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A MULTIDIMENSIONAL IMPACT EVALUATION OF THE NATIONAL POVERTY REDUCTION STRATEGY AND HUMAN CAPITAL INVESTMENT PROGRAM IN LUZON, PHILIPPINES

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Abstract

Impact evaluation studies are often generic and susceptible to large sampling errors. Therefore, assessing impacts using small area configurations to analyse poverty alleviation and economic development is crucial, particularly in the poorest region of Luzon, Philippines. This study utilised randomised control trials, predictive analytics, and regression discontinuity. Most households in the treatment locality live above the poverty line (19.85%), whereas a significant portion of households in the comparison locality live below the poverty threshold (41.93%). Gap metrics (0.36–0.44), severity statistics (0.17–0.26), and Watts indices (0.53–0.79) were analysed. Logistic (17) and multivariate (2) regression models were employed to examine the impact of eligibility (-6.8715), socio-economic characteristics (Sig = 9VAR), and economic development variables (3.8208, 0.000, R^2 = 0.4967). Results indicate that the programme has successfully reduced poverty (0.26%) and fostered economic development (diff=P022.08%, P_1=0.08, P_2=0.09, w=0.26) by decreasing child malnutrition (0.08%) and mortality rates (0.62%), lowering dropout rates from schooling (e=0.35%, 0.23%, h=0.61%, 0.49%, s=0.84%, 0.87%), improving housing (0.17%), settlement (0.77%), water (0.47%), and sanitation facilities (0.58%), increasing employment (U=-0.70), creating new sources of income (6+), promoting participation in community development initiatives (15+), and enhancing peace and order outcomes (0.12%). Additionally, regression discontinuity design was applied to estimate the overall impact (LATE=0.9386) at various levels of disaggregation. Finally, policy proposals were provided to complement the poverty alleviation and economic development programme.

Keywords: *impact evaluation, community-based monitoring system, poverty alleviation, economic development, regression discontinuity design*

INTRODUCTION

The battle against poverty has been a persistent challenge throughout history, with approximately 700 million people currently living on less than 2.15USD daily (World Poverty Statistics, 2024; Barbado et al., 2024). This issue is particularly severe in the Asia-Pacific region, where around 1.7 billion individuals survive on less than 2USD per day. Southeast Asian nations have made uneven progress in tackling poverty, especially in rural areas with limited access to essential services. Conditional cash transfers (CCTs) have emerged as an effective strategy, targeting impoverished households and promoting human capital development (World Bank, 2024a). In the Philippines, the Department of Social Welfare and Development (DSWD) launched the Pantawid Pamilyang Pilipino Program (4Ps) in 2008 to alleviate poverty and drive economic growth (Asian Development Bank [ADB], 2024; Bulao et al., 2018). Institutionalised into law in 2019, this programme aims to support eligible households in exchange for meeting specific requirements, thereby fostering investments in their children's health and education to break the poverty cycle. The 4Ps programme is a key component of the Philippines' poverty alleviation strategy (Fernandez & Olfindo, 2011). CCT programmes are recognised for their effectiveness in enhancing health and education outcomes among vulnerable populations, providing financial aid contingent on school attendance and health check-ups, and showing significant positive effects on educational and health metrics across various contexts (Hudang et al., 2024; Barbado et al., 2024; Sanchez Chico et al., 2020). Evaluating the impact of these initiatives is essential to determine their success in achieving intended objectives.

To evaluate the effectiveness, performance, suitability, and sustainability of the Pantawid Pamilyang Pilipino Program (4Ps), rigorous impact evaluations have been conducted by the Department of Social Welfare and Development (DSWD) in collaboration with the Philippine Institute of Development Studies (PIDS), the World Bank, and the Asian Development Bank (ADB). Results have shown positive impacts on education and health among beneficiary households (Department of Social Welfare and Development [DSWD], 2021; World Bank, 2014). The programme's success in enhancing children's well-being highlights its role in addressing poverty-related challenges (Chaudhury et al., 2013; Orbeta & Paqueo, 2016). Targeting 376,000 households, evaluations using the Randomised Control Trial (RCT) method in selected areas showed improvements in education and healthcare for impoverished families (Chaudhury et al., 2013; World Bank, 2014). However, the lack of representation from the Bicol Region, the poorest in

Luzon, necessitates a focused impact assessment there. A subsequent evaluation using Regression Discontinuity Design across 30 municipalities reported positive outcomes in child health and school attendance (PIDS, 2014; Orbeta & Paqueo, 2016). Yet, the Bicol Region's exclusion in national evaluations underscores the need for specific assessments. In a third phase, 6,775 households across 180 barangays in 10 municipalities showed consistent positive impacts on education, health, and livelihoods (Orbeta et al., 2021). The Bicol Region, identified by the Philippine Statistics Authority as having the highest poverty incidence in Luzon (Philippine Statistics Authority, 2022, 2023), requires focused evaluation (Onsay & Rabajante, 2024a). Naga City, with a population density of 2,300 individuals/km² and 4,959 beneficiaries, ranks second in Pantawid beneficiaries in Camarines Sur. Despite its independent status and substantial revenues, many areas remain rural, with prevalent poverty (Onsay & Rabajante, 2024b). Thus, evaluating the 4Ps programme's impact in this region is essential.

Assessing the effects of interventions is crucial, as impact evaluation research can suffer from significant sampling inaccuracies. Therefore, localised study designs are essential for evaluating poverty reduction and economic growth, particularly in the poorest areas of Luzon, Philippines (Wu, 2010; Peersman, 2014; Barbado et al., 2024; Onsay & Rabajante, 2024b; Cororaton et al., 2022). Despite the programme's successes, gaps in impact assessments exist, especially regarding the Bicol Region. A focused evaluation in areas like Naga City is necessary to understand the 4Ps' effects on socio-economic development. Utilising the Community-Based Monitoring System (CBMS) and collaborating with local stakeholders, this study aims to analyse the programme's impact on beneficiaries, ensuring transparency and accountability in public fund usage (Onsay & Rabajante, 2024a; Republic Act No. 11315, 2019). The study will assess the Pantawid Pamilyang Pilipino Program's impact on poverty alleviation and economic development in Naga City, comparing health and nutrition indicators, education enrolment rates, income sources, and housing conditions between beneficiaries and non-beneficiaries. It will also analyse regression discontinuity results related to mortality rates, educational improvements, income generation, community participation, and housing quality. Conducting an impact assessment in impoverished communities within Bicol is crucial to uncovering the tangible changes brought about by the 4Ps programme. This research aligns with the United Nations Sustainable Development Goals (SDGs), particularly Goal 1 (No Poverty), Goal 3 (Good Health and Well-being), Goal 4 (Quality Education), Goal 6 (Clean Water and Sanitation), and Goal 8 (Decent Work and Economic Growth), contributing to national sustainable development efforts.

LITERATURE REVIEW

Conditional Cash Transfer (CCT) programmes have gained traction globally, especially in Latin America, by providing financial support to impoverished households whereas incentivising beneficial behaviours like education and healthcare utilisation (Valencia Lomelí, 2008; Johannsen et al., 2009). In the Philippines, the Pantawid Pamilyang Pilipino Program (4Ps) was launched in 2008 and formalised as Republic Act 11310 in 2019 (Republic Act No. 11315, 2019). The 4Ps aims to alleviate poverty and enhance health, nutrition, and education outcomes for eligible households, thereby breaking the intergenerational cycle of poverty. By providing grants conditioned on children's education and maternal health, the programme supports long-term socio-economic upliftment (Fernandez & Olfindo, 2011). Impact evaluations are crucial for assessing the effectiveness of social welfare programmes like the 4Ps. Baker (2000) emphasises their importance in determining whether programmes achieve intended effects. Robust methodologies, including randomised controlled trials (RCTs), quasi-experimental designs, and regression discontinuity designs, are essential for accurate evaluations. RCTs, considered the gold standard, effectively compare outcomes between treatment and control groups (Rawlings & Rubio, 2003). For instance, CCT evaluations in Mexico have demonstrated significant impacts on education and health outcomes. Quasi-experimental designs, such as difference-in-differences, are often used where randomisation isn't feasible (Millán et al., 2019; Beltran & Delgado, 2023; Khandker et al., 2009). Regression discontinuity designs have also proven useful, as shown in a study of Ecuador's Bono de Desarrollo Humano programme, which revealed significant effects on reproductive health behaviours (Velasco et al., 2020; World Bank, 2011).

Empirical evaluations of Conditional Cash Transfer (CCT) programmes generally indicate positive impacts on socio-economic outcomes, particularly in education and health. Reviews show significant enhancements in school enrolment and attendance, especially among female beneficiaries. For instance, Mexico's PROGRESA programme documented substantial increases in school attendance and improved healthcare access (Skoufias, 2005; Flores-Peregrina, 2024; Garza-Rodriguez, 2023). Long-term studies reveal that CCT participants often enjoy better employment prospects and economic outcomes as adults, suggesting potential for sustainable poverty alleviation (Barbado et al., 2024; Zheng et al., 2022; Mamangan, 2018). However, outcomes vary based on contextual factors like programme design and local socio-economic conditions, complicating assessments of universal effectiveness. Challenges such as data availability, accuracy, and participant compliance hinder comprehensive

evaluations. Ethical considerations regarding participant privacy and potential stigma associated with cash assistance also need to be addressed (Baker, 2000; White, 2014; Gertler, 2016). Additionally, some evaluations suggest CCTs may inadvertently increase dependency on cash transfers or negatively affect household dynamics, highlighting the need for careful consideration of socio-cultural contexts (Barbado et al., 2024; Ramos et al., 2024; De Jesus & Villanueva, 2023).

Previous impact evaluations conducted in 2011, 2012, and 2014 demonstrated the positive effects of the 4Ps programme on education and health outcomes among beneficiaries (Department of Social Welfare and Development [DSWD], 2021; World Bank, 2014). These studies highlight the programme's success in promoting child health and educational participation, contributing to poverty reduction in the Philippines (Chaudhury et al., 2013). The World Bank (2014) notes the 4Ps' role in decreasing poverty rates and improving living conditions for cash assistance recipients (Acosta et al., 2019). Research by Brendo (2024) and Pañares and Rapista (2023) further confirms that families receiving cash grants are more likely to enrol their children in school. The 4Ps programme currently serves 376,000 households across 148 municipalities and 12 cities in 34 provinces. A Randomised Control Trial (RCT) evaluated its first phase, selecting 3,742 households from eight randomly chosen municipalities. Among these, 1,418 were eligible based on criteria set by the National Household Targeting System. The selected municipalities span various regions, including Mountain Province and Negros Oriental. Evidence after over two years of implementation shows that the 4Ps programme effectively meets its objectives, supporting impoverished families whereas enhancing education and healthcare (Chaudhury et al., 2013; World Bank, 2014). However, no municipalities from the Bicol Region were included, highlighting the need for a specific impact assessment in that area. The second evaluation phase in 2013 used Regression Discontinuity Design, focusing on 5,041 households across 30 municipalities, revealing ongoing positive impacts on health and school attendance even five years post-implementation (PIDS, 2014; Orbeta & Paqueo, 2016). The third evaluation involved 6,775 households from 180 barangays in 10 municipalities, confirming consistent positive impacts on education, health, and livelihoods (Orbeta et al., 2021).

