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Rapid Assessment of Water Quality on Environmental Health at Riverside Kahayan

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Abstract
Central Kalimantan has a geographical uniqueness because it has 11 (eleven) major rivers, tributaries and thousands of small river branches that are connected to the oxbow lake (horseshoe). According to data from the Palangka Raya City Health Office, in 2019, the number of people with diseases suffered by the community was related to diseases caused by the environment originating from Bukit Hindu Health Center and Pahandut Health Center. In the period of two years, the 5 dominant diseases were 1,958 people with diarrhea, 1,329 typhoid and parathyphoid fevers, 939 people with infection with other bacteria, 205 viral pneumonia and 148 pulmonary TB affected by environmental factors such as water quality. The purpose of this study was to analyze water quality on environmental health in settlements on the banks of the Kahayan River. In this study using the Mix Method, namely data collection is done qualitatively and quantitatively. Data analysis was carried out using Qualitative and Quantitative.Results: Environmental health status is determined by the level of sanitation, hygiene and water quality of an area. Stratification is carried out based on the geographical and demographic conditions of the area to be then linked to the Environmental Health Risk Assessment (IRS) Sanitation Risk Index (EHRA), in order to obtain a stratification of health status. Based on geographic and demographic conditions, the Pahandut Seberang area has a higher sanitation risk score than Tumbang Rungan and Bereng Bengkel due to the larger population than the two areas, but overall, the three areas are included in the very high risk category based on the Environmental Health Risk Assessment (EHRA) Sanitation Risk Index (IRS) standard.
Keywords: Rapid Assessment, EHRA, Very High Risk.

1. Introduction

The province of Central Kalimantan is geographically unique because it has 11 (eleven) major rivers, tributaries and thousands of small river branches that are connected to oxbow (horseshoe) lakes and other inundation areas. The Dayak community in general is very dependent on the river to fulfill their daily needs as well as being a residential area in the form of lanting houses (floating houses) as a form of local wisdom. The population living on the banks of the river in each Regency/City in Central Kalimantan is 860,426 people, for the Palangka Raya City area as many as 37,816 people (BPS, 2018).The research was conducted at three locations, namely Tumbang Rungan Village and Tumbang Rungan VillagePahandut Seberang Village which is included in Pahandut District, and Bereng Bengkel Village which is included in Sabangau District. Tumbang Rungan Village has 2 RT and 1 RW (BPS, 2020), with a population of 707 people with 191 families consisting of 357 men and 350 women (BKKBN, 2016). Pahandut Seberang Village has 10 RT and 2 RW (BPS, 2020), has a population of 1,663 people with 1,305 families consisting of 830 men and 833 women (BKKBN, 2018), while Bereng Bengkel Village has 6 RT and 1 RW (BPS, 2020), has a population of 1,009 people with 325 families consisting of 513 men and 496 women (BKKBN, 2017). These three location points are located on the outskirts of the river which is the parent of the Kahayan River.

Pruss-Ustun, et al. (2014)mentions that in 2012, there were 502,000 deaths from diarrhea caused by inadequate drinking water and there were 280,000 deaths due to inadequate sanitation. Most likely there will be an estimated disease burden from inadequate hand hygiene totaling 297,000 deaths. In total there were 842,000 diarrheal deaths estimated to be caused by these risk factors, which amounted to 1.5% of the total disease burden and 58% of diarrheal diseases. In children under 5 years there were 361,000 preventable deaths, representing 5.5% of deaths in this age group. This study is based on a retrospective study of 145 countries regarding the burden of disease due to inadequate water, sanitation and hygiene in the environment by taking into account low- and middle-income people.

Based on data from Bukit Hindu Health Center and Pahandut Health Center, within two years there were 5 dominant diseases suffered by riverside communities. These diseases included diarrhea (1,958 people), Typhoid and Parathyphoid fever (1,329 people), intestinal infections due to other bacteria (939 people), viral pneumonia (205 people) and pulmonary TB (148 people) (Palangka City Health Office). Raya, 2019). Improving water quality, level of knowledge, and accelerating development, especially in the field of sanitation and hygiene are expected to overcome health problems that occur.

A rapid assessment is a field assessment based on a short period of time, focusing on the rapid and accurate collection and recording of relevant data and observations, both qualitatively and quantitatively, about what is happening at a particular location by involving local communities who are involved in the process. have knowledge and experience in the location and have an interest, and can be a direct source of information on the impacts (IUCN, 2007). Water quality assessment refers to the parameters that indicate the feasibility of using water according to its designation. Parameters that are often used for rapid assessment of water quality are physicochemical and microbiological quality parameters. Sanitation is a planned effort so that environmental factors around humans, such as soil, water and air are not polluted, while hygiene is an effort to prevent disease that focuses on individual or human health efforts and the environment in which the person is located. With good environmental conditions, it is hoped that various kinds of infectious diseases can be prevented, environmental pollution will be reduced, the environment will be cleaner, healthier, and more comfortable, and the health status of the community will be better.

