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Charting the Path Forward through Partnerships in M&E

THE 10th M&E NETWORK FORUM

29 November 2023 | Seda Vertis North, Quezon City

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GINGOOG CITY–CLAVERIA–VILLANUEVA ROAD (GCVR) AND ITS IMPACT ON HOUSEHOLD INCOME OF CONFLICT-AFFECTED AREAS

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Regional Director, NEDA Regional Office X

PRESENTATION OUTLINE

I. Rationale and Overview of the Impact Evaluation Study

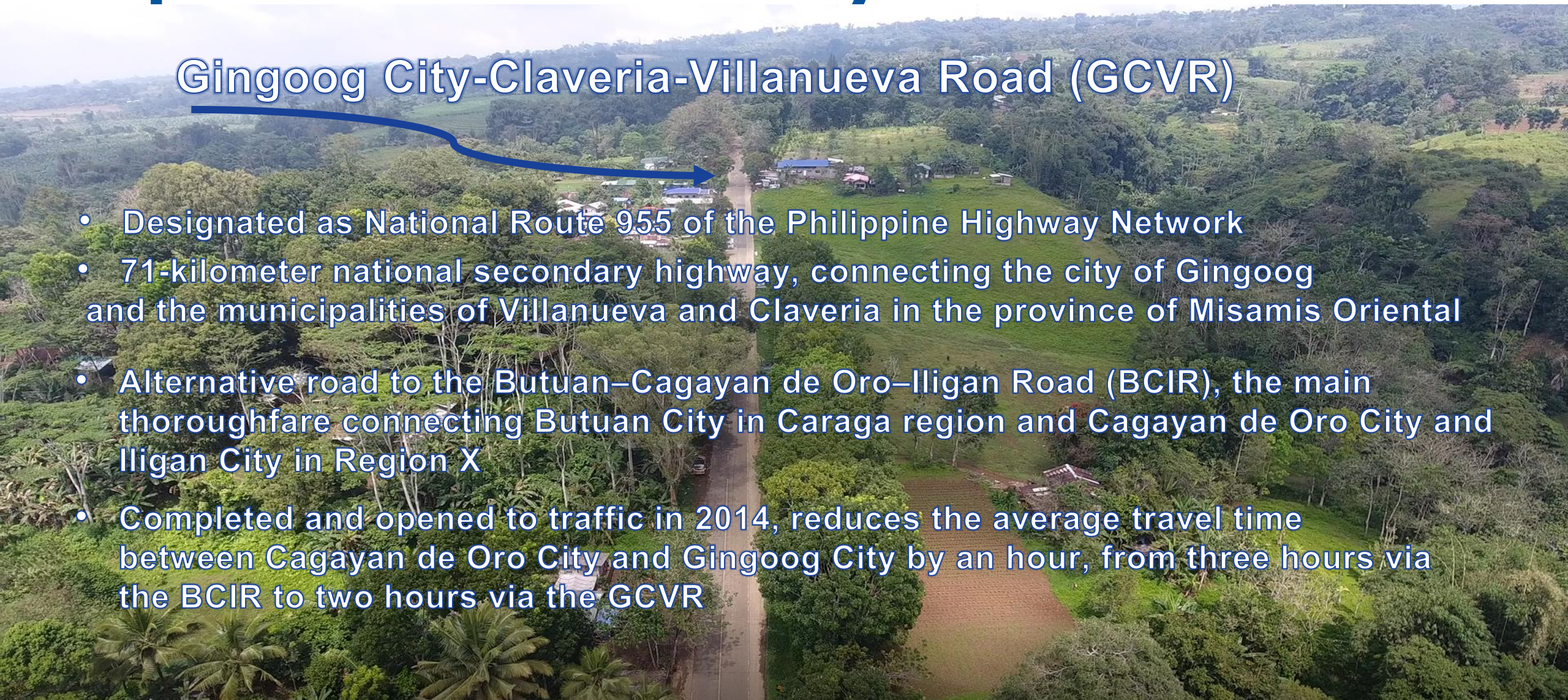
II. Evaluation Objectives

III. Methodology

IV. Preliminary Results

V. Policy Recommendations and Lessons Learned

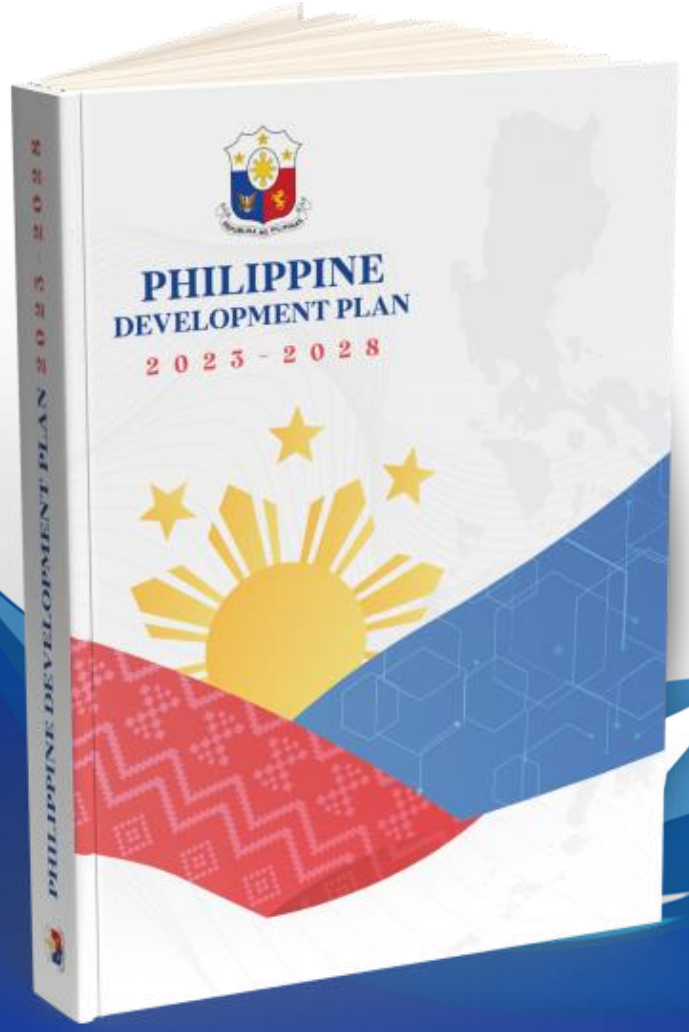
I. Rationale and Overview of the Impact Evaluation Study



Gingoog City-Claveria-Villanueva Road (GCVR)

- Designated as National Route 955 of the Philippine Highway Network
- 71-kilometer national secondary highway, connecting the city of Gingoog and the municipalities of Villanueva and Claveria in the province of Misamis Oriental
- Alternative road to the Butuan–Cagayan de Oro–Iligan Road (BCIR), the main thoroughfare connecting Butuan City in Caraga region and Cagayan de Oro City and Iligan City in Region X
- Completed and opened to traffic in 2014, reduces the average travel time between Cagayan de Oro City and Gingoog City by an hour, from three hours via the BCIR to two hours via the GCVR

I. Rationale and Overview of the Impact Evaluation Study



CHAPTER 12:

Expand and Upgrade Infrastructure

CHAPTER 13:

Ensure Peace and Security and Enhance Administration of Justice

SDG 16:

Peace, Justice, and Strong Institutions

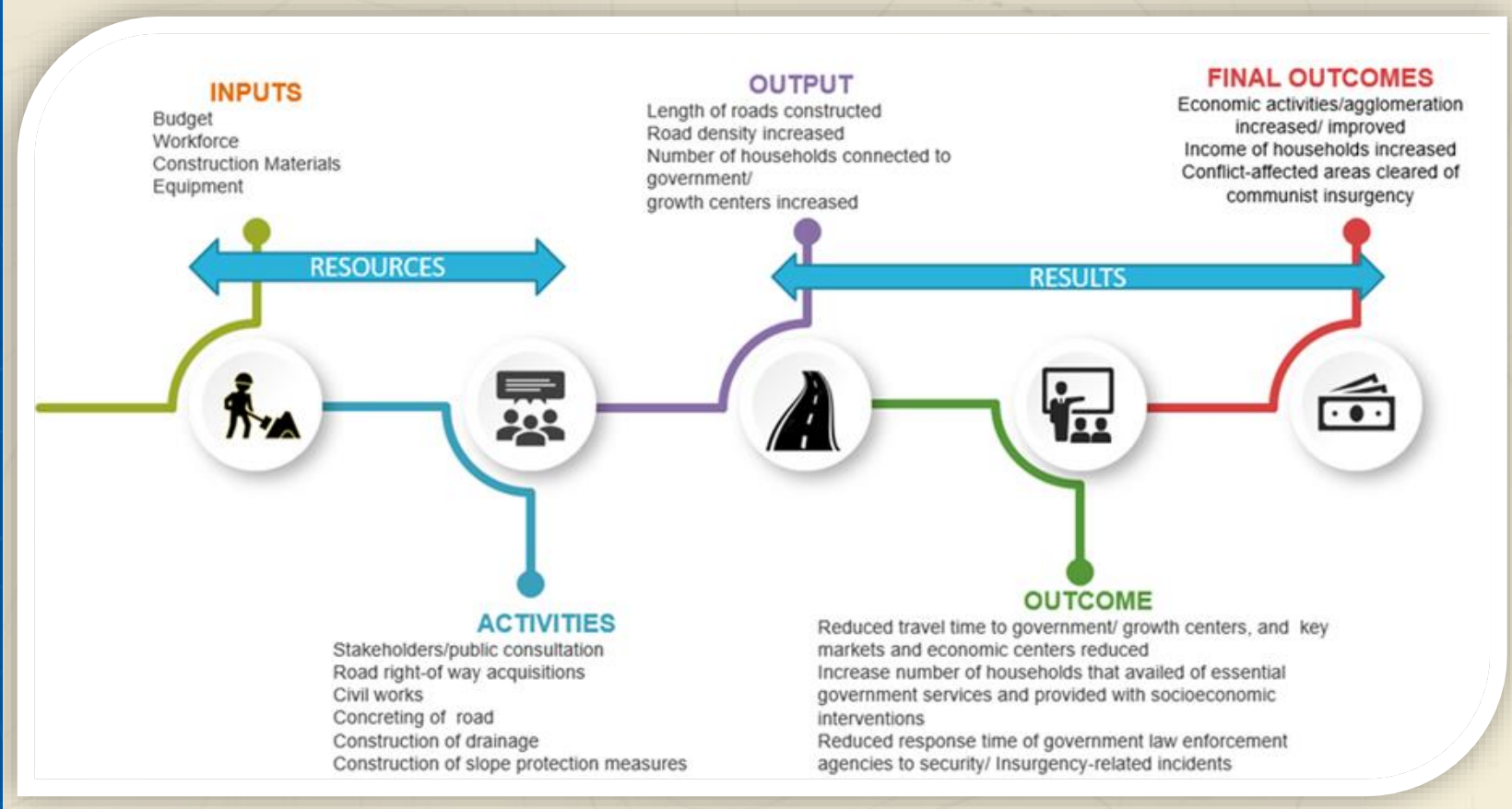
8-POINT SOCIO-ECONOMIC AGENDA

1 - Reduce Transport & Logistics Costs

4 - Improve Infrastructure

8 - Uphold Public Order & Safety, Peace & Security

Theory of Change



II. Evaluation Objectives

Determine the impact of the GCVR on the following outcomes:

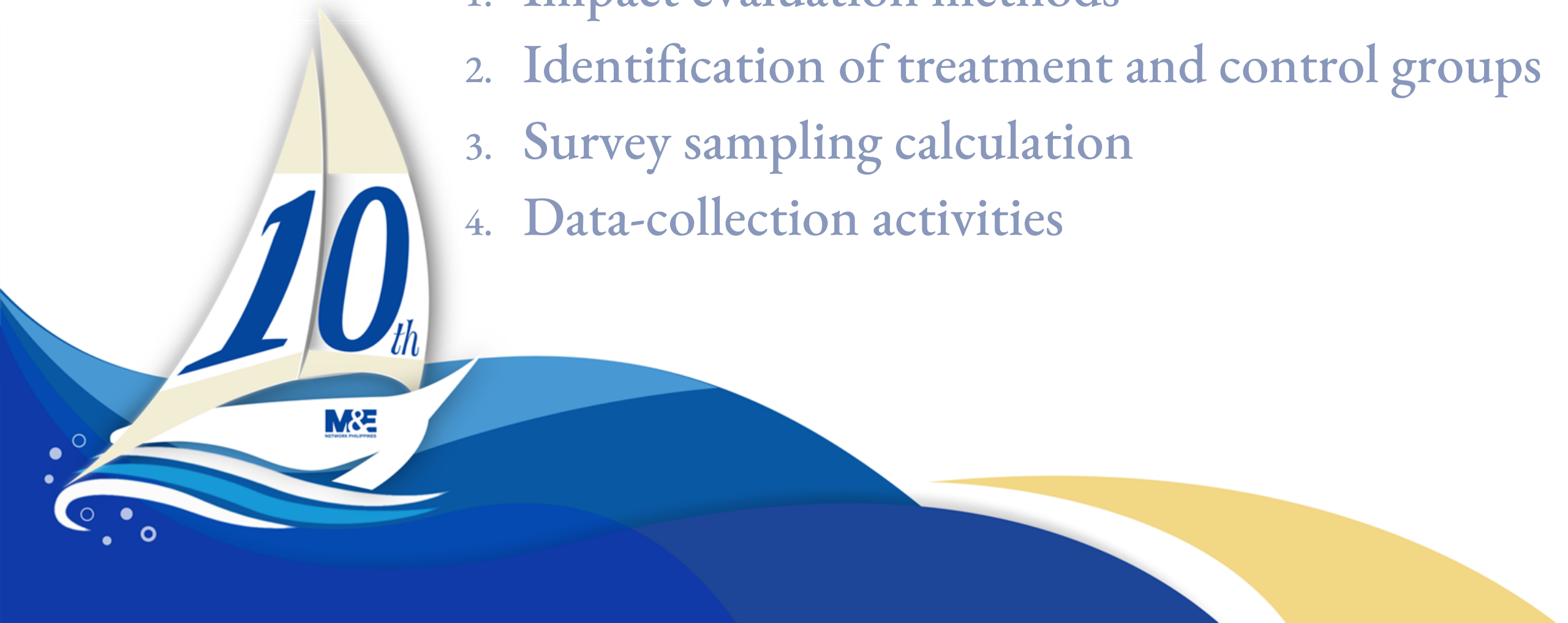
1) **HOUSEHOLD INCOME**

2) **ECONOMIC ACTIVITIES/ AGGLOMERATION:**

   i. Tourism-related services;
   ii. Real estate development; and
   iii. Agriculture production.