Despite the credibility of the impact analysis, no municipalities from the Bicol Region were included, necessitating an impact assessment specifically for that area. The integration of Family Development Sessions (FDS) within the programme equips beneficiaries with skills in parenting, financial management, and disaster preparedness, empowering informed decision-making (Gealon, 2021; Dy, 2018). Studies by Reyes et al. (2013) and Taguiam (2024) indicate that

conditionalities tied to cash transfers have improved school attendance and academic performance. Villaflor et al. (2022) and Canlas et al. (2022) emphasise the programme's role in enhancing access to educational resources, contributing to better outcomes for children in impoverished households. Research by Mamangon et al. (2019), Cho et al. (2020), and Organo (2023) shows the programme's effectiveness in promoting health behaviors, reducing malnutrition, and improving hygiene. However, gaps in impact assessments exist, particularly in regions like Bicol. The lack of evaluations in areas such as Naga City underscores the need for targeted studies to understand the 4Ps programme's effects on socio-economic advancement. Utilising tools like the Community-Based Monitoring System (CBMS) and collaborating with local stakeholders will facilitate a detailed examination of the programme's influence, promoting transparency and evidence-based policymaking. As the government invests in the 4Ps to uplift vulnerable populations, rigorous evaluations remain essential for assessing efficacy and guiding future policies for sustainable poverty alleviation. We aim to assist by leveraging underutilised datasets through the CBMS, which provides localised data for more effective programme design (Onsay & Rabajante, 2024b; Sobreviñas, 2020; Onsay, 2022). Focused assessments in areas like Naga City are crucial for deriving region-specific insights and validating the programme's outcomes.

THEORETICAL AND CONCEPTUAL FRAMEWORK

The hypothesis, theory of change, and results chain of the evaluation are based on assumptions regarding factors influencing poverty outcomes, including health, nutrition, education, housing, water and sanitation, income, livelihoods, peace and security, and access to government services. These assumptions are integral to the results outlined in the Theory of Change. Below are these assumptions presented in a structured format:

Table 1: Hypotheses of the Impact Evaluation Study

Set of Indicators	*Hypotheses*
Poverty	The programme helps to mitigate poverty among its beneficiaries.
Health and Nutrition	The programme contributes to decreased child mortality rates.
	The programme addresses and decreases child malnutrition.
	The programme works to reduce maternal mortality rates.
Water and Sanitation	The programme enhances access to safe drinking water.
	The programme improves access to safe sanitation facilities, such as toilets.
Education	The programme increases and enhances participation in education.
	The programme contributes to lower school drop-out rates.
Income and Livelihood	The programme raises household income and diversifies income sources.
	The programme leads to increased food consumption.
	The programme promotes job creation.
Housing	The programme fosters improved housing conditions.
Peace and Order	The programme helps to lessen the prevalence of informal settlements.
	The programme aims to decrease instances of crime.

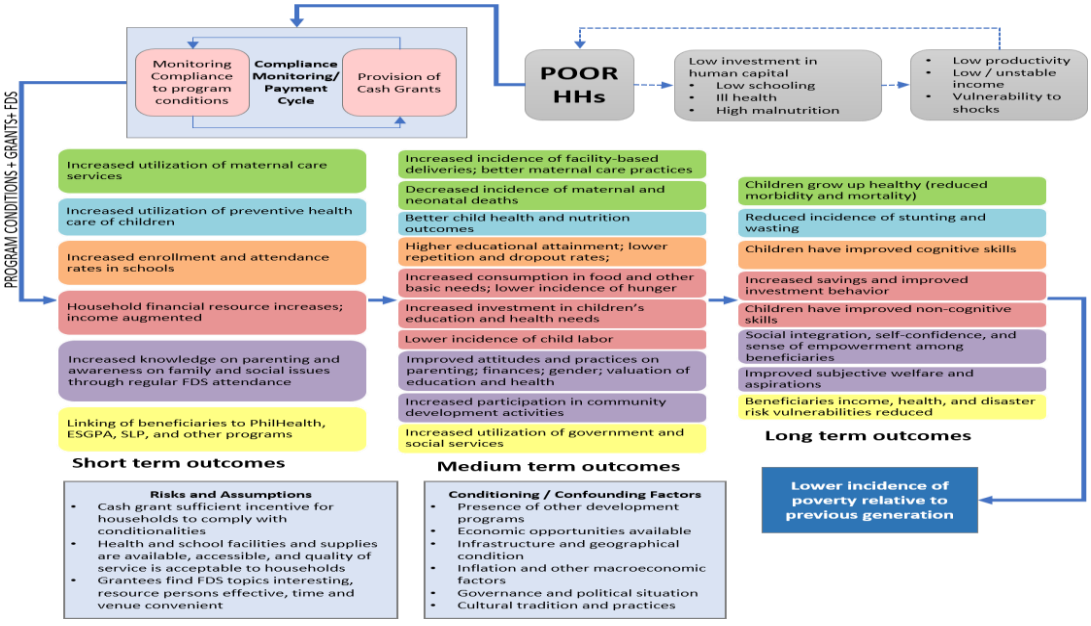
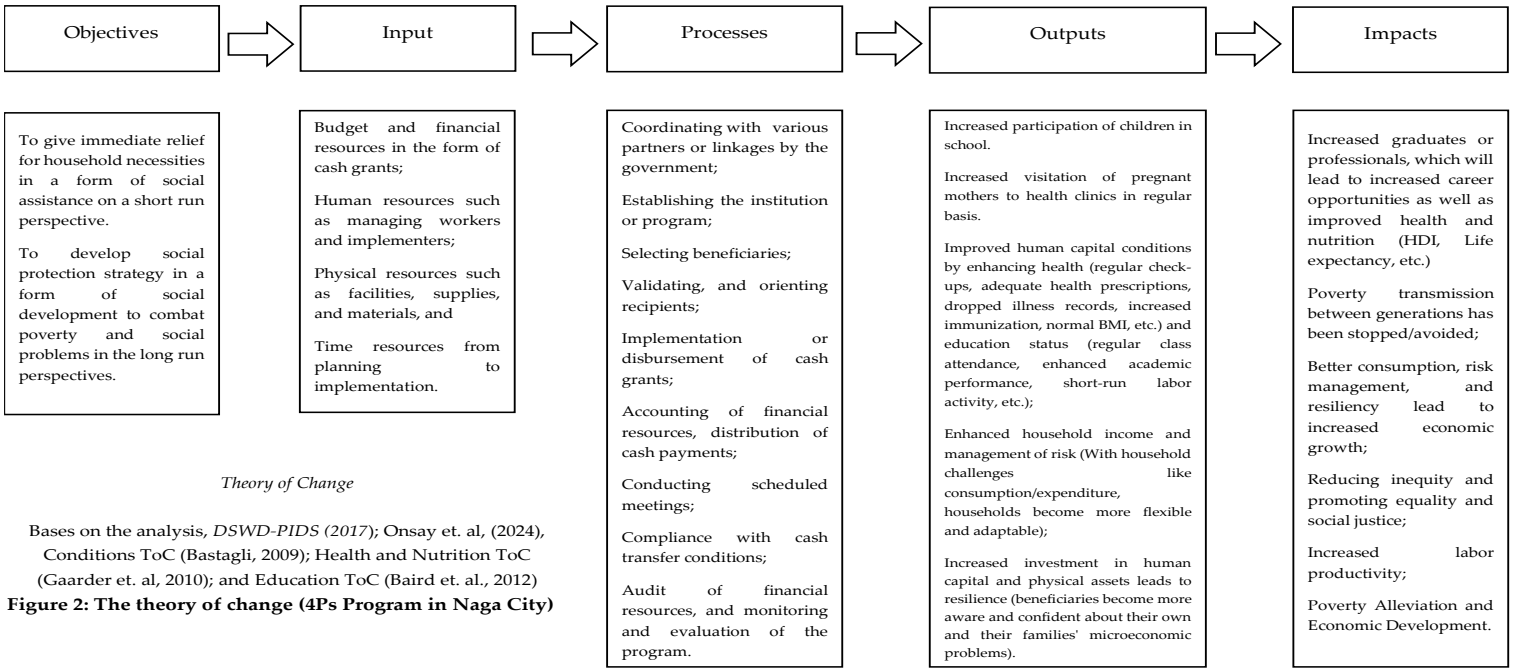


Figure 1: Official theory of change by the impact evaluation study (DSWD-PIDS, 2017)

The 4Ps initiative aims to break the cycle of intergenerational poverty by encouraging low-income families to invest in their children's human capital, prioritising education and health to enhance future productivity and income. Its primary objective is to disrupt poverty through four approaches: cash transfers to boost income, access to education, improved healthcare, and enhanced social services (Department of Social Welfare and Development [DSWD], 2021, 2024;

Barbado et al., 2024; Fernandez & Olfindo, 2011; Orbeta et al., 2021). Whereas the theoretical framework covers a wide range of anticipated outcomes, this study will focus on regional impact evaluation with disaggregated configurations (Figure 2). The Theory of Change (ToC) serves as a foundational structure for planning and evaluating social interventions (Connell & Kubisch, 1998; Mayne, 2017). It identifies key indicators that help organisations monitor progress and adapt strategies. Regularly refining the ToC is essential for maintaining its relevance and effectiveness, allowing teams to reassess assumptions in light of new insights and challenges (Barbado et al., 2024; Onsay & Rabajante, 2024a). Additionally, the analysis aligns with Sustainable Development Goals and incorporates techniques from benchmark frameworks, integrating futures thinking and data analytics (Parro, 2024; Onsay & Rabajante, 2024b; Velasco, 2019).

The theory of change for the 4ps program was formulated taking into account the nation's surroundings, economic conditions, policy instruments, and duration of implementation. The researchers/evaluators have summarized the synthesized theory of change outlined thereafter.