Based on the description above, the authors are interested in researching more deeply about the Quick Assessment River-based environmental health, this study is based on a rapid assessment method where a quick assessment is to look at the status of water quality, sanitation, and hygiene in an effort to develop environmental health in areas such as the city of Palangka Raya.

2. Research Method

2.1. Research Time and Location

The research was conducted from September to December 2020. The water sampling point is determined by the sample survey method, which is a sampling method by dividing the research area into segments or points that are expected to represent the research population.Determination of the location of water sampling is done through three stages, namely geometric correction, digitization, overlay and location analysis. Geometric correction is carried out by rectification using a geographic coordinate system with reference to the World Geodetic System 1984 (WGS1984).

Sanitation and hygiene data were collected through interviews, questionnaires, and observations. The research location is station 1 which represents the Kahayan Hulu watershed is located on the river in the Tumbang Rungan village, Pahandut Palangka Raya district, station 2 is in

the middle of the Kahayan river in Pahandut Seberang Village, Pahandut Palangka Raya District and station 3 is in the downstream part of the river. Kahayan in Bereng Bengkel Village, Sabangau District, Palangka Raya (Figure 1). Sampling of water quality at each station was carried out 3 times with the point of collection adjusting the settlements of the people living in the area.

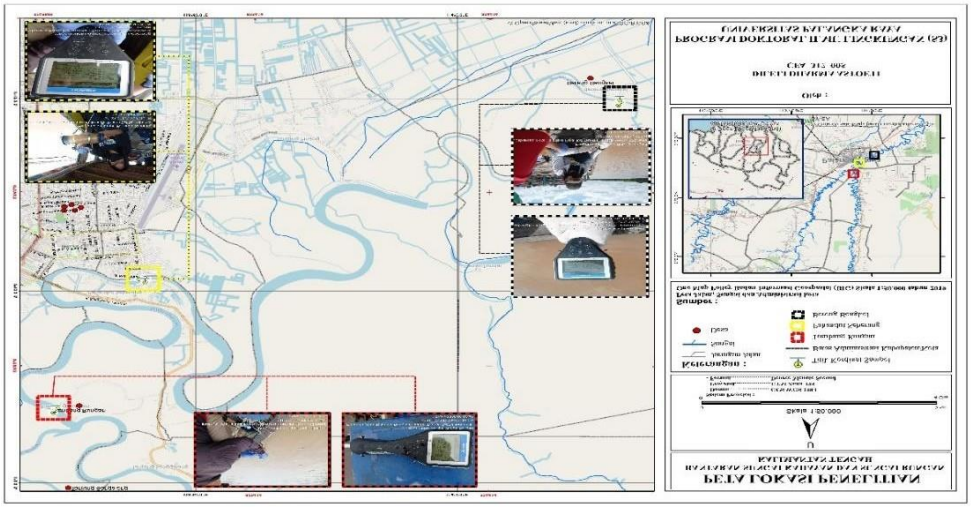

Figure 1. Sampling locations

2.2. Population and Sample

Social data is taken from people who live in settlements on the banks of the Kahayan River. The population of this research is residents in 3 villages, namely Tumbang Rungan Village, Pahandut Seberang Village and Bereng Bengkel Village, Palangka Raya City. The sample of this study was taken from residents who live on the banks of the Kahayan City River by using simple random sampling or simple random sampling, where each member or unit of the population has the same opportunity to be selected as a sample. To get the number of samples that represent each village, it is taken proportionally according to the number of families in each village. The sample size is determined using the Slovin formula, where:

n = N/Nd2 + 1

Information

n = Number of samples

N = Total population

d = degree of trust

With the number of Family as many as 2098 and a degree of confidence of 90%, it was found that a sample of 96 person. The selection of respondents was carried out according to predetermined criteria, namely housing conditions, completeness of sanitation conditions, the surrounding environment according to the parameters and variables used.

2.3 Research Variables and Operational Definition

Research variables consist of independent variables and dependent variables. The independent variables consist of water quality, sanitation, and hygiene in 3 urban villages on the banks of the Kahayan river, Palangka Raya City in 2020. While the dependent variable is the health status of the residential environment.residents at that location. Operational definitions of research variables are presented in Table 2.

Table 2. Operational definitions of research variables

No	Variable	Definition	Measuring instrument	How to measure
1.	Independent Variable			
	a. Water quality	Water conditions for consumption that meet physical, chemical and biological requirements	• Water quality checklist • Laboratory examination	• Interview and observation • Laboratory Test
	a. Sanitation	supervision of the human environment that can have adverse effects on human health,which includes the disposal of waste water, solid waste, and drainage.	Questionnaire and checklist	Interview and observation
	b. Hygiene	All efforts to maintain, protect and improve the health of the body and soul, both for the community and individuals, which are the basis for the continuation of a healthy life and the improvement of health.	Questionnaire and checklist	Interview and observation
2	Dependent variable			
	Environmental Health Status	An optimum environmental condition or condition so that it has a positive effect on the realization of optimal human health status includes: housing, disposal of human waste (feces), provision of clean water, waste disposal, and disposal of dirty water (waste).	Questionnaire and Check list	Interview and Observation

3.Data analysis

Water quality assessment refers to the parameters that indicate the feasibility of using water according to its designation. Parameters that are often used for rapid assessment of water quality are physicochemical and microbiological quality parameters.

