

## Socioeconomic Status, Environmental Health Vulnerabilities, and Traditional Practices of Communities Along the Pulangi River

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### ABSTRACT

This study presents a comprehensive assessment of the socioeconomic status, environmental health vulnerabilities, and socio-cultural dynamics of 608 households situated along the Pulangi River across selected barangays in President Roxas, Matalam, and Carmen, Cotabato. Utilizing a quantitative descriptive survey design, data were collected on household tenure, utility access, health outcomes, asset ownership, and traditional practices. Findings reveal severe housing and land insecurity, with 79% of households living with parents and 55% occupying relatives' land. Environmental infrastructure deficits are critical: 91% lack access to safe drinking water, and 47% lack toilet facilities, relying on direct river disposal. Consequently, 61% of households reported serious illnesses dominated by flu (353 cases), general fever (134 cases), and dengue (141 usual incidents) with dengue accounting for 27% of recorded deaths. Furthermore, 38% find health services completely inaccessible, and 84% have no active NGO affiliation. Economic resilience is low, as 46% hold no major assets, while cultural practice retention has significantly declined to 21%. These findings underscore urgent policy needs for targeted water, sanitation, and hygiene (WASH) interventions, vector control, healthcare expansion, and land tenure security to mitigate systemic vulnerabilities in riverine populations.

**Keywords:** socioeconomic status, environmental health vulnerabilities, socio-cultural dynamics, Pulangi River

### INTRODUCTION

Riverine communities frequently face an intersection of geographical isolation, institutional neglect, and ecological exposure (Adger, 2006; Wisner et al., 2004). The Pulangi River system serves as a vital hydrological resource in Cotabato, supporting local subsistence and agriculture (National Economic and Development Authority [NEDA], 2021). However, rapid demographic growth and inadequate rural infrastructure have heightened the socio-environmental risks experienced by riverbank dwellers (Philippine Statistics Authority [PSA], 2023; Center for Environmental Politics, 2022).

Understanding the baseline socioeconomic conditions, environmental health profiles, and institutional linkages of these households is essential for evidence-based development planning and policy drafting. This study evaluates household security, utility infrastructure, morbidity and mortality patterns, economic asset distribution, healthcare access, civil society participation, and cultural practice retention among communities living along the Pulangi River.

### METHODOLOGY

**Research Design:** A quantitative, descriptive cross-sectional survey design was employed to quantify socioeconomic indicators, health conditions, and institutional access.

**Study Area & Sampling:** The study encompassed 608 head-of-household respondents selected via random sampling across major riverine barangays: Brgy. Tual Siteo Lebpa; Brgy. Kisupaan, Siteo Kaminuangan (President Roxas), Brgy. Arakan Siteo Pulangi (Matalam); Brgy. Manili, and Brgy. Ugalingan Siteo Lumayong, Carmen Cotabato (Figure 1).

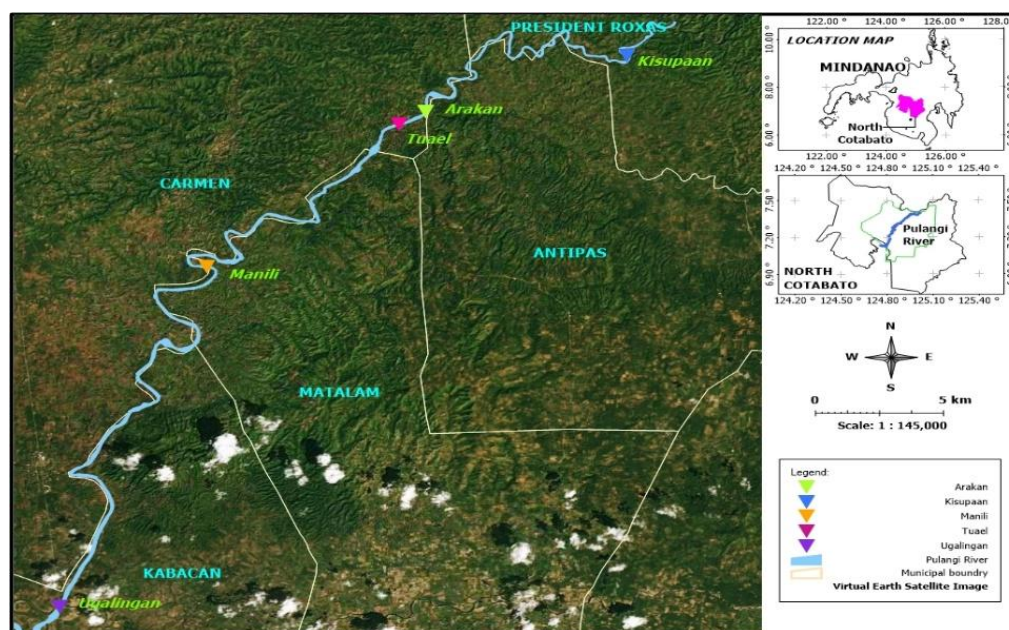


Figure 1. Map showing the study sites along Pulangi River

**Data Collection Instrument:** Structured questionnaire schedules were administered to capture demographic data, land/housing tenure, water and power access, sanitation facilities, health incidents, mortality, household assets, civil society affiliations, and traditional practices.

**Data Analysis:** Quantitative data were analyzed using descriptive statistics, specifically frequency distributions and percentage allocations.

## RESULTS AND DISCUSSION

### Socioeconomic Characteristics of the Households

The data findings on personal information of the identified respondents from the sampling areas namely, Brgy. Tual Sitio Lebpas; Brgy. Kisupaan, Sitio Kaminuangan (President Roxas), Brgy. Arakan Sitio Pulangi (Matalam); Brgy. Manili, and Brgy. Ugalingan Sitio Lumayong (Carmen, Cotabato) revealed that although economic activities associated with the river are infrequent, several households depend on “fishing” as their primary source of income. Nonetheless, the overall reliance on the river for commercial purposes is rather low. The river remains considered crucially significant by many for both economic and cultural practices, rendering it indispensable to their lives and traditions. The majority of respondents regard the river as crucial for the preservation of their cultural heritage. Regarding the quality and reliability of water, the majority of individuals believe that it has declined during the past five years. Many additionally regard the river as highly unreliable as a water source year-round. These concerns indicate that individuals are apprehensive about the river's sustainability and its capacity to supply water in the long run.

The assessment of the socioeconomic characteristics of the 608 households living along the Pulangi River revealed that farming plays a critical role in terms of occupation and income. Most households have limited access to clean water, healthcare, and electricity. The study also revealed that the challenges in terms of employment, income generation, limited access to social services and predominant reliance on the Pulangi River for the various needs of the households along it highlight significant areas of vulnerability.

### Personal Information

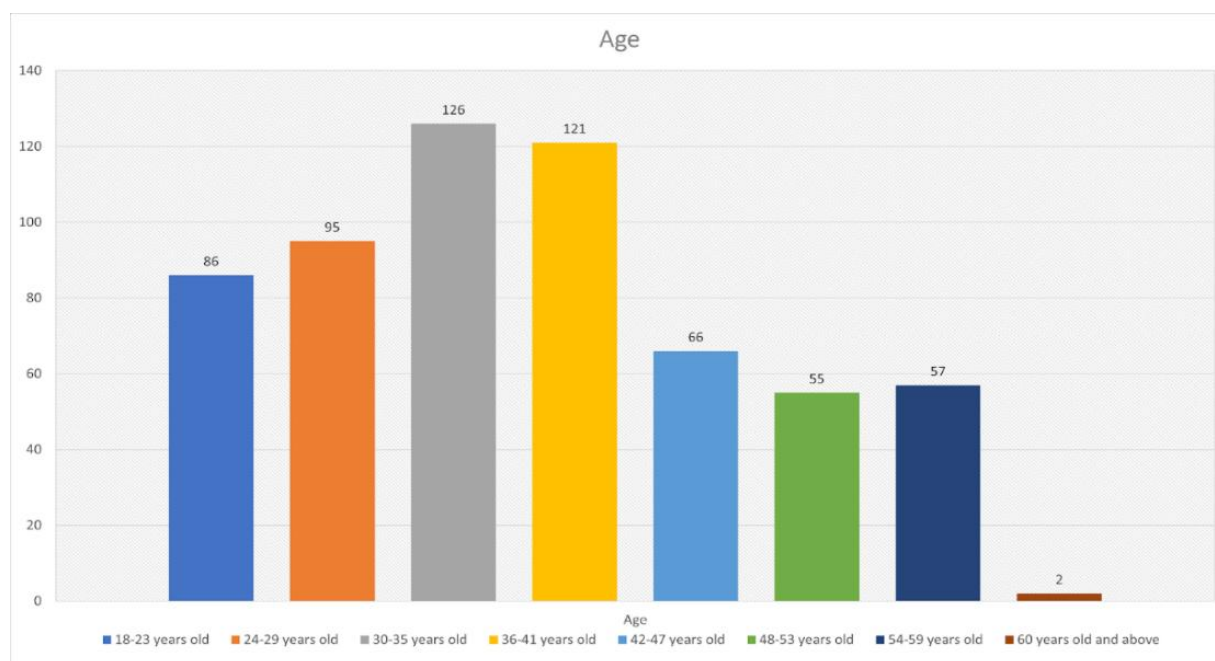
#### Age

The largest group of respondents falls into the 30–35 years old category with 126 individuals (~20.72%), closely followed by the 36–41 years old category with 121 individuals (~19.90%). Together, individuals aged 30 to 41 years old represent the core demographic, accounting for 247 respondents (~40.63%). Younger adults are also

prominently represented, with 95 respondents (~15.63%) aged 24–29 years old and 86 respondents (~14.14%) aged 18–23 years old (Figure 2).

In contrast, participation steadily declines among older age brackets: 66 respondents (~10.86%) are aged 42–47 years old, 57 respondents (~9.38%) are 54–59 years old, and 55 respondents (~9.05%) are 48–53 years old. The 60 years old and above group has the lowest representation, comprising only 2 respondents (~0.33%).

Overall, over 70% of the sample consists of individuals under 42 years of age, indicating that the surveyed households are predominantly represented by young to early middle-aged working adults, with minimal involvement from senior citizens.

