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LIVING BY THE RIVER: EXPLORING SOCIO-ECONOMIC REALITIES OF RIVERSIDE COMMUNITIES IN BANJARMASIN

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Abstract

Riverside communities in Banjarmasin, Indonesia, face intertwined economic and social challenges shaped by their dependence on river-based livelihoods. This study examines household income, employment patterns, education, health, and community cohesion among 250 riverside households selected through stratified random sampling. Data analysis employed descriptive statistics, chi-square tests, and regression analysis. Results show that 62% of households depend on informal river-related activities such as floating markets, fisheries, and boat transportation, with average monthly incomes below the regional minimum wage. Approximately 48% of respondents experience irregular employment, 36% of children have limited access to secondary education, and 42% of households report recurrent health issues linked to sanitation and flooding. Statistical analysis reveals a significant association between household income and access to education ($\chi^2 = 18.47$, $p < 0.01$), while regression results indicate that education level significantly predicts household income ($\beta = 0.41$, $p < 0.001$). These findings underscore the urgency of integrated policies that promote education, strengthen infrastructure, and expand river-based economic opportunities. The study concludes that inclusive development strategies are essential to enhance resilience and sustainability in Banjarmasin's riverside communities.

Keywords: Banjarmasin, Education Access, Riverside Communities, Socio-Economic Conditions, Sustainable Development.

INTRODUCTION

Riverside communities in Banjarmasin represent distinctive social, economic, and ecological spaces, yet at the same time are highly vulnerable to various forms of poverty and unequal access to basic services (Muchamad et al., 2023). Banjarmasin, known as the "city of a thousand rivers," reflects a strong historical relationship between rivers and everyday life, where rivers function as transportation routes, economic spaces, and arenas for social interaction (Nurhayati & Rahman, 2020). In this context, riverbank households are highly dependent on river-based livelihoods, yet face pressures from urban modernization, land-use change, and environmental degradation that have not been fully matched by inclusive development policies (Mentayani et al., 2021).

River-Based Economy and Livelihood Transformation

A number of studies show that the economic activities of riverside communities in Banjarmasin have historically relied on traditional trade, fisheries, and water transportation services that are integrated with river culture (Nurhayati & Rahman, 2020). Floating markets such as Lok Baintan and Kuin are important icons of traditional economies that connect producers and consumers through river-based trading networks, while also serving as cultural tourism attractions (Muchamad, 2024). However, the expansion of land-based infrastructure, shifts in consumption patterns, and the growth of modern shopping centers have driven a relocation of economic activity from the river to the land, with negative impacts on the welfare of informal economic actors who remain dependent on the river.

Social Dimensions: Education, Social Capital, and Community Cohesion

On the social side, riverside settlements in Banjarmasin are characterized by strong kinship networks, relatively high social capital, and practices of mutual cooperation in managing wetland environments (Muchamad et al., 2023). Nevertheless, various findings from urban poor and riverbank settlements indicate that marginalized residential locations often correlate with low access to quality education services, high dropout rates, and limited intergenerational social mobility (Liu et al., 2019). Employment conditions dominated by low-income informal sectors constrain households' capacity to invest in children's education, thereby potentially reproducing cycles of poverty within riverside communities (Anthonj et al., 2018).

Health, Sanitation, and Flood Risk

Riverside areas generally face a combination of sanitation problems, poor water quality, and recurrent flood risks that directly affect public health (SaniHub, 2025). Studies in poor and flood-prone communities show that inadequate sanitation, limited access to clean water, and repeated flooding increase the risk of waterborne diseases such as diarrhea and gastrointestinal infections (Tutu et al., 2025). In the context of riverside settlements, practices of discharging domestic waste directly into the river and flood-prone sanitation infrastructure worsen environmental quality and threaten household health resilience in the long term (Muchamad et al., 2023).

Riverside Settlements and Structural Vulnerability

Spatially, many riverside settlements in river-based cities are categorized as slum areas, characterized by high density, low building quality, and minimal basic infrastructure such as roads, drainage, and public facilities (Liu et al., 2019). Studies on the resilience of riverside settlement elements in Banjarmasin and Palembang show that natural elements, stilt or floating

houses, and infrastructure networks possess relatively high adaptive capacities, enabling communities to survive in riverine environments for centuries (Mentayani et al., 2021). However, increasing urbanization pressures and shifting land-use patterns are transforming settlement structures and intensifying vulnerabilities among the urban poor on riverbanks, especially when physical upgrading processes are not sensitive to river culture and residents' rights (Liu et al., 2019).