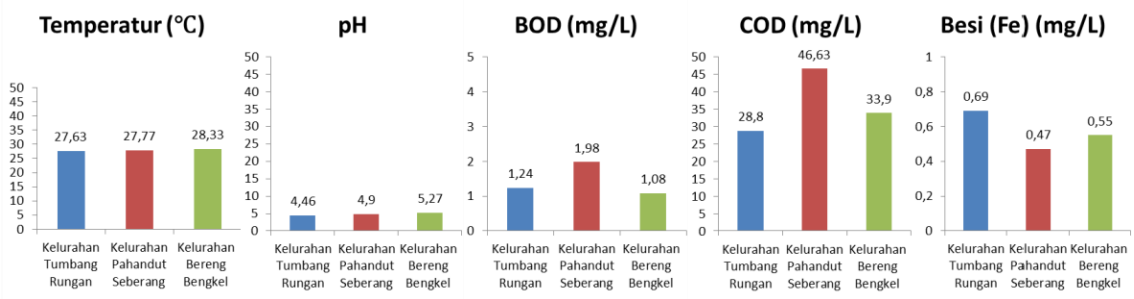

Figure 2. Comparison of Physicochemical Parameter Measurement Results at 3 (three) Research Locations

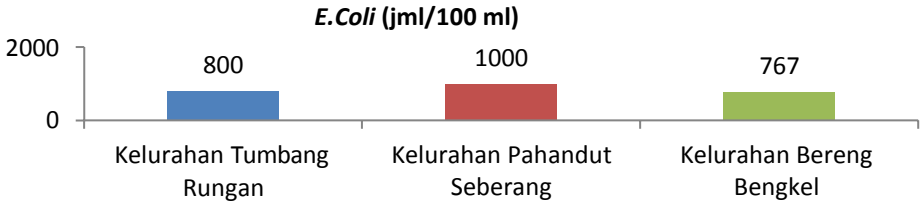

Figure 3. Water Quality on Microbiological Parameters at 3 (three) Research Locations

Based on the quality standard class according to PP 22/2021, the class fluctuates depending on the parameters studied. However, further processing is required before the water can be consumed safely. The BOD and COD parameters fluctuated where the samples in Pahandut Seberang Village were of worse quality than those in Tumbang Rungan (upstream) due to pollutant input (Mubarok, 2018; Kospa and Rahmadi, 2019), but decreased in Bereng Bengkel due to the dilution process (Saputra, Sudiro, and Setyobudiarso, 2016).

The lifestyle and habits of the Kahayan riverside community in Tumbang Rungan, Pahandut Seberang, and Bereng Bengkel villages are grouped based on Minister of Health Regulation No. 12 of 2016 concerning Community-Based Total Sanitation. Lifestyles and habits describe the willingness of the community to change their hygienic behavior.

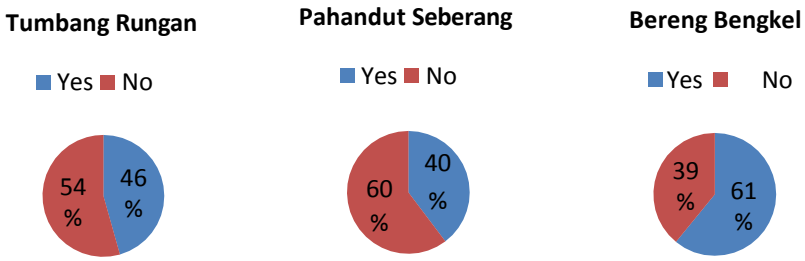

Figure 4. Behavior of Stop Defecation indiscriminately

The behavior of stopping open defecation illustrates the presence or absence of proper faecal disposal facilities. The majority of the people of Tumbang Rungan and Pahandut Seberang Villages still dispose of their fecal waste directly into the river. The majority of the residents of Bereng Bengkel Village have good faecal disposal facilities, but there are still 39% who have not implemented good hygienic behavior.