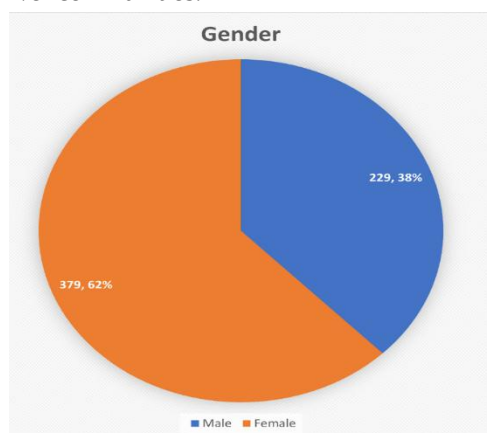


**Figure 2. Frequency Distribution of Respondents According to Age**

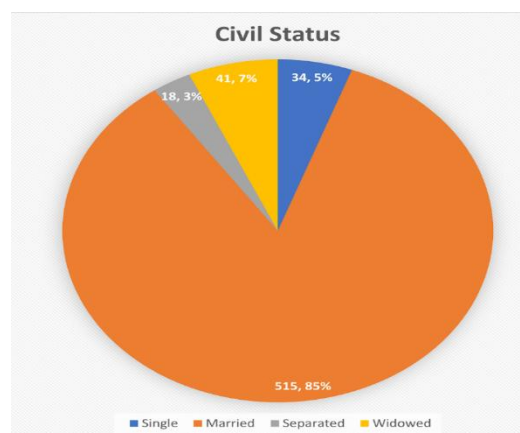
### Gender

The pie chart (Figure 3) shows the gender distribution of the 608 respondents surveyed along the Pulangi River. Out of the total sample, the majority of the respondents are female, accounting for 379 individuals or 62%. Male respondents make up the remaining 229 individuals, representing 38% of the surveyed population.

This indicates a clear female predominance among the survey respondents, which suggests that women were more available, accessible, or designated as primary household representatives during the data collection process in these river communities.



**Figure 3. Gender**



**Figure 4. Civil Status**

### Civil Status

An overwhelming majority of the respondents are married (Figure 4), comprising 515 individuals or 85% of the surveyed population. The remaining categories account for a much smaller fraction of the sample: 41 individuals (7%) are widowed, 34 individuals (5%) are single, and 18 individuals (3%) are separated.

This strong concentration of married individuals indicates that the vast majority of survey respondents represent established, family-based households, reflecting high household stability among the populations residing along the Pulangi River.

### Religion

Majority of the respondents practice Islam, comprising 510 individuals or 84% of the total sample. Christianity represents the second-largest group with 64 individuals (10%), while 34 individuals (6%) adhere to other religions (Figure 5). This demonstrates a dominant Muslim presence among the communities in the surveyed areas along the Pulangi River, reflecting the strong cultural and religious identity of the local population.

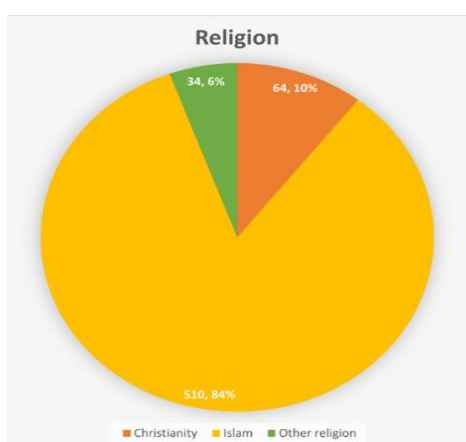


Figure 5. Religion

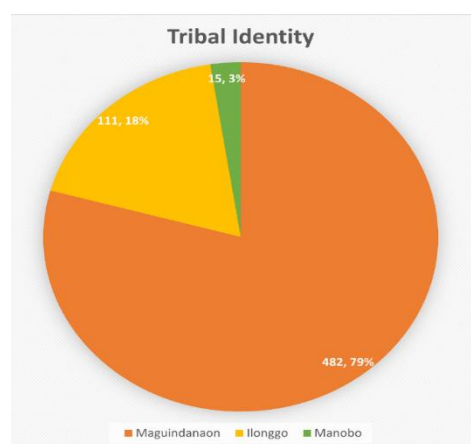


Figure 6. Tribal Identity

### Tribal Identity

An overwhelming majority of the respondents identify as Maguindanaon, comprising 482 individuals or 79% of the total sample. The second-largest ethnic group represented is Ilonggo, accounting for 111 individuals (18%), while the Manobo group represents the remaining 15 individuals (3%) (Figure 6).

This reflects a predominant Maguindanaon population in the surveyed communities along the Pulangi River, alongside a notable presence of Ilonggo settlers and a smaller indigenous Manobo minority.

### Polygamous Marriage

A vast majority of the respondents, comprising 540 individuals or 89%, are not involved in a polygamous marriage (Figure 7). Meanwhile, 68 individuals, representing 11% of the surveyed population, indicated that they are in a polygamous marriage. While monogamy is the predominant marital structure in these riverine communities, the presence of polygamous unions among 11% of the respondents aligns with the cultural and religious traditions of the area, where Islamic customs permit plural marriage under specific conditions.

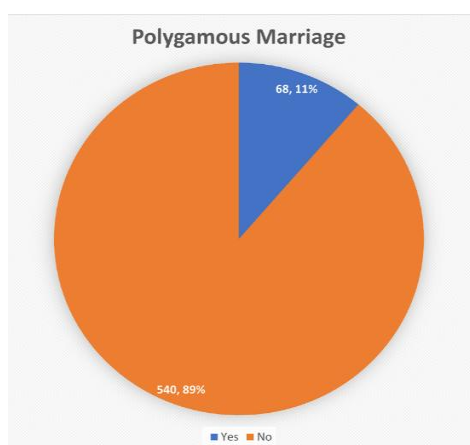


Figure 7. Polygamous Marriage

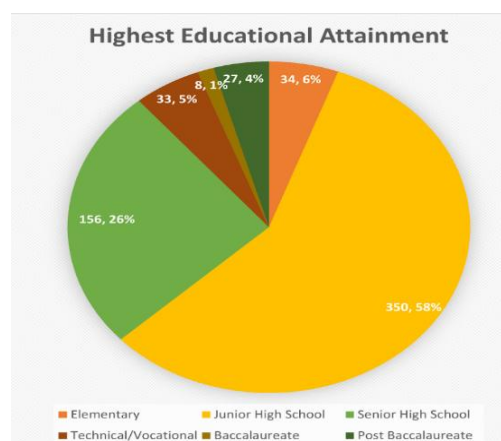


Figure 8. Highest Educational Attainment

### Highest Educational Attainment

Most of the respondents reached Junior High School, comprising 350 individuals or 58% of the sample, while 156 respondents (26%) completed or attended Senior High School. Basic education constitutes the core educational level among residents, with 34 individuals (6%) attaining Elementary education. On the other hand, higher and specialized education levels reflect lower proportions: 33 individuals (5%) completed Technical/Vocational programs, 27 individuals (4%) attained a Post Baccalaureate education, and 8 individuals (1%) held a Baccalaureate degree (Figure 8).

Overall, 84% of the respondents have a secondary-level education (Junior or Senior High School) as their highest level of schooling, indicating widespread foundational secondary literacy but limited progression into tertiary and vocational degree programs within these riverine communities.

### Occupation

The pie chart (Figure 9) illustrates the primary occupation distribution among the 608 respondents surveyed along the Pulangi River. Farming represents the single largest primary occupation, engaged in by 279 respondents or 46% of the total sample. Housekeeping constitutes the second-largest category with 154 individuals (25%), followed by laborers at 78 respondents (13%) and barangay workers at 75 respondents (12%). Occupations directly tied to fishing account for 15 respondents (3%), while formal professionals comprise the smallest group with only 7 respondents (1%).

Overall, agricultural activities and domestic work dominate the economic landscape of the communities along the Pulangi River, together making up 71% of all primary occupations, while formal professional and river-based commercial fishing play relatively minor roles.

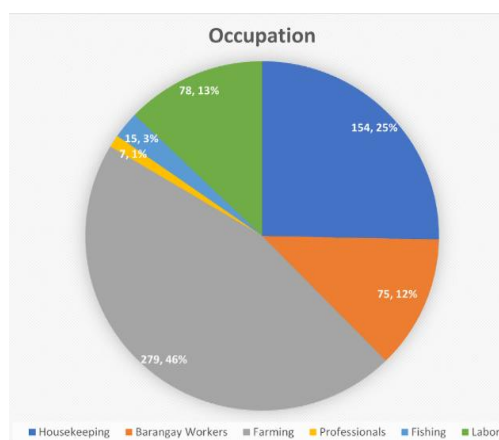


Figure 9. Occupation

### Employment

Most of the respondents fall under the Others category, comprising 316 individuals or 52% of the total sample, which typically captures informal sector workers, agricultural smallholders, and unpaid family laborers. Private sector engagement constitutes the second-largest category with 258 respondents (42%). In contrast, smaller proportions are recorded for the remaining categories: 23 respondents (4%) reported being Unemployed, 7 respondents (1%) are Self-employed, and 4 respondents (1%) work in Government service (Figure 10).

Overall, formal government and self-directed business enterprises account for a minimal portion of the workforce, highlighting that the local economy relies heavily on informal, non-standard, or private contractual employment opportunities.

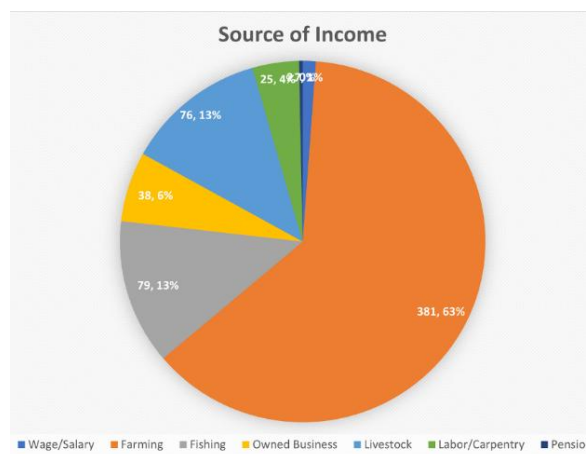
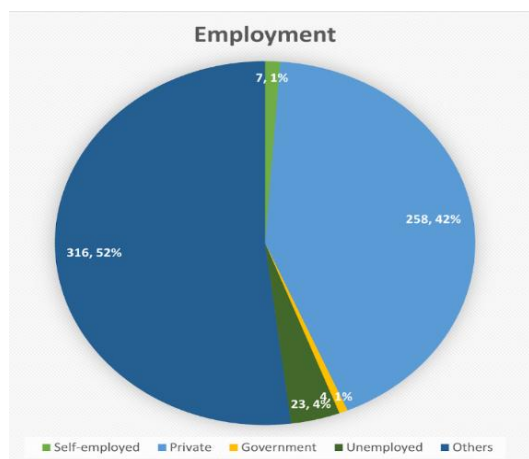