III. Methodology

1. Impact evaluation methods
2. Identification of treatment and control groups
3. Survey sampling calculation
4. Data-collection activities



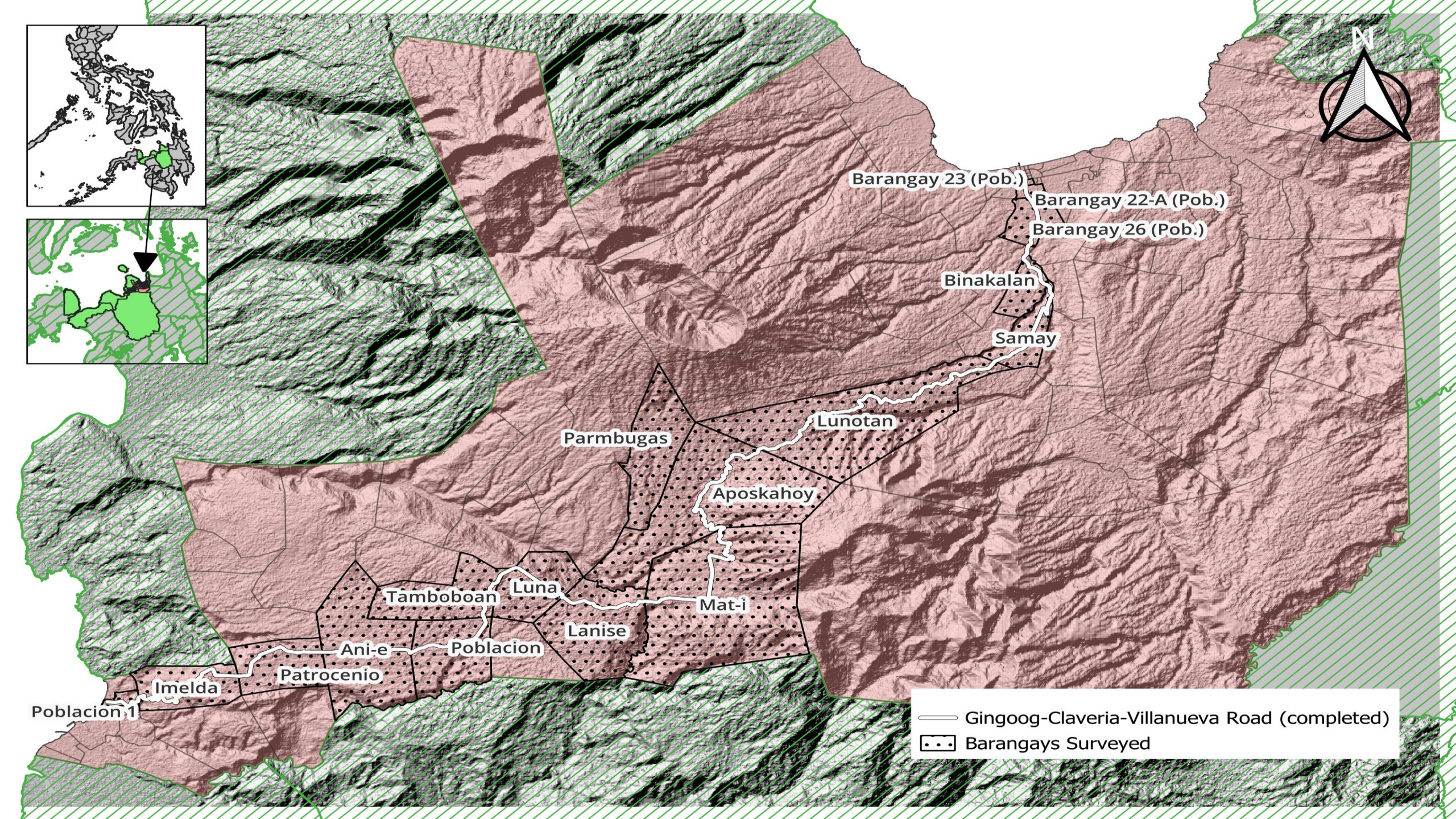
1. Impact Evaluation Methods

- Quasi-experimental design using Difference-in-Difference method
- Household (HH) survey
- Focus Group Discussions (FGDs)/Key Informant Interviews (KIIs)
- Secondary data from relevant national government agencies and local government units

2. Identification of Treatment and Control Groups

Selection Criteria for Treatment Group

Geographical coverage	• Barangays directly traversed by the GCVR
HH respondents	• Residents in the barangays directly traversed by the GCVR • Reside in the barangay before (Year 2000 or below) and after the GCVR was constructed (Year 2014 until present)
FGD/KII respondents	• Barangay Captains, officials in charge of economic enterprise and/or peace and order Committee in the barangays, Local Chief Executives and/or key personnel in the city/municipality

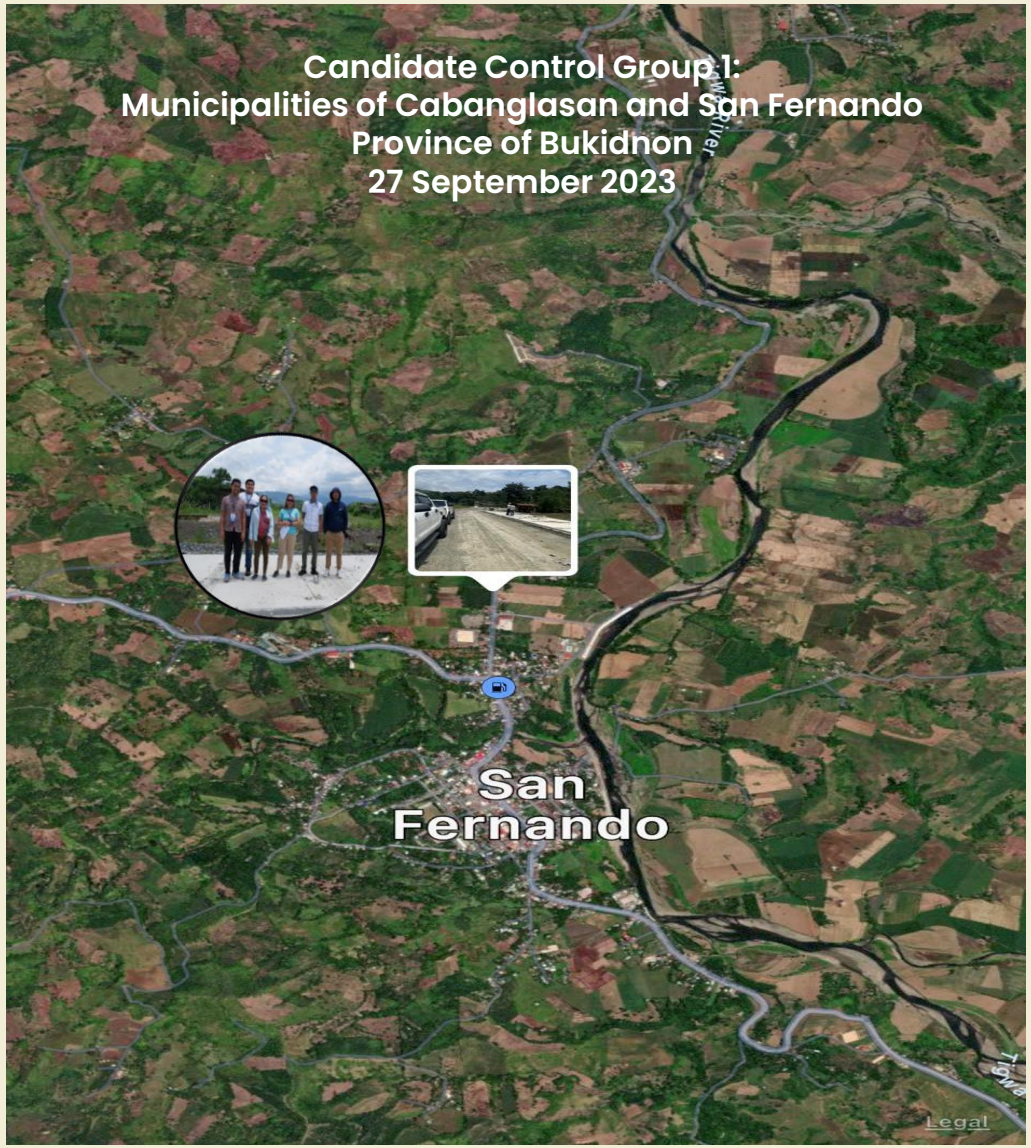

N
Barangay 23 (Pob.)
Barangay 22-A (Pob.)
Barangay 26 (Pob.)
Binakalan
Samay
Lunotan
Parmbugas
Aposkahoy
Luna
Tamboboan
Mat-i
Lanise
Ani-e
Poblacion
Patrocenio
Imelda
Poblacion 1
Gingoog-Claveria-Villanueva Road (completed)
Barangays Surveyed

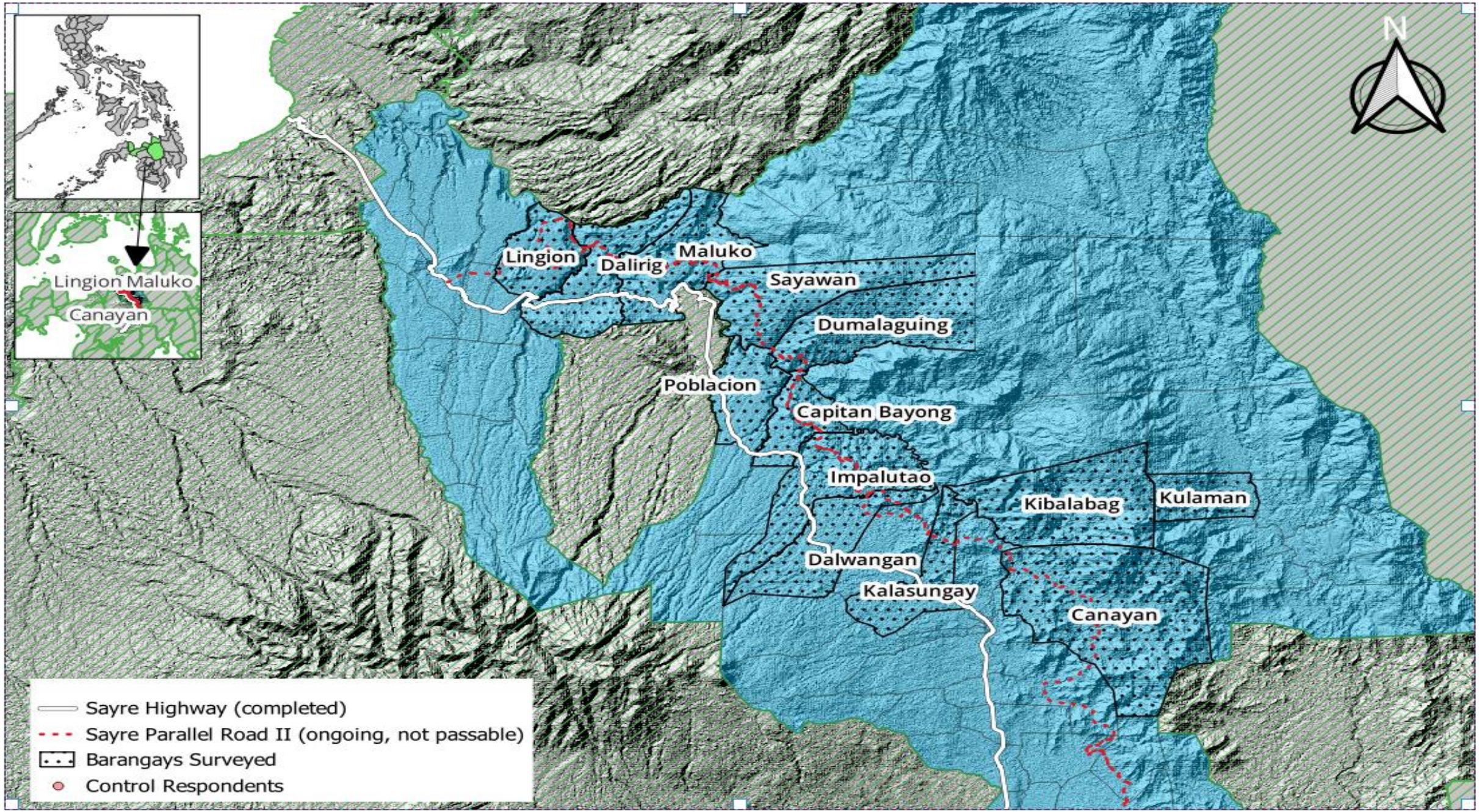
2. Identification of Treatment and Control Groups

Selection Criteria for Control Group

Income Class (DOF)	With Barangays with Geographically Isolated Areas (DOH)	Classified as Conflict-Affected Areas (PA)	Household Population (PSA)
Population Density (PSA)	Land Area (DENR)	Economic Dynamism Ranking (DTI)	Revenues Generated from Local Sources (DOF-BLGF, DOT, DA, and LGUs)

Ocular Inspection of Control Group




Lingion Maluko
Canayan
N
Lingion
Dalirig
Maluko
Sayawan
Dumalaguing
Poblacion
Capitan Bayong
Impalutao
Kibalabag
Kulaman
Dalwangan
Kalasungay
Canayan
Sayre Highway (completed)
Sayre Parallel Road II (ongoing, not passable)
Barangays Surveyed
Control Respondents

2. Identification of Treatment and Control Groups

Selection Criteria for Control Group

Geographical coverage	• Barangays directly traversed by a proposed road (not opened to traffic)
HH respondents	• Resident in the barangays directly traversed by proposed road • Reside in the barangay in Year 2000 until present (Year 2023)
FGD/KII respondents	• Barangay Captains, officials in charge of economic enterprise and/or peace and order committee in the barangays at present, Local Chief Executives and key personnel in the city/municipality

Location of Treatment and Control Groups for the Impact Evaluation Study on the GCVR

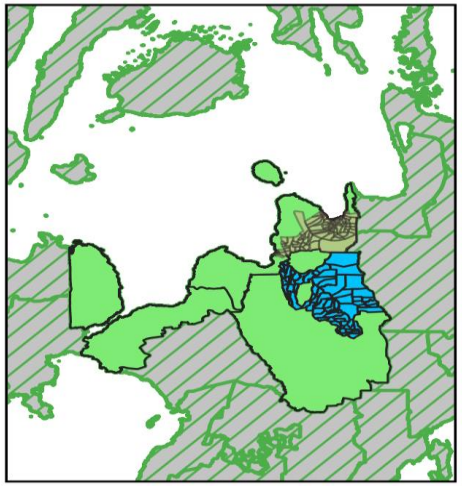
Legend:

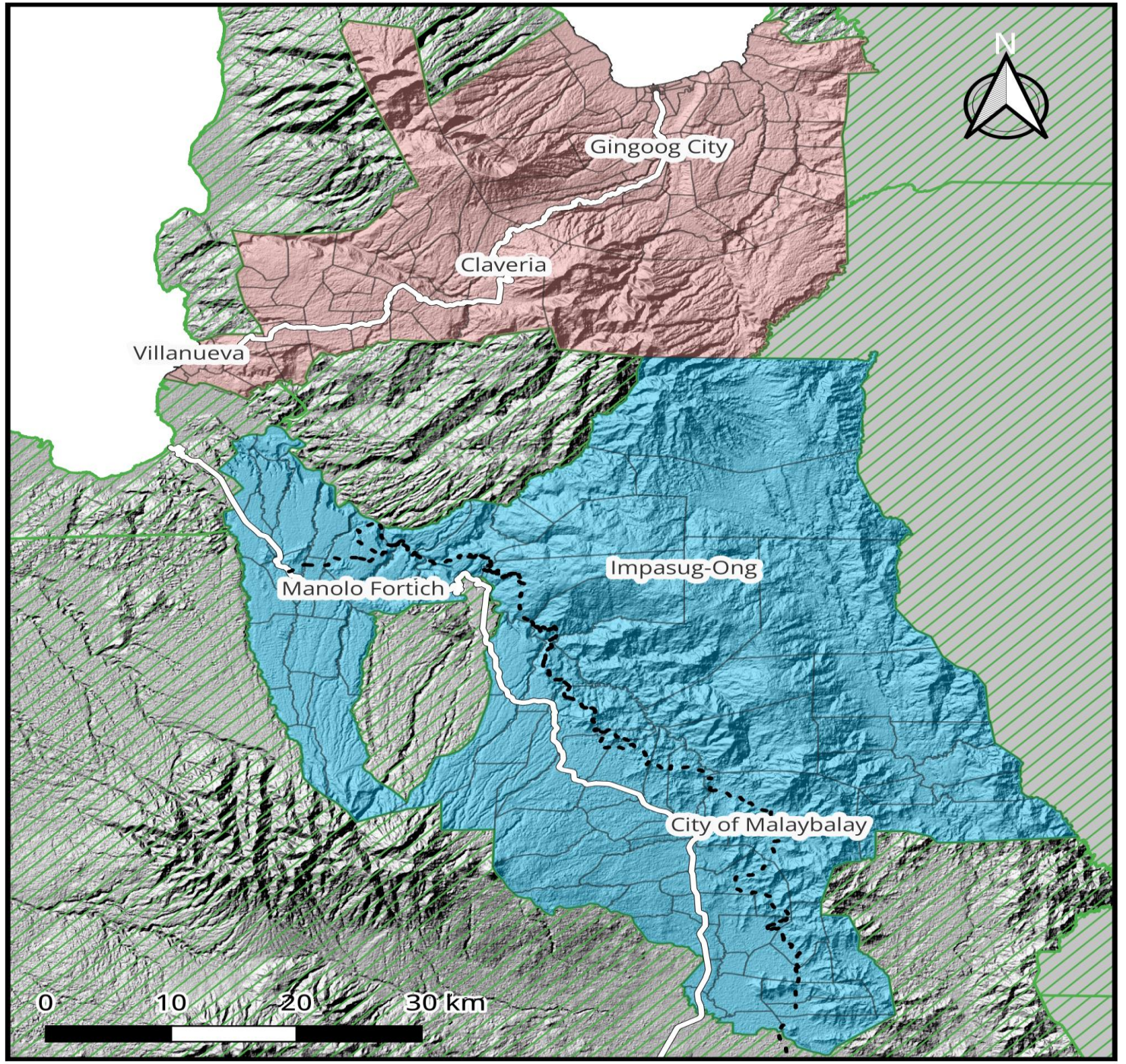
Treatment

- Treatment Municipalities/City
- GCVR (completed)

Control

- Control Municipalities/City
- Sayre Highway (completed)
- Sayre Parallel Road II (ongoing, not passable)





3. Survey Sampling Calculation

Margin of error of 5%

Confidence level of 95%

Household Population (Year 2000)

Group	Estimated Sample Size	Targeted Sample Size
Treatment Group	372	400
Control Group	365	400

4. Data-Collection Activities

PILOT-TESTING OF SURVEY INSTRUMENTS

25-26 September 2023
3 Barangays, GCVR, Misamis Oriental

CALIBRATION OF SURVEY INSTRUMENTS

NBSC, Manolo Fortich, Bukidnon
29 September 2023

ENUMERATORS' TRAINING

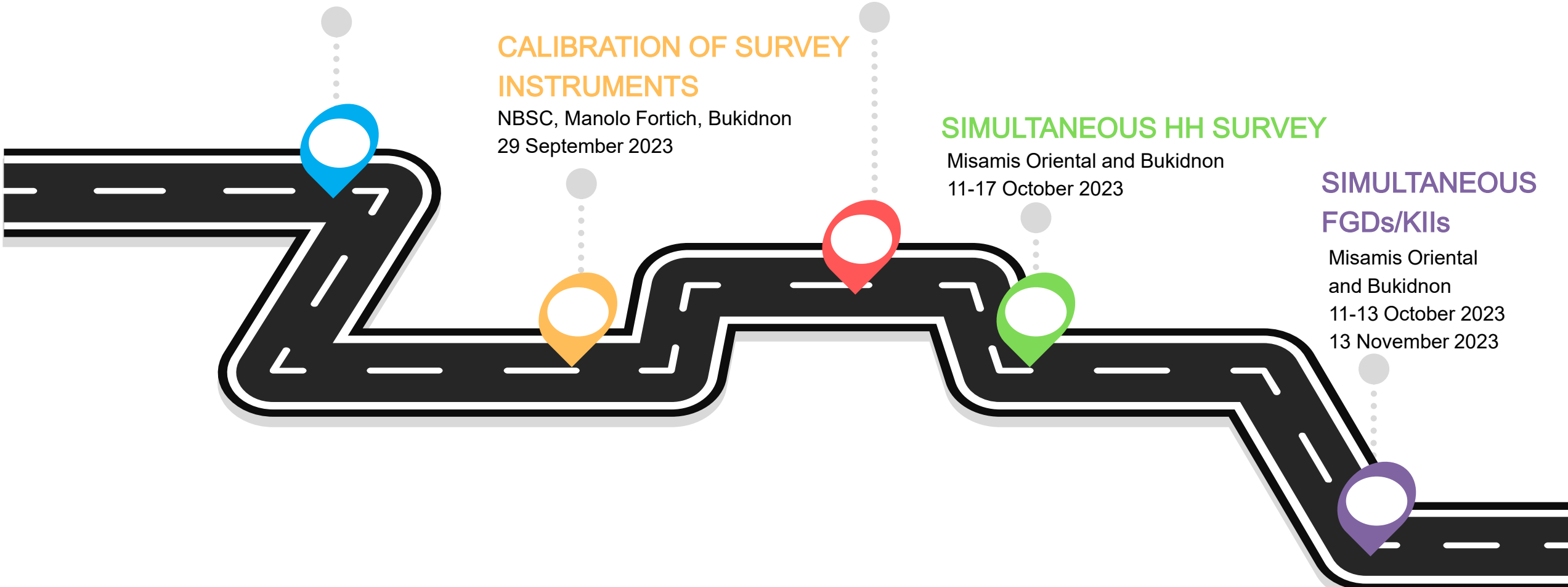
Cagayan de Oro City
9-10 October 2023

SIMULTANEOUS HH SURVEY

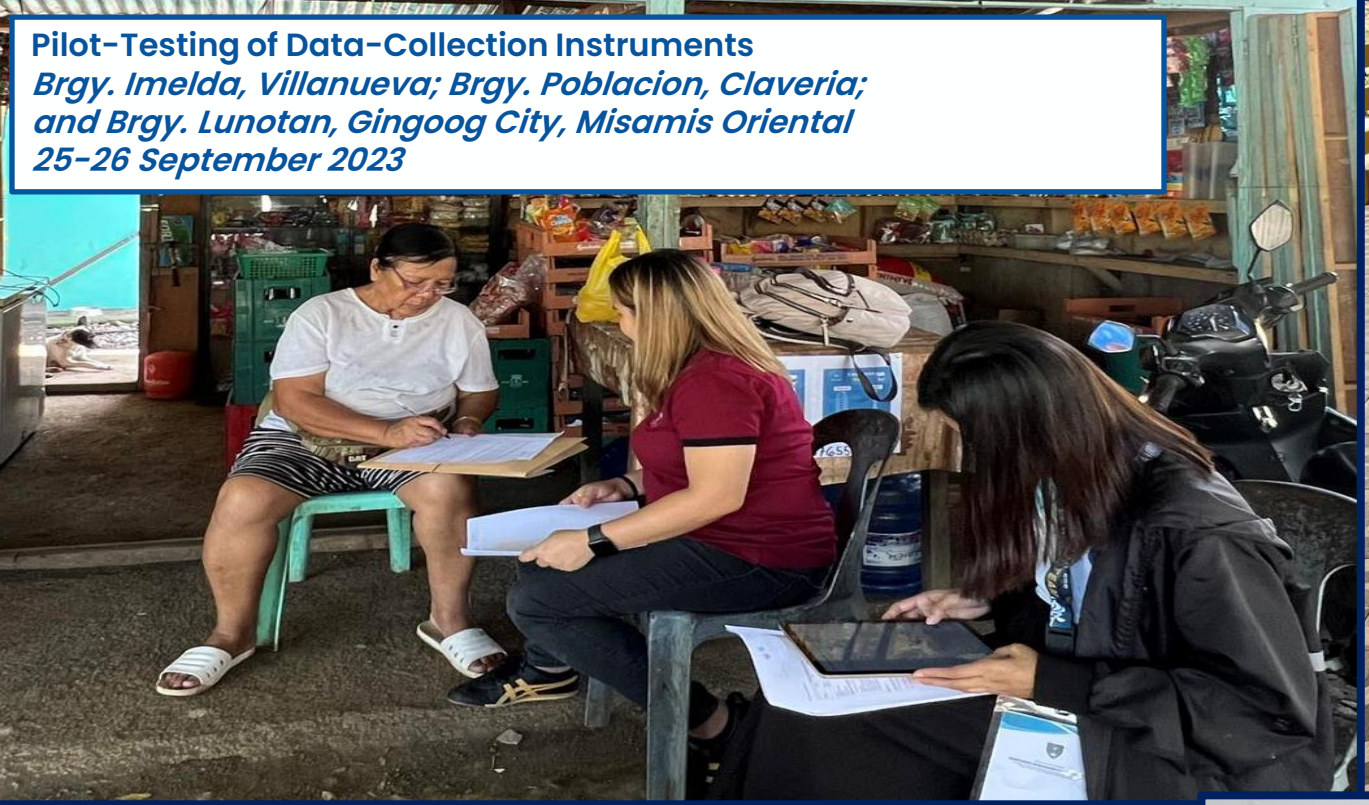
Misamis Oriental and Bukidnon
11-17 October 2023

SIMULTANEOUS FGDs/KIIs

Misamis Oriental
and Bukidnon
11-13 October 2023
13 November 2023



Pilot-Testing of Data-Collection Instruments
Brgy. Imelda, Villanueva; Brgy. Poblacion, Claveria; and Brgy. Lunotan, Gingoog City, Misamis Oriental
25-26 September 2023



Validity and Reliability Testing, and Calibration of Data-Collection Instruments

NBSC Campus, Manolo Fortich, Bukidnon
29 September 2023

Face Validity Assessment Certification Form

This is to certify that the questionnaire has **"Gingoog City- Claveria-Villanueva Road (GCVR) and its Impact on Socio-Economic Conditions in Conflict-Affected /Vulnerable Areas in Gingoog City and the Municipalities of Villanueva and Claveria in the Province of Misamis Oriental"** undergone a thorough face validity assessment by a panel of experts in the field. The purpose of the face validity assessment was to ensure that the questionnaire appears to measure what it is intended to measure and confirm its clarity, relevance, and appropriateness for the intended population.

Each expert reviewed the questionnaire items and provided feedback regarding the clarity of instructions, the relevance of items to the intended construct or domain, and the appropriateness of items for the target population.

After revisions, the certification panel found that the questionnaire demon
of face validity, indicating that it measures the intended construct effectively and
with the target population.

The panel of experts who participated in the face validity assessment are as follo

Ms. Loisel B. Buelban – Expertise: Statistics
Signature: _____
Date: 10/4/2023

Mr. Jo Augustine G. Corpuz – Expertise: Registered Psychometrician, Registered Counselor
Signature: _____
Date: 10/4/2023

Mr. John Kevin Artuz- Expertise: Mathematics
Signature: _____
Date: 10/4/2023

Ms. Mary Cris J. Go, Expertise: Mathematics Education
Signature: _____
Date: 10/4/23

This certification affirms that the questionnaire has successfully undergone a face v
and has received the endorsement of the panel of experts.

Content Validity
0.93 S-CVI
(with seven experts)

DECISION RULE		
Number of Expert	**Acceptable CVI Values**	**Source of Recommendation**
Two Experts	At least 0.80	Davis (1992)
Three to Five Experts	Should be 1.00	Polit, et al. (2007)
At Least Six Experts	At least 0.83	Polit, et al. (2007)
Six to Eight Experts	At least 0.83	Lynn (1986)
At Least Nine Experts	At least 0.78	Lynn (1986)

Cronbach's Alpha Reliability

	Cronbach's Alpha (α)	Interpretation
Module 2. Level of Agreement with the Impact of Road Infrastructure	0.988	Excellent internal consistency
Module 3. Level of Perception on Peace and Security	0.756	Acceptable internal consistency

Enumerators Training
N Hotel, Kauswagan, Cagayan de Oro City
9-10 October 2023

Simultaneous Household Surveys (Hired Enumerators)
Gingoog City-Claveria-Villanueva, Misamis Oriental and Malaybalay City-Impasug-ong-Manolo Fortich, Bukidnon
11-17 October 2023

Simultaneous FGDs (NEDA X-NBSC TWG members)
Gingoog City-Claveria-Villanueva, Misamis Oriental and
Malaybalay City-Impasug-ong-Manolo Fortich, Bukidnon
11-13 October 2023

KIIs (NEDA-X TWG members)
Gingoog City-Claveria-Villanueva, Misamis Oriental
13 November 2023

With Hon. Erick Cañosa
Mayor
Gingoog City, Misamis Oriental
(7th person from the left)

With Rogelio Quiño
Mayor
Manolo Fortich, Bukidnon
(5th person from the right)

With Architect Jason Roi Bucton
Division Chief, CPDO
Gingoog City, Misamis Oriental
(4th person from the right)

With Hon. Meraluna Abrogar
Mayor
Claveria, Misamis Oriental
(3rd person from the right)

With Hon. Jeric Emano
Vice-Mayor/Acting Mayor
Villanueva, Misamis Oriental
(3rd person from the right)

With Major Keenan Arguelles
Executive Officer
58th Infantry Batallion, Phil Army
(4th person from the right)

Data Collected: HH Survey

TREATMENT GROUP			
MUNICIPALITY	Barangay	HH Population (2000)	Indicative Sample Size
GINGOOG CITY	Lunotan	275	12
	Samay	158	7
	Binakalan	135	6
	Barangay 22-A	361	16
	Barangay 26	842	37
	Barangay 23	646	29
VILLANUEVA	Poblacion	507	22
	Imelda	659	29
CLAVERIA	Patrocenio	613	27
	Ani-e	664	29
	Poblacion	1899	84
	Tamboboan	232	10
	Luna	299	13
	Lanise	427	19
	Mat-I	623	28
	Pambugas	154	7
	Aposkahoy	526	23
TOTAL		9,020	400
ACTUAL			470