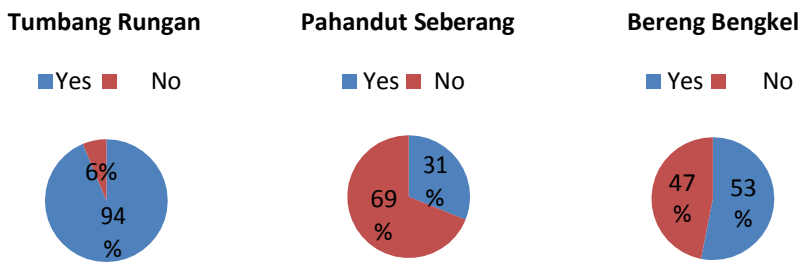

Figure 5. Handwashing Behavior with Soap (CTPS)

BehaviorWashing Hands with Soap (CTPS) illustrates public awareness to maintain personal hygiene through washing hands using soap. The majority of the people of Tumbang Rungan and Bereng Bengkel have implemented this good habit, but the people of Pahandut Seberang still have low awareness in carrying out these activities.

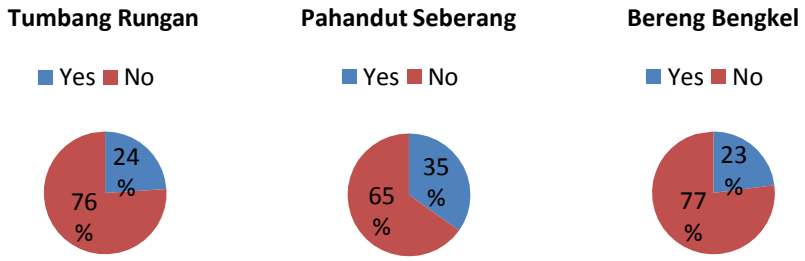

Figure 6. Household Food Drinking Water Management Behavior (PAMMRT)

Household Food Drinking Water Management Behavior (PAMMRT) illustrates public awareness to manage drinking water both in terms of source and processing. The majority of the people in the three locations do not yet have awareness in managing and maintaining sources and processing drinking water before consumption.

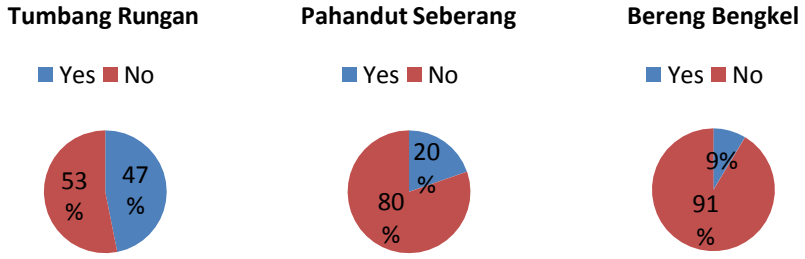

Figure 7. Household Waste Safeguarding Behavior

Household Waste Safeguarding Behavior describes public awareness in securing household waste both from the frequency of disposal, management, and sorting of waste. The majority of the people in the three locations do not yet have awareness in managing and securing the waste they produce.

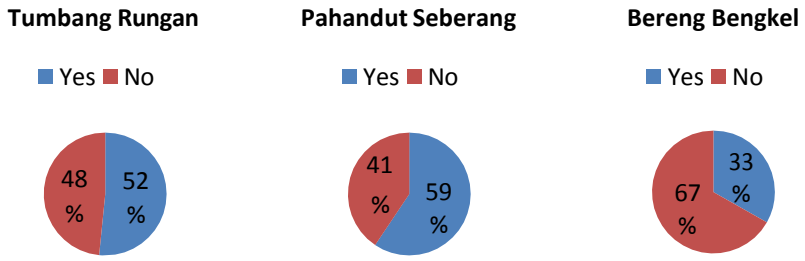

Figure 8. Household Liquid Waste Safeguarding Behavior

Household Liquid Waste Safeguarding Behavior illustrates public awareness in securing household liquid waste in the form of water used for bathing and washing. The majority of the people of Tumbang Rungan and Pahandut Seberang already have awareness in wastewater management, but

the amount is still not significant, while only a third of the people of Bereng Bengkel Village manage their liquid waste.

Environmental health status is determined by the level of sanitation, hygiene and water quality of an area. In this study, an assessment of the environmental health status of the people on the banks of the Kahayan River was carried out, especially those in Tumbang Rungan, Pahandut Seberang, and Bereng Bengkel Villages. The reference in the assessment of environmental health status is sanitation risk.

Sanitation risk is defined as a decrease in the quality of life, health, buildings and/or the environment due to low access to sanitation sector services and hygiene and sanitation behavior. Sanitation Risk Index (IRS)defined as the size and level of sanitation risk as a result of the analysis of the Environmental Health Risk Assessment (EHRA) study or the benefits of calculating sanitation risk, among others, can provide information on the scale of relative sanitation problems from certain areasand become one of the components in determining sanitation risk areas. The Sanitation Risk Index Standard based on the EHRA study of Palangka Raya City (Bappeda, 2018) can be seen in Table 3

Table 3. Sanitation Risk Index

	Value Limit	Information
Total Risk Index Max	307	
Min . Total Risk Index	107	
interval	50	
Risk Area Category	Lower limit	Upper limit
Less risk	107	157
Medium risk	158	208
High risk	209	259
Very high risk	260	310

Data source. EHRA Sanitation Risk Index Standard (Bappeda Kota P.Raya, 2018)

EHRA Studycarried out by the Palangka Raya City Bappeda (2018) withStratified Random Sampling method. Village stratification in the EHRA study is intended to classify villages/kelurahan according to the strata/level of environmental health risk from geographic and demographic factors. Stratification will result in Strata/Levels of Environmental Health Risk from the Village/Kelurahan. The determination of strata can provide an initial indication of the strata/level of environmental health risk in the village/kelurahan. The main criteria for determining the strata are population density, poverty rate, areas/areas with rivers/rivers/drainage canals/irrigation channels, and areas affected by flooding. The number of samples in the EHRA study can be seen in Table 4.