Theory of Change

Bases on the analysis, *DSWD-PIDS (2017*); Onsay et. al, (2024), Conditions ToC (Bastagli, 2009); Health and Nutrition ToC (Gaarder et. al, 2010); and Education ToC (Baird et. al., 2012)

Figure 2: The theory of change (4Ps Program in Naga City)

DATA AND METHODS

This impact evaluation study utilised the Community-Based Monitoring System (CBMS) 2021 Database, providing comprehensive data from 27 barangays in Naga City, encompassing 28,687 households and 113,165 household members. The focus was on evaluating poverty outcomes and economic development parameters. The dataset was filtered and manipulated to enable randomised control trials and regression discontinuity analysis. The study was limited to Naga City, with the CBMS 2021 database serving as the reference as of June 2021. It examined 2,595 beneficiaries of the 4Ps programme using a cross-sectional design, with a treatment group of 2,595 beneficiaries and a control group of 2,595 non-beneficiaries, determined by power calculations. Methodologies included logistic regression, multivariate regression, and regression discontinuity analysis to derive insights. The study employed a non-experimental, causal-explanatory research design, utilising regression discontinuity to compare the impacts on households receiving the programme versus those that did not (Rossi et al., 2004).

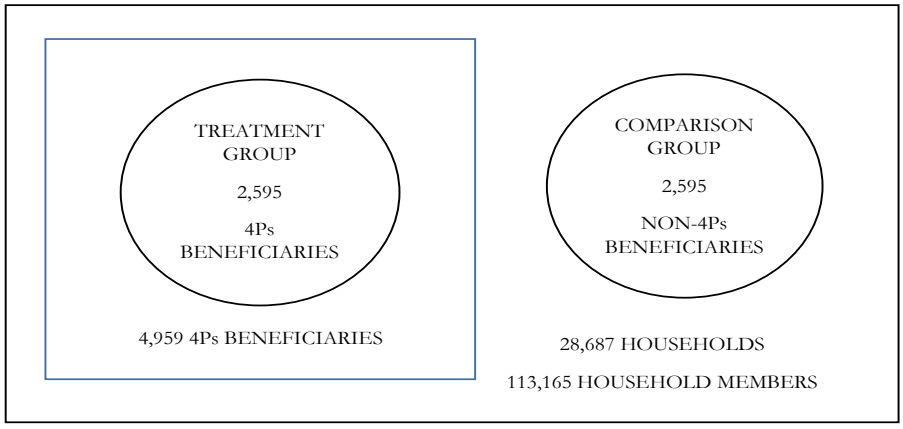


Figure 3: The treatment and control groups for the impact evaluation study in Naga City

Through power calculations, 2,595 beneficiaries were selected for the treatment group, and an equivalent 2,595 non-beneficiaries were chosen for the control group, ensuring similar characteristics. A randomised control trial (RCT) approach was employed to cluster respondents into these two groups and establish counterfactuals effectively. The details of the power calculations are outlined in Table 2. An RCT is a rigorous evaluation technique that uses random assignment to minimise biases and ascertain causal relationships. By comparing outcomes between treatment and control groups, RCTs enable direct examination

of the intervention's effects. Establishing clear eligibility criteria is critical for maintaining the study's integrity and applicability to the broader eligible population, with meticulous data collection and analysis essential for deriving evidence-based policy insights (Barbado et al., 2024; World Bank, 2024b; Bouguen et al., 2019; Banerjee et al., 2019; Kneipp et al., 2013).

Table 2: Power calculations of sample size (Verification of power)

Estimated sample size for two samples with repeated measures Assumptions:			
alpha	0.0500 (two sided)	correlation between baseline & follow-up	0.500
power	0.978	Method: ANCOVA	
m1	0.0	Relative efficiency	1.333
m2	0.1	adjustment to sd	0.866
sd1	1	adjusted sd1	0.866
sd2	1	Estimated required sample sizes:	
n2/n1	1.00	n1	2595
number of follow-up measurements	1	n2	2595
number of baseline measurements	1		

The Regression Discontinuity

The Regression Discontinuity Design (RDD) is a respected quasi-experimental technique utilised for evaluating programme impacts by comparing outcomes above and below a predetermined cutoff point. This method allows for estimating causal effects whereas addressing potential confounding variables, establishing counterfactuals to gauge the impact of the intervention. RDD's strength lies in its capacity to infer outcomes if the treatment were absent, emphasising the importance of meeting specific assumptions, including a continuous eligibility measure and similar characteristics near the cutoff (Maciejewski & Basu, 2020; Barbado et. al., 2024; Lee & Lemieux, 2010). To implement the RDD, the income of households and its natural logarithm were utilised to examine the impact of the 4Ps.

Empirical Procedure and Econometric Modelling

By utilising logistic models from Onsay (2022), Onsay and Rabajante (2024b), Reyes et al. (2011), Conchada and Rivera (2013), Conchada et al. (2017), and Sobrevinas (2020), evaluators identify variables impacting poverty and economic development. Dependent variables focus on poverty alleviation and economic outcomes, whereas independent variables include programme eligibility, socio-

demographic profiles, and socio-economic conditions. Control variables are also included to enhance evaluation robustness.

$$\mathbf{Y} = \alpha + \mathbf{X}\beta + \mu$$

where: Y = logit (p) = log [p / (1- p)], p = probability of poverty alleviation, being non-poor of household, and of health and nutrition, housing, water and sanitation, livelihood and income, education, and peace and order outcomes; α = the intercept or individual effects of the Pantawid Pamilyang Pilipino Program, socio-demographic and profile which is assumed to be constant; X = vector of independent variables or characteristics of Pantawid Pamilyang Pilipino Program, socio-demographic and profile; β = vector of coefficients, intercepts, or effects of Pantawid Pamilyang Pilipino Program, socio-demographic and profile on poverty outcomes and economic development parameters; and μ = error term. To assess the effects of the Pantawid Pamilyang Pilipino Program on poverty reduction outcomes and economic advancement based on socio-demographic profiles, a logit regression technique was utilised. The logit models in this research were calculated in the subsequent manner:

Model

1 $POVALLEV = \beta_0 + \beta_1 TREATCOM + \beta_2 ELIGI + \beta_3 HSIZE + \beta_4 AGEHH + \beta_5 HHF + \beta_6 MARSTATHH + \beta_7 ETHNI + \beta_8 RELIG + \beta_9 HEA + \beta_{10} CMORTAL + \beta_{11} MMORTAL + \beta_{12} CMAL + \beta_{13} AMV + \beta_{14} ASDW + \beta_{15} ASSTF + \beta_{16} STRHOUSE + \beta_{17} TYHOUSE + \beta_{18} NNUCFAM + \beta_{19} SETCON + \beta_{20} SPELEM + \beta_{21} SPJHIGHS + \beta_{22} SPSHIGHS + \beta_{23} VICCRIM + \beta_{24} POLPAR + \beta_{25} UNEMPLOY + \beta_{26} AELEC + \beta_{27} AINTER + \beta_{28} IRENT + \beta_{29} GARDIS + \beta_{30} ASSETSBEL + \beta_{31} ENTREPACT + \mu$

2 $AMV = \beta_0 + \beta_1 TREATCOM + \beta_2 ELIGI + \beta_3 HSIZE + \beta_4 AGEHH + \beta_5 HHF + \beta_6 MARSTATHH + \beta_7 ETHNI + \beta_8 RELIG + \beta_9 HEA + \beta_{10} CMORTAL + \beta_{11} MMORTAL + \beta_{12} CMAL + \beta_{13} HOUSEINC + \beta_{14} ASDW + \beta_{15} ASSTF + \beta_{16} STRHOUSE + \beta_{17} TYHOUSE + \beta_{18} NNUCFAM + \beta_{19} SETCON + \beta_{20} SPELEM + \beta_{21} SPJHIGHS + \beta_{22} SPSHIGHS + \beta_{23} VICCRIM + \beta_{24} POLPAR + \beta_{25} UNEMPLOY + \beta_{26} AELEC + \beta_{27} AINTER + \beta_{28} IRENT + \beta_{29} GARDIS + \beta_{30} ASSETSBEL + \beta_{31} ENTREPACT + \mu$

3 $POVALLEVtc = \beta_0 + \beta_1 AGEHHtc + \beta_2 HSIZEtc + \beta_3 HSIZEtc + \beta_4 HHFtc + \beta_5 MARSTATHHtc + \beta_6 ETHNItc + \beta_7 RELIGtc + \beta_8 HEAtc + \beta_9 AELECtc + \beta_{10} ASSETSBELtc + \beta_{11} ENTREPACTtc + \beta_{12} UNEMPLOYtc + \mu$

4 $HOUSECONtc = \beta_0 + \beta_1 AGEHHtc + \beta_2 HSIZEtc + \beta_3 HSIZEtc + \beta_4 HHFtc + \beta_5 MARSTATHHtc + \beta_6 ETHNItc + \beta_7 RELIGtc + \beta_8 HEAtc + \beta_9 AELECtc + \beta_{10} ASSETSBELtc + \beta_{11} ENTREPACTtc + \beta_{12} UNEMPLOYtc + \beta_{13} STRHOUSEtc + \beta_{14} AINTERtc + \beta_{15} NNUCFAMtc + \mu$

5 $AMVtc = \beta_0 + \beta_1 AGEHHtc + \beta_2 HSIZEtc + \beta_3 HSIZEtc + \beta_4 HHFtc + \beta_5 MARSTATHHtc + \beta_6 ETHNItc + \beta_7 RELIGtc + \beta_8 HEAtc + \beta_9 EXPSICKtc + \beta_{10} CMORTALtc + \beta_{11} MMORTALtc + \beta_{12} CMALtc + \beta_{13} ASDWtc + \beta_{14} ASTFtc + \mu$

6 $ASDWtc = \beta_0 + \beta_1 AGEHHtc + \beta_2 HSIZEtc + \beta_3 HSIZEtc + \beta_4 HHFtc + \beta_5 MARSTATHHtc + \beta_6 ETHNItc + \beta_7 RELIGtc + \beta_8 HEAtc + \beta_9 EXPSICKtc + \beta_{10} AMVtc + \beta_{11} DISWATtc + \mu$

7 $ASTFtc = \beta_0 + \beta_1 AGEHHtc + \beta_2 HSIZEtc + \beta_3 HSIZEtc + \beta_4 HHFtc + \beta_5 MARSTATHHtc + \beta_6 ETHNItc + \beta_7 RELIGtc + \beta_8 HEAtc + \beta_9 EXPSICKtc + \beta_{10} AMVtc + \beta_{11} SFACtc + \mu$

