The Geographic Profiling of Poverty and Accessibility

(The Case of Eastern Samar and Siquijor Provinces)

By

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In loving memory of

(✠) Cristela Goce-Dakila, PhD

Flow of Presentation

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II. Theoretical Consideration
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    - SCI definition
    - Accessibility
III. Methodology
IV. Data and Analysis
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    - Accessibility data
    - Regression models
    - Poverty, Accessibility and Gender
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Metro Manila

Province of
Eastern Samar

Island Province
of Siquijor
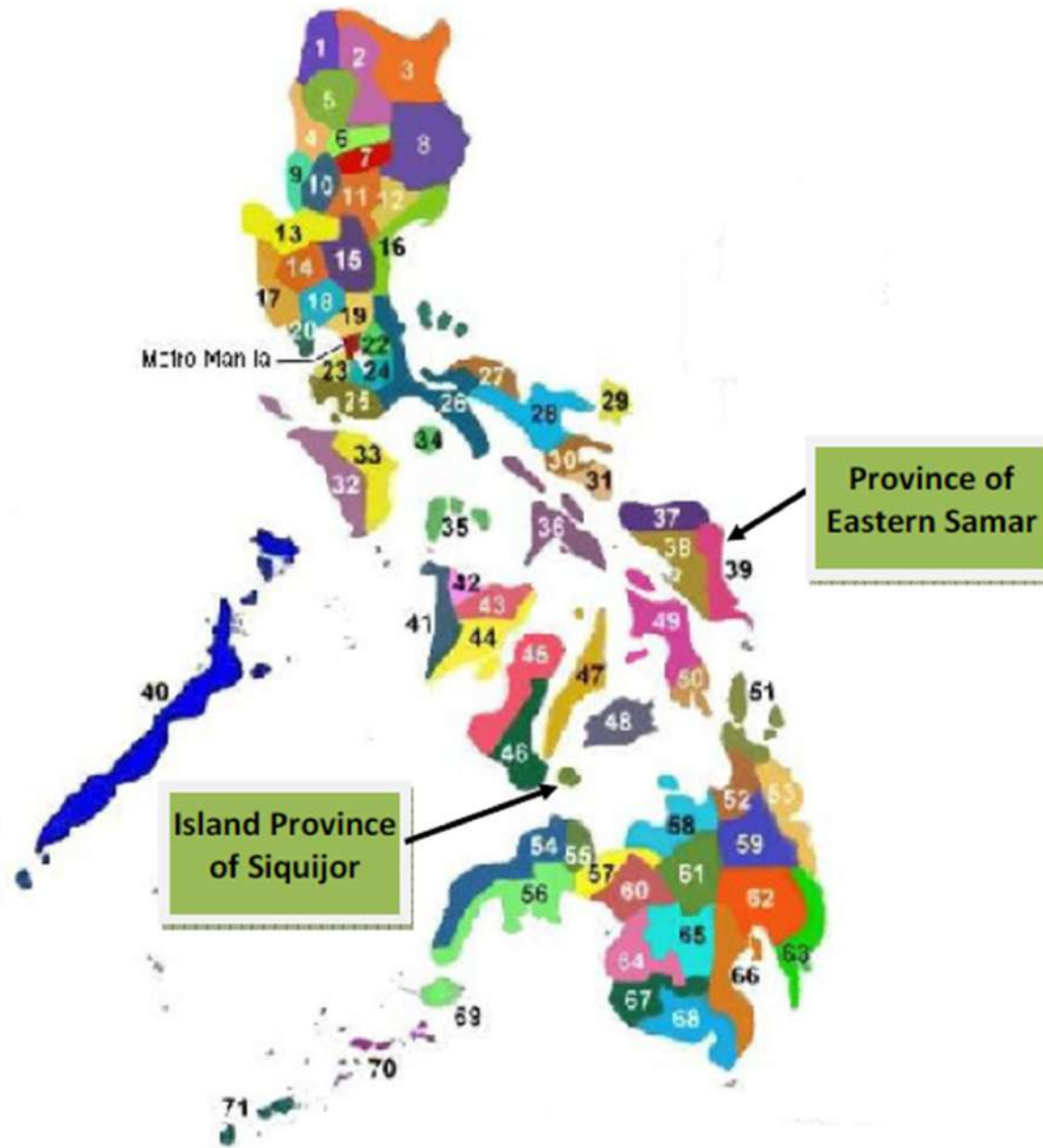
Fig. 1.1 The geographic location of the two provinces