Table 4. Number of EHRA Study samples in 3 (three) location points

Region	Number of RT	Selected RT	Sample/RT (KK)	Number of Samples (KK)
Tumbang Rungan Village	2	2	10	20
Pahandut Seberang Village	10	8	5	40
Bereng Workshop Village	6	5	8	40

Data source: Bappeda Kota P.Raya (2018)

Respondents answered questions about household drinking water management, disposal of sewage/human waste waste and faecal sludge, household waste management, hygiene and sanitation behavior, as well as environmental drainage/sewers around the house and flooding.

Household drinking water management. For household drinking water management, respondents were interviewed about the occurrence of water shortages, sources of water for daily needs (for drinking water), sources of water for daily needs (cooking), and how to process it. In the case of water shortages, 91% stated that there were no water difficulties, indicating that the water sources were sufficient in terms of quantity. The source of water for daily needs (for drinking water) shows that 52.7% of respondents get it through hand pump wells, followed by the use of refilled water by 34.6%. In water sources for daily cooking needs, 95% of respondents treat water by boiling it. This indicates that most people have awareness to treat the water they will consume.

Disposal of human excreta/waste and faeces. For the disposal of human excreta/waste and faeces, respondents were interviewed about the place of defecation (BAB) and the final disposal of feces. Respondents stated that the majority of places to defecate (BAB) are private latrines (73.9%), where the majority (65%) are where the final disposal of feces is in the septic tank. This indicates that the majority of the community is aware of having a private latrine, but there are still 45% of respondents who dispose of feces other than in the septic tank, so that it has the potential to pollute the surrounding water sources.

Household waste management. For household waste management, respondents were interviewed about the condition of waste in the environment, waste management, frequency of waste transportation, and waste sorting. Respondents stated that 47.7% of garbage is still scattered which may cause a lot of mosquitoes (27.9%). This is dangerous for health, because in addition to smelling and unsightly, mosquitoes that nest in garbage can cause various diseases. Waste is managed by burning (46%) or collected and disposed of at TPS (24%). This indicates that the majority of people still manage their waste in an inappropriate way, because processing waste by burning it can produce greenhouse gases that are harmful to the earth's ozone layer. The frequency of waste transportation is still less because only 10, 7% who transport garbage every day. Whereas the waste generated by households ranges from 1.75-2.5 L/person/day or around 0.25-0.4 Kg/person/day.(SNI 19-3983-1995), so that there is a possibility that the waste that is not transported can pollute the surrounding environment. This is exacerbated by the lack of awareness in sorting waste, where 76.9% of respondents do not sort the waste they dispose of.

Hygiene and sanitation behavior. For hygiene and sanitation behavior, respondents were interviewed about the habit of washing hands with soap (CTPS), where only 59.3% used soap to wash their hands, with the majority of hand washing time being done before eating (76.10%), after eating (70, 20%) and after defecation (60.20%). This shows that there is still a fairly high health risk because there are still many respondents who do not wash their hands with soap after activities other than eating and defecating.

Environmental drainage / sewers around the house and flooding. For environmental drainage/sewers around the house and flooding, respondents were interviewed regarding the ownership of wastewater treatment facilities other than feces, a place to dispose of leftover water from the kitchen and washing clothes, as well as the frequency of flooding. In the ownership of waste water treatment facilities other than feces, 57% of respondents do not have treatment facilities. The majority of residual waste water is still in the river (38.6% kitchen water and 37.5% washing). This indicates that household liquid waste still has the potential to pose a risk to environmental health. For

the frequency of floods, 63% stated that they experienced regular flooding. This indicates a lack of drainage infrastructure to prevent flooding.

From the EHRA study, it is known that assessment of health status in Tumbang Rungan, Pahandut Seberang and Bereng Bengkel Villages, and can be seen in Figure 9.