8 $SCHOOLPtc = \beta_0 + \beta_1 AGEHHtc + \beta_2 HSIZEtc + \beta_3 HSIZEtc + \beta_4 HHFtc + \beta_5 MARSTATHHtc + \beta_6 ETHNItc + \beta_7 RELIGtc + \beta_8 HEAtc + \beta_9 AELECtc + \beta_{10} ASSETSBELtc + \beta_{11} ENTREPACTtc + \beta_{12} UNEMPLOYtc + \beta_{13} HOUSEINCtc + \beta_{14} AINTERtc + \mu$

9 $UNEMPLOYtc = \beta_0 + \beta_1 AGEHHtc + \beta_2 HSIZEtc + \beta_3 HSIZEtc + \beta_4 HHFtc + \beta_5 MARSTATHHtc + \beta_6 ETHNItc + \beta_7 RELIGtc + \beta_8 HEAtc + \beta_9 AELECtc + \beta_{10} ASSETSBELtc + \beta_{11} ENTREPACTtc + \beta_{12} AINTERtc + \mu$

10 $PEACEOOtc = \beta_0 + \beta_1 AGEHHtc + \beta_2 HSIZEtc + \beta_3 HSIZEtc + \beta_4 HHFtc + \beta_5 MARSTATHHtc + \beta_6 ETHNItc + \beta_7 RELIGtc + \beta_8 HEAtc + \beta_9 AELECtc + \beta_{10} ASSETSBELtc + \beta_{11} ENTREPACTtc + \beta_{12} POLPARtc + + \beta_{13} GARDIStc + \beta_{14} UNEMPLOYtc + \mu$

Table 3 shows the variable descriptions and sources (Onsay & Rabajante, 2024a). To examine the income and livelihood outcomes of the programme, a multivariate regression model was utilised. The Multiple Linear Regression Model is a tool that analyses the factors that impact household income among Pantawid beneficiaries with continuous dependent variables. The multivariate linear model is as follows:

$HOUSEINClog = \beta_0 + \beta_1 TREATCOM + \beta_2 ELIGI + \beta_3 HSIZE + \beta_4 AGEHH + \beta_5 HHF + \beta_6 MARSTATHH + \beta_7 ETHNI + \beta_8 RELIG + \beta_9 HEA + \beta_{10} CMORTAL + \beta_{11} MMORTAL + \beta_{12} CMAL + \beta_{13} AMV + \beta_{14} ASDW + \beta_{15} ASSTF + \beta_{16} STRHOUSE + \beta_{17} TYHOUSE + \beta_{18} NNUCFAM + \beta_{19} SETCON + \beta_{20} SPELEM + \beta_{21} SPJHIGHS + \beta_{22} SPSHIGHS + \beta_{23} VICCRIM + \beta_{24} POLPAR + \beta_{25} UNEMPLOY + \beta_{26} AELEC + \beta_{27} AINTER + \beta_{28} IRENT + \beta_{29} GARDIS + \beta_{30} ASSETSBEL + \beta_{31} ENTREPACT + \mu$

Table 3: Variable descriptions and sources (Onsay et. al., 2024)

Variables		VAR	Description	A priori Expectation (Expected Sign of Coefficient)
Dependent Variables	Poverty Alleviation	*POVALLEV***	0 (Yes/Poor/HH Living below Poverty Threshold), 1 (No/Non-Poor/ HH Not Living below Poverty Threshold)	
	Access to medicines, vaccines, and health facility	*AMV***	0 (HH without access to medicines, vaccines, and health facility), 1 (HH with access to medicines, vaccines, and health facility)	
	Housing Conditions	*HOUSECON***	0 (HH who are living in Makeshift Housing), 1 (HH who are not living in Makeshift Housing)	
	Access to Safe Drinking Water	*ASDW***	0 (HH without Access to Safe Drinking Water), 1 (HH with Access to Safe Drinking Water)	
	Access to Sanitary Toilet Facility	*ASTF***	0 (HH without Access to Sanitary Toilet Facility), 1 (HH with Access to Sanitary Toilet Facility)	
	School Participation	*SCHOOLP***	0 (HH with Children not attending school), 1 (HH without Children not attending school)	
	Peace and Order Outcomes	*PEACEOO**	0 (HH with victims of crime), 1 (HH without victims of crime)	
	Household Income	*HOUSEINClog***	Natural logarithm of household income from all sources	
Independent Variables	Treatment Locality	*TREATCOM***	0 (HH that are not pantawid beneficiaries), 1 (HH that are pantawid beneficiaries)	Positive (+)
	Eligibility	*ELIGI**	0 (HH that are not eligible to the 4Ps), 1 (HH that are eligible to 4Ps)	Positive (+)
	Child Mortality	*CMORTAL***	0 (HH with Children under 5 who died), 1 (HH without Children under 5 who died)	Positive (+)
	Maternal Mortality	*MMORTAL***	0 (HH with Women who died due to pregnancy related cases), 1 (HH without Women who died due to pregnancy related cases)	Positive (+)
	Malnutrition of Children	*CMAL***	0 (HH with children aged 0-5 who are malnourished), 1 (HH without children aged 0-5 who are malnourished)	Positive (+)

Experience Sickness	*EXPSICK***	0 (HH with members who get sicked), 1 (HH without members who get sicked)	Negative (+)
Settlement Conditions	*SETCON***	0 (HH that are informal settlers), 1 (HH that are not informal settlers)	Negative (+)
Distance of Water Source to Household	*DISTWAT**	Distance in meters of Household from Water source	Positive (+)
Garbage Collection Disposal	*GARDIS***	0 (HH without proper waste disposal), 1 (HH with proper waste disposal)	Positive (+)
Structure of House	*STRHOUSE***	0 (HH without concrete structure in a house), 1 (HH with concrete structure in a house)	Negative (+)
Type of Housing	*TYHOUSE***	0 (HH who are living in Makeshift Housing), 1 (HH who are not living in Makeshift Housing)	Positive (+)
Number of Nuclear Family	*NNUCFAM**	The actual number of nuclear family in a household	Negative (+)
Shared Sanitary Facility	*SFAC***	0 (HH without shared sanitary toilet facility), 1 (HH with shared sanitary toilet facility)	Negative (+)
School Participation in Elementary	*SPELEM***	0 (HH with Children not attending elementary school), 1 (HH without Children not attending elementary school)	Positive (+)
School Participation in Junior High School	*SPJHIGHS***	0 (HH with Children not attending junior high school), 1 (HH without Children not attending junior high school)	Positive (+)
School Participation in Senior High School	*SPSHIGHS***	0 (HH with Children not attending Senior High school), 1 (HH without Children not attending Senior High school)	Positive (+)
Victims of Crime	*VICCRIM**	0 (HH with victims of crime), 1 (HH without victims of crime)	Positive (+)
Political Participation	*POLPAR**	0 (HH with qualified members who did not voted last election), 1 (HH with qualified members who voted last election)	Positive (+)
Unemployment	*UNEMPLOY***	0 (HH with qualified members who are unemployed), 1 (HH without qualified members are unemployed)	Positive (+)
Access to Electricity	*AELEC***	0 (HH without access to electricity), 1 (HH with access to electricity)	Positive (+)
Access to Internet	*AINTER***	0 (HH without access to internet), 1 (HH with access to internet)	Positive (+)
Imputed Rent	*IMPRENT**	Monetary value of imputed rent	Positive (+)

	Assets and Belongings	*ASSETBEL***	0 (HH without five or more non-current assets), 1 (with five or more non-current assets)	Positive (+)
	Entrepreneurial Activities	*ENTACT***	0 (HH that are not engaged in poultry, livestock, fishing, or agriculture), 1 (HH that are engaged in poultry, livestock, fishing, or agriculture)	Positive (+)
Control Variables	Age of the head of the household	*AGEHH**	The biological age of household head	Positive (+)
	Household Size	*HSIZE**	The total number of members of Households	Positive (+)
	Household Head is Female	*HHF***	0 (Female or otherwise), 1 (Male)	Negative (+)
	Marital Status	*MARSTATHH***	0 (Single or otherwise), 1 (Married)	Negative (+)
	Ethnicity	*ETHNIC***	0 (Tagalog or Otherwise), 1 (Bicolano Naga)	Negative (+)
	Religion	*RELIG***	0 (Christian or Otherwise), 1 (Roman Catholic)	Positive (+)
	Highest Educational Attainment	*HEA***	1 (High School or Otherwise), 0 (Elementary)	Positive (+)

Sources:

**CBMS – Given/As is **CBMS – Transformed/Processed by Researchers/Evaluators*

The Participants of the Impact Evaluation Study

Table 4: Distribution of households among 4Ps beneficiaries and Non-4Ps beneficiaries in Naga city (treatment and comparison locality, 2020-2021)

Barangay	Treatment Locality		Comparison Locality	
	Frequency	Percentage	Frequency	Percentage
Abella	79	3.04	75	2.89
Bagumbayan Norte	26	1	26	1.00
Bagumbayan Sur	44	1.7	43	1.66
Balatas	153	5.9	141	5.43
Calauag	124	4.78	119	4.59
Cararayan	177	6.82	185	7.13
Carolina	172	6.63	204	7.86
Concepcion Grande	95	3.66	105	4.05
Concepcion Pequena	321	12.37	329	12.68
Dayangdang	13	0.5	19	0.73
Del Rosario	77	2.97	83	3.20
Igualdad	43	1.66	42	1.62

Lerma	44	1.7	41	1.58
Liboton	12	0.46	16	0.62
Mabolo	212	8.17	221	8.52
Pacol	240	9.25	230	8.86
Panicuason	105	4.05	109	4.20
Peñafrancia	27	1.04	30	1.16
Sabang	146	5.63	104	4.01
San Felipe	141	5.43	139	5.36
San Isidro	105	4.05	103	3.97
Santa Cruz	55	2.12	39	1.50
Tabuco	57	2.2	62	2.39
Tinago	7	0.27	13	0.50
Triangulo	96	3.7	93	3.58
Unspecified	24	0.92	24	0.92
Total	2,595	100.00	2,595	100.00

Table 4 displays the household distribution in treatment and comparison areas, focusing on 4Ps recipients and non-4Ps beneficiaries. The treatment locality's population was selected from the CBMS database, whereas the comparison area was chosen based on similar characteristics. After identifying 4Ps beneficiaries, datasets were categorised into non-programme participants and those in programmes excluding 4Ps. Matching was based on barangay location, household size, head's education level, and age, with randomisation used for tied households. The treatment area comprises 9.05% of Naga City households and 13.58% of its population. Concepcion Pequeña has the highest proportion of 4Ps beneficiaries at 12.37%, followed by Pacol, Mabolo, and Cararayan, whereas Tinago has the lowest at 0.27%. Few participants are from Liboton, Dayangdang, and Bagumbayan Norte, and 24 households (0.92%) lacked specified addresses in both areas.