Figure 10. Occupation Figure 11. Source of Income

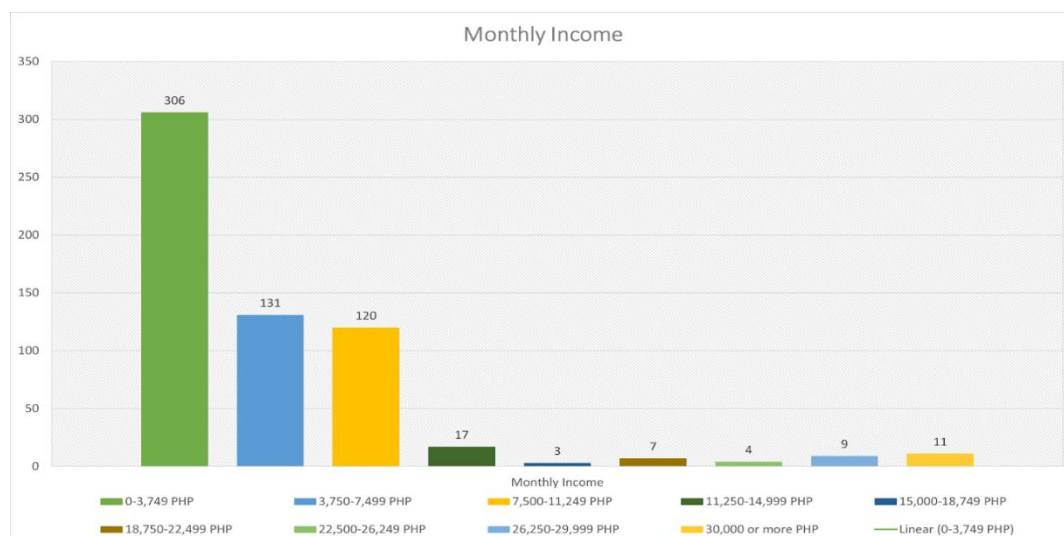
### Source of Income

Farming emerges as the dominant livelihood (Figure 11), serving as the main source of income for 381 respondents or 63% of the sample. Fishing and Livestock rearing form the next largest categories, each accounting for a notable portion at 79 respondents (13%) and 76 respondents (13%), respectively. Micro-entrepreneurship through an owned business supports 38 respondents (6%), while labor/carpentry provides income for 25 respondents (4%). Formal wage/salary employment is relatively scarce, reported by only 7 respondents (1%), and pension supports 2 respondents (0%).

Overall, agricultural and riverine pursuits—farming, livestock, and fishing—collectively drive the local economy, representing 89% of all primary income sources, while formal wage employment and pension reliance remain minimal across these river communities.

### Monthly Income

The bar chart (Figure 12) presents the distribution of monthly household income among the surveyed residents along the Pulangi River, revealing a heavy concentration of households within the lowest earnings brackets. A dominant majority of 306 households earn between 0 and 3,749 PHP per month, representing the largest proportion of the sample. This is followed by 131 households generating 3,750 to 7,499 PHP and 120 households earning 7,500 to 11,249 PHP monthly. In contrast, higher income brackets account for a negligible share of the population: 17 households earn 11,250 to 14,999 PHP, 11 households report 30,000 PHP or more, 9 households fall into the 26,250 to 29,999 PHP range, 7 households earn 18,750 to 22,499 PHP, 4 households earn 22,500 to 26,249 PHP, and 3 households earn 15,000 to 18,749 PHP. Overall, the data illustrates economic fragility across the community, as the vast majority of households subsist on low monthly earnings well below national poverty thresholds, limiting their capacity to invest in improved housing, sanitation, and healthcare.



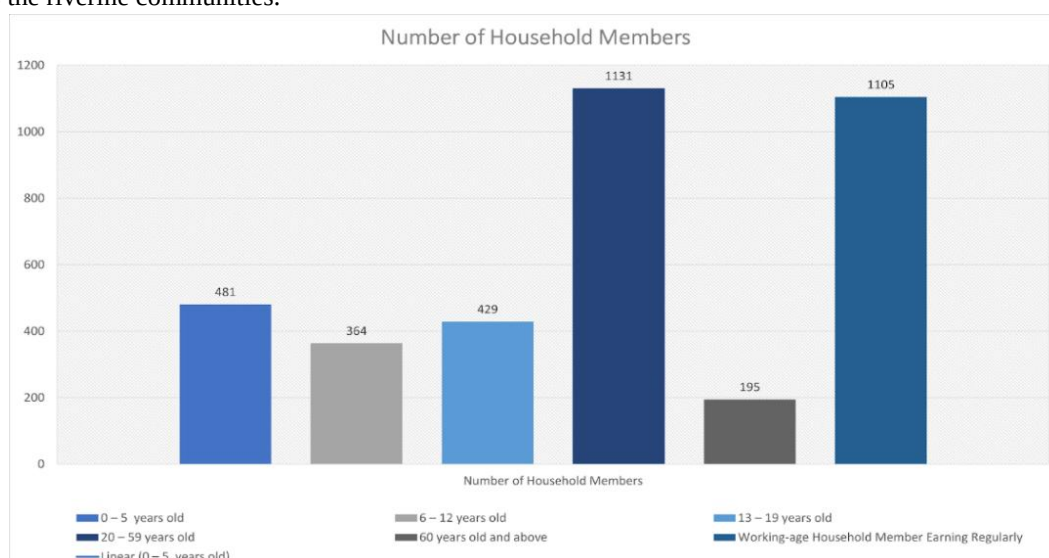
**Figure 12. Frequency Distribution of Respondents According to Monthly Income**

## HOUSEHOLD INFORMATION

### Household Members from 0-60 Years and Above

Among the total population recorded across these households, working-age adults aged 20–59 years old form the largest demographic group at 1,131 individuals, with 1,105 working-age household members reported as earning regularly. Children and dependent youth also represent a significant portion of the total household population, comprising 481 children aged 0–5 years old, 429 adolescents aged 13–19 years old, and 364 school-age children aged 6–12 years old. Seniors aged 60 years old and above make up the smallest demographic bracket, with 195 individuals (Figure 13).

Overall, the data reflects a young and economically active household structure with a substantial dependency ratio, where working-age adults (20–59 years) sustain a high proportion of children and school-aged dependents across the riverine communities.



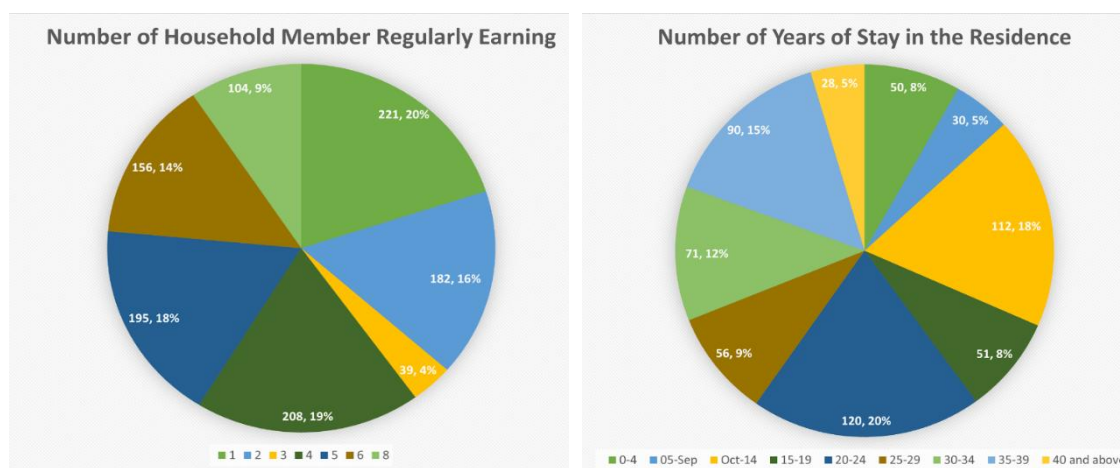
**Figure 13. Frequency Distribution of Respondents According to Number of Household Members from 0-60 Years and Above**

### Household Member Regularly Earning

Figure 14 illustrates the distribution of the number of regularly earning members per household among the 608 respondents surveyed along the Pulangi River. Households with 1 regularly earning member form the single

largest proportion at 221 households (20%), closely followed by households with 4 earning members at 208 households (19%) and 5 earning members at 195 households (18%). Meanwhile, 182 households (16%) report having 2 earning members, 156 households (14%) have 6 earning members, and 104 households (9%) have 8 earning members. The category for 3 earning members represents the smallest share, accounting for 39 households (4%).

Overall, while single-earner households remain the most common individual setup, over 75% of the surveyed households rely on multiple earning members to support the family unit, highlighting shared economic contributions across households in these riverine communities.



**Figure 14. Household Member Regularly Earnin--- -- Figure 15. Number of Years of Stay in the Residence**

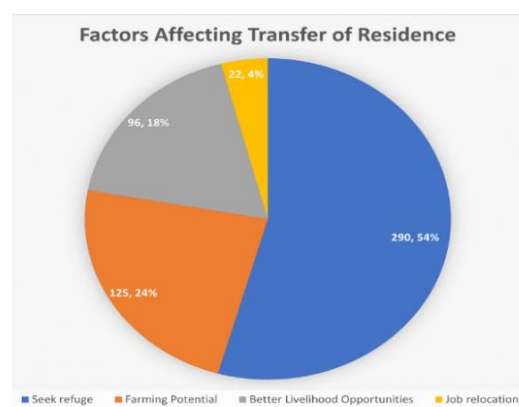
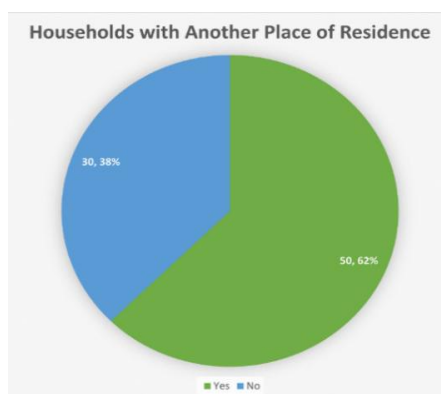
#### Years of Residency

The pie chart (Figure 15) illustrates the distribution of the length of residency among the 608 respondents surveyed along the Pulangi River. Respondents residing in their current home for 20–24 years constitute the largest single group, accounting for 120 households (20%), followed by those who have lived there for 10–14 years (labeled Oct-14) at 112 households (18%) and 35–39 years at 90 households (15%). Moderate lengths of stay include 30–34 years with 71 households (12%), 25–29 years with 56 households (9%), 15–19 years with 51 households (8%), and 0–4 years with 50 households (8%). The smallest categories are composed of respondents who have stayed for 5–9 years (labeled 05-Sep) with 30 households (5%) and those living in the residence for 40 years and above with 28 households (5%).