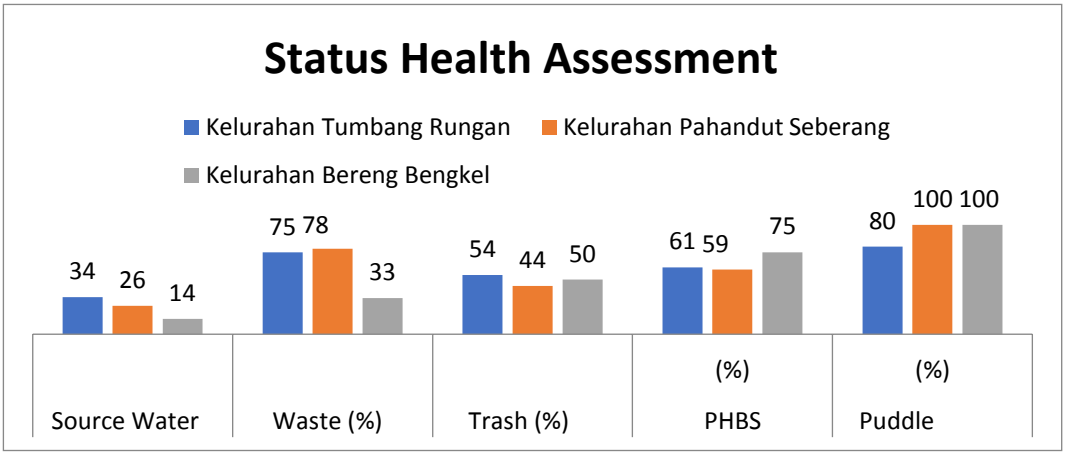

Figure 9Diagram of Public Health Status Assessment Results based on Environmental Health Risk Assessment (EHRA) Data in Tumbang Rungan, Pahandut Seberang and Bereng Bengkel

In accordance with the assessment of health status in Figure 9, a stratification process was carried out to determine the sanitation risk strata score. Sanitation strata score will determine the category of sanitation risk areas. The strata scores of Tumbang Rungan, Pahandut Seberang and Bereng Bengkel sub-districts can be seen in Table 5.

Table 5. Assessment of Health Status in Tumbang Rungan Village, Pahandut Seberang and Bereng Bengkel

Field Data	Percentage (%)					Strata Score
	Water sources	Waste	Rubbish	PHBS	Puddle	
Tumbang Rungan Village	34	75	54	61	80	304
Pahandut Seberang Village	26	78	44	59	100	307
Bereng Workshop Village	14	33	50	75	100	272

Source: Palangka Raya City Bappeda, 2018

Based on Table 5, it is found that the stratum scores of the three kelurahan are included in areas that have a very high sanitation risk. This indicates that these areas face a large sanitation threat from the parameters involved in the assessment. It is known that the greatest sanitation risk for the Tumbang Rungan, Pahandut Seberang and Bereng Bengkel sub-districts is the problem of standing water (80%) and liquid waste (75%) for Tumbang Rungan, puddles (100%) and liquid waste (78%).) for Pahandut Seberang Village, as well as standing water (100%) and Clean and Healthy Lifestyle (PHBS) (75%) for Bereng Bengkel Village. This indicates that the main problem in the three areas is the availability of drainage and the frequency of flooding according to the results of interviews with respondents.

4. Discussion

Environmental health status is determined by the level of sanitation, hygiene and water quality of an area. Stratification is carried out based on the geographical and demographic conditions of the region and then linked to the Environmental Health Risk Assessment (EHRA) Sanitation Risk Index (IRS) (Table 3) in order to obtain a stratification of health status (Table 5). Based on geographical and demographic conditions, the Pahandut Seberang area has a higher sanitation risk score than Tumbang Rungan and Bereng Bengkel due to a larger population than the two regions, but overall, the three areas are included in the very high risk category based on the Sanitation Risk Index standard. (IRS) Environmental Health Risk Assessment (EHRA).

For the Tumbang Rungan sub-district, it was found that the percentage of assessment for water source parameters was 34%. This indicates that this area still has shortcomings in terms of quantity, quality, and processing methods, which is strengthened by the results of the study where 76% of respondents still do not manage their drinking water (Figure 6). In the waste parameter, the percentage value is 75%. This indicates that the awareness of respondents to manage their liquid waste is still low, which is strengthened by the results of the study where only 51.5% of respondents secure their liquid waste (Figure 8). In the waste parameter, the percentage value is 54%. This indicates that the awareness of respondents to manage the condition of waste in the environment, the frequency of transporting waste, and sorting solid waste is still low. which is reinforced by the results of the study where 53.1% of respondents did not secure their waste (Figure 7). In the parameter of Clean and Healthy Life Behavior (PHBS) the percentage value is 61%. This indicates that the awareness of respondents to implement Clean and Healthy Lifestyle Behavior (PHBS) is quite good, which is strengthened by the results of the study where 93.7% of respondents wash their hands with soap (CTPS) (Figure 5). In the puddle parameter, the percentage value is 80%. This indicates that the awareness of respondents to manage the drainage around them is still lacking, where most of the respondents are still experiencing regular flooding. From these parameters, an assessment was carried out to obtain a strata score for the sanitation risk index, and a score of 304 was obtained. In accordance with the standard table of the Sanitation Risk Index (IRS) (Table 3), the Tumbang Rungan sub-district area is included in the category of very high risk area, with the sanitation risk in the water and sewage parameters being the highest among other parameters. This indicates that things that need to be prioritized to reduce the Sanitation Risk Index (IRS) in Tumbang Rungan Village are problems related to standing water and liquid waste.