Poverty Evaluation Methods

Poverty is multifaceted, making it impractical to assess with a single measure. To capture its prevalence, distribution, severity, and extent, various indicators have been developed (Onsay & Rabajante, 2024b; Onsay, 2022; Sobreviñas, 2020). The following metrics have been formulated to illustrate the complexity of poverty: : i. *Headcount Index* P_0 = *Headcount Ratio* $P_0 = \frac{1}{N}\sum_{i=1}^{N}(y_i < z)$, $P_O = \frac{N_P}{N}$ *Where, Np = Number of poor; and N = Total Population (or sample)*. The headcount ratio (HCR) serves as a metric indicating the percentage of the population living below the

poverty line. The indicator "i" functions as a binary signal, returning 1 when the enclosed statement is true and 0 when false. If a household's income (yi) falls beneath the poverty threshold (z), "i" equates to 1, indicating impoverishment. The primary strengths of the headcount index lie in its simplicity and clarity. However, a limitation of the headcount ratio is its failure to account for the intensity of poverty; even as the impoverished experience deepening financial struggles, the headcount index remains unchanged.; ii. *Poverty Gap Metrics* P_1 = Poverty Gap Index $P_1 = \frac{1}{N}\sum_{i=1}^{N}\frac{G_i}{z}$ *Where,* $G_i = (z - x_1)$ x $I(y_i < z)$. The poverty gap index assesses the severity and depth of poverty by quantifying the average poverty deficit compared to the poverty threshold. Individuals in poverty typically have minimal or zero poverty gaps. This index gauges how far below the poverty line those in poverty fall on average. A value closer to 0 indicates a smaller proportion in poverty, whereas a value closer to 1 signifies a higher percentage living in poverty; ; iii. *Poverty Severity* P_2 = Squared Poverty Gap Index $P_\propto = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{z}\right)^{\propto}, (\propto \geq 0)$ *Where* $\propto$*=sensitivity of index to poverty; z=poverty line;* x_1*=value of expenditure (income) per capita for ith person's HH; and* $G_i = z - x_1$*(with* $G_i = 0$ *when* $x_i > z$*) = poverty gap for individual i.* The squared poverty gap index, known as the poverty severity index, is derived from the poverty gap index. It involves squaring each person's poverty gap ratio and averaging these squared values. By emphasising the impact of income falling below the poverty line, this index assigns weight to each gap based on its size. It offers a weighted sum of poverty gaps, reflecting variations in poverty levels (Foster et al., 1984). iv. *Watts Index,* W *= Watts Index,* $W = \frac{1}{N}\sum_{i=1}^{N}[ln(z) - ln(y_i)] = \left(\frac{1}{N}\right)\sum_{i=1}^{q} ln\left(\frac{z}{y_i}\right)$ *where* One of the early poverty metrics responsive to income distribution involves arranging the total income or spending of N individuals in ascending order. It entails dividing the total by q participants with incomes below the poverty line z. The index is computed by dividing the poverty line by income, logarithmically transforming the values, summing these for the poor, and then dividing by the total population. (Haughton & Khandker, 2009).

Ethical considerations

This study was approved by Partido State University under the PARSU-CBM-ECON-NTP4-2023 research project. The Naga City Local Government Unit granted permission for data use, management, analysis, and application. The researchers conducted the data analysis and procedures independently and voluntarily, outside of a laboratory setting. Since the study only involves

socioeconomic human data, without laboratory experimentation, animal testing, or direct human volunteer involvement, ethical clearances were not required. Furthermore, the research does not utilise social media-sourced data.

FINDINGS AND ANALYSIS

Most beneficiaries (66.91%) have access to a private faucet, whereas 16.8% share a communal one; some rely on dug wells, rainfall, or natural sources for water. In healthcare, 66.29% did not seek medical treatment last year, and 18.98% sought care, primarily from public hospitals and health stations. About 58.69% have access to free or affordable medications, whereas 35.92% do not. Among sanitation facilities, 2,547 beneficiaries use water-sealed toilets, but 1.85% lack safe sanitation, resorting to pail systems or open pits. Of the participants, 25 informal settler families (0.96%) were noted, with 84.59% owning their homes and 7.24% renting. Entrepreneurial activities are limited, with many not involved, though some engage in various trades. Approximately 19.85% live below the poverty threshold. Regarding water supply, 71.45% report no change, whereas 17.23% note a decrease due to increased consumption and drought. Hunger affects 4.54% of households, peaking in March, August, February, and April. Table 5 details differences between treatment and comparison communities through proportional difference analysis. Beneficiaries expressed optimism about their children's futures, stating that cash grants sufficiently cover healthcare and education needs (Frufonga, 2015).

Table 5. Impact Evaluation of 4Ps on household and population from treatment and comparison localities through their differences

Poverty Indicators		Household			Population		
		Treatment	Comparison	Difference	Treatment	Comparison	Difference
Health and Nutrition	Children under 5 years old who died	0.00	0.08	-0.08	0.00	0.08	-0.08
	Women who died due to pregnancy related causes	0.00	0.00	0	0.00	0.00	0
	Malnourished children 0-5 years old	0.81	1.43	-0.62	0.64	1.13	-0.49
Housing	Households living in makeshift housing	1.18	1.35	-0.17	1.22	1.46	-0.24

	Households who are informal settlers	0.96	1.73	-0.77	0.98	1.75	-0.77
Water and Sanitation	**Households without access to safe water**	1.65	2.12	-0.47	1.60	2.05	-0.45
	Households without access to sanitary toilet facility	1.85	2.43	-0.58	1.63	2.14	-0.51
Basic Education	**Children aged 6-11 years old who are not attending elementary**	0.19	0.54	-0.35	0.08	0.31	-0.23
	Children aged 12-15 years old who are not attending Junior High School	0.31	0.92	-0.61	0.26	0.75	-0.49
	Children aged 16-17 years old not attending Senior High School	0.50	1.34	-0.84	0.44	1.31	-0.87
Income and Livelihood	**Households with income below poverty threshold**	19.85	41.93	-22.08	18.80	38.87	-20.07
	Households with income below food threshold	19.58	40.46	-20.88	18.55	37.51	-18.96
	Households who experienced food shortage	4.47	7.32	-2.85	4.71	7.71	-3
	Unemployed members of the labor force	1.51	2.21	-0.70	1.11	1.58	-0.47
Peace and Order	**Victims of crime**	0.12	0.31	-0.19	0.02	0.05	-0.03

In the control group of 2,595 households not participating in the 4Ps programme, access to safe drinking water is high, with only 55 households (2.11%) lacking it. Most have private faucets (62.24%), whereas 15.87% share access. Healthcare access shows that 71.25% did not seek medical attention last year, 12.64% reported no illnesses, and 16.10% sought medical help. Access to medications and vaccines varies, with 47.90% reporting access and 45.13% lacking it. Regarding sanitation, 2,532 households have safe water-sealed toilets, whereas 68 use alternative methods. Living conditions reveal that 1.73% are informal settlers, with 83.97% owning their homes and 10.98% renting. Engagement in commercial activities is low, although some participate in the informal economy. Approximately 41.93% of households fall below the poverty line, and food insecurity affects 7.33% of households, peaking in March, April, February, and August. Prior evaluations indicate that control communities not receiving 4Ps have lower health and education outcomes compared to treatment communities (Barbado et al., 2024; Orbeta et al., 2021).

Impact on Reducing Child Mortality, Maternal Deaths, and Malnutrition

As a result of the initiative, it is clear that child mortality, maternal mortality, and malnutrition have all decreased. In the treatment area, child mortality was reduced by 0.08% when compared to the control area. Based on total households in the treatment area, child malnutrition has decreased by 0.62%. In terms of maternal mortality, no location has ever documented a pregnancy-related death.

Table 6: Results of logistic regression on access to medicines and vaccines among treatment and comparison locality

Access to Medicines and Vaccines	Treatment Group		Comparison Group	
	Coefficients	P-Values	Coefficients	P-Values
Household Size	0.0856	0.0000	0.1439	0.0000
Age of Household Head	0.0055	0.0550	0.0022	0.3910
Household Head is a Female	0.0818	0.4520	-0.0085	0.9350
Marital Status of Household Head	0.0354	0.7090	-0.0045	0.9620
Ethnicity	-0.0257	0.8590	0.0604	0.6750
Religion	0.0526	0.7910	-0.0618	0.7290
Highest Educational Attainment	0.1859	0.0390	-0.0582	0.5110
Experience Sickness	1.3482	0.0000	1.0176	0.0000
Child Mortality	0.0000	0.0000	0.0027	0.9990
Maternal Mortality	0.0000	0.0000	0.0000	0.0000
Child Malnutrition	-0.5595	0.3930	0.1220	0.7560
Access to Safe drinking Water	-0.0095	0.9740	0.3274	0.0260
Access to Safe Sanitary Toilet	-1.0120	0.0290	-0.6755	0.0000

_cons	1.0347	0.2560	-0.4259	0.7830
Overall		0.0000		0.0000

Household characteristics significantly predict health resource access differently across localities. In the treatment area, household size (0.0856), head's age (0.0055), and education level correlate with improved access to medicines and vaccines, whereas only household size matters in the comparison area. Illness presence and toilet access are significant predictors in both areas (all p=0.0000), whereas child/maternal mortality were excluded due to collinearity. The programme's positive health impacts are documented through improved vaccination rates and child check-ups (Peñalba, 2019; Organo, 2023), reduced child malnutrition in beneficiary households (Velarde & Fernandez, 2011; Barbado et al., 2024; Diaz, 2021), and increased health-seeking behaviour (Department of Social Welfare and Development [DSWD], 2024).

Impact on Improving Water and Sanitation access

The programme is also promoting better access to safe drinking water and sanitation. Based on the results of the analysis, there is an estimated 0.47% impact on reducing households without access to safe water and 0.58% impact on reducing Households without access to a sanitary toilet facility. The households and population under treatment locality have better access to safe drinking water and sanitary toilet facility as compared to comparison locality.