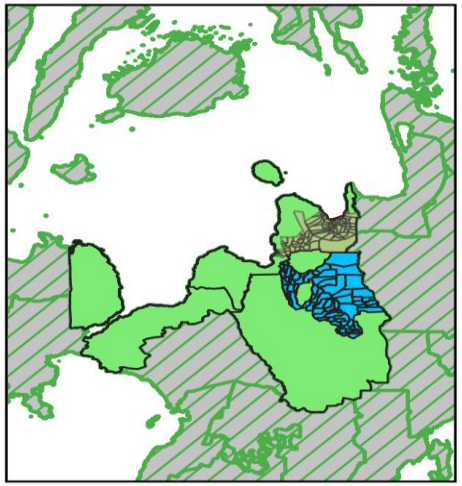
CONTROL GROUP			
MUNICIPALITY	Barangay	HH Population (2000)	Indicative Sample Size
MALAYBALAY CITY	Can-ayan	918	32
	Kalasungay	1,535	54
	Kulaman	185	7
	Kibalabag	172	6
	Dalwangan	1,238	44
IMPASUG-ONG	Sayawan	267	9
	Dumalaguing	446	16
	Poblacion	2,040	72
	Capitan Bayong	546	19
	Impalutao	1,212	43
MANOLO FORTICH	Lingion	1,171	41
	Dalirig	787	28
	Maluko	808	29
TOTAL		11,325	400
ACTUAL			419

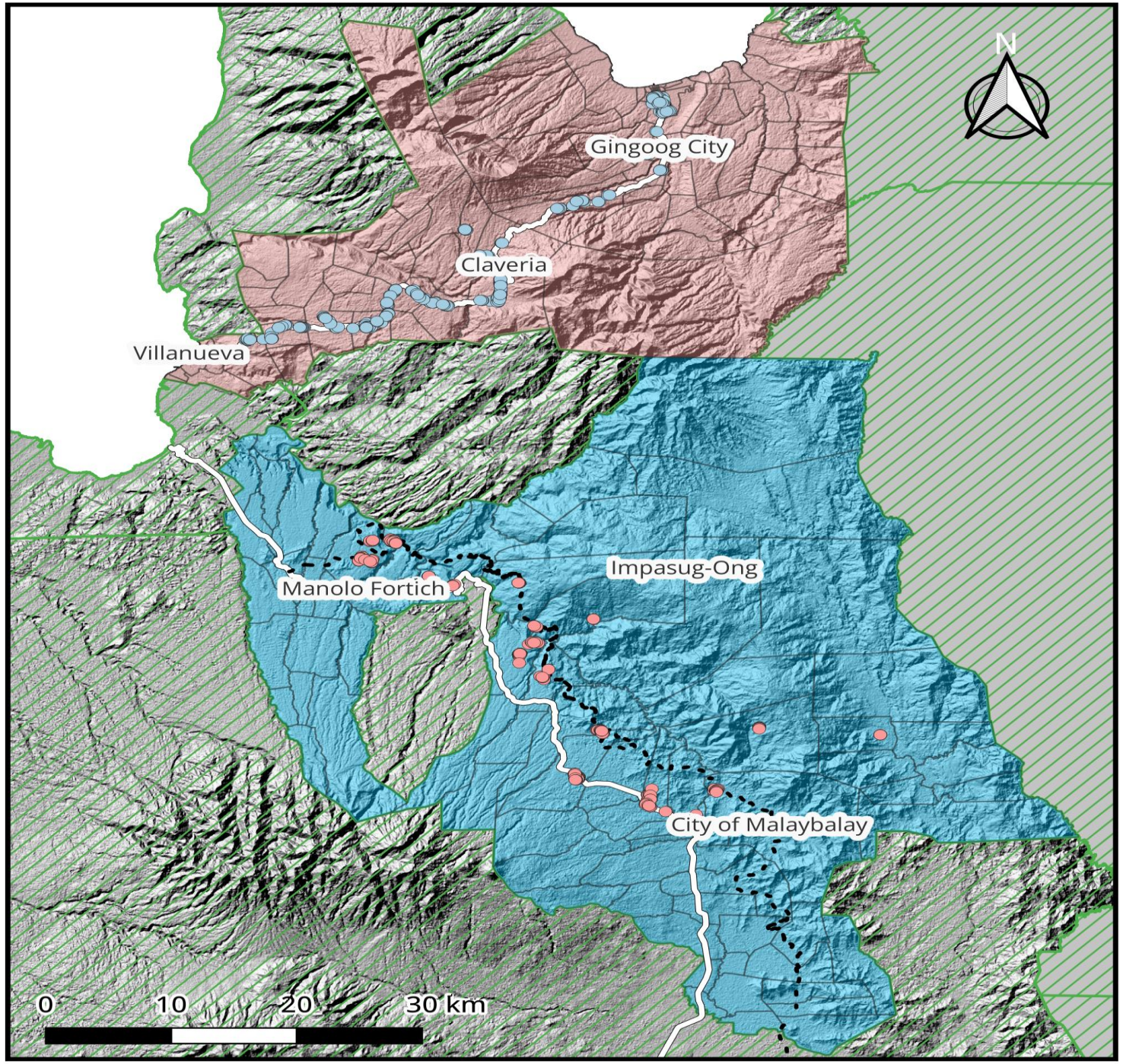
Map of Survey Points for the Impact Evaluation Study on the GCVR

Legend:

Treatment
- Treatment Municipalities/City
- Treatment Respondents
- GCVR

Control
- Control Municipalities/City
- Control Respondents
- Sayre Highway
- Sayre Parallel Road II





Data Collected: FGDs/KIIs

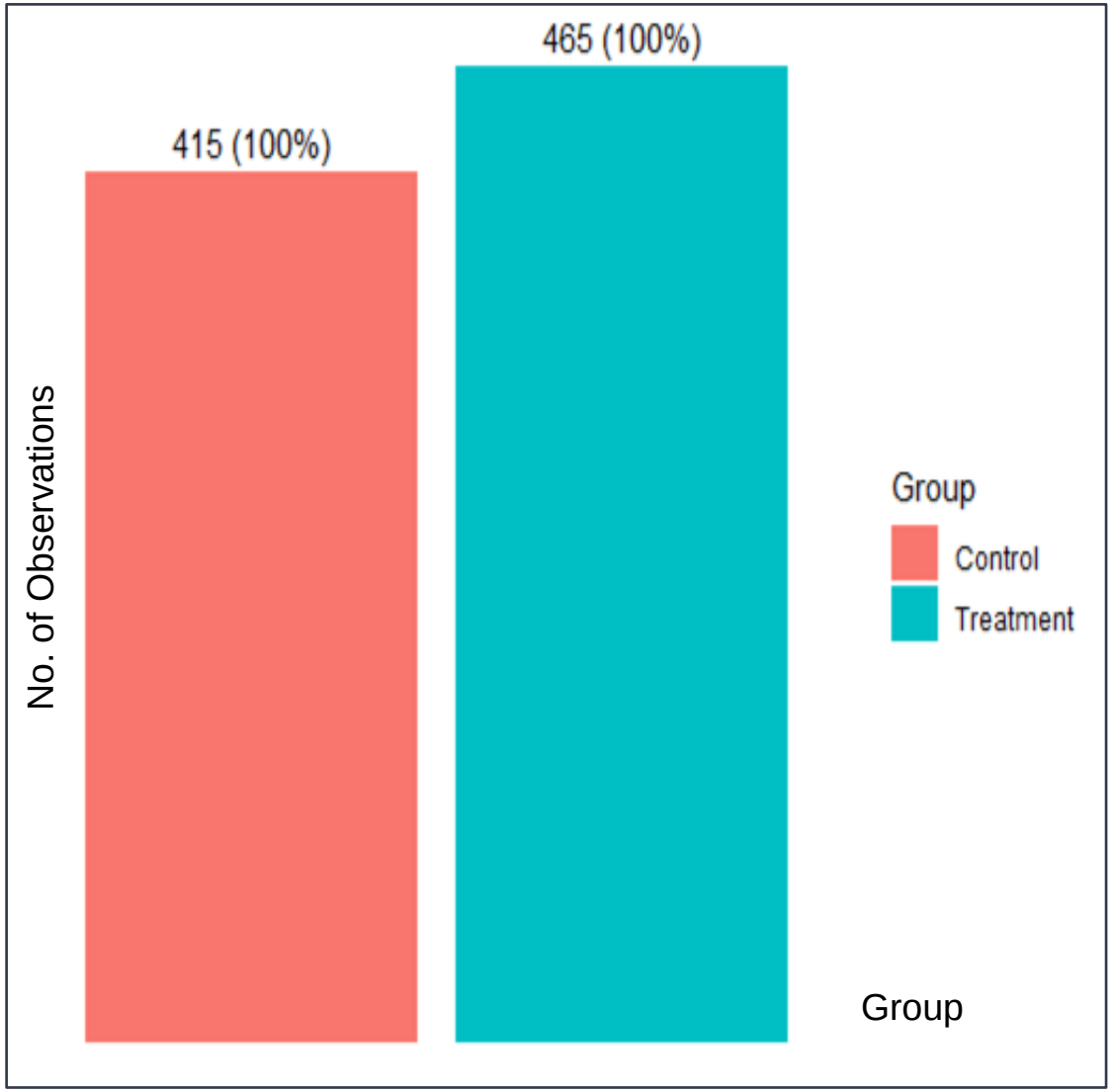
Treatment Group		Control Group	
City/ Municipality	No. of FGD Participants	City/ Municipality	No. of FGD Participants
Gingoog City	15	Malaybalay City	12
Claveria	26	Impasug-ong	18
Villanueva	6	Manolo Fortich	6
TOTAL	47	TOTAL	36
Grand Total = 83			