For the Pahandut Seberang sub-district, it was found that the percentage of assessment for water source parameters was 26%. This indicates that this area still has shortcomings in terms of quantity, quality, and processing methods, which is strengthened by the results of the study where 65.2% of respondents still do not manage their drinking water (Figure 6). In the waste parameter, the percentage value is 78%. This indicates that the awareness of respondents to manage their liquid waste is still low, which is strengthened by the results of the study where only 59.4% of respondents secure their liquid waste (Figure 8). In the waste parameter, the percentage value is 44%. This indicates that the awareness of respondents to manage the condition of waste in the environment, the frequency of transporting waste, and sorting solid waste is still low. which is reinforced by the results of the study where 80.3% of respondents did not secure their waste (Figure 7). In the parameter of Clean and Healthy Life Behavior (PHBS) the percentage value is 59%. This indicates that the awareness of respondents to apply Clean and Healthy Living Behavior (PHBS) is still not good, which is strengthened by the results of the study where only 31.1% of respondents wash their hands

with soap (CTPS) (Figure 5). In the puddle parameter, the percentage value is 100%. This indicates that the awareness of respondents to manage the drainage around them is still lacking, where most of the respondents are still experiencing regular flooding. From these parameters, an assessment was carried out to obtain a strata score for the sanitation risk index, and a score of 307 was obtained. In accordance with the standard table of the Sanitation Risk Index (IRS) (Table 3), the Pahandut Seberang sub-district area is included in the category of very high risk area, with the sanitation risk in the water and sewage parameters being the highest among other parameters. This indicates that things that need to be prioritized to reduce the Sanitation Risk Index (IRS) in Pahandut Seberang Village are problems related to standing water and liquid waste.

For the Bereng Bengkel sub-district, it was found that the percentage of assessment for water source parameters was 14%. This indicates that this area still has shortcomings in terms of quantity, quality, and processing methods, which is strengthened by the results of the study where 77% of respondents still do not manage their drinking water (Figure 6). In the waste parameter, the percentage value is 33%. This indicates that the awareness of respondents to manage their liquid waste is still quite low, which is reinforced by the results of the study where only 33.2% of respondents secure their liquid waste (Figure 8). In the waste parameter, the percentage value is 50%. This indicates that the awareness of respondents to manage the condition of waste in the environment, the frequency of transporting waste, and sorting solid waste is still low. which is reinforced by the results of the study where 91.4% of respondents did not secure their waste (Figure 7). In the parameter of Clean and Healthy Life Behavior (PHBS) the percentage value is 75%. This indicates that the awareness of respondents to implement Clean and Healthy Living Behavior (PHBS) is still not good, which is strengthened by the results of the study where only 53.1% of respondents wash their hands with soap (CTPS) (Figure 5). In the puddle parameter, the percentage value is 100%. This indicates that the awareness of respondents to manage the drainage around them is still lacking, where most of the respondents are still experiencing regular flooding. From these parameters, an assessment was carried out to obtain a strata score for the sanitation risk index, and a score of 272 was obtained. In accordance with the standard table of the Sanitation Risk Index (IRS) (Table 3), the Bereng Bengkel sub-district area is included in the category of very high risk area, with the sanitation risk on the water inundation parameter and Clean and Healthy Life Behavior (PHBS) being the highest among other parameters. . This indicates that the things that need to be prioritized to reduce the Sanitation Risk Index (IRS) in Bereng Bengkel Village are problems related to waterlogging and Clean and Healthy Life Behavior (PHBS).

The government's role is important in controlling sanitation risks in the area. Water sources are controlled by reducing the risk of water pollution and ensuring that the community gets an adequate source of clean water. Domestic waste can be controlled by building adequate septic tanks, sucking up existing septic tanks at least once every 5 years, and preventing the disposal of domestic waste directly into rivers with local policies (Arifianty, 2017). The synergy between the community, government and the private sector must be improved so that domestic waste generated from the private sector and households can be controlled properly (Soejarwo and fitriyanny, 2016). The problem of solid waste can be controlled by management, transportation (with the right frequency and time), and adequate waste management. Clean and healthy living behavior (PHBS) can be improved by socializing clean and healthy living behavior by collaborating with related agencies, in line with what is suggested by Khoiron and Rokhmah (2015). The problem of standing water can be controlled by ensuring adequate drainage is available to prevent flooding. The lack of government's role in fulfilling adequate drainage capacity is an influential factor. In addition, the structure of the

peat soil causes the process of absorption of water into the soil to take a long time (Bappeda Kota Palangka Raya, 2018) thus allowing for routine flooding. With these steps, it is hoped that the environmental health status can be improved by reducing the sanitation risk of the three areas.