Table 7: Results of logistic regression on access to access to safe drinking water among treatment and comparison locality

Access to Safe Drinking Water	Treatment Group		Comparison Group	
	Coefficients	P-Values	Coefficients	P-Values
Household Size	0.0632	0.0916	0.0009	0.9850
Age of Household Head	-0.0081	0.0123	-0.0016	0.7580
Household Head is a Female	1.2661	0.5244	0.0123	0.9550
Marital Status of Household Head	1.0147	0.3926	-0.0409	0.8380
Ethnicity	1.1908	0.4320	-0.4999	0.1730
Religion	0.5528	0.7057	0.2485	0.5290
Highest Educational Attainment	0.3564	0.4132	0.2265	0.2290
Experience Sickness	-0.3351	0.4071	-0.0879	0.7070
Access to Medicines and Vaccines	0.3412	0.3890	0.2670	0.1400
Distance from Water Source	-0.9403	0.0290	-2.5105	0.0030
_cons	-1.3729	1.4173	2.1750	0.0230
Overall		0.0007		0.1220

In the treatment locality, both Household Head age (-0.0081) and Distance from Water Source (0.9403) significantly predict safe drinking water access, with older heads and greater distances associated with reduced access. The comparison locality shows only Distance (-2.5105) as a significant predictor, though the overall model lacks statistical significance unlike in the treatment area. These findings support Sanchez-Danday's et al. (2019) observation that whereas most 4Ps recipients have safe drinking water access, some rely on deep wells. The results challenge assumptions about water source's irrelevance to programme implementation and align with Basas III's (2021) finding that Samar beneficiaries still face water access challenges despite cash grants.

Table 8: Results of logistic regression on access to safe sanitary toilet facility among treatment and comparison locality

Access to Safe Sanitary Toilet Facility	Treatment Group		Comparison Group	
	Coefficients	P-Values	Coefficients	P-Values
Household Size	0.1022	0.2800	-0.0200	0.4790
Age of Household Head	0.0219	0.0820	-0.0001	0.9860
Household Head is a Female	0.1342	0.7730	-0.0208	0.8740
Marital Status of Household Head	0.5984	0.1370	0.0545	0.6390
Ethnicity	-0.3655	0.6230	-0.4433	0.0290
Religion	-0.3037	0.7690	-0.0032	0.9890
Highest Educational Attainment	-0.1934	0.6070	-0.0003	0.9980
Experience Sickness	0.8487	0.1220	0.0068	0.9600
Access to Medicines and Vaccines	-0.9576	0.0390	-0.5305	0.0000
Shared Facility	0.9384	0.0220	0.7923	0.0000
_cons	3.0082	0.0390	1.6138	0.0000
Overall		0.0274		0.0000

In the treatment locality, Access to Medicines and Vaccines (-0.9576, p=0.0390) and Shared Facility (0.9384, p=0.0220) significantly predict access to safe sanitary toilets, with shared facilities positively correlating with better access. The comparison locality shows Ethnicity, Medicine/Vaccine Access, and Shared Facility as significant predictors, with Bicolano ethnicity linked to improved access. Other variables' p-values exceed 0.05. The models demonstrate significant predictive power in both areas (treatment p=0.0274, comparison p=0.0000). These findings align with research by Mamangon et al. (2019), Cho et al. (2020), and Organo (2023) showing the initiative's success in promoting health-protective behaviours, including improved cleanliness and sanitation among participants.

Impact on school participation and lowering kid dropout rates

School participation data shows consistent improvement across all levels: elementary school dropout rates decreased by 0.35% (households) and 0.23%

(individuals), high school rates dropped by 0.61% (households) and 0.49% (individuals), and senior high school rates declined by 0.84% (households) and 0.87% (individuals). Logistic regression analysis revealed that factors in both treatment and comparison localities are not significant predictors of school attendance (treatment p=0.9580, comparison p=0.1747), with independent variables exceeding the 0.05 threshold. This suggests strong school attendance in the treatment area, likely due to programme conditions. Research confirms the programme's positive impact on education and healthcare access (Barbado et al., 2024; Malinao et al., 2022; Basiri, 2024). Multiple studies support these findings. Pañares and Rapista (2023) and Brendo (2024) found higher school enrolment rates among grant recipients. Villaflor et al. (2022) and Canlas et al. (2022) emphasised the programme's role in improving educational resource access for underprivileged households. Reyes et al. (2013) and Taguiam (2024) noted that education-linked cash transfer requirements have enhanced both attendance and academic performance among beneficiaries.

Impact on Income and Livelihood

The treatment locality shows significant poverty reduction, with a 22.08% decrease in poverty incidence as of 2021. Currently, 80.15% of households and 81.20% of household members are classified as non-poor, marking a substantial improvement from their pre-programme status when all participants were below the poverty threshold. The impact is particularly evident in economic engagement, with treatment locality households demonstrating increased participation in entrepreneurial activities, agricultural farming, and livestock raising compared to the comparison locality, as supported by both descriptive and regression analyses.

Table 9: Results of multivariate regression on household income

Household Income	Coef.	Robust Std. Err.	t	P>t	[95% Conf.	Interval]
Treatment Community	2.0758	0.0364	45.1777	0.0000	1.9851	2.1670
Eligibility	-2.8116	0.0243	-81.3523	0.0000	-2.8787	-2.7441
Household Size	0.0487	-0.0003	7.0377	0.0000	0.0298	0.0680
Age of Household Head	-0.0200	-0.0090	-0.0523	0.9680	-0.0218	-0.0179
Household Head is a Female	0.0079	0.0281	0.7177	0.4630	-0.0665	0.0828
Marital Status of Household Head	-0.0502	0.0239	-0.9023	0.3720	-0.1164	0.0164
Ethnicity	-0.0040	0.0420	0.2977	0.7580	-0.1058	0.0982
Religion	0.0182	0.0614	0.5277	0.5930	-0.1216	0.1585
Highest Educational Attainment	-0.0266	0.0234	-0.2123	0.8440	-0.0919	0.0391

Child Mortality	0.2552	0.4957	0.5277	0.5860	-0.7359	1.2468
Maternal Mortality	-0.0200	-0.0100	-0.0123	0.0000	-0.0198	-0.0198
Child Malnutrition	0.6408	0.3989	1.6077	0.1060	-0.1607	1.4427
Access to Medicine and Vaccines	0.0243	0.0220	1.3677	0.1670	-0.0383	0.0872
Access to Safe Drinking Water	-0.1093	0.0516	-1.4623	0.1470	-0.2298	0.0116
Access to Safe Sanitary Toilet Facility	0.0415	0.0338	1.3877	0.1610	-0.0442	0.1276
Structure of House	-0.1984	0.0612	-2.5223	0.0120	-0.3378	-0.0587
Type of Housing	0.0056	0.1220	0.1777	0.8460	-0.2529	0.2645
Number of Nuclear Family	-0.1531	0.0152	-5.2923	0.0000	-0.2024	-0.1035
Settlement Condition	-0.2280	0.0557	-3.1823	0.0020	-0.3566	-0.0990
School Participation in Elementary	-0.1696	0.3156	-0.4723	0.6460	-0.8077	0.4688
School Participation in Junior High School	0.2026	0.2506	0.8377	0.3930	-0.3081	0.7137
School Participation in Senior High School	-0.9225	0.4377	-2.0323	0.0440	-1.8001	-0.0445
Victims of Crime	0.2811	0.2682	1.0677	0.2790	-0.2640	0.8266
Political Participation	0.2665	0.3224	0.8477	0.3890	-0.3851	0.9184
Unemployment	0.0833	0.1116	0.8377	0.3950	-0.1548	0.3218
Access to Electricity	0.1031	0.0251	3.4977	0.0000	0.0345	0.1721
Access to Internet	0.1165	0.0247	3.9177	0.0000	0.0486	0.1848
Imputed Rent	-0.0200	-0.0100	3.8577	0.0000	-0.0198	-0.0197
Garbage Disposal	0.0944	0.0370	2.4277	0.0150	0.0025	0.1867
Assets and Belongings	0.1704	0.0227	5.8077	0.0000	0.1064	0.2348
Entrepreneurial Activities	0.3998	0.0666	5.4677	0.0000	0.2498	0.5503
_cons	10.5203	0.7286	14.2577	0.0000	9.0724	11.9685

Logistic regression analysis of medicine and vaccine access across localities shows ten significant predictors ($p<0.05$), including Treatment Community and household characteristics, with strong model fit ($p=0.000$, Pseudo $R^2=0.4178$). Research supports higher Human Development Index levels during programme implementation (Diaz, 2021), whereas Barbado et al.'s (2024) study using Regression Discontinuity Design and Randomized Controlled Trials demonstrates higher incomes among 4Ps beneficiaries who invest grants in education, food, and livelihood activities.

Impact on Unemployment

According to the findings, the treatment locality's unemployment rate is just 1.51%, whereas the comparison locality's unemployment rate is 2.21%. A considerable difference of -0.70 can be attributed to the impact. It implies that more members of the treatment locality who are part of the labor force are employed.

Table 10: Results of logistic regression on unemployment among treatment and comparison locality

Unemployment	Treatment Group		Comparison Group	
	Coefficients	P-Values	Coefficients	P-Values
Household Size	-1.0414	0.0000	-0.6985	0.0000
Age of Household Head	-0.0238	0.0610	-0.0017	0.8540
Household Head is a Female	-0.8736	0.0560	0.0024	0.9950
Marital Status of Household Head	-0.3806	0.3800	-0.1381	0.6760
Ethnicity	0.4728	0.4330	-0.2346	0.6510
Religion	0.2852	0.3760	0.3963	0.4880
Highest Educational Attainment	-0.4528	0.2510	0.0057	0.9850
Access to Electricity	-0.1890	0.6520	0.1148	0.7160
Access to Internet	-0.7432	0.0420	-0.6756	0.0330
Assets and Belongings	0.3425	0.3680	-0.3466	0.2750
Entrepreneurial Activities	-1.2033	0.0650	-1.0137	0.0350
_cons	13.9702	0.0000	7.9559	0.0000
Overall		0.0000		0.0000

The total models yielded p-values of 0.0000 for unemployment, indicating that socio-economic and economic development factors predict unemployment outcomes in both locations. Household size had the lowest p-values of 0.0000, with larger sizes correlating to reduced unemployment, likely due to more working members. In the treatment area, female household heads significantly motivate household members to work, lowering unemployment—a trend not seen in the comparison locality. Internet access and entrepreneurial activities are statistically significant in both areas, with coefficients of -0.7432 and -1.2033 in the treatment location, and -0.6756 and -1.0137 in the comparison area. This suggests that expanding internet connectivity and engaging in entrepreneurship are linked to decreased unemployment rates. Overall, the 4Ps programme enhances educational outcomes, positively affecting employment, as noted by Onsay and Rabajante (2024b). Many children of beneficiaries have secured jobs based on their skills, as mentioned by Barbado et al. (2024). Cash grants also supplement beneficiaries' disposable income, enhancing earnings (Tabilog et al., 2017). However, low employment rates are a concern due to poor educational achievements, as discussed by Araos et al. (2022) and Barbado et al. (2024).