Overall, 69% of the surveyed respondents have resided in their homes for 15 years or longer, indicating high residential stability and long-term settlement within these riverine communities along the Pulangi River.

#### Household with Other Residence

A clear majority of 50 households (62%) indicated Yes, maintaining another place of residence. In contrast, 30 households (38%) responded No, relying solely on their current dwelling as their primary residence (Figure 16). Overall, the data highlights that most surveyed households have access to secondary housing, which often serves as alternative shelter during seasonal flooding or environmental disturbances along the riverine areas.



**Figure16. Households with Another Place of Residence----- Figure 17. Factors Affecting Transfer of Residence**

### Factors in the Transfer of Residence

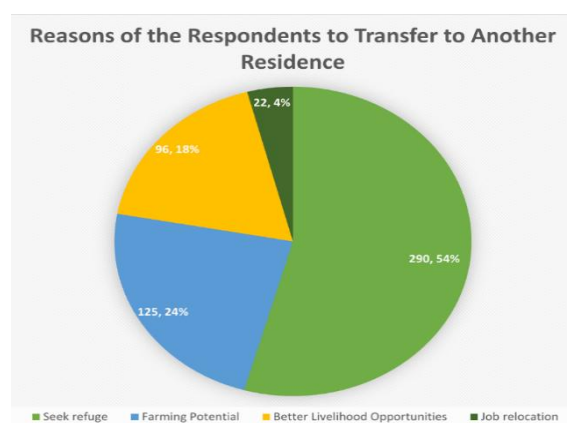
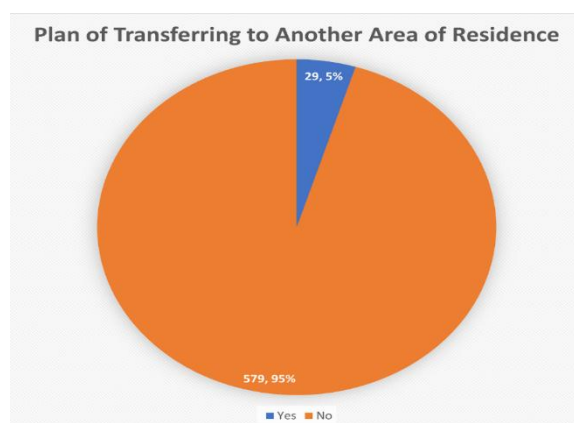
Most respondents cited seeking refuge as their primary reason for relocation, comprising 290 households (54%). Farming potential was identified as the second main driver, accounting for 125 households (24%), followed by better livelihood opportunities at 96 households (18%). Job relocation represented the smallest factor, reported by 22 households (4%) (Figure 17).

Overall, the data demonstrates that safety and environmental security (seeking refuge) are the primary drivers of household relocation along the Pulangi River, while agricultural land accessibility and broader economic livelihood opportunities serve as significant secondary motivations.

### Plan of Transferring to another Residence

Figure 18 illustrates whether respondents plan to transfer to another area of residence. An overwhelming majority of **579 households (95%)** responded **No**, indicating no plans to relocate from their current residence. In contrast, only **29 households (5%)** indicated **Yes**, expressing an intention to move to another area.

Overall, the data demonstrates strong residential attachment and high community retention among the surveyed households along the Pulangi River, with the vast majority intending to stay in their present location despite potential environmental or socio-economic challenges.



**Figure 18. Plan of Transferring to Another Area of Residence** **Figure 19. Reasons of Transfer to Another Residence**

### Reasons to Transfer to Another Residence

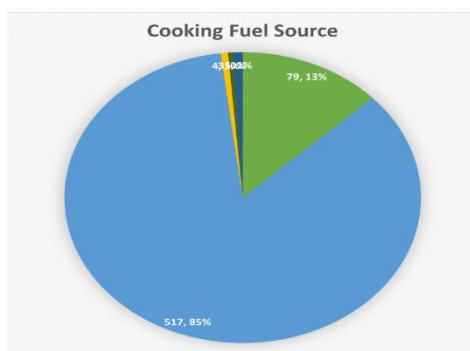
Figure 19 details the specific reasons given by respondents for transferring to another residence. Most respondents cited seeking refuge as their primary reason for transferring, representing 290 households (54%). Farming potential was the second most common driver, selected by 125 households (24%), followed by better livelihood opportunities at 96 households (18%). Job relocation accounted for the smallest proportion, reported by 22 households (4%).

Overall, the data emphasizes that environmental safety and security (seeking refuge) are the primary drivers for household relocation along the Pulangi River, while agricultural productivity and broader economic motivations also play key supporting roles.

### Source of Cooking Fuel

The pie chart (Figure 20) illustrates the primary cooking fuel sources utilized by the surveyed households along the Pulangi River.

A vast majority of 517 households (85%) rely on Kerosene as their main cooking fuel. Firewood represents the second most common source, utilized by 79 households (13%). Minor cooking fuel sources account for the remaining share, including Liquified Petroleum Gas (LPG) used by 4 households (1%), Electric stoves used by 5 households (1%), and Charcoal used by 3 households (0%).



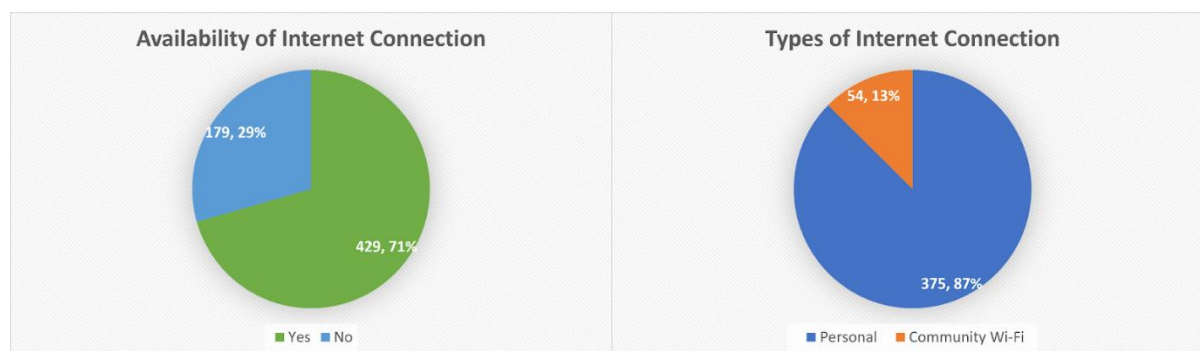
**Figure 20. Distribution of Respondents According to Source of Cooking Fuel**

Overall, the data demonstrates a heavy reliance on traditional and non-modern energy sources for daily domestic cooking, reflecting local energy accessibility and socio-economic considerations within the riverine communities.

### Availability of Internet Connection and Type

Figure 21 present the availability and types of internet connection among the surveyed households along the Pulangi River. Regarding the Availability of Internet Connection, a substantial majority of 429 households (71%) reported having access to an internet connection (Yes), while 179 households (29%) indicated having no internet access (No). Among those households with internet connectivity, the chart on Types of Internet Connection shows that an overwhelming majority of 375 households (87%) utilize a Personal internet connection, whereas 54 households (13%) rely on Community Wi-Fi.

Overall, the data indicates high digital connectivity among the surveyed population, with personal connections serving as the predominant primary means of accessing online information and digital services.

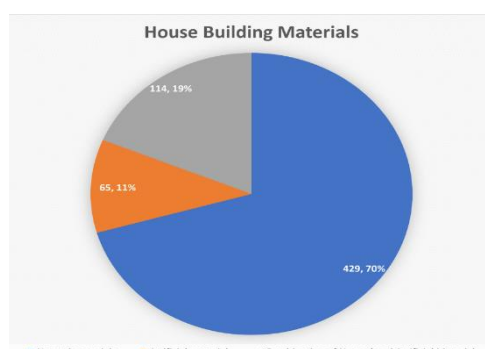


**Figure 21. Frequency Distribution of Respondents According to Availability of Internet Connection and Types of Internet Connection**

### Household Building Materials

Figure 22 illustrates the distribution of construction materials used in residential housing among the surveyed households along the Pulangi River.

An overwhelming majority of 429 households (70%) rely on Natural materials (such as bamboo, wood, or nipa) for building their houses. Households using a Combination of Natural and Artificial Materials form the second largest group at 114 households (19%). In contrast, houses constructed entirely with Artificial materials (such as concrete, corrugated zinc, or metal sheets) represent the smallest category, accounting for 65 households (11%).



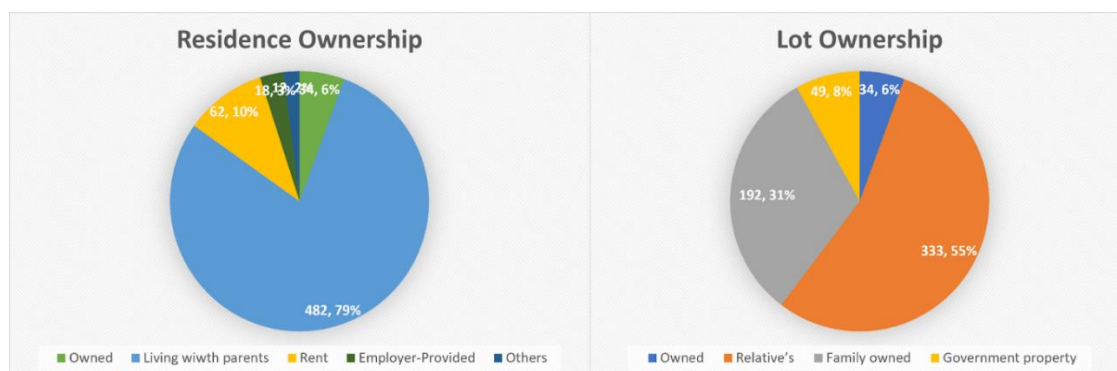
**Figure 22. Distribution of Respondents According to House Building Materials**

Overall, the data reflects a predominant reliance on locally sourced, traditional, or natural construction materials, highlighting housing vulnerability and low adaptation of durable artificial structures against environmental hazards along the riverine areas.

### Ownership of Lot and Residence

The pie charts (Figure 23) present the patterns of residence and lot ownership among the surveyed households along the Pulangi River. Regarding Residence Ownership, a vast majority of 482 households (79%) indicated Living with parents. Rented housing represents the second largest share at 62 households (10%), followed by Owned residences at 34 households (6%), Employer-Provided arrangements at 18 households (3%), and Others at 12 households (2%).

In terms of Lot Ownership, more than half of the respondents reside on a Relative's lot (333 households, 55%). Family owned lots constitute 192 households (31%), while Government property accounts for 49 households (8%). Only 34 households (6%) report having direct individual ownership (Owned) of their residential land. Overall, the data reveals significant land and housing tenure insecurity, characterized by high reliance on informal family arrangements and low rates of formal individual property ownership within the community.