IV. PRELIMINARY RESULTS

1. Descriptive Analysis
2. Quantitative analysis
3. Qualitative Analysis

1. Descriptive Analysis

- 465 observations in the treatment group
- 415 observations in the control group




```
        Chi-squared test for given probabilities

data:  table(iedata$Group)
X-squared = 2.8409, df = 1, p-value = 0.09189
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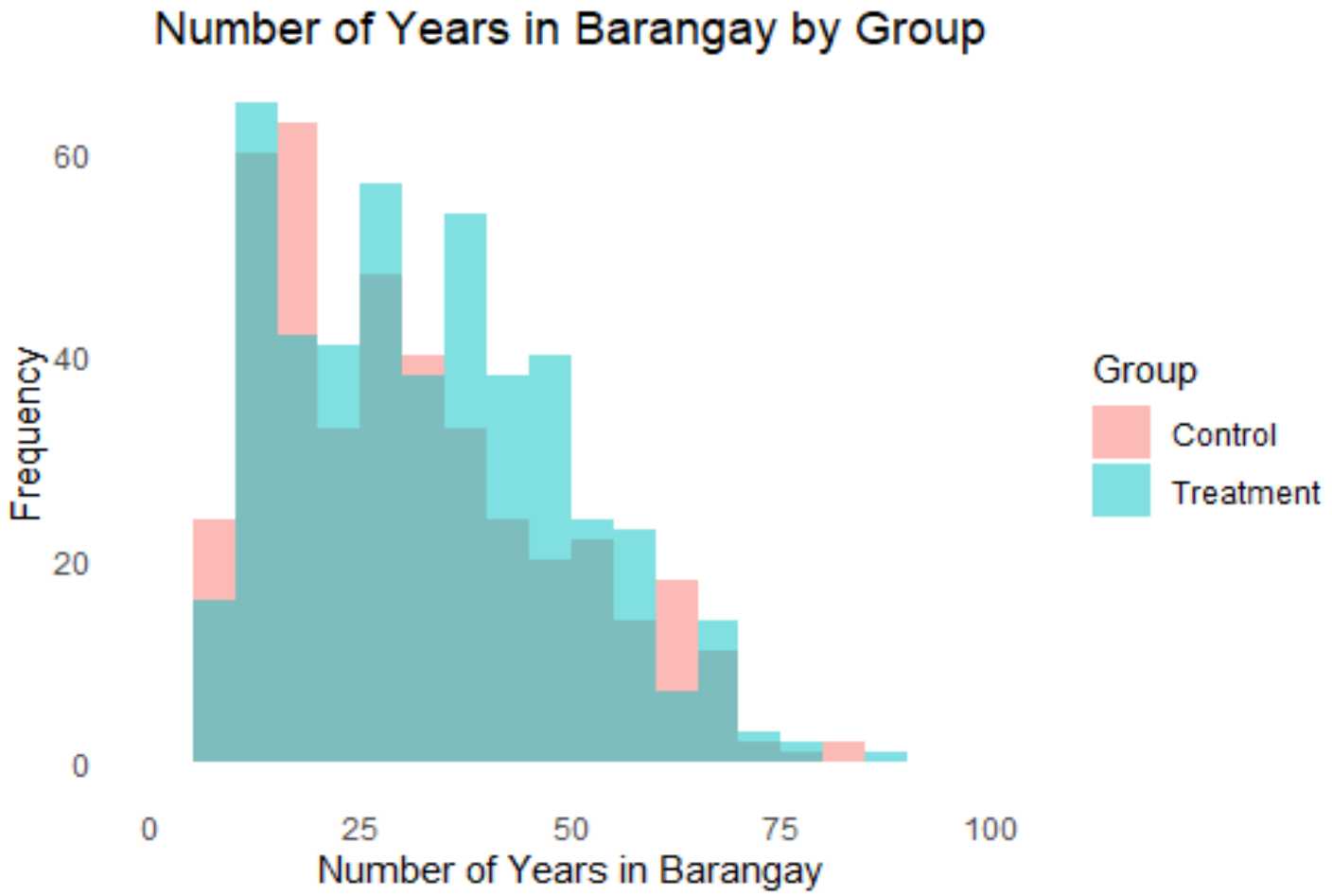
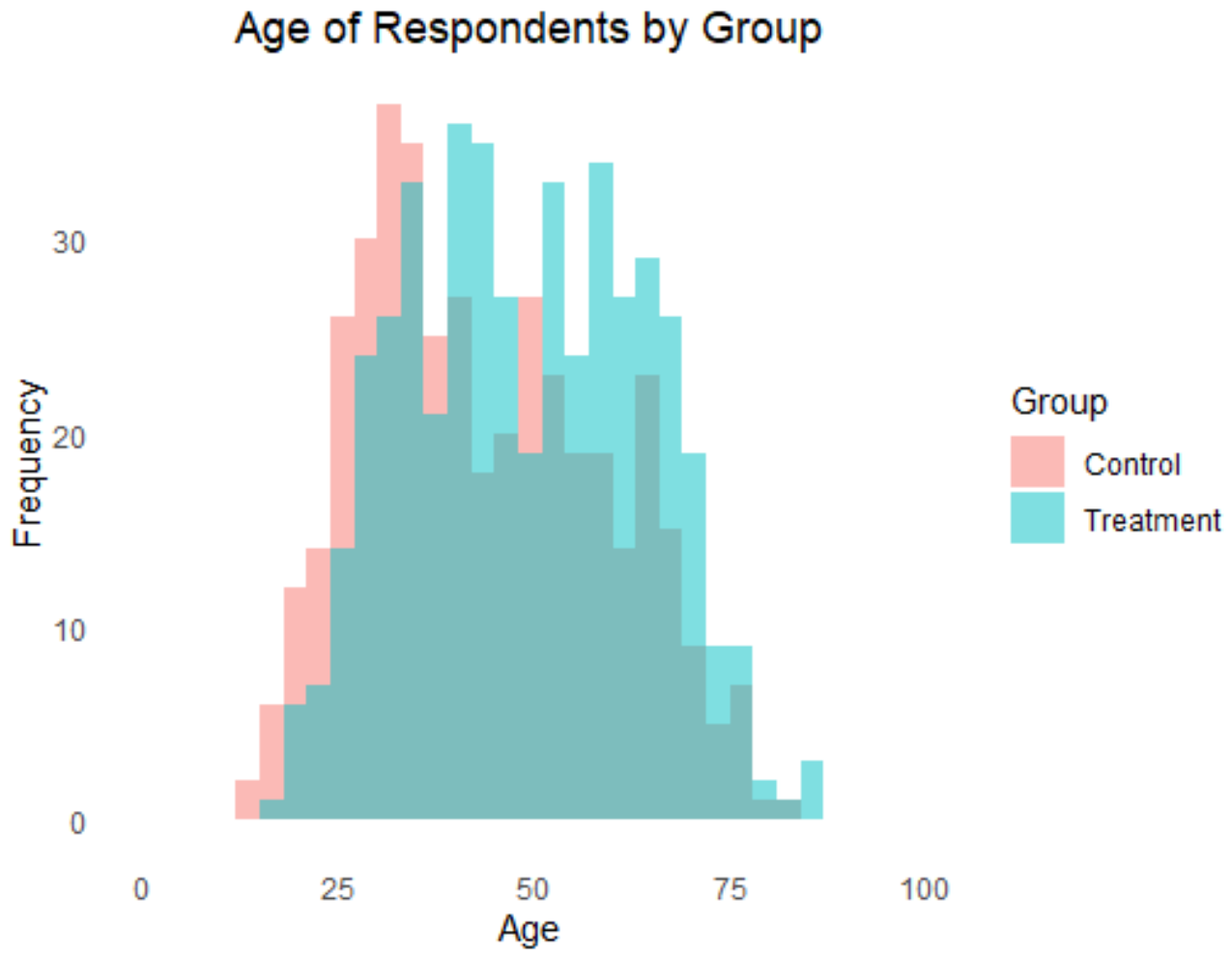
- The treatment and control groups both have similar medians in terms of residency in the Barangays (32 and 30 years, respectively);
- (25 years) provides a measure of the spread of the middle 50% of the data, showing the range where most observations fall; and
- Both groups have a minimum value of 10 years. The maximum values (86 and 83 years, respectively) indicate the highest number of years in Barangays observed in each group.



Group	Min	Q1	Median	Mean	Q3	Max	IQR
Treatment	10	20	32	34	45	86	25
Control	10	18	30	32	43	83	25

- The treatment group exhibits a similar pattern, with ages ranging from 18 to 87 years old. The 25th , 50th , and 75th percentiles are 37, 49, and 61, respectively, and the mean age is 49. years old.
- In the Control group, the age range spans from a minimum of 15 to a maximum of 83, with the 25th percentile at 32, the median at 42, and the 75th percentile at 56. The average age, represented by the mean, is 44.
- Both groups share an IQR, indicating comparable variability in age distribution.

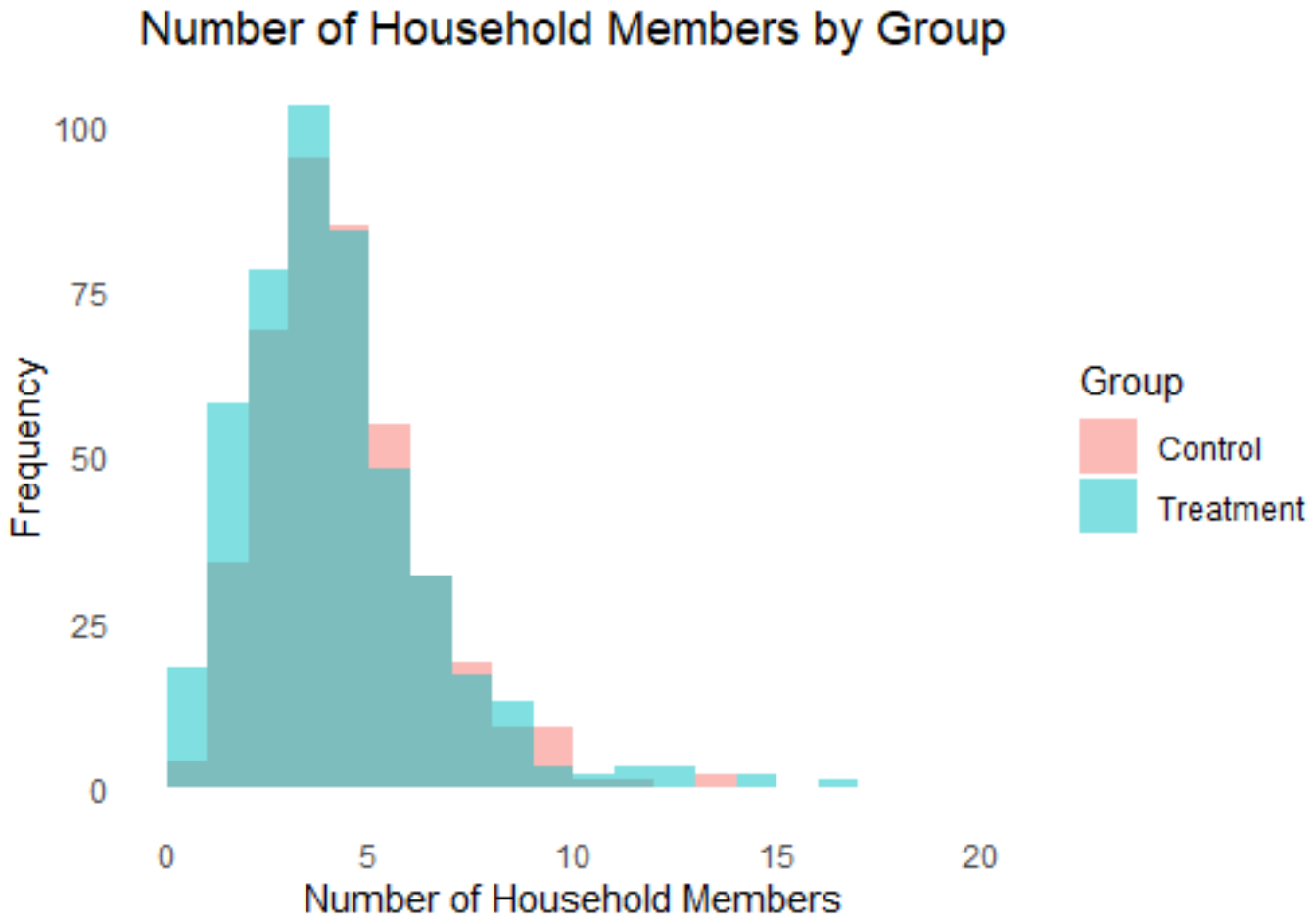


Group	Min	Q1	Median	Mean	Q3	Max	IQR
Treatment	18	37	49	49	61	87	24
Control	15	32	42	44	56	83	24

- The treatment group, the minimum number of household member is 1, and the quartile distribution mirrors that of the control group. However, the median in the treatment group is 4, and the mean is 5. The maximum number of household members in the Treatment group is 17, with an IQR of approximately 3.

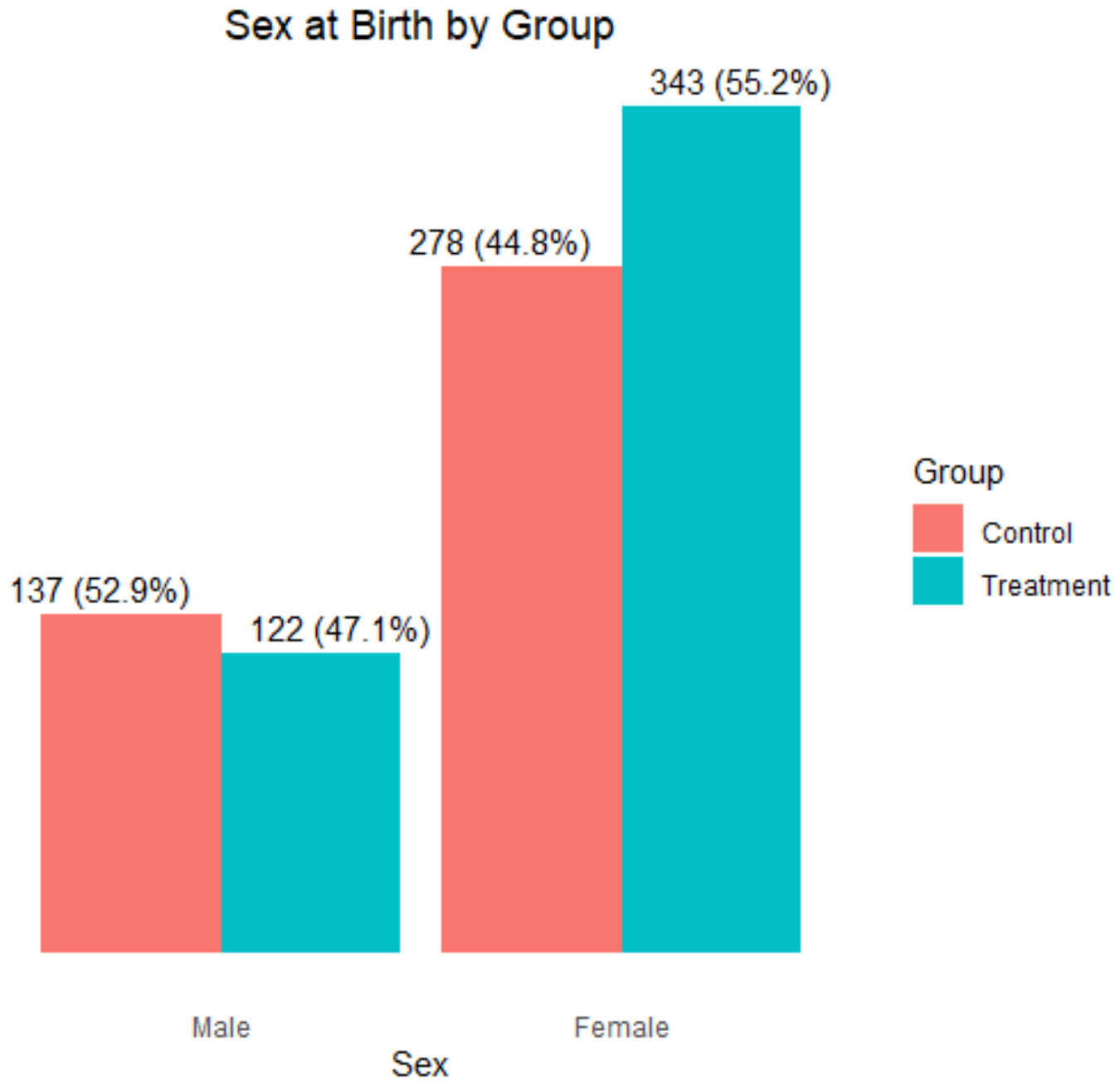
- In the control group, the minimum number of household member is 1, and 25% of observations have up to 3 members, while 75% have up to 6 members. The median is 5, and the mean is approximately 5. The maximum observed number of household members in the control group is 14, with an IQR of approximately 3.

- Overall, both groups exhibit similar quartile distributions and IQRs, suggesting comparable central tendencies and spreads in the distribution of household sizes.

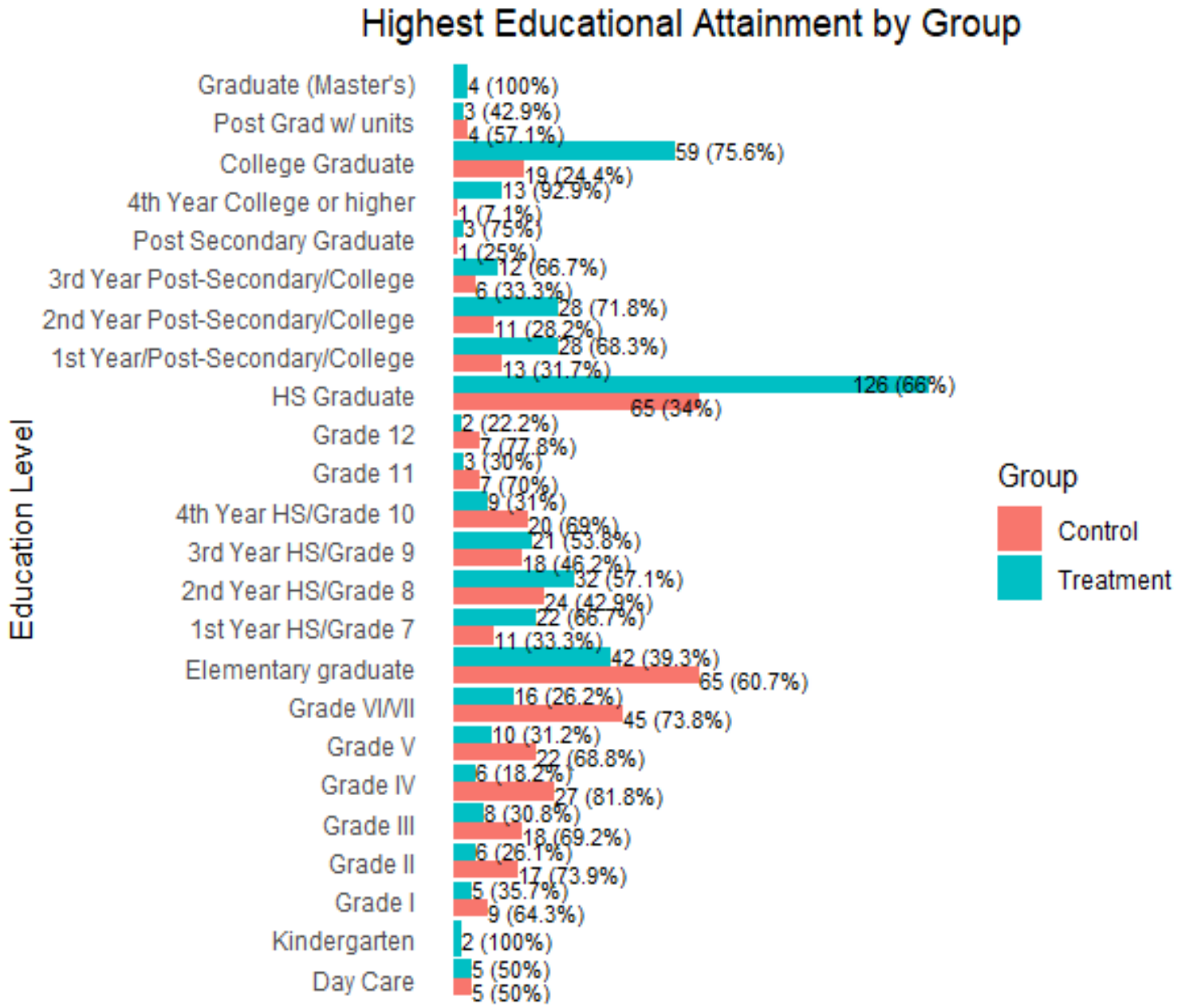


Group	Min	Q1	Median	Mean	Q3	Max	IQR
Control	1	3	5	5	6	14	3
Treatment	1	3	4	5	6	17	3

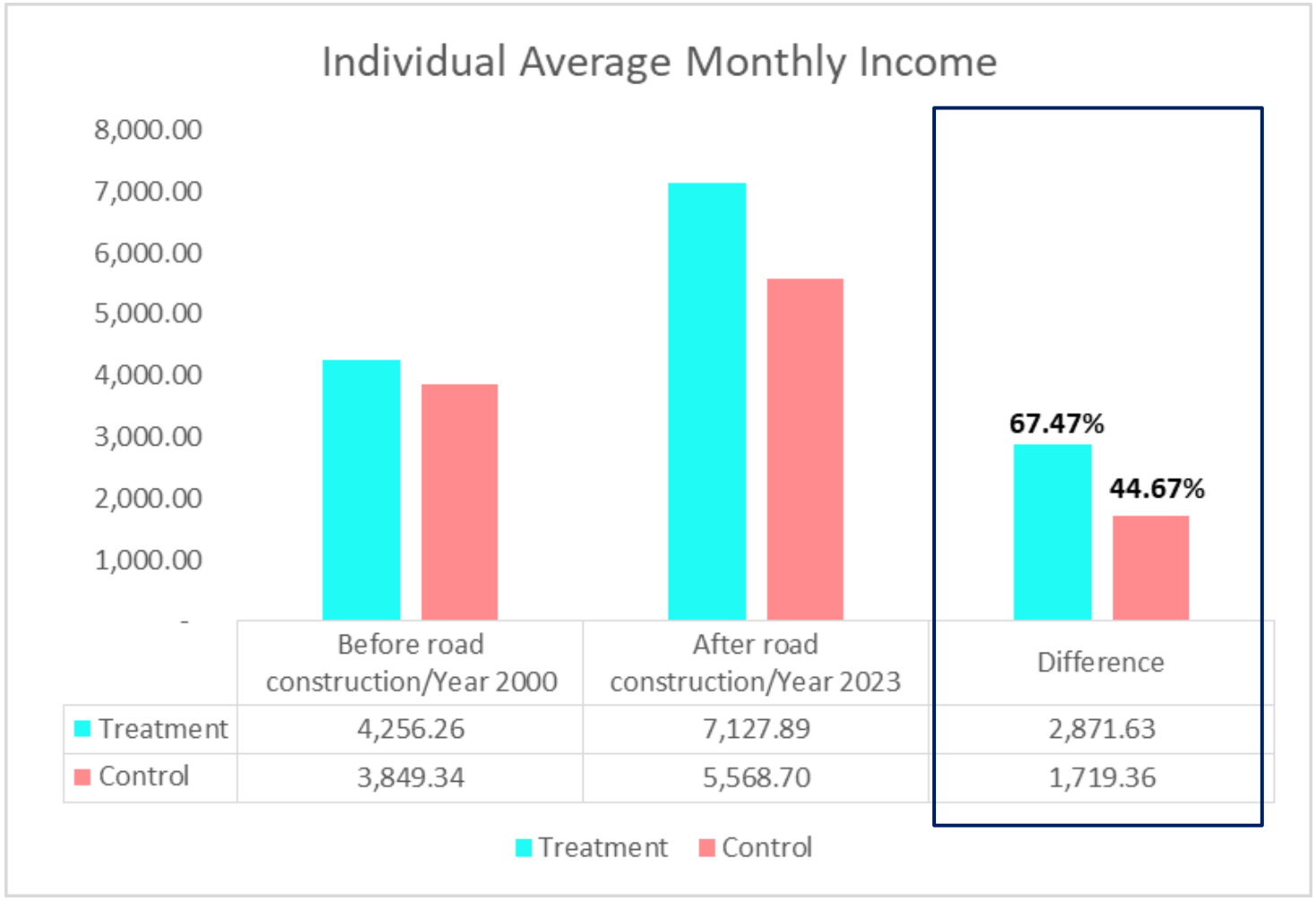
- Females comprised 71% of the respondents.
- When comparing the treatment group to the control group , there was a noticeable difference in the gender composition.
- The treatment group had a higher proportion of females, while the control group had a higher representation of males compared to the treatment group.



- Both groups have similar educational attainment, encompassing individuals from early childhood education to post-graduate studies.
- High school graduate is a prominent feature in both groups, suggesting a comparable educational background.
- College-level education, including graduates and those currently enrolled, is present in both groups, contributing to the overall diversity of educational attainment.

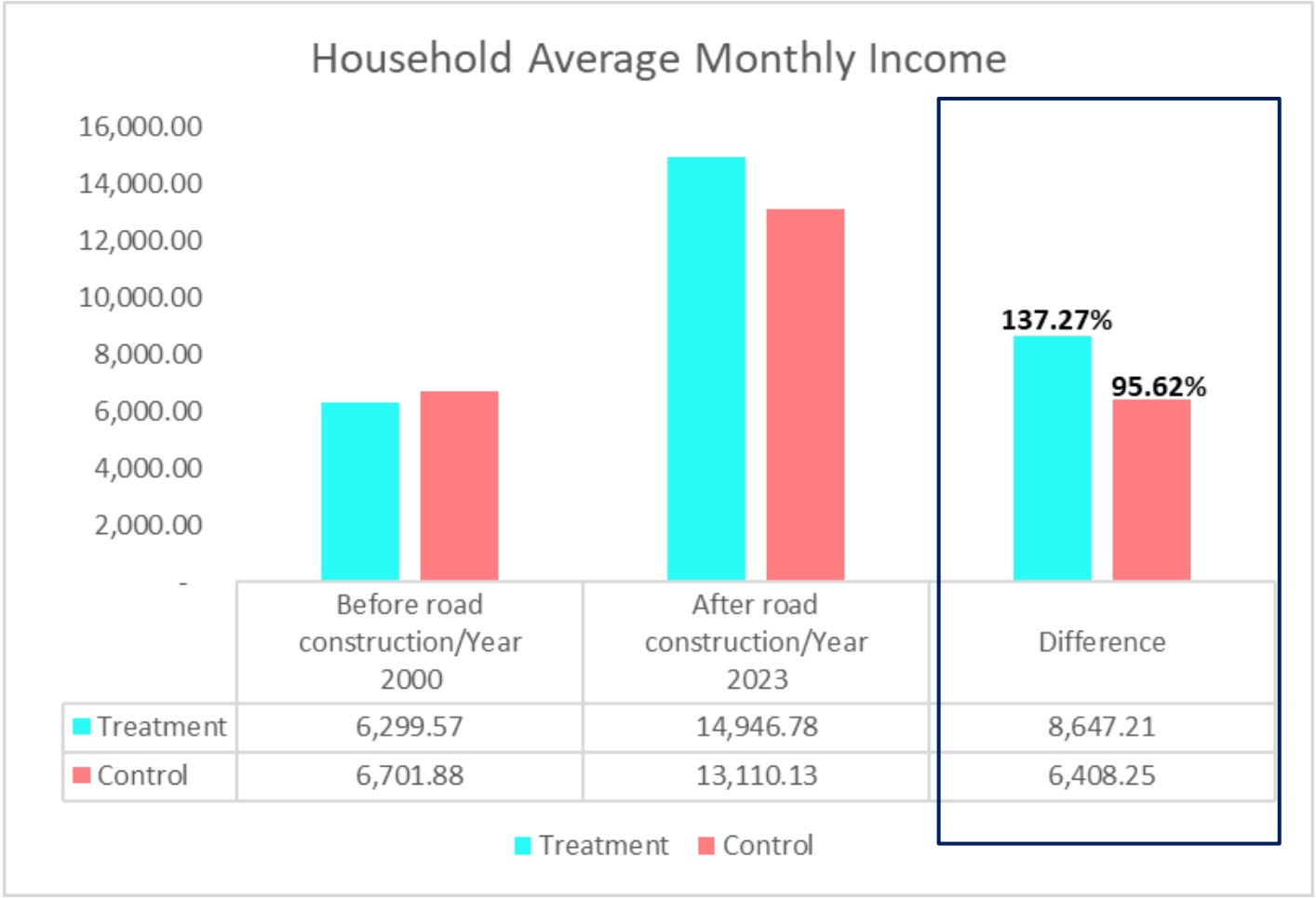


