The older you get, the more your grasping power and perspective will develop so that your understanding will get better. The results of the regression analysis for the education factor (X4) with the level of knowledge in climate change adaptation activities are negative (b= -0.463); this means that the higher the level of education, the level of community participation in climate change adaptation activities will decrease. This is because the status of a person's education does not affect the implementation of a workout. Those with higher education are relatively faster in carrying out government recommendations/extensions. Low and high levels of education generally do not like innovation, so that the mental attitude to increase knowledge, especially agricultural science, is lacking. Education is considered not to affect a person's perspective in deciding what is best for them to participate or not in development programs (Puspito, 2016; Putirulan *et al*, 2019). The results of the multiple regression equation on the information media factor (X6) is equal to (b = -1190.575), indicating that the information media has a negative influence on the level of public understanding regarding climate change adaptation. This suggests that information through the media does not affect the level of knowledge of climate change adaptation actions. Information heard through print, and electronic media cannot make someone more understanding and understanding in carrying out adaptation activities.

Conclusion

Based on the results of research and analysis that has been done, the following conclusions can be drawn:

1. Adaptation activities in Sindang Jaya Village belong to the Main climate program category, while Waroser Village belongs to the Middle climate program category.
2. Age variable has a partial negative effect on climate change adaptation activities in Sindang Village. In contrast, for Waroser Village, age, education, and information media significantly affect people's attitudes towards climate change adaptation activities.

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