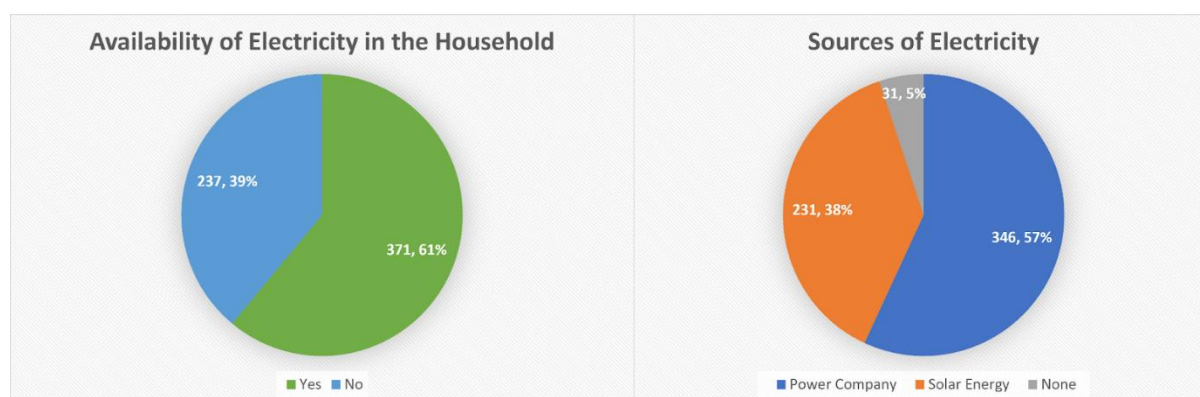


**Figure 23. Distribution of Respondents According to Ownership of Lot and Residence**

### Electricity and Its Source

Figure 24 present the availability and specific sources of electricity among the surveyed households along the Pulangi River. Regarding the Availability of Electricity in the Household, 371 households (61%) reported having access to electricity (Yes), while 237 households (39%) indicated having no household electricity connection (No).

**Figure 24. Frequency Distribution of Respondents According to Availability of Electricity and Its Source**



In terms of Sources of Electricity, the main power distribution is led by a Power Company, serving 346 households (57%). Solar Energy provides an alternative renewable power source for 231 households (38%), while 31 households (5%) reported having None.

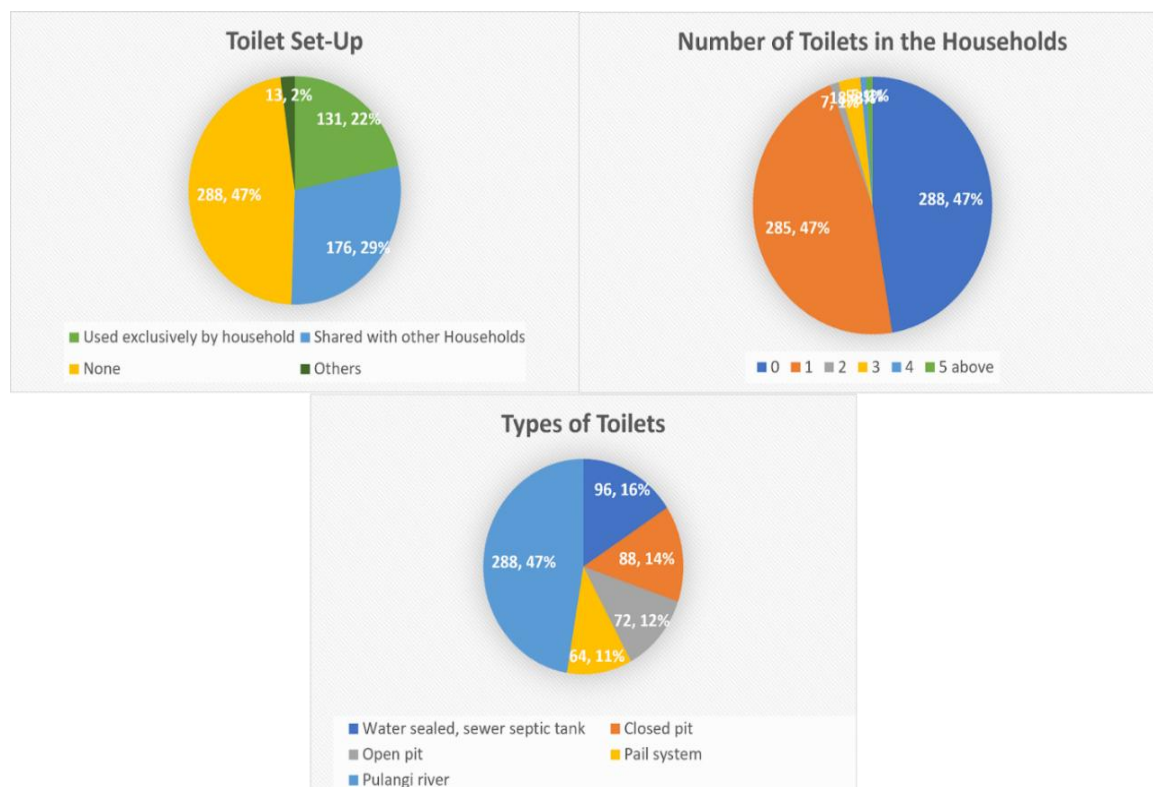
Overall, the data demonstrates moderately high electricity penetration, where traditional grid connections from power distribution companies are significantly complemented by off-grid solar energy systems across local households.

### Toilet Set-up, Number of Toilets, and Types of Toilets

The pie charts (Figure 25) outline sanitation, toilet availability, and facility types among the surveyed households along the Pulangi River. Toilet Set-Up: A plurality of 288 households (47%) reported having no dedicated toilet facility (None). Shared arrangements are common, with 176 households (29%) indicating their setup is Shared with other Households. Meanwhile, 131 households (22%) have toilets Used exclusively by household, and 13 households (2%) fall under Others. Number of Toilets in the Households: Reflecting the setup data, 288 households (47%) have 0 toilets, while an equal number of 285 households (47%) own 1 toilet facility. Multiple toilet ownership remains low: 18 households (3%) have 2 toilets, 7 households (1%) have 3 toilets, 1 household (0%) has 4 toilets, and 8 households (1%) reported 5 above.

Types of Toilets: Direct disposal into the Pulangi river is the most frequent practice, accounting for 288 households (47%). Standard sanitary infrastructure is present in 96 households (16%) utilizing a Water sealed, sewer septic tank. Alternative methods include Closed pit toilets used by 88 households (14%), Open pit facilities used by 72 households (12%), and the Pail system used by 64 households (11%).

Overall, the findings highlight severe sanitation infrastructure deficits, with nearly half of the households lacking basic toilet facilities and relying directly on the Pulangi River for waste disposal, presenting critical environmental and public health implications.



**Figure 25. Distribution of Respondents According Toilet Set-up, Number of Toilets, and Types of Toilets**

#### Access to Clean and Safe Water, Source of Clean and Safe Water, and Other Sources of Water

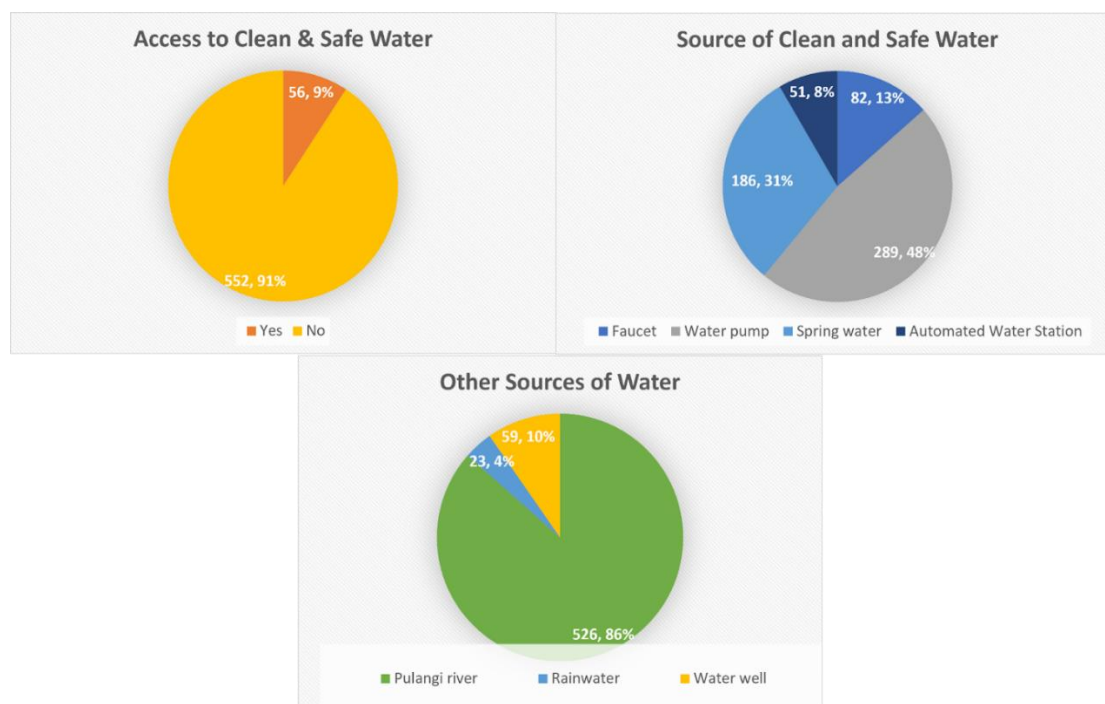
Figure 26 present the access to and sources of water among the surveyed households along the Pulangi River.

**Access to Clean & Safe Water:** An overwhelming majority of 552 households (91%) reported having no access to clean and safe drinking water (No). Only 56 households (9%) indicated having access to clean and safe water (Yes).

**Source of Clean and Safe Water:** Among households with access to safe water sources, the Water pump is the most common, utilized by 289 households (48%). Spring water serves as the source for 186 households (31%), followed by piped Faucet water at 82 households (13%), and Automated Water Station facilities at 51 households (8%).

**Other Sources of Water:** For general domestic and supplementary water needs, a vast majority of 526 households (86%) depend directly on the Pulangi river. Additionally, 59 households (10%) utilize a Water well, while 23 households (4%) harvest Rainwater.

Overall, the findings highlight severe water security and health vulnerabilities, as over 90% of households lack access to safe drinking water and heavily rely on surface water directly from the Pulangi River.