- The treatment group saw an increase in individual average monthly income before road construction (Year 2000) and after road constrcution (Year 2014 – 2023) by 67%.
- The Control group also experienced a substantial increase in individual average monthly income from Year 2000 to present by 45%.
- Overall, both groups experienced positive changes in average monthly income individually over the specified time period, with the treatment group showing a higher percentage increase compared to the control group.



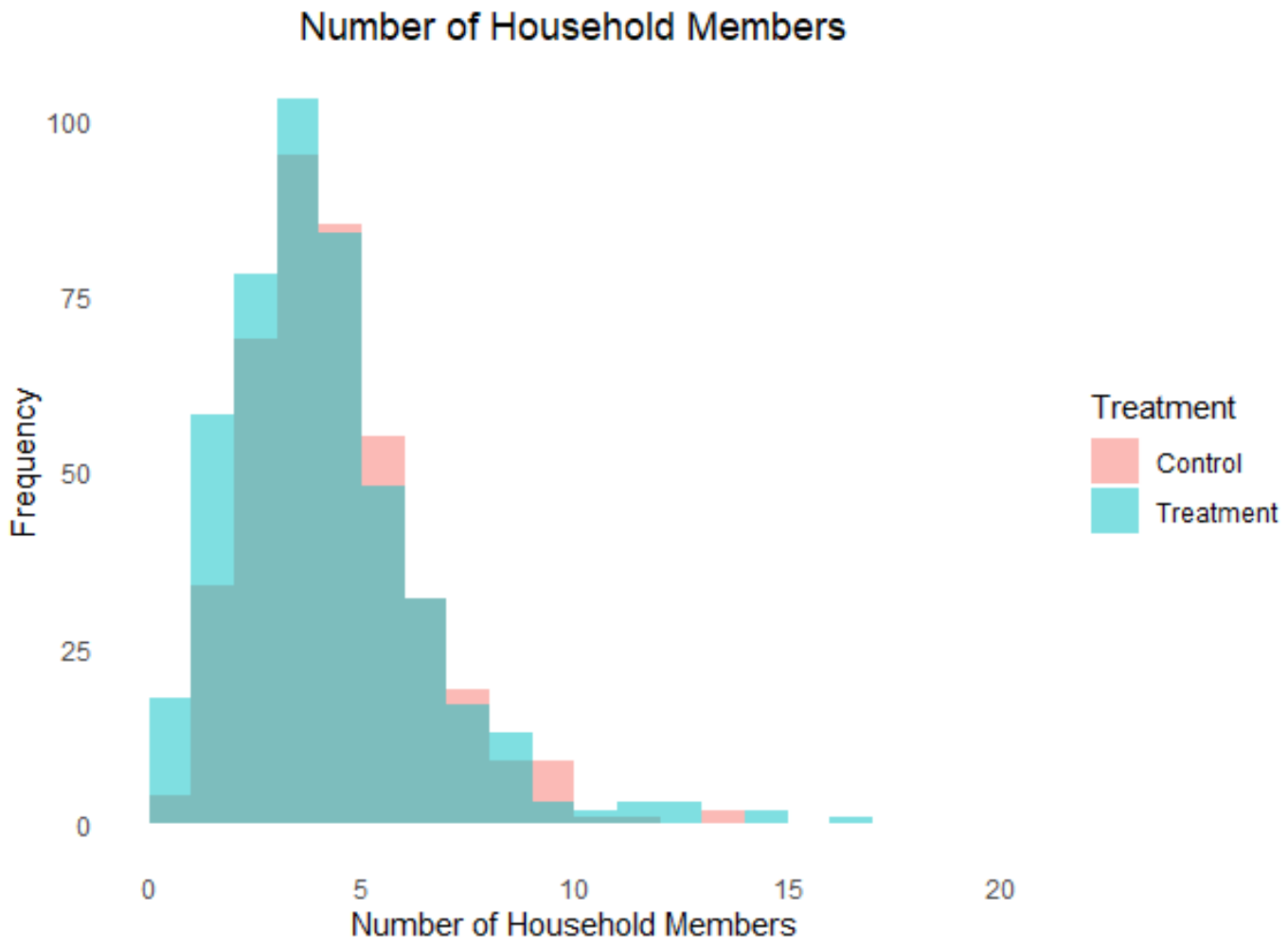
	Before road construction/Year 2000	After road construction/Year 2023	Difference
Treatment	4,256.26	7,127.89	2,871.63
Control	3,849.34	5,568.70	1,719.36

- The treatment group saw an increase in household average monthly income before road construction (Year 2000) and after road constrcution (Year 2014 – 2023) by 137%.
- The control group also experienced a substantial increase in household average monthly income from Year 2000 to present by 96%.
- Overall, both groups experienced positive changes in household average monthly income over the specified time period, with the treatment group showing a higher percentage increase compared to the Control group.



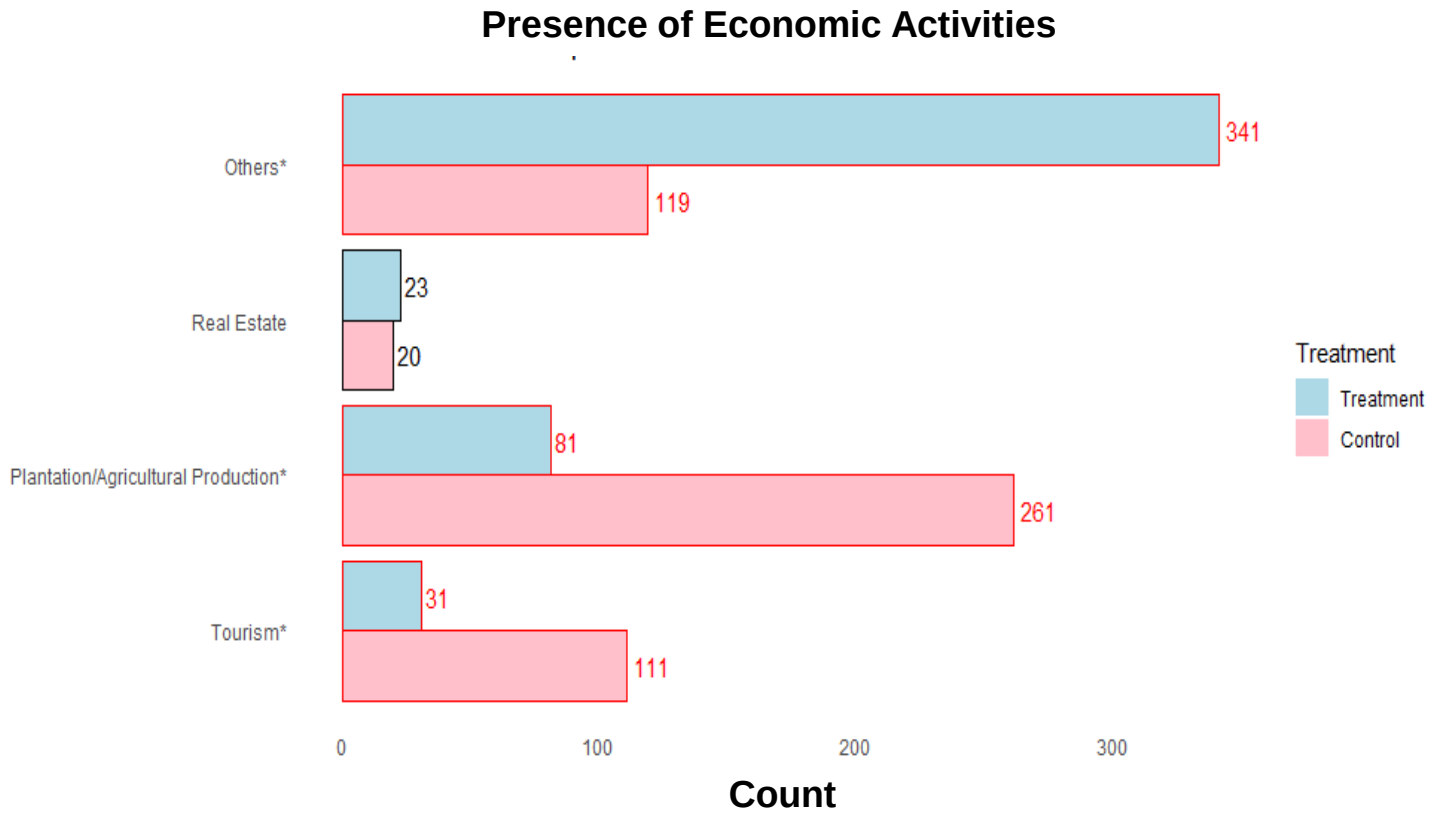
	Before road construction/Year 2000	After road construction/Year 2023	Difference
Treatment	6,299.57	14,946.78	8,647.21
Control	6,701.88	13,110.13	6,408.25

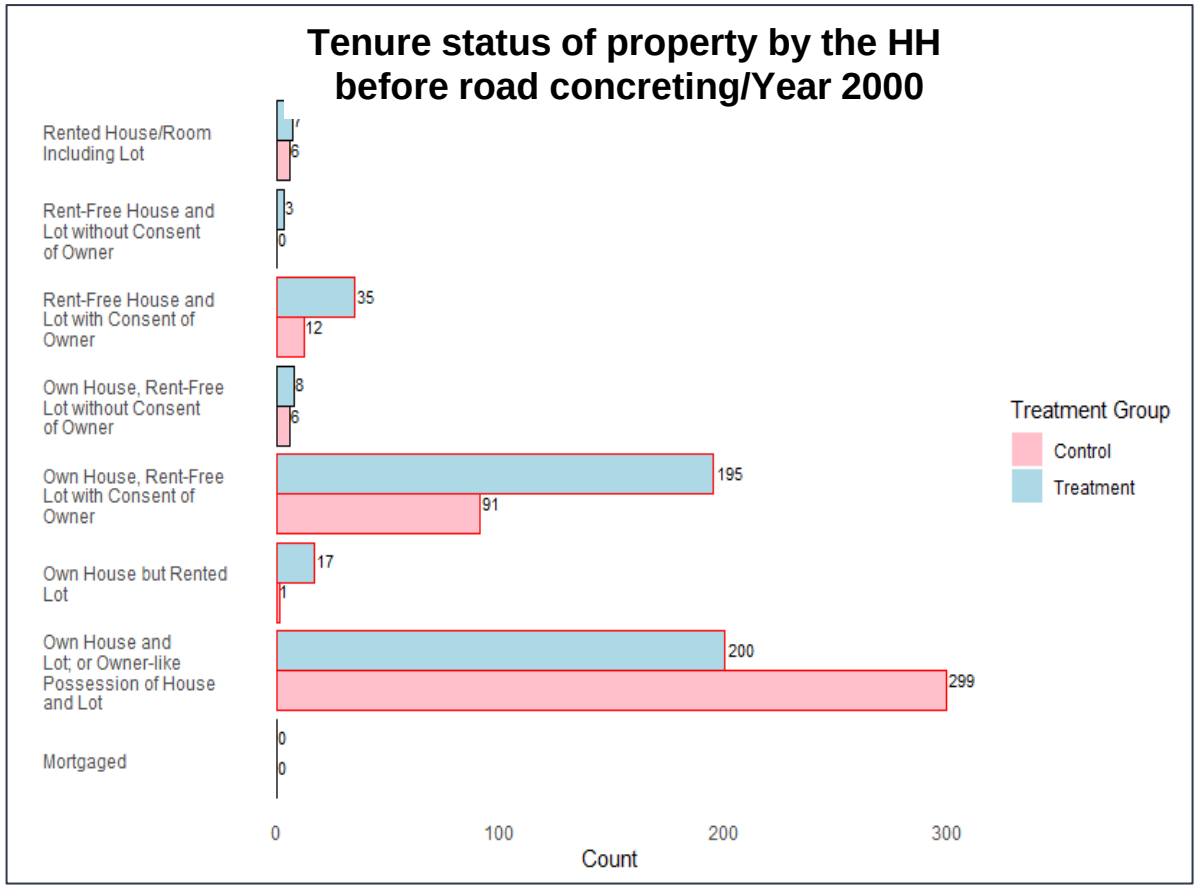
Both groups exhibit similar quartile distributions and IQRs, suggesting comparable central tendencies and spreads in the distribution of household sizes.

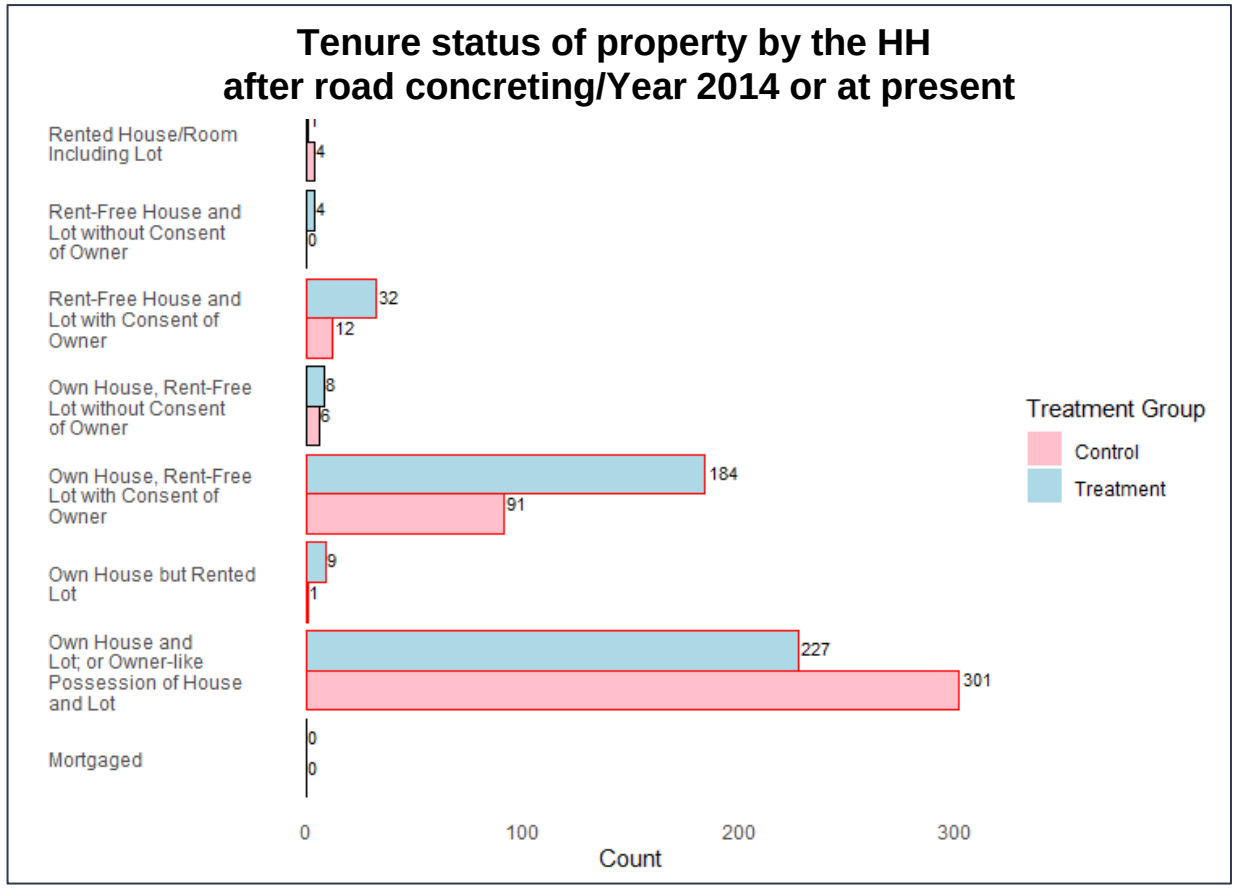


Group	Min	Q1	Median	Mean	Q3	Max	IQR
Treatment	1(22)	3	4	5	6	17 (1)	3
Control	1(22)	3	5	45	6	14 (2)	3

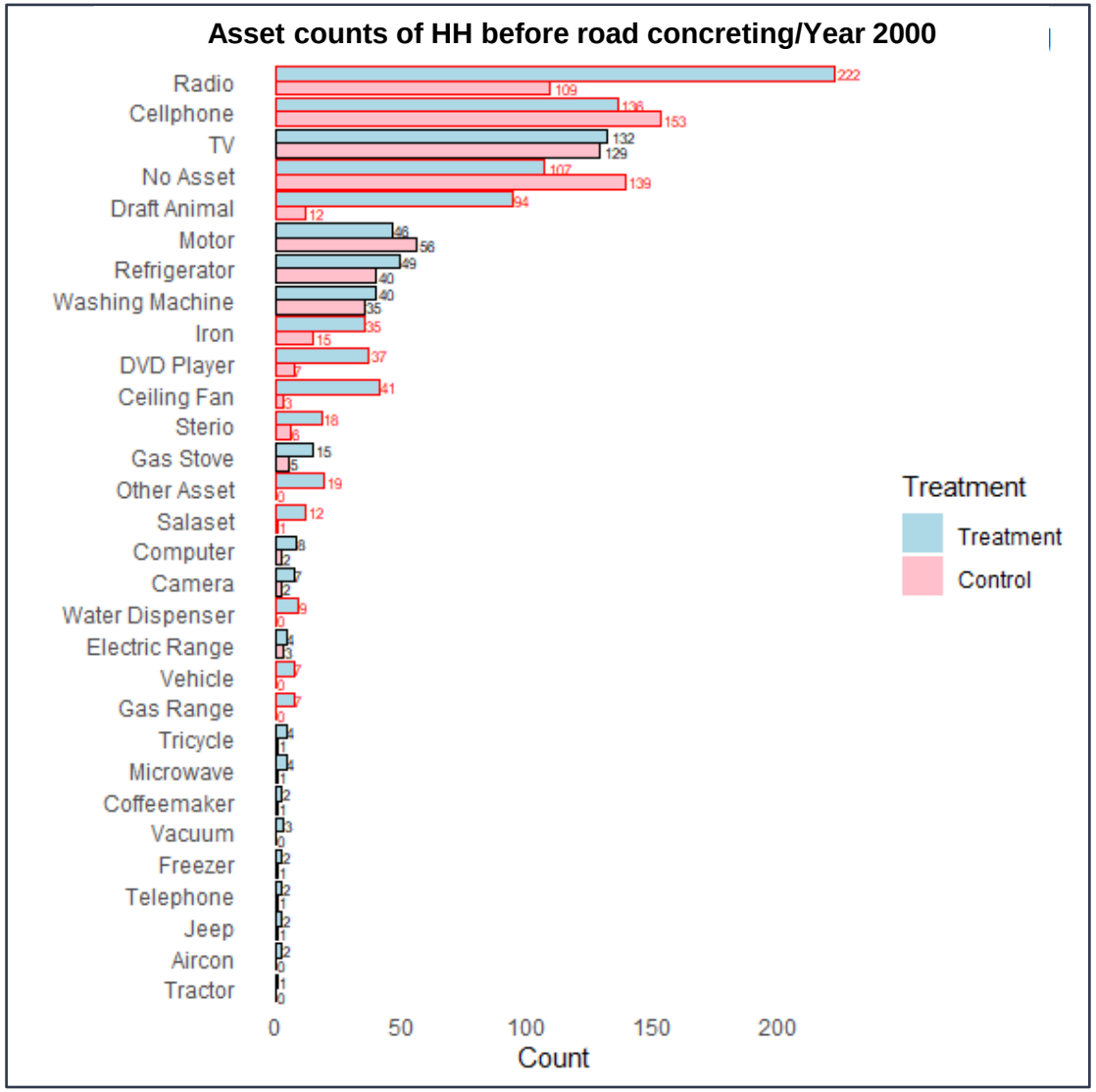
- Majority in the treatment group has plantation/agricultural production areas followed by the presence of tourism areas/sites.
- While the control group has establishments not listed in the survey.

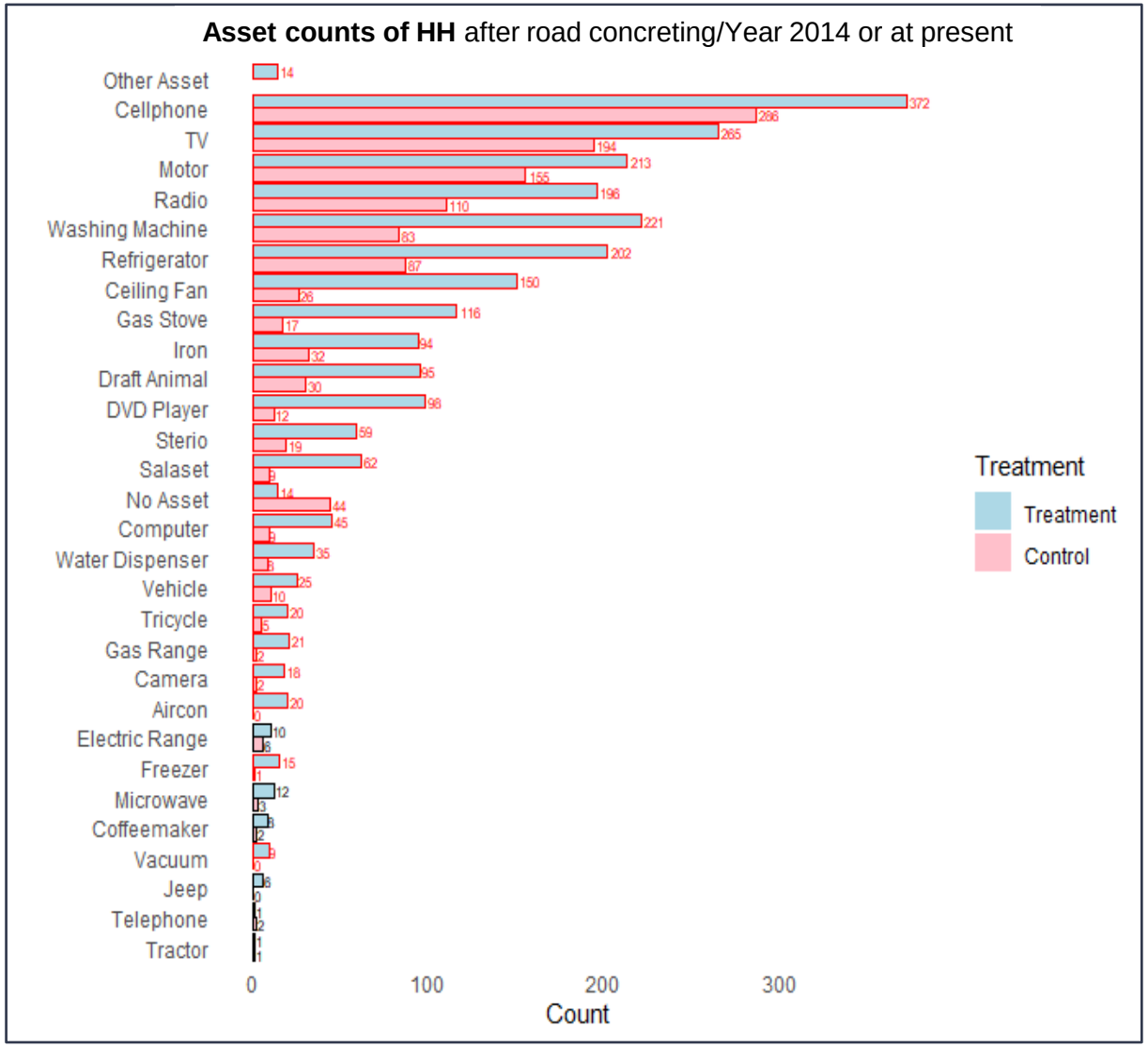




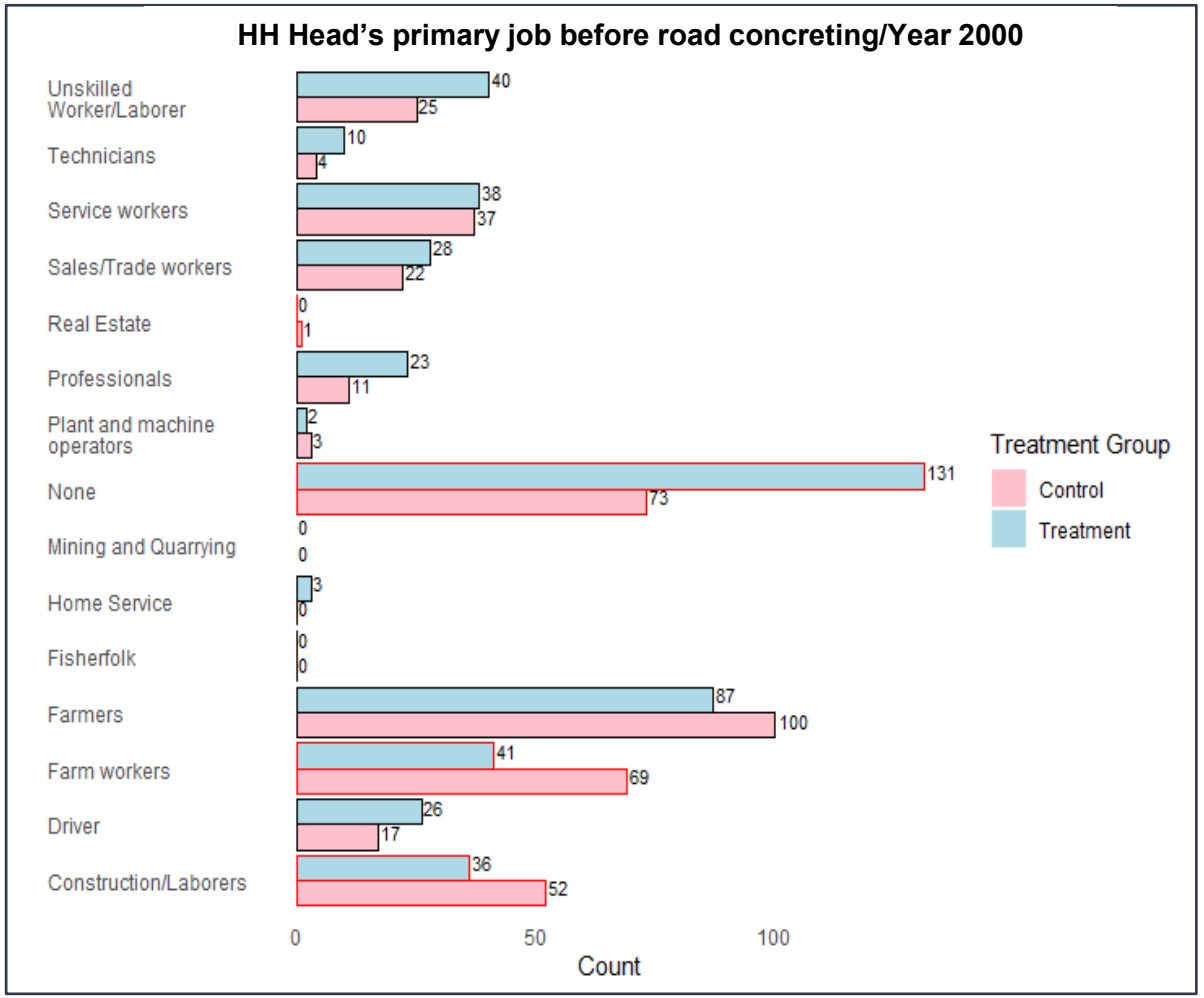


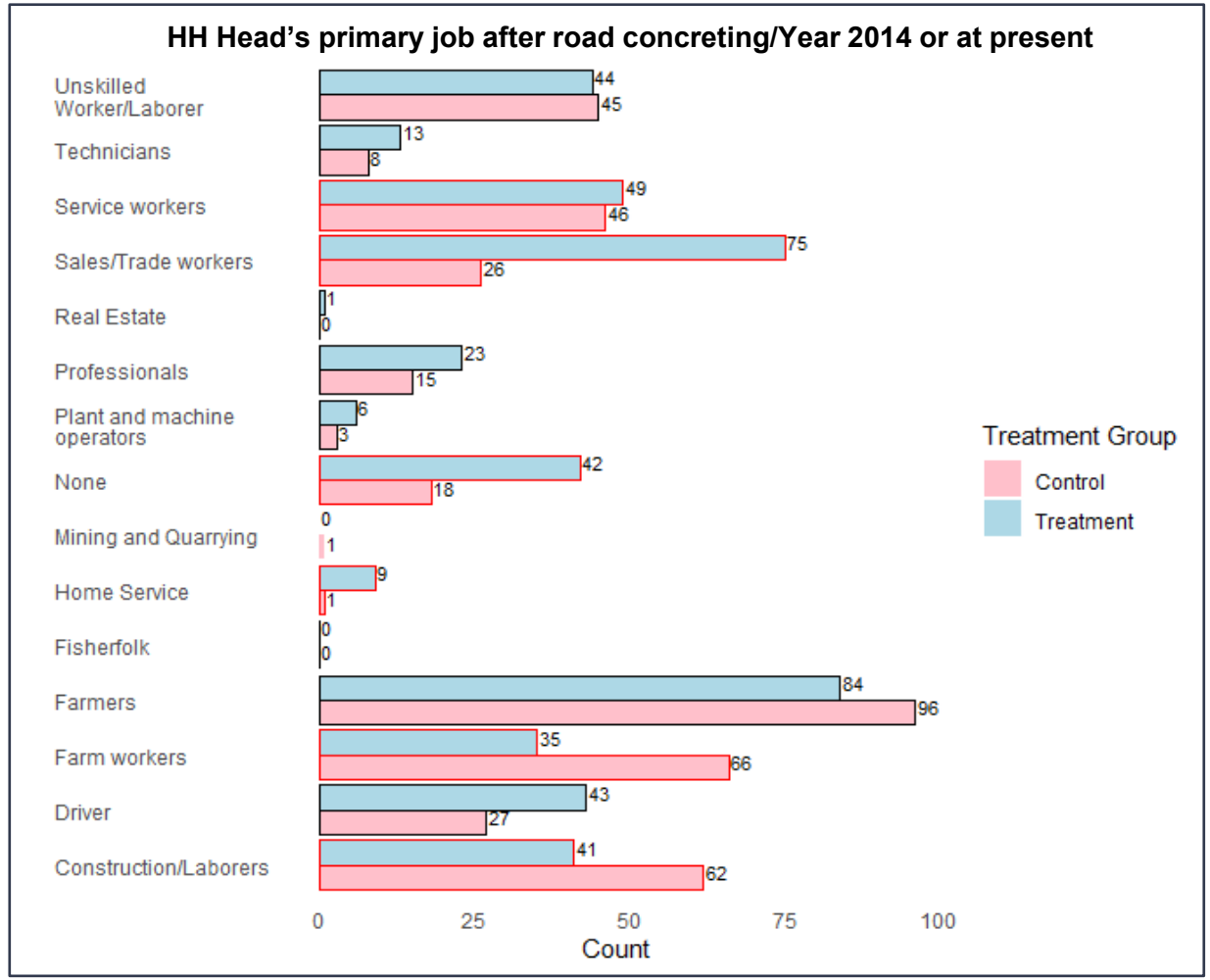
Group differences were found for "Rent-Free House and Lot with Consent of Owner", "Own House, Rent-Free Lot with Consent of Owner", and "Own House but Rented Lot





Group differences were found for number of cellphones, TV, motor, and refrigerators





Group differences were found for 'Farm Workers', 'Construction/Laborers', ''Sales/Trade Workers' and 'None'. This means that a higher number of individuals in the treatment group still do not have work than in the control group after road concreting.

2. Preliminary Results (Quantitative Analysis: Impact Estimation)

Predictors of Income (HH Level)

- Number of household members
- Presence of economic activities
- Average HH monthly income
- Tenure status of property by the HH before road concreting/Year 2000 and after road concreting/Year 2014 or at present
- Asset counts of HH before road concreting/Year 2000 and after road concreting/Year 2014 or at present

Key Interpretations

- Adjusted R-squared: With a value of 0.303, the model explains about 30% of the variance in household income, considering the number of predictors.
- F-statistic and p-value: The F-statistic and its p-value (<2e-16) indicate that the model is statistically significant overall.