5. Cover

Conclusion

a. A quick assessment of environmental health in settlements on the banks of the Kahayan River based on the EHRA study shows that Tumbang Rungan Village, Pahandut Seberang Village, and Bereng Bengkel Village are included in areas with very high sanitation risk.
b. The structure of the peat soil causes the process of absorption of water into the soil to take a long time, thus allowing for regular flooding, the problem of standing water can be controlled by ensuring adequate drainage is available to prevent flooding
c. Clean and healthy living behavior (PHBS) can be improved by socializing clean and healthy living behavior by collaborating with the government, private sector and the community.

Suggestion

a. The research was conducted in three locations, Tumbang Rungan Village, Pahandut Seberang Village, and Bereng Bengkel Village. It is hoped that further research will be carried out in all urban villages in Palangka Raya City.
b. It is necessary to look at the overall environmental health indicators in order to get a picture of environmental health in the Kahayan Riverside Settlement, Palangka Raya City.
c. Promoting Appropriate Technology that is in accordance with the characteristics of the area studied, such as floating septic tanks and RPS independently and family groups living on the banks of the Kahayan river

REFERENCES

Asmawi, Suhaili, Muhammad Ahsin Rifa'i, Idiannor Mahyudin, and Muhammad Ruslan, 2020. Protection of Turbidity on Reefs along the Southeast Coast of the Kalimantan during the 2015 El Niño

Bappeda Palangka Raya City, 2018. EHRA: Environmental Health Risk Assessment 2018.

National Population and Family Planning Agency, 2016. Tumbang Rungan Profile. https://kampungkb.bkkbn.go.id/kampungkb/profile/1271. Accessed on July 24, 2021. At 10.10 WIB

National Population and Family Planning Agency, 2017. Bereng Workshop Profile. https://kampungkb.bkkbn.go.id/profile/1949. Accessed on July 24, 2021. At 10.13 WIB

National Population and Family Planning Agency, 2018. Profile of Pahandut Seberang. https://kampungkb.bkkbn.go.id/profile/16558. Accessed on July 24, 2021. At 10.15 WIB

Central Bureau of Statistics of Palangka Raya City, 2020. City of Palangka Raya in Figures. https://palangkakota.bps.go.id/publication/2020/04/27/dcaedb06dab5bf3e9c1adf0f/kota-palangka-raya-dalam-angka-2020.html. Accessed on July 15, 2021. At 10.10 WIB

Indonesian Ministry of Health. 2004. Food and Beverage Sanitation Hygiene. Director General of PPL and PM. Jakarta

Haslam, SM, 1992. River Pollution; An Ecological Perspective, Belhaven Press, London, UK

Howard.G., Ince, ME and Smith, 2003. Rapid Assessment of Drinking Water Quality: a Handbook for Implementation. Joint Monitoring Program for Water Supply and Sanitation.

Irmawati, 2017. Application of Multidimensional Scaling Analysis in Mapping Poverty Characteristics in South Sulawesi Province.

Kospa, Herda Sabriyah Dara and Rahmadi, 2019. The Effect of Community Behavior on Water Quality in the Sekanak River, Palembang City. JOURNAL OF ENVIRONMENTAL SCIENCES Volume 17 Issue 2 (2019) :212-221

Lantagne, Daniele. Water, Sanitation and Hygiene Interventions: Household Water Treatment and Safe Storage to Reduce the Burden of Diarrhoeal Disease in Developing Countries.https://doi.org/10.1002/9781119148784.ch8. Accessed, 10 June 2019. At 19.30 WIB

Mubarok, Latifah Rizqi, 2018. Study of Pollutants Characteristics of the Upper Belik River, Special Region of Yogyakarta. Indonesian Earth Journal Vol. 7, No. 4.

McMichael ,Celia . Water, Sanitation and Hygiene (WASH) in Schools in Low-Income Countries: A Review of Evidence of Impact. International Journal of Environmental Research and public Health.Int J Environ Res Public HealthMiles, MB & Huberman, AM. 1994. An Expanded Sourcebook : Qualitative Data Analysis (2nd ed.) Thousand Oaks. Sage Publication.CA. 2019 Feb; 16(3): 359. Published online 2019 Jan 28. doi:10.3390/ijerph16030359. Accessed, June 10, 2019. At 19.09 WIB.

Prüss-Ustun A et al. Burden of disease from inadequate water, sanitation and hygiene in low- and middle-income settings: a retrospective analysis of data from 145 countries (e-journal). Trop Med Int Health.2014 Aug;19(8):894-905. doi: 10.1111/tmi.12329. Epub 2014 Apr 30. Accessed April 5, 2019, at 02.00 WIB.

Saputra, Adrian Rizali., Sudiro., Setyobudiarso, Hery., 2016. Water Quality Control Strategy of Banjarmasin Kuin River Based on Pollutant Load Capacity. Thesis, Department of Environmental Engineering National Institute of Technology.