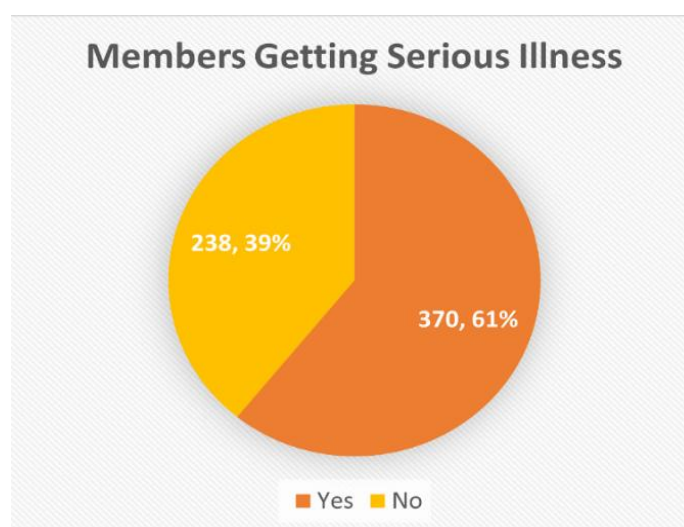
**Figure 26. Distribution of Respondents According to Access to Clean and Safe Water, Source of Clean and Safe Water, and Other Sources of Water**

#### Household Members Getting Serious Illness

Figure 27 illustrates whether household members have experienced serious illness among the surveyed households along the Pulangi River.

A majority of 370 households (61%) reported Yes, indicating that at least one household member has experienced a serious illness. Conversely, 238 households (39%) responded No, indicating no occurrences of serious illness among their household members.

Overall, the high prevalence of serious illness among surveyed residents aligns with the documented environmental challenges in the area—such as limited access to clean drinking water and inadequate sanitation infrastructure—underscoring significant health vulnerabilities in these riverine communities.

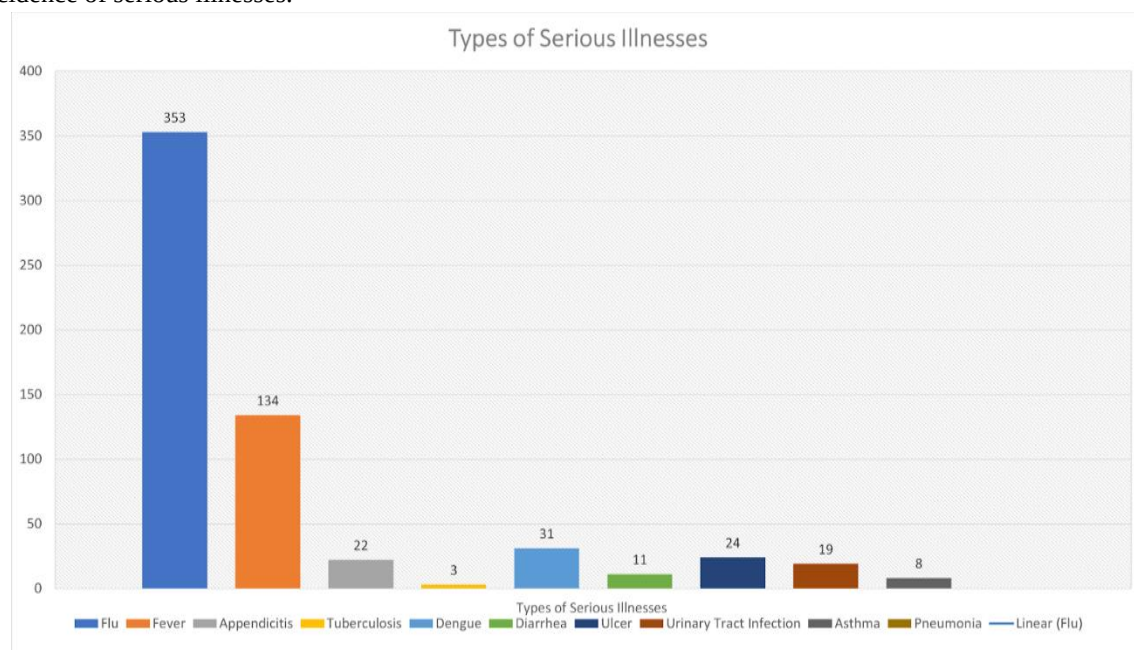


**Figure 27. Distribution of Respondents According to Household Members Getting Serious Illness**

### Types of Serious Illnesses

The survey results (Figure 28) on health status among households along the Pulangi River reveal significant health vulnerabilities directly linked to poor sanitation and limited safe water access. A clear majority of 370 households (61%) reported that at least one member has experienced a serious illness, while 238 households (39%) reported no serious illnesses.

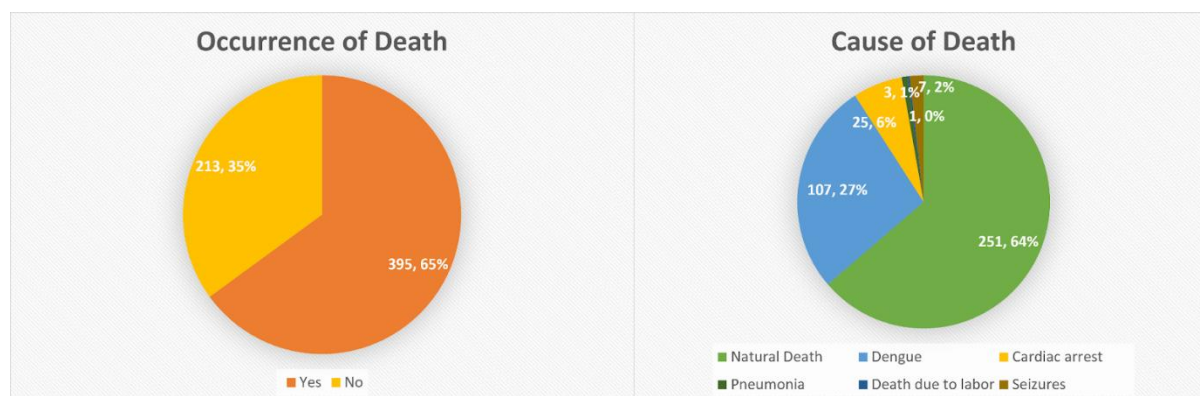
When examining the specific conditions reported, systemic infections and fevers dominate the health burden, with flu accounting for the highest frequency at 353 cases, followed by general fever at 134 cases. Mosquito-borne and waterborne conditions are also prevalent, including dengue (31 cases), ulcer (24 cases), appendicitis (22 cases), urinary tract infection (19 cases), and diarrhea (11 cases). Less common conditions reported include asthma (8 cases) and tuberculosis (3 cases). Overall, these findings underline the public health challenges in the community, where inadequate waste disposal and reliance on unsafe water sources heavily contribute to the widespread incidence of serious illnesses.



**Figure 28. Frequency Distribution of Respondents According to the Types of Serious Illnesses**

Figure 29 detail mortality experience and specific causes of death among the surveyed households along the Pulangi River. Occurrence of Death: A major proportion of 395 households (65%) reported Yes, indicating that a death has occurred within the household. Meanwhile, 213 households (35%) reported No, indicating no deaths experienced. Cause of Death: Among reported deaths, Natural Death accounts for the primary majority, attributed to 251 cases (64%). Vector-borne infectious illness is a major specific factor, with Dengue causing 107 deaths (27%). Other reported causes include Cardiac arrest with 25 cases (6%), Seizures with 7 cases (2%), Pneumonia with 3 cases (1%), and Death due to labor with 1 case (0%).

Overall, the high rate of household mortality—particularly the substantial percentage of deaths driven by dengue—further underscores the urgent need for environmental health interventions and improved vector-control measures along the riverine communities.



**Figure 29. Frequency Distribution of Respondents**

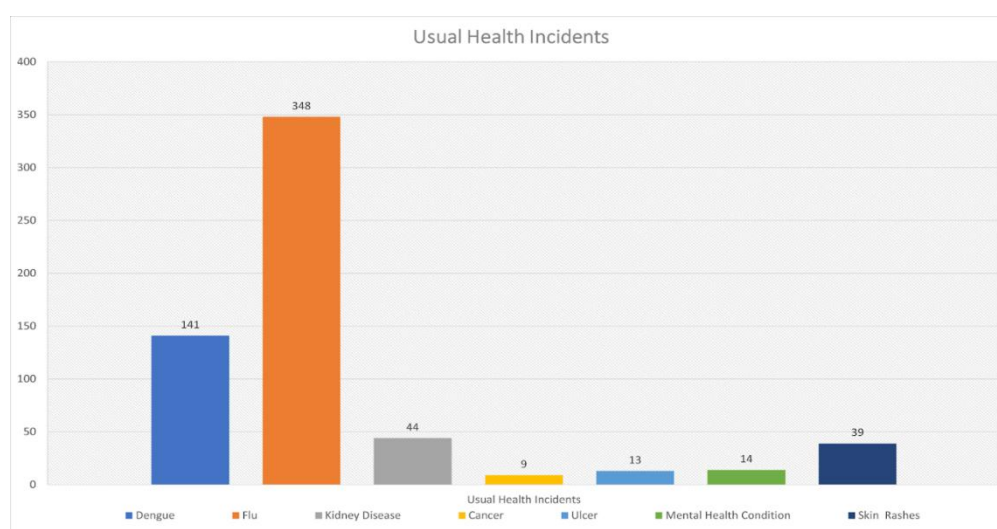
According to Occurrence and Cause of Death

### Usual Health Incidents

The data on usual health incidents reported among surveyed households along the Pulangi River underscores a high prevalence of infectious and environment-related health conditions (Figure 30). Flu emerged as the most widely reported health issue by a substantial margin, affecting 348 cases across the community. Mosquito-borne dengue represents the second highest condition with 141 recorded cases, reflecting significant vector-borne risks in the area. Chronic and environmental ailments were also present, led by kidney disease with 44 cases and skin rashes—a condition typically associated with riverine water exposure and sanitation conditions—with 39 cases. Mental health conditions and ulcers were reported in 14 and 13 cases, respectively, while cancer was identified in 9 cases. Overall, infectious diseases such as flu and dengue heavily dominate the health profile of these riverine households, while the presence of water-linked skin issues and kidney conditions further emphasizes the environmental health vulnerabilities of the population.

### Access to Health Services

The pie chart (Figure 31) illustrates the level of access to health services among the surveyed households along the Pulangi River.