Impact on Participation in Community Development Initiatives

Descriptive and regression analyses suggest that 4Ps members are motivated to work rather than dependent on cash transfers, indicating the programme fosters self-sufficiency. Beneficiaries engage in community development initiatives, complying with health and nutrition conditions that have led to lower child malnutrition rates and no reported maternal mortality. Conditions tied to cash transfers have also contributed to school participation, as dropout rates from elementary to secondary are minimal. Some beneficiaries use their cash for

entrepreneurial activities, generating additional income. Overall, the programme promotes community involvement, aligning with findings that participants benefit significantly from Family Development Sessions, which support family well-being and children's education through 4Ps cash subsidies (Montilla et al., 2015). These sessions empower participants to make informed choices and improve their welfare by focusing on topics like parenting, financial management, and disaster preparedness (Gealon, 2021; Dy, 2018; Manguiat et al., 2021).

Impact on Housing and Peace and Order

The programme has enhanced housing conditions for beneficiaries, with approximately 1.18% of households in the treatment locality living in makeshift housing, reflecting a 0.17% improvement. Additionally, 0.96% of households are informal settlers, showing a 0.77% improvement. Overall, the majority of participants have experienced better housing and settlement conditions.

Table 11: Results of logistic regression on type of housing among treatment and comparison locality

Type of Housing	Treatment Group		Comparison Group	
	Coefficients	P-Values	Coefficients	P-Values
Household Size	-0.0641	0.5480	0.1369	0.1600
Age of Household Head	-0.0084	0.5190	-0.0047	0.6840
Household Head is a Female	0.2092	0.6620	-0.0388	0.9290
Marital Status of Household Head	-0.0995	0.8190	-0.2812	0.4720
Ethnicity	-0.3960	0.4860	-0.6809	0.1920
Religion	0.5768	0.5880	0.5791	0.5660
Highest Educational Attainment	-0.3785	0.4010	0.1373	0.3814
Access to Electricity	-0.3693	0.3730	0.6114	0.4207
Assets and Belongings	-1.1831	0.0070	-1.6202	0.4748
Entrepreneurial Activities	0.3844	0.6190	-0.0597	1.0610
Unemployment	-1.3669	0.2540	-0.0938	1.1080
Structures of House	-2.3808	0.0000	-2.1181	0.0438
Access to Internet	-0.1311	0.7730	-0.1823	0.3918
Number of Nuclear Family	-0.0597	0.7810	-0.5080	0.5786
_cons	0.4206	0.8440	-1.1938	1.5482
Overall		0.0093		0.0003

In the treatment locality, logit regression analysis indicated that assets (coefficient of -1.1831) and house structures (-2.3808) are significant predictors of housing type, suggesting that lower asset levels correlate with poorer housing quality. In the comparison locality, only house structures were meaningful indicators, with

other variables showing no significance. The overall p-values for independent and dependent variables were 0.0093 and 0.0003, respectively, confirming a significant influence of independent factors on dependent variables. Improved educational outcomes lead to increased incomes and employment for beneficiaries, positively affecting housing quality, with some cash grants used for repairs (Barbado et al., 2024; Onsay & Rabajante, 2024a). Regarding peace and order, the treatment locality has lower crime rates, with only 0.12% of 2,595 households reporting theft or robbery, reflecting a 0.19% improvement. Logit regression models revealed a significant link between economic variables and peace outcomes in the treatment area (p-value of 0.004), whereas the comparison locality showed no significance (p-value of 0.4293). Household size was a strong indicator of peace and order, with a coefficient of -1.4678, suggesting that larger households may be associated with decreased peace outcomes.

Impact on Poverty Alleviation and Economic Growth

In the treatment locality, the poverty rate is 19.85%, affecting 515 households, whereas the comparison area has a headcount ratio of 41.93%, with 1,088 households below the poverty threshold. This highlights that many 4Ps beneficiaries in the treatment region are above the poverty line. The 22.08-point difference in headcount ratios suggests a significant programme impact. By 2021, households enrolled in 4Ps are expected to experience improved quality of life compared to non-beneficiaries. However, the headcount ratio does not account for the severity of poverty, which is addressed by the Poverty Gap Index. In the treatment locality, the poverty gap is 0.36, compared to 0.44 in the comparison area, indicating a smaller population below the poverty line. This 0.08 difference underscores the programme's efficacy. The Poverty Severity Index also shows notable differences, with the treatment area at 0.17 and the comparison area at 0.26, reflecting a more pronounced poverty level in the latter. The discrepancy of 0.09 suggests the programme's influence. Finally, the Watts Indices reveal a higher incidence of poverty in the comparison area (index of 0.79) than in the treatment region (index of 0.53), resulting in a 0.26 difference that may be linked to the programme's impact.

Table 12. Poverty Alleviation in the treatment and comparison locality

Poverty Metrics	Treatment Locality	Comparison Locality	Difference
Poverty Incidence	0.1985	0.4193	0.2208
Poverty Gap	0.36	0.44	0.08
Poverty Severity	0.17	0.26	0.09
Watts Index	0.53	0.79	0.26

The programme aims to reduce poverty and promote economic growth, with the treatment locality showing a lower incidence of poverty (22.08% difference) compared to the comparison locality. The poverty gap indicates moderate poverty in the treatment area and moderate-to-intense poverty in the comparison area, with a difference of 0.08. The severity of poverty is also less in the treatment locality, showing a reduction of 0.09%. The Watts Index reveals a broader extent of poverty in the comparison locality, with a 0.26% difference. Overall, the treatment locality exhibits better outcomes in health and nutrition, housing, water and sanitation, school participation, income and livelihood, and peace and order compared to the comparison area. These findings support the conclusion that the programme effectively promotes economic growth and development. Despite the locality being a hub for educational, religious, and commercial activities (Borromeo-Bulao, 2019), many households still face poverty due to various structural, political, and multifaceted factors (Bulao et al., 2018; Onsay & Rabajante, 2024a). The vulnerability of the Bicol region, situated in the typhoon belt of the Philippines, exacerbates this issue (Lagman, 2023). Our analysis aligns with methodologies employed by PSA (2023), Mercado and Ubaldo (1998), and Angeles (2007).

Table 13: Results of logistic regression on poverty alleviation outcomes among treatment and comparison locality

Poverty Alleviation	Treatment Group		Comparison Group	
	Coefficients	P-Values	Coefficients	P-Values
Household Size	0.1114	0.0000	0.2965	0.0000
Age of Household Head	0.0005	0.8820	0.0058	0.0300
Household Head is a Female	-0.1045	0.4160	-0.0755	0.4860
Marital Status of Household Head	-0.2014	0.0780	-0.0759	0.4310
Ethnicity	0.0139	0.9350	0.0541	0.7150
Religion	0.1444	0.5180	-0.0819	0.6590
Highest Educational Attainment	0.1077	0.3190	-0.1691	0.0650
Access to Electricity	0.5333	0.0000	0.3243	0.0000
Assets and Belongings	0.1346	0.1830	0.4746	0.0000
Entrepreneurial Activities	2.7215	0.0000	1.5653	0.0000
Unemployment	0.8318	0.0430	-0.1405	0.7030
_cons	-0.5842	0.3170	-1.1399	0.0150
Overall		0.0000		0.0000

Access to electricity and entrepreneurial activities are strong predictors of poverty reduction. In the treatment locality, electricity access (coefficient = 0.5333, p <

0.0001) and entrepreneurial activity (coefficient = 2.7215, $p < 0.0001$) show significant positive correlations with poverty alleviation. The comparison locality also displays similar, albeit weaker, correlations: electricity access (coefficient = 0.3243, $p < 0.0001$) and entrepreneurial activity (coefficient = 1.5653, $p < 0.0001$). The overall model's significance ($p < 0.0001$) underscores the importance of these economic factors in reducing poverty. Households without electricity or entrepreneurial engagement face a significantly higher risk of poverty. Since its inception, the programme has positively impacted numerous families (Catubig & Villano, 2017), effectively breaking the cycle of poverty across generations by addressing the pressing needs of extremely impoverished families (Cuizon, 2016).

Table 14 presents logistic regression analysis on 4,731 observations across treatment and comparison localities, revealing significant predictors of poverty alleviation. The model shows good fit with a Pseudo R^2 of 0.5978 and a Log Likelihood of -1451.7868 (LR chi2 value of 2865.71, $p = 0.000$). Twelve variables, including Treatment Community, Household Size, and Access to Safe Drinking Water, have p-values below 0.05. For example, a coefficient of 2.2415 for Treatment Community indicates a 224.15% increase in the log-odds of being non-poor for 4Ps beneficiaries. The constant value of 0.4177 reflects the expected log-odds of poverty alleviation when all predictors are zero. Confidence intervals excluding 1.0 for significant variables further indicate their impact on poverty alleviation. According to the World Bank (2014), the initiative has contributed to decreasing poverty rates, with data showing that households receiving financial aid experience improvements in their quality of life (Acosta et al., 2019).