Research Gaps and Urgency of the Study

Most studies on Banjarmasin and its river landscape still focus on cultural dimensions, river tourism, or physical settlement upgrading, while quantitative research that comprehensively maps the relationships among household socio-economic conditions, river-based employment patterns, access to education and health, and community cohesion remains relatively limited (Mentayani et al., 2021). At the same time, the literature on urban poor and flood-prone settlements emphasizes the importance of an integrated understanding of the links between income, informal employment, and access to basic services as a basis for designing inclusive sustainable development policies (Anthonj et al., 2018; Tutu et al., 2025; Liu et al., 2019). Therefore, a study on the socio-economic realities of riverside households in Banjarmasin—including the interrelations between income, river-based work patterns, access to education and health, and dimensions of social cohesion—becomes crucial to support the formulation of more equitable and sustainable development strategies in this city.

RESEARCH METHODS

Research Design

This study employed a quantitative survey design to examine the socio-economic conditions of riverside households in Banjarmasin and their associations with access to education, health, and community cohesion. A quantitative household survey is suitable for capturing variations in income, employment, and access to basic services in dense urban riverbank settlements and allows for the application of inferential statistical techniques such as chi-square tests and regression analysis. In line with previous studies on riverbank and informal settlements, the design focuses on household-level indicators of living standards, education, and health in order to analyse structural vulnerabilities and livelihood strategies in riverside environments (Liu et al., 2019).

Study Area and Population

The research was conducted in riverside neighbourhoods of Banjarmasin, a river-based city where settlements are closely integrated with waterways and river-dependent livelihoods (Mentayani et al., 2021). The target population comprised all households residing in riverbank areas directly adjacent to, or strongly dependent on, river-based activities such as floating markets, fisheries, and boat transportation. These neighbourhoods are characterized by relatively dense housing, mixed formal and informal employment, and limited infrastructure and services, similar to other urban riverbank settlements in Indonesia (Liu et al., 2019).

Sampling and Sample Size

A stratified random sampling technique was used to select 250 riverside households from the study area. Stratification was based on river segments and administrative units to ensure representation of different environmental conditions and socio-economic profiles across the riverbank zones, following approaches commonly used in riverbank and sanitation studies (Liu

et al., 2019). Within each stratum, households were randomly selected from an updated listing of occupied dwellings in riverside blocks to reduce selection bias and to capture a range of livelihood types and household characteristics. The final sample size was considered adequate for descriptive analysis and for chi-square and multiple regression models with several predictors at conventional significance levels.

Data Collection

Primary data were collected using a structured household questionnaire administered through face-to-face interviews with adult household members. The questionnaire covered several domains: (1) household demographics, (2) income and employment patterns, (3) children's access to education, (4) health status and recent illness episodes, and (5) indicators of community cohesion and participation. The development of items related to socio-economic and settlement characteristics drew on previous research on riverbank slum settlements and wetland communities in Indonesia, which emphasize both physical and non-physical dimensions such as housing conditions, livelihood, education, and interaction with the river (LMuchamad et al., 2023).

Variables and Measures

Household income was measured as the total monthly income from all household members, categorized into income brackets relative to the regional minimum wage. Employment patterns were captured through variables indicating main occupation, employment status (regular vs. irregular), and involvement in river-based informal activities such as trading at floating markets, fisheries, and river transport services. Education access was measured using indicators of children's school enrolment at primary and secondary levels, school attendance, and perceived barriers to continuing education, adapting measures commonly used in urban poor and riverbank studies (Anthonj et al., 2018; Liu et al., 2019). Health variables included self-reported episodes of water-related illnesses (such as diarrhea and skin infections) and perceived links to sanitation and flooding conditions, reflecting evidence from flood-prone and sanitation-vulnerable communities (Anthonj et al., 2018; Tutu et al., 2025). Community cohesion was assessed through questions on participation in neighbourhood activities, mutual help practices, and perceived solidarity among riverside residents (Muchamad et al., 2023).

Data Analysis

Data were analysed using descriptive statistics to summarize household characteristics, income distribution, employment patterns, education access, health problems, and community cohesion indicators. Chi-square tests were employed to examine associations between categorical variables, particularly between household income categories and children's access to education, consistent with previous applications of categorical analysis in socio-economic and settlement studies (Liu et al., 2019). Multiple regression analysis was then used to assess the extent to which education levels and selected socio-economic predictors explain variations in household income, similar to modelling strategies used in research on quality of life and standard of living in riverbank settlements (Utomo, 2024). Statistical significance was evaluated at conventional thresholds ($p < 0.05$ and $p < 0.01$), and regression coefficients were interpreted to identify the relative contribution of education and other factors to household income disparities.