- Treatment, Period, and their Interaction: The non-significant interaction term suggests that the combined effect of being in the barangays directly traversed by the GCVR and time period at present does not have a significant impact on household income.

Key Interpretations

- **Variables that significantly impact HH income are as follows:**
  1. ***Number of household members – indicates that each additional household member is associated with an average increase in household income;***
  2. ***Various assets have significant associations with income such as gas ranges, cellphones, stereos and ceiling fans.***
- **While some variables show a significant association with income, others do not. The treatment and period variables do not exhibit a significant impact in this model.**
- **The model reveals complex relationships between household income and various factors, including household size, presence of economic activities, asset ownership, and house tenure.**

2. Preliminary Results (Quantitative Analysis: Impact Estimation)

Predictors of Income (Individual Level)

- Age
- Sex
- Role of Respondent
- Educational Attainment
- Type and nature of primary job before road concreting/Year 2000 and after road concreting/Year 2014 or at present
- Type and nature of secondary job before road concreting/Year 2000 and after road concreting/Year 2014 or at present

Key Interpretations

- Adjusted R-squared: With a value of 0.297, the model explains about 30% of the variance in individual income, considering the number of predictors.

- F-statistic and p-value: The F-statistic and its p-value (<2e-16) indicate that the model is statistically significant overall.

- Treatment, Period, and their Interaction: The interaction term is significant ($p < 0.05$), suggesting that the effect of the treatment on income varies over different periods. The result also indicates that the combined effect of treatment and period being in the barangays directly traversed by the GCVR and time period at present have a significant impact on individual income.

Key Interpretations

- Sex has a negative coefficient, indicating that being of a particular sex at birth (female) is associated with lower income.
- Higher educational attainment seems to be associated with higher income.
- Various job categories have been found to significantly influence income such as:
    1. *Service Workers: a significant negative coefficient suggests that individuals in these jobs earn significantly less than those in the reference job category.*
    2. *Employers in Own Family-Operated Farm or Business: a positive coefficient indicates higher earnings for these individuals, possibly due to business ownership or entrepreneurial benefits.*

3. Preliminary Results (Qualitative Analysis: FGDs/KIIs)

Increased employment opportunities

Observed increase in employment opportunities following the road improvement. These opportunities mainly stem from the tourism and restaurant sectors.

Boosted tourism-related activities

The road boosted tourism particularly Gingoog City and Municipality of Claveria. Once a barren and isolated areas, these areas have been transformed into prominent tourism destinations. This transformation has led to the establishment of various food establishments, hostels, and other tourism sites.

Eased transportation of goods and products