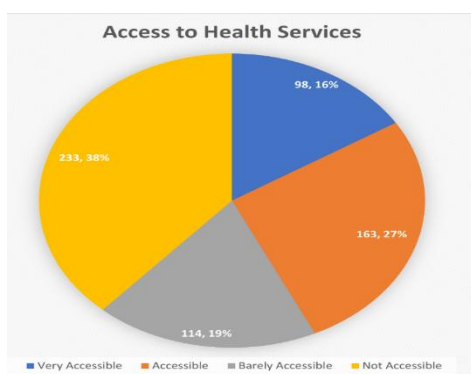


**Figure 30. Frequency Distribution of Respondents According to Usual Health Incidents**

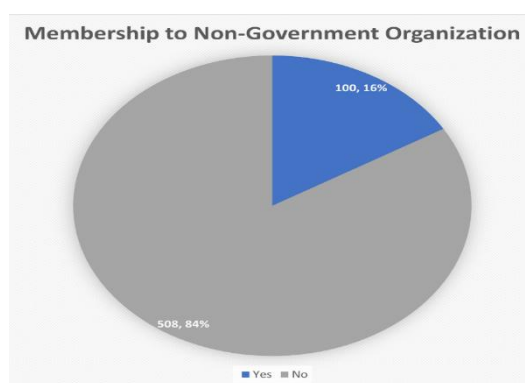
A plurality of 233 households (38%) reported that health services are Not Accessible. Meanwhile, 163 households (27%) indicated that services are Accessible, 114 households (19%) categorized them as Barely Accessible, and 98 households (16%) reported that health services are Very Accessible.

In paragraph form, the survey findings on access to health services among households along the Pulangi River reveal substantial healthcare accessibility barriers within the community. A plurality of 233 households (38%) indicated that health services are not accessible, while an additional 114 households (19%) stated that healthcare is barely accessible. Conversely, 163 households (27%) described health services as accessible, and only 98 households (16%) found them to be very accessible. Overall, over half of the surveyed households face significant difficulties or complete restrictions in obtaining essential healthcare, compounding the public health vulnerabilities previously observed across the riverine settlements.

**Figure 31. Access to Health Services**



**Figure 32. Membership to Non-Government Organization**

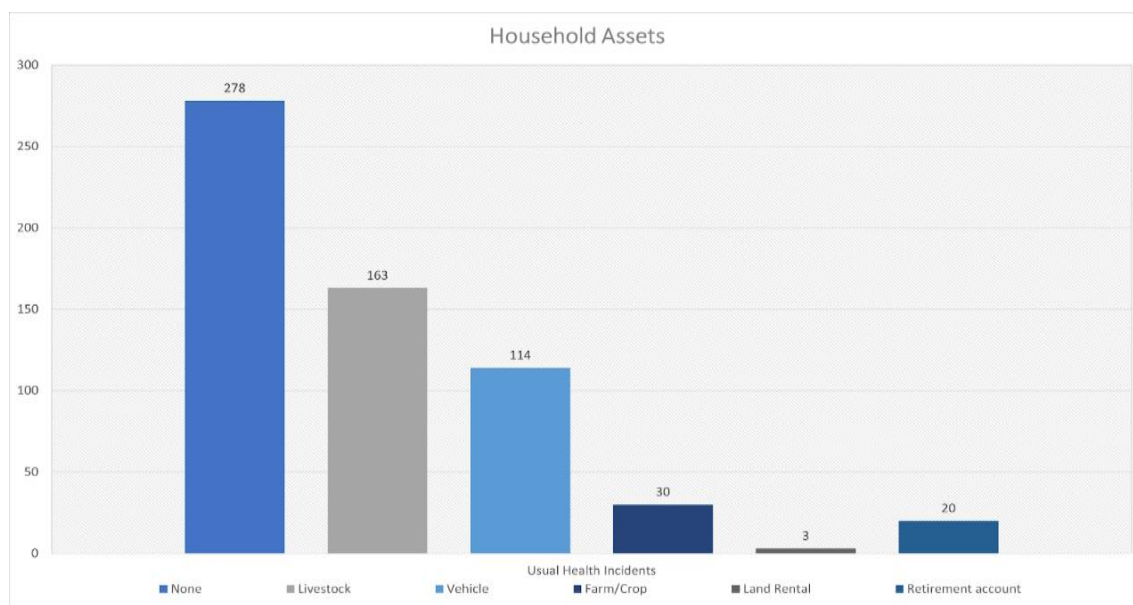


**Figure 32 illustrates the extent of membership in Non-Government Organizations (NGOs) among the surveyed households along the Pulangi River.**

An overwhelming majority of 508 households (84%) reported having no affiliation or membership in any non-government organization (No). In contrast, 100 households (16%) indicated active membership in an NGO (Yes). In paragraph form, the survey data regarding non-government organization membership among households along the Pulangi River highlights limited institutional community engagement and civil society involvement. A substantial majority of 508 households (84%) indicated that they hold no membership in any NGO, whereas only 100 households (16%) reported affiliation with non-government entities. This low rate of organizational participation underscores potential gaps in community-led development initiatives, external support networks, and local civic engagement across the riverine settlements.

### Household Assets

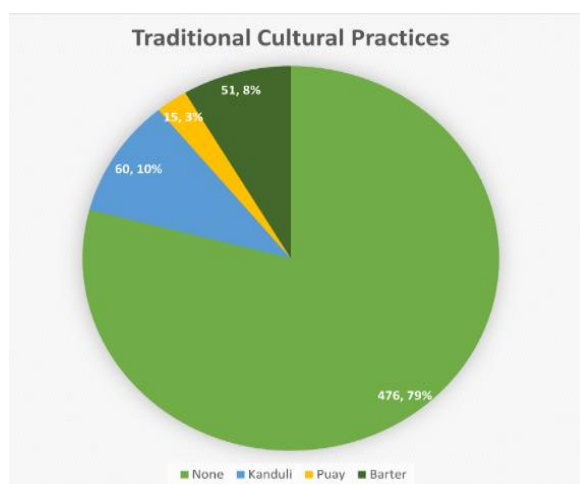
The survey results on household assets among residents along the Pulangi River highlight limited asset ownership and economic vulnerability across the community. A plurality of 278 households indicated having no major assets (None). Among those with reported assets, livestock represents the most common, held by 163 households, followed by vehicles owned by 114 households. Less common assets include farm or crop holdings reported by 30 households, retirement accounts held by 20 households, and land rental income reported by 3 households (Figure 33). Overall, the high proportion of households lacking major assets underscores economic instability and limited financial buffers among the surveyed population in the riverine area.



**Figure 33. Frequency Distribution of Respondents According to Household Assets**

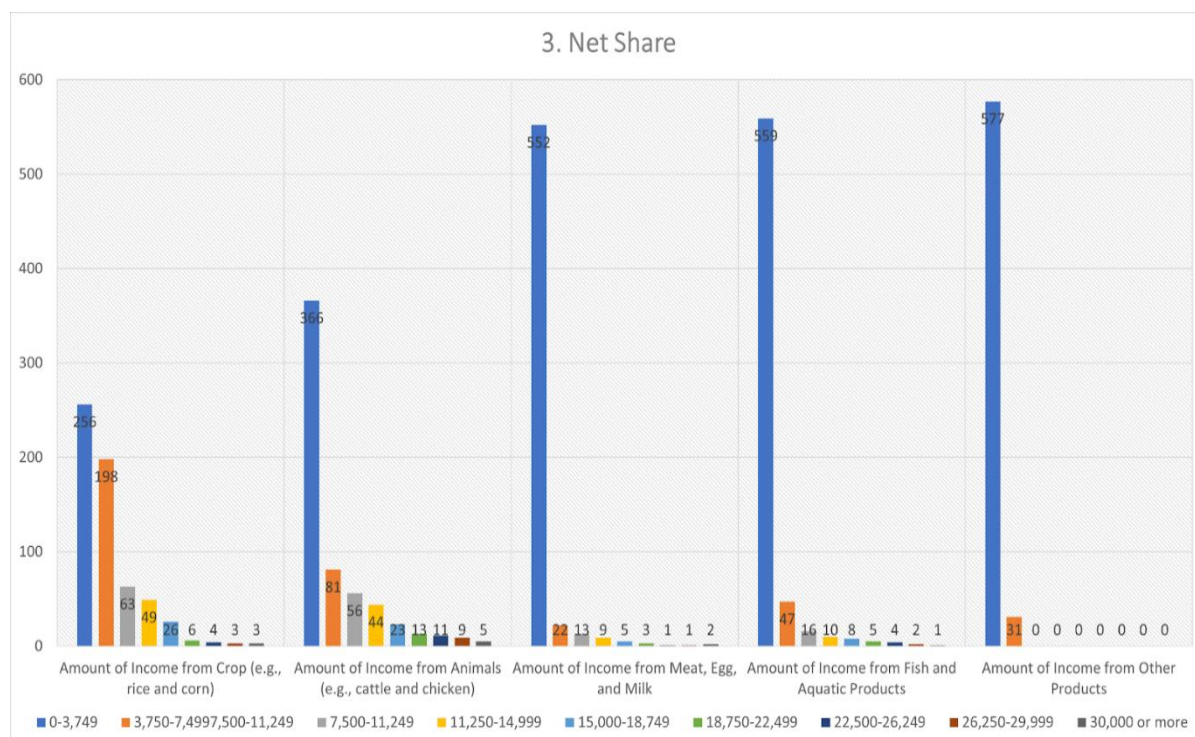
### Traditional Cultural Practices

The survey findings on traditional cultural practices among households along the Pulangi River (Figure 34) indicate a significant shift away from specific indigenous and customary traditions. A substantial majority of 476 households (79%) reported no involvement in traditional cultural practices (None). Among the remaining households that continue to observe customary traditions, Kanduli represents the most prevalent practice, retained by 60 households (10%), followed by traditional Barter trade system engaged in by 51 households (8%), and Puay practiced by 15 households (3%). Overall, these metrics highlight a gradual decline or low retention rate of traditional socio-cultural customs across the surveyed riverine population.