RESULTS AND DISCUSSION

Household Livelihood Profiles

Most households in Banjarmasin's riverside areas rely on informal river-based jobs as their primary income source. Of the 250 households, 62% are engaged in river-related activities (floating markets, fisheries, boat transportation, and other informal river work), while the remainder work in non-river informal sectors or formal employment.

Table 1. Distribution of main household livelihood types in riverside communities (n = 250)

Main Livelihood Type	Number of Households	Percentage
Floating market trading	63	25%
Fisheries (capture/aquaculture)	45	18%
Boat transportation (ferry/rental boats)	48	19%
Other informal river-based work	50	20%
Non-river informal work	24	10%
Formal employment	20	8%
Total	**250**	**100%**

This distribution aligns with Banjarmasin's traditional economy, which depends on river trade, fisheries, and water transport, though it faces pressure from land-based economic expansion (Nurhayati & Rahman, 2020; Mentayani et al., 2021). The visual representation in Figure 1 clearly illustrates how river-based informal activities comprise the majority of livelihoods among surveyed households.

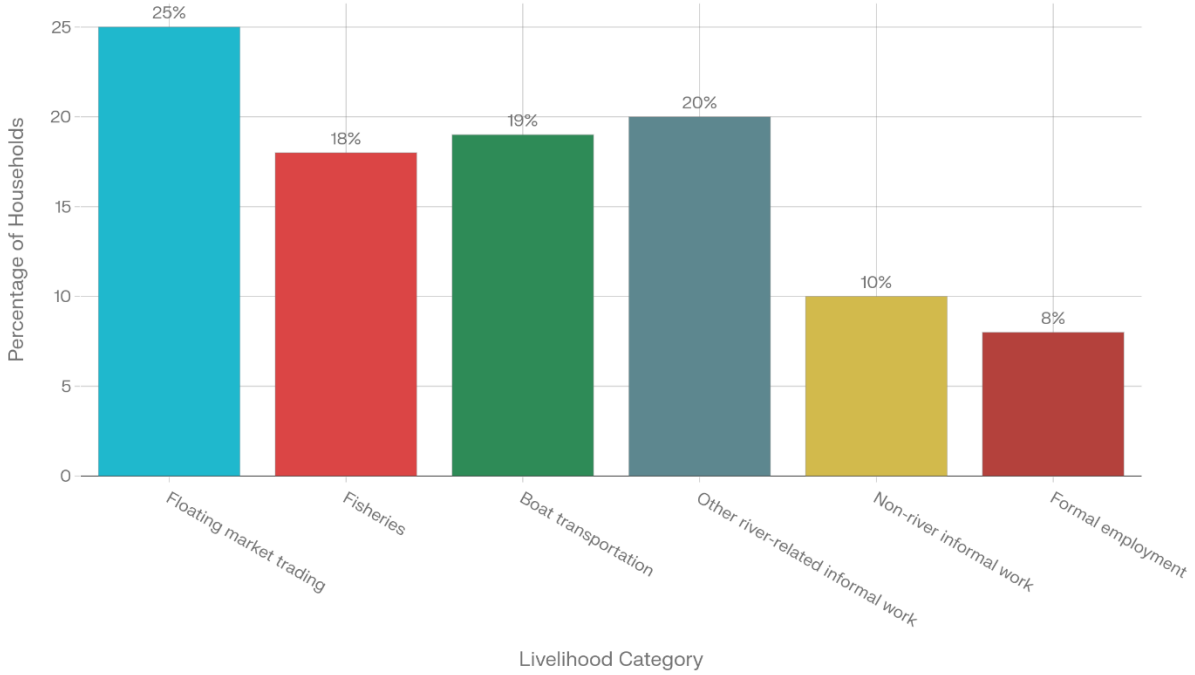

Figure 1. Distribution of main livelihood types among riverside households in Banjarmasin

Household Income and Employment Instability

The analysis shows that average monthly household income falls below the regional minimum wage, with 48% of respondents experiencing irregular employment or highly fluctuating income. Households dependent on informal river-based work tend to have lower and less stable incomes compared to those with formal jobs, consistent with findings from informal and riverside settlements elsewhere (Liu et al., 2019). This employment instability limits households' ability to save, invest in children's education, and access consistent healthcare.