Enhanced the ease of transporting goods and products within the barangay, reducing travel times and product damage. Farmers transitioned from traditional transport methods to motorized vehicles, leading to reduced damage but higher transportation costs.

Improved mobility and access to services

Improved the daily commute and access to employment opportunities for factory workers, highlighting the positive impact of road infrastructure on resident mobility and access to services. The road has improved access to essential services and education in the areas where it traverses.

Improved peace and security conditions

Enhanced road access in upland areas has transformed the peace and security situation, reducing threats from CTGs in these areas. However, it has also led to new challenges like car thefts and increased incidences of vehicular accidents.

V. POLICY RECOMMENDATIONS AND LESSONS LEARNED (PRELIMINARY)

Policy Recommendations

INVEST IN EDUCATION AND SKILLS DEVELOPMENT

Invest in programs that enhance the skills and employability of individuals, potentially leading to higher income levels.

IMPLEMENT GENDER-INCLUSIVE ECONOMIC POLICIES

Promote equal opportunities for all genders, address wage gaps, and provide support for women in the workforce, including training and mentorship programs

PROVIDE SUPPORT AND TRAINING FOR SERVICE WORKERS

Implement support and training programs for service workers to enhance their skills and potentially open up opportunities for career advancement or job transitions

ENCOURAGE NTREPRENEURIAL ACTIVITIES

Implement policies that support entrepreneurship, including access to funding, business development resources, and training programs for aspiring entrepreneurs.

Lessons Learned

1. While roads can stimulate economic development by promoting trade, tourism, and other business activities, this does not necessarily translate to increase income at the HH level. Other support infrastructure and socio-economic interventions are necessary to make a positive impact of increasing HH income.

2. Improved road infrastructure increases the accessibility of government services such as schools, making it easier for students to travel to and from educational institutions. The data on educational attainment in the treatment group having a larger number of individuals in several subgroups compared to the control group supported this observation.

3. Need to conduct of follow-up or related studies to determine impact of the GCVR to the Indigenous Peoples, impact to health and education outcomes. This is currently beyond the scope of the study.

Lessons Learned

4. Need further analysis and data transformations to further test the model and to better understand the dynamics and relationship of improved road infrastructure to income at the household level:
    - Rank income data by decile
    - Check the level of income before and after the road intervention vis-à-vis the poverty threshold in the area
    - Extract data on the possible factors that may have contributed to the change in HH income such as:
        1. profile of HH head in terms of educational attainment;
        2. type and nature of job of household heads and members;
        3. shift in livelihood; and
        4. proximity of the HH to the road, among others.

GINGOOG CITY–CLAVERIA–VILLANUEVA ROAD (GCVR) AND ITS IMPACT ON HOUSEHOLD INCOME OF CONFLICT-AFFECTED AREAS

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