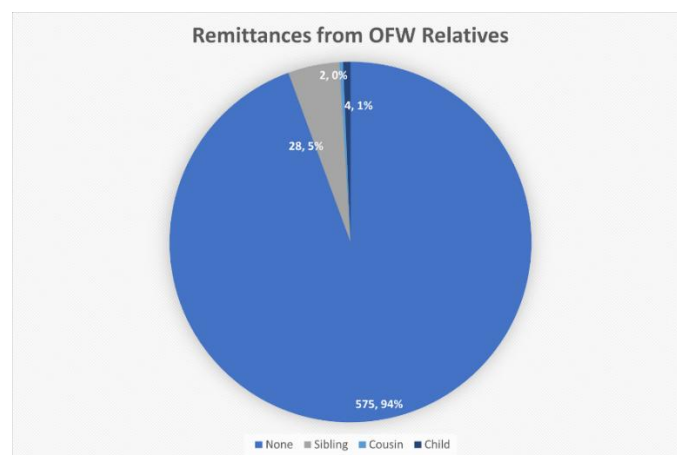


**Figure 34. Distribution of Respondents According to Traditional Cultural Practices**

Part 1.3. Net Share of Crops, Fruits, Vegetables Produced, Aquaculture Harvested or Livestock and Poultry Raised



**Figure 35. Frequency Distribution of Respondents According to Net Share of Crops, Fruits, Vegetables Produced, Aquaculture Harvested or Livestock and Poultry Raised**

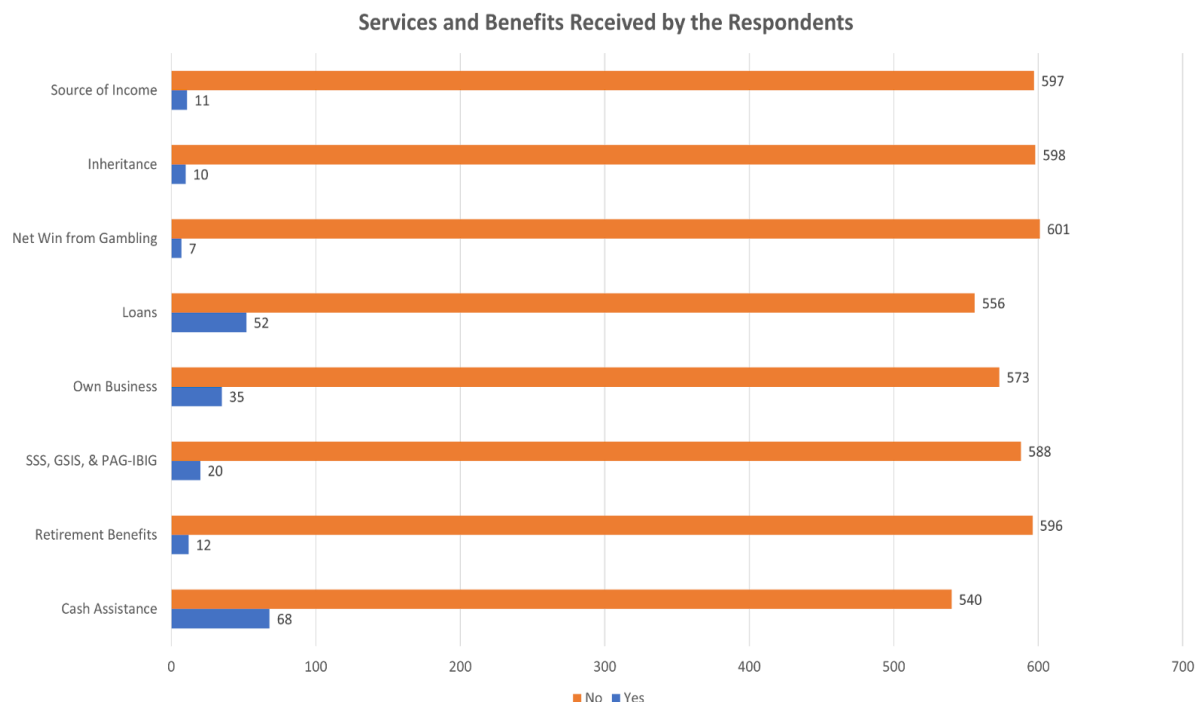


**Figure 36. Distribution of Respondents According to Remittances from OFW Relatives**

### Economic Services and Benefits

The horizontal bar chart (Figure 37) depicts the distribution of services and benefits received by the surveyed respondents along the Pulangi River, highlighting widespread non-receipt across all evaluated financial and institutional support categories. Cash Assistance represents the most accessed benefit, yet it was received by only 68 respondents compared to 540 who did not receive it. Credit access through Loans was reported by 52 respondents, while 556 had no loan utilization. Revenue from Own Business was indicated by 35 respondents (573 non-recipients), and government social security coverage (SSS, GSIS, & PAG-IBIG) was utilized by merely 20 respondents, with 588 indicating no coverage. Other sources of financial inflows were virtually absent across the sample: Retirement Benefits were reported by 12 respondents (596 non-recipients), formal Source of Income support by 11 respondents (597 non-recipients), Inheritance by 10 respondents (598 non-recipients), and Net Win from Gambling by 7 respondents (601 non-recipients). Overall, these metrics reveal severe social protection gaps

and limited formal economic integration, as the overwhelming majority of households operate without social security coverage, institutional credit, or government benefit support



**Figure 37. Frequency Distribution of Respondents According to Cash Assistance, Pension or Retirement Benefits, Benefits from SSS, GSIS, and/or PAG-IBIG, Own Business, Loans, Occurrence of Winnings from Gambling, Sweepstakes, and Raffle, Inheritance and Other Sources of Income and Receipts.**

### Social Services

Figure 38 details the extent of access to social services among the surveyed respondents along the Pulangi River, revealing substantial gaps in social protection, welfare benefits, and institutional insurance coverage across the population. Public health insurance and conditional cash transfers represent the most accessible government social programs. PhilHealth coverage was reported by 195 respondents (with 413 non-recipients), while the Pantawid Pamilyang Pilipino Program (4Ps) was availed of by 160 respondents, compared to 448 who indicated non-inclusion. Beyond these main programs, participation in other government welfare initiatives remains minimal: 46 respondents participated in Cash-for-Work Programs (562 non-recipients), 32 accessed Free Training Programs (576 non-recipients), 25 benefited from Feeding, Business, or Employment Programs (583 non-recipients), 20 received Scholarship Programs (588 non-recipients), 19 availed of Livelihood Programs (589 non-recipients), and 19 accessed the Special Program for Employment of Students (SPES; 589 non-recipients). Social Pension coverage for senior citizens was virtually absent, with only 2 respondents receiving it (606 non-recipients). Similarly, institutional social security and private insurance integration are minimal: 49 respondents are covered by SSS (559 non-recipients), 22 by GSIS (586 non-recipients), 21 by Private Health Insurance (587 non-recipients), 17 by Private Life Insurance (591 non-recipients), and 17 by Private Pre-need Insurance (591 non-recipients). Overall, the findings highlight that while state-sponsored health insurance and targeted cash transfer programs offer partial support, the overwhelming majority of riverine households remain excluded from broader social security networks, specialized welfare schemes, and private safety nets.

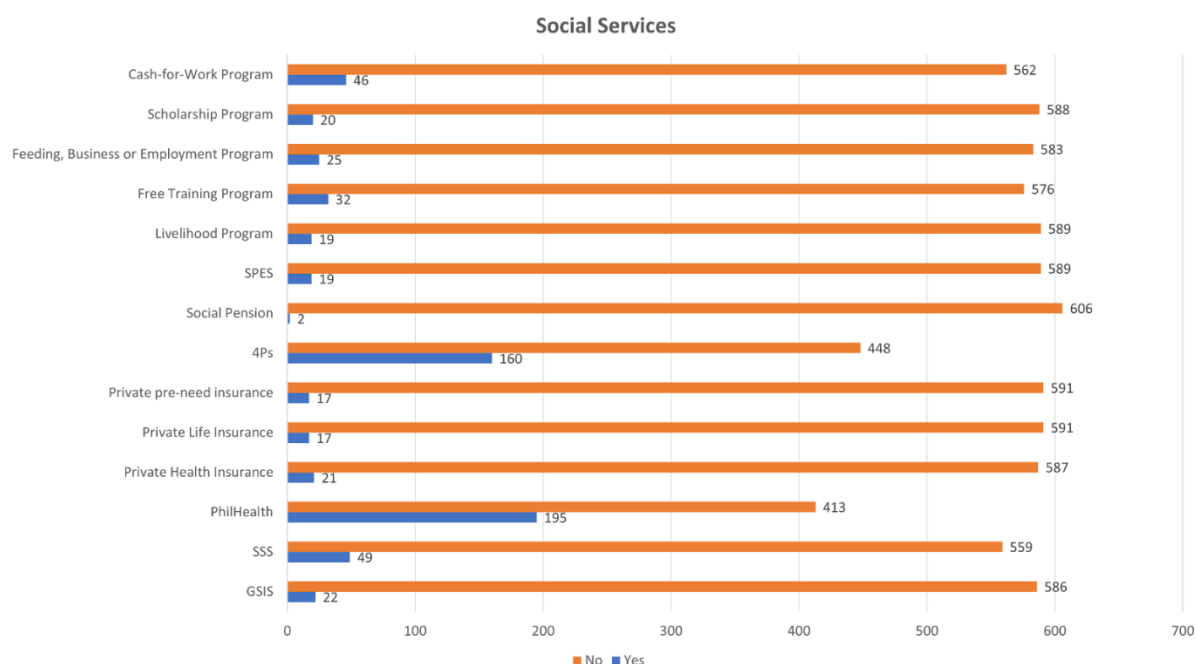


Figure 38. Frequency Distribution of Respondents According to Membership and Benefits from GSIS, SSS, PhilHealth, Private Health Insurance Company or Health Maintenance Organization (HRMO), Private Life Insurance, Private Pre-Need insurance Company, Pantawid Pampamilyang Pilipino (4Ps), Social Pension, Special Program for the Employment of Students (SPES), Livelihood Program, Training Program for Business or Employment, Scholarship Program, and Cash-for-Work Program.

## CONCLUSION

The households along the Pulangi River operate under acute environmental health vulnerabilities, economic fragility, and tenure insecurity. High reliance on untreated river water for domestic use and widespread direct waste disposal into the river system directly correlate with high rates of serious illnesses and vector-borne mortality (dengue). These physical challenges are compounded by institutional exclusion, marked by poor healthcare accessibility and low civil society engagement. Addressing these interconnected risks requires immediate infrastructural, social, and policy interventions.

## Recommendations

**Water Safety and Infrastructure (WASH):** Implement community-level water purification facilities, level-II water supply distribution networks, and subsidized water testing along riverbank barangays to reduce reliance on untreated river water.

**Sanitation and Environmental Protection:** Establish municipal zero-open-defecation programs providing subsidized pour-flush toilets and septic systems to stop direct waste discharge into the Pulangi River.

**Targeted Vector-Borne Disease Control:** Mobilize localized dengue prevention campaigns, routine riverine mosquito larvae suppression, and free bed-net/repellent distribution through local health boards.

**Healthcare Access Mobilization:** Establish regular mobile medical clinics and riverine barangay health stations to bridge the gap for the 57% of households experiencing limited or no healthcare access.

**Economic and Land Tenure Support:** Formulate local land tenure regularisation schemes and introduce rural livelihood programs (e.g., livestock management and microfinance) to build household asset buffers.

## Acknowledgement

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