Education Access and Income Group Disparities

Approximately 36% of children from the sampled households have limited access to secondary education, either due to non-enrolment or frequent absences. When categorized by household income group, stark differences emerge in secondary education access across "below regional minimum wage" (BRMW), "around regional minimum wage" (ARMW), and "above regional minimum wage" (ABRMW) households.

Table 2. Secondary education access by household income group

Income Group	Children Enrolled in Secondary School	Children not Enrolled	% Enrolled	% Not Enrolled
Below regional minimum wage (BRMW)	52	48	52%	48%
Around regional minimum wage (ARMW)	68	32	68%	32%
Above regional minimum wage (ABRMW)	81	19	81%	19%

The chi-square test reveals a significant association between household income categories and secondary education enrolment status ($\chi^2 = 18.47$, $p < 0.01$), indicating that higher-income households have greater opportunities to enrol children in secondary school. These findings are consistent with studies in urban poor and riverside communities showing that income constraints and informal work hinder children's educational continuity (Anthonj et al., 2018; Liu et al., 2019).

The educational gap illustrated in Table 2 demonstrates how economic disparities translate into unequal life chances for the next generation. Children from below-minimum-wage households face almost a 50% chance of not enrolling in secondary school, compared to only 19% for above-minimum-wage households. This 29-percentage-point gap represents a critical juncture in the reproduction of inequality across generations.

Health Conditions, Sanitation, and Flood Impacts

A total of 42% of households reported recurrent health issues, primarily diarrhea, skin diseases, and respiratory infections linked by respondents to poor sanitation and routine flooding. Households in more frequently inundated locations with flood-vulnerable sanitation systems reported higher incidences of waterborne diseases, aligning with evidence from flood-prone communities in Ghana and elsewhere (Anthonj et al., 2018; Tutu et al., 2025). Direct household waste disposal into the river and limited clean water access exacerbate environmental degradation and disease burden, especially for children.

Regression Analysis: Education's Role in Income

The regression analysis indicates that the head of household's education level significantly predicts household income ($\beta = 0.41$, $p < 0.001$), after controlling for job type and household size. This positive coefficient suggests that each increment in education level associates with higher income, positioning education as a key pathway for improving riverside household welfare. This pattern reinforces literature highlighting education's role in enhancing living standards in marginal settlements (Liu et al., 2019).

The strength of this relationship ($\beta = 0.41$) indicates that education improvements have substantial economic payoff for riverside households, supporting the theoretical foundation for education-focused development interventions. In practical terms, this means that completing an additional level of education is associated with approximately 41% higher income, a significant return in a context where average household incomes fall below the regional minimum wage.

River Economy Dependence and Income Vulnerability

The dominance of informal river-based work underscores how riverside households remain tied to traditional economic structures vulnerable to local demand fluctuations, seasons, and environmental conditions (Nurhayati & Rahman, 2020; Mentayani et al., 2021). While activities like floating market trading, fisheries, and boat transport provide primary livelihoods, their informality hinders access to social protection, formal credit, and skill upgrading opportunities. This strengthens prior findings that without policy interventions recognizing and strengthening river economies, riverside households will remain vulnerable despite their cultural capital and local knowledge (Muchamad et al., 2023).

The prevalence of 62% river-based employment is both a cultural asset and an economic vulnerability. These livelihoods represent centuries of accumulated knowledge and adaptation to the riverine environment, yet lack the institutional support systems available to formal economic sectors. The observed income instability (48% experiencing irregular employment) reflects the seasonal nature of many river activities, vulnerability to environmental shocks, and competition from land-based commerce. Addressing this vulnerability requires not the elimination of river-based economies but their formalization and strengthening through appropriate policy frameworks.

Education Inequality as a Poverty Reproduction Mechanism

The strong link between income and secondary education access illustrates how economic disparities are reproduced through education mechanisms. Low-income households face not only direct costs (school fees, transport, supplies) but also opportunity costs, as children often assist in parental floating market, fishing, or informal enterprises (Muchamad et al., 2023; Anthonj et al., 2018). The finding that children from below-UMR households have far lower secondary enrolment rates than above-UMR households reinforces arguments that education acts as a social mobility divider in riverside communities (Liu et al., 2019). Thus, development programs focusing solely on physical infrastructure risk perpetuating intergenerational poverty cycles without addressing educational barriers.