Table 14: Results of Logistic Regression on Poverty Alleviation

Poverty Alleviation	Coef.	Std. Err.	z	P>z	[95% Conf.Interval]	
Treatment Community	2.2415	0.0931	2.5900	0.0090	0.0591	0.4240
Eligibility	-0.0403	0.0896	-0.4500	0.6530	-0.2159	0.1353
Household Size	0.1243	0.0183	6.7900	0.0000	0.0884	0.1601
Age of Household Head	0.0039	0.0020	1.9500	0.0520	0.0000	0.0077
Household Head is a Female	-0.0077	0.0786	-0.1000	0.9220	-0.1617	0.1464
Marital Status of Household Head	-0.0181	0.0691	-0.2600	0.7940	-0.1536	0.1174
Ethnicity	-0.0356	0.1039	-0.3400	0.7320	-0.2392	0.1681
Religion	-0.0818	0.1377	-0.5900	0.5530	-0.3517	0.1882
Highest Educational Attainment	0.0407	0.0657	0.6200	0.5350	-0.0880	0.1694
Child Mortality	0.2985	1.4676	0.2000	0.8390	-2.5779	3.1748
Maternal Mortality	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Child Malnutrition	0.5564	0.7194	0.7700	0.4390	-0.8537	1.9664
Access to Safe Drinking Water	0.1806	0.1387	1.3000	0.1930	-0.0912	0.4524
Access to Safe Sanitary Toilet Facility	-0.6229	0.1196	-5.2100	0.0000	-0.8574	-0.3885
Structure of House	0.0194	0.1567	0.1200	0.9010	-0.2877	0.3265
Type of Housing	0.3293	0.2969	1.1100	0.2670	-0.2525	0.9111

Number of Nuclear Family	-0.1976	0.0370	-5.3300	0.0000	-0.2702	-0.1250
Settlement Condition	-0.6115	0.2220	-2.7500	0.0060	-1.0467	-0.1763
School Participation in Elementary	-0.8473	0.8956	-0.9500	0.3440	-2.6026	0.9080
School Participation in Junior High School	1.4447	0.9705	1.4900	0.1370	-0.4575	3.3469
School Participation in Senior High School	-1.4770	1.0538	-1.4000	0.1610	-3.5423	0.5884
Victims of Crime	-1.6109	1.0688	-1.5100	0.1320	-3.7057	0.4839
Political Participation	2.0064	0.8237	2.4400	0.0150	0.3919	3.6209
Unemployment	-0.0455	0.2619	-0.1700	0.8620	-0.5587	0.4679
Access to Electricity	-0.0781	0.0664	-1.1800	0.2390	-0.2082	0.0520
Access to Internet	-0.1933	0.0663	-2.9100	0.0040	-0.3233	-0.0633
Imputed Rent	0.0001	0.0000	4.8800	0.0000	0.0001	0.0002
Garbage Disposal	0.0696	0.0948	0.7300	0.4620	-0.1161	0.2554
Assets and Belongings	0.2544	0.0645	3.9500	0.0000	0.1281	0.3808
Entrepreneurial Activities	-0.1402	0.1532	-0.9200	0.3600	-0.4405	0.1601
_cons	0.4177	2.1613	0.1900	0.8470	-3.8184	4.6538

A multivariate regression analysis was performed on 4,731 observations to identify factors influencing household income in both treatment and comparison localities. Table 17 presents the results, with household income as the dependent variable, represented logarithmically. The analysis indicates that 13 factors, including Treatment Community, Eligibility, Household Size, and Housing Structure, significantly affect household income, all with p-values below 0.05. The model's F statistic is F(30, 4700) = 309.92, and the R-squared value is 0.5687, indicating a good fit. The overall p-value is 0.000, and the Root Mean Square Error (MSE) is 1.0546.

Regression Discontinuity Results

The effects of the 4Ps programme were assessed using a regression discontinuity methodology. A robust regression model was developed to measure the programme's impact by analysing households near a specific threshold to establish a counterfactual scenario. The Watts index was calculated for each household, with a theoretical cutoff set at 0.41. This value corresponds to the natural logarithm of the smallest difference between the official poverty line in the country and the household income arranged in ascending order.

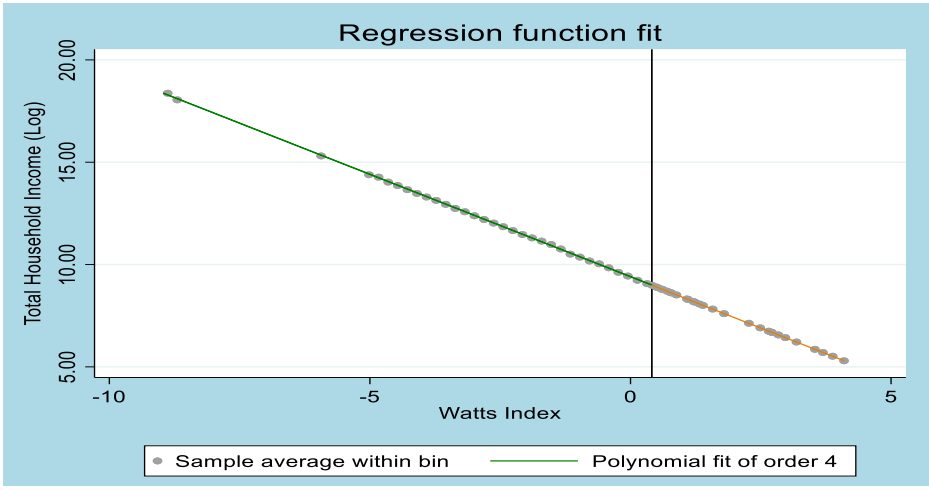


Figure 4: Regression discontinuity plot of Watts index and poverty alleviation (measured by household income) among treatment and comparison groups

At a Watts index of 0.41, a noticeable discontinuity appears between point alpha and point phi, with the fit for the comparison group being lower than that of the treatment group. This gap indicates that households eligible for the programme, or those in the treatment group, experience greater poverty alleviation as measured by household income. The regression model shows significance, with all p-values being statistically significant. The eligibility coefficient of 0.9154 suggests that each unit increase in eligibility corresponds to a 0.9154 rise in poverty alleviation. When household income is expressed linearly, it becomes evident that the treatment group has higher income levels than the comparison group at the Watts index of 0.41. As households join the 4Ps programme, their income reflects a significant increase in poverty alleviation. The variations in income between the two groups can be attributed to eligibility status, with those on the left side of the cutoff being eligible for the programme. This study aligns with Barbado et al. (2024), who used Regression Discontinuity Design (RDD) to evaluate poverty alleviation strategies, particularly the 4Ps programme's role in breaking the cycle of poverty. The eligibility coefficient of 0.5261315, significant at the 1% level, indicates that eligible individuals have a 52.6% higher likelihood of income increase for poverty reduction. These results highlight the programme's efficacy in elevating incomes and demonstrate that the 4Ps initiative has significantly benefited impoverished households within the communities.

Table 15. Results of regression analysis on the Watts index and poverty alleviation among eligible and non-eligible groups

Poverty Alleviation	Coef.	Std. Err.	t	P>t	[95% Conf. Interval]	
Watts Index left	-0.0252	-0.0175	-2.0600	-0.0000	-0.0302	-0.0202
Watts Index Right	-0.0510	-0.0103	-3.2200	-0.0000	-0.0700	-0.0320
Eligible	0.9154	-0.0117	111.2300	-0.0000	0.9023	0.9348
_cons	0.0228	-0.0149	8.2900	-0.0000	0.0127	0.0329

Table 18 shows a coefficient of 0.9154, a standard error of 0.0117, and a t-value of 111.2300, illustrating the local average treatment effects (LATE) related to eligibility. The regression discontinuity design provides LATE estimates near the eligibility cutoff, where the characteristics of eligible and non-eligible groups are similar. The closer the households are to the cutoff, the more accurate the estimate around the 0.41 index. However, LATE estimates are not applicable for households significantly distant from this index, as the focus is on eligibility effects within that specific range. Additionally, if the households on either side of the cutoff are not comparable, LATE estimates cannot validate the measurements. The analysis indicates that the programme aims to promote economic growth and reduce poverty, aligning with findings from Ramos et al. (2024), Orbeta et al. (2021), Chaudhury et al. (2013), and Puracan et al. (2024).

STUDY LIMITATIONS AND ADVANTAGES

This research has effectively evaluated the impact of the Pantawid Pamilyang Pilipino Program in Naga City, an area previously lacking such an assessment. The evaluation design incorporates multidimensional socio-economic characteristics, comparing beneficiaries to non-beneficiaries. Using Regression Discontinuity Design (RDD), the study establishes counterfactuals through treatment and control groups, employing robust methods to quantify the programme's impact. However, it faces limitations due to the lack of qualitative insights from respondents regarding satisfaction, issues, and delays related to cash transfers, which may affect the generalisability of findings. Additionally, the study does not assess the negative performance or utilisation of cash by beneficiaries. Despite these limitations, the research benefits from its comprehensive approach, utilising the Community-Based Monitoring System and engaging local stakeholders for nuanced analysis. Future research could combine quantitative and qualitative methods and explore prospective impact evaluation designs at more localised levels.

CONCLUSION AND RECOMMENDATIONS

Beneficiary households of the Pantawid Pamilyang Pilipino Program (4Ps) must meet specific educational and health criteria to qualify for financial grants. The programme has led to significant positive outcomes in community well-being, including substantial reductions in child and maternal mortality and no reported cases of malnutrition during the latest census. Improved access to clean drinking water and sanitation has enhanced living conditions. Additionally, the programme has boosted school attendance, reduced dropout rates, and increased income levels whereas fostering entrepreneurial activities and lowering unemployment. Community engagement in development projects has fostered self-sufficiency, and adherence to health requirements has improved health outcomes. Investments in business and housing have elevated living standards, whereas a lower crime rate has contributed to a safer environment. Overall, the programme has catalysed long-term economic development and improved living conditions, positioning beneficiaries towards sustained well-being and prosperity. The Programme significantly enhances the well-being of its beneficiaries, and it is recommended that support continue for households below the poverty line whereas phasing out assistance for those above it. To promote social equity, the programme should focus exclusively on low-income individuals. Comprehensive policy recommendations aim to improve child and maternal health, combat malnutrition, and enhance housing conditions. Maintaining health-related requirements for beneficiaries is crucial to ensure accountability, alongside improved tracking of illnesses and compliance with health check-ups and vaccinations. Community initiatives during Family Development Sessions (FDS) should emphasise nutrition, health counseling, and prenatal care. To address housing challenges, collaboration with the Local Government Unit (LGU) in Naga City is essential for identifying suitable relocation sites and implementing rent-to-own schemes. Continuous evaluation through localised impact studies will assess the effectiveness of these efforts. Specific strategies to improve access to water and sanitation include watershed management training, distribution of health and sanitation IEC materials, and potential provision of safe water facilities. To boost school attendance, enforcing educational conditions related to 4Ps and implementing feeding programmes are vital. The LGU should consider supplying school supplies and uniforms for school-aged children and collaborate with the Department of Education for effective implementation. For older students, the Alternative Learning System (ALS) and skills training through TESDA can provide additional opportunities. To alleviate poverty and enhance livelihoods, initiatives such as promoting backyard gardening, empowering women through

targeted programmes, and establishing community kitchens can improve food security. Enhancing safety can involve installing CCTV cameras and monitoring community activities. For future research, this data can serve as a benchmark for impact evaluations in impoverished areas, and establishing a robust monitoring and evaluation framework will help assess the effectiveness and sustainability of these initiatives, contributing to a more secure and self-sufficient community.

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DECLARATION OF INTEREST

The authors declare that they have no known conflict or competing financial or nonfinancial interest with any party in any aspect.

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