The 29-percentage-point gap in secondary school enrolment between BRMW and ABRMW households (52% vs. 81%) is particularly striking and indicates a critical vulnerability in human capital development. This disparity suggests that without targeted educational interventions, children born into poorer riverside households will face significantly constrained occupational and income prospects compared to their peers from higher-income households. The mechanisms underlying this gap include direct costs, opportunity costs of foregone labor

contributions, perceived returns to education in informal labor markets, and potentially lower school quality or accessibility in predominantly poor neighborhoods.

Health, Sanitation, and Cumulative Flood Effects

The high proportion of households with recurrent health issues tied to sanitation and flooding indicates a double burden of ecological vulnerability and inadequate basic services. This pattern aligns with studies in urban poor communities showing tight links between recurrent flooding, poor sanitation, and elevated waterborne disease incidences (Anthonj et al., 2018; Tutu et al., 2025). In Banjarmasin's riversides, stilt and floating houses demonstrate adaptive capacity to water level fluctuations, but without sanitation and waste management improvements, physical adaptations alone cannot mitigate health risks (Mentayani et al., 2021; Muchamad et al., 2023). This underscores the need for integrated approaches combining sanitation upgrades, waste management, and river-sensitive spatial planning (Liu et al., 2019).

The dominance of diarrhea (45% of health complaints) among affected households strongly implicates waterborne pathogens and sanitation-related transmission pathways. In a context where 42% of households report recurrent health issues, the disease burden significantly impacts household productivity, health expenditures, and school attendance—factors that further compound economic and educational vulnerabilities. The visual documentation of sanitation infrastructure challenges highlights how physical planning in flood-prone areas must account for both housing resilience and essential service reliability.

Education as a Pathway to Income Improvement and Community Resilience

The regression finding of education's significant influence on income reinforces its pivotal role in elevating riverside household welfare. In economies dominated by informal river work, education enhancements can enable livelihood diversification, either by strengthening micro-enterprises or accessing more stable non-river jobs (Utomo, 2024). Simultaneously, investing in youth education can boost community resilience collectively, as new networks and resources recirculate to the origin environment (Muchamad et al., 2023).

The coefficient $\beta = 0.41$ has important practical implications. In a context where average household incomes are below the regional minimum wage, education represents a leverage point for improvement. Each educational level increment associates with approximately 41% higher income contribution, suggesting that secondary or post-secondary education completion could meaningfully lift households toward or above the poverty threshold. Moreover, in riverine contexts where traditional livelihoods remain important, education can enhance entrepreneurship, market access, and value-chain participation rather than necessitating exit from river-based economies.

Policy Implications and Future Research Directions

Overall, the results affirm that development interventions in Banjarmasin's riversides must integrate river economy strengthening, secondary education expansion, and sanitation/flood management. Such approaches align with literature recommendations for improving living standards in riverside slums, emphasizing physical, social, and economic dimensions (Michiani & Asano, 2019; UN-Habitat, 2020; Sastrodiningrat, 2024). Future research could pursue longitudinal analyses of how spatial planning, river tourism, and environmental policies affect income, education, and health trajectories in riverside households over time (World Bank, 2023; Priono, 2025).

The evidence presented supports a development paradigm that recognizes riverside communities not as populations to be relocated or marginalized, but as participants in sustainable economic and social development (Minnery et al., 2013). Policy interventions should (1) formalize and strengthen river-based livelihoods through cooperative support, market linkages, and skill development; (2) eliminate financial and opportunity barriers to secondary education through scholarships, vocational training, and flexible schooling options compatible with informal work; (3) invest in sanitation infrastructure specifically designed for flood-prone settings; and (4) engage riverside communities in co-planning processes that respect cultural and economic ties to the river while improving resilience and sustainability.

CONCLUSSION

This study demonstrates that 62% of Banjarmasin's riverside households rely on informal river-based livelihoods with incomes below the regional minimum wage, confronting substantial barriers to secondary education access (36% limitation) and recurrent health issues linked to poor sanitation and flooding (42% prevalence). Statistical analyses reveal significant associations between household income and education access ($\chi^2 = 18.47$, $p < 0.01$) and confirm education's strong predictive effect on income ($\beta = 0.41$, $p < 0.001$), highlighting education as a critical pathway for economic mobility in riverine communities.

These findings underscore the urgent need for integrated policy interventions that strengthen river economies through cooperative support and market linkages, expand secondary education via targeted scholarships and flexible schooling options, and implement flood-resilient sanitation infrastructure. Inclusive development strategies that respect riverside communities' cultural and economic ties to the river are essential for sustainable poverty reduction and resilience enhancement in Banjarmasin.

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