Objectives of the Study

The following are the objectives of the study:

1. to define and develop accessibility models in the context of the poverty problem of the country,
2. to determine the extent to which accessibility largely in its spatial dimension is one of the contributing factors that cause poverty,
3. to determine the role accessibility plays in availing of basic social services (focusing on several of the social services, like access to education, to health services, and economic activities),
4. to establish proxy variables that could serve as determinants of the lack of or availability of accessibility variables, and
5. to determine the effect of poverty and accessibility relations on gender.

Poverty Definition

From the National Statistical Coordination Board (NSCB)

Poverty line – may be viewed as the minimum income required to meet the food requirements and other non-food basic needs

Poor – individuals and families whose incomes fall below the official poverty threshold defined by the government

From the Social Weather Station (SWS)

Poor - are those household heads who rate their own families as *mahirap* (poor)

The Single Composite Index (SCI) of CBMS

➢ Reflects a representation of unmet needs in the local government unit

➢ The CBMS Composite Indicator is one way of ranking and identifying needy households that may be prioritized as beneficiaries of development interventions

➢ reflects living standards in a particular community.

➢The index is measured, using a bottom-up approach, starting at the household level. At the household level, it is derived by counting the number of attained needs out of the 14 CBMS core indicators using a dichotomous choice (0 or 1) decision variable

➢ The poorest households are the ones with the most unmet needs. At each geopolitical level, it is the average unmet needs or unattained indicators of the households (CBMS, 2005).

➢At the barangay level, the equation form of how Brgy_SCI is computed as follows:

$$Brgy\_SCI = \sum_{i=1}^{14} \left(\frac{Number\ of\ HH\ with\ unmet\ needs\ i\ in\ the\ Barangay}{Total\ number\ of\ HH\ in\ the\ Barangay} \right)_i$$

Table 3.1 The CBMS 14 Poverty Indicators and their Decision Variables

Poverty Variables	Binary Choice / Description
1. HH_wMaln05	0 - without malnourished children 0-5 years old/without children between 0-5 years old 1 - with malnourished children 0-5 years old
2. HH_wDeath05	0 - without child death 0-5 years old/without children 0-5 years old 1 - with child death 0-5 years old
3. HH_wDeathPreg	0 - without death due to pregnancy related causes/Not applicable (no pregnancy in the HH) 1 - with death due to pregnancy related causes
4. HH_Squat	0 - formal settler 1- informal settler
5. HH-MSH	0 – not living in makeshift housing 1 – living in makeshift housing
6. HH_ntSWS	0 – with access to safe water 1 – without access to safe water
7. HH_ntSTF	0 – with access to sanitary toilet 1 – without access to sanitary toilet
8. HH_wntElem612	0 – all members 6-12 years old attending elementary/no members 6-12 years old 1 – with members 6-12 years old not in elementary
9. HH_wntHS1316	0 – all members 13-16 years old attending high school/no members 13-16 years old 1 – with members 13-16 years old not in high school
10. HH_povp	0 – non poor HH 1 – poor HH
11. HH_Subp	0 – subsistently non-poor 1 – subsistently poor
12. HH_Fshort	0 – did not experienced food shortage 1 – experienced food shortage
13. HH_wUnemp15ab	0 – all members in the labor force are employed 1 – with unemployed members of the labor force
14. HH_wVictcr	0 – no victims of crime 1 – with victims of crime

Accessibility

- is the ease with which one could avail of the social services and economic opportunities laid in geographic space

- distance or travel time as the primary measure of accessibility

Poverty and Accessibility

Poverty = f(Accessibility, socio-economic characteristics, other factors)

SCI = f(Accessibility, socio-economic characteristics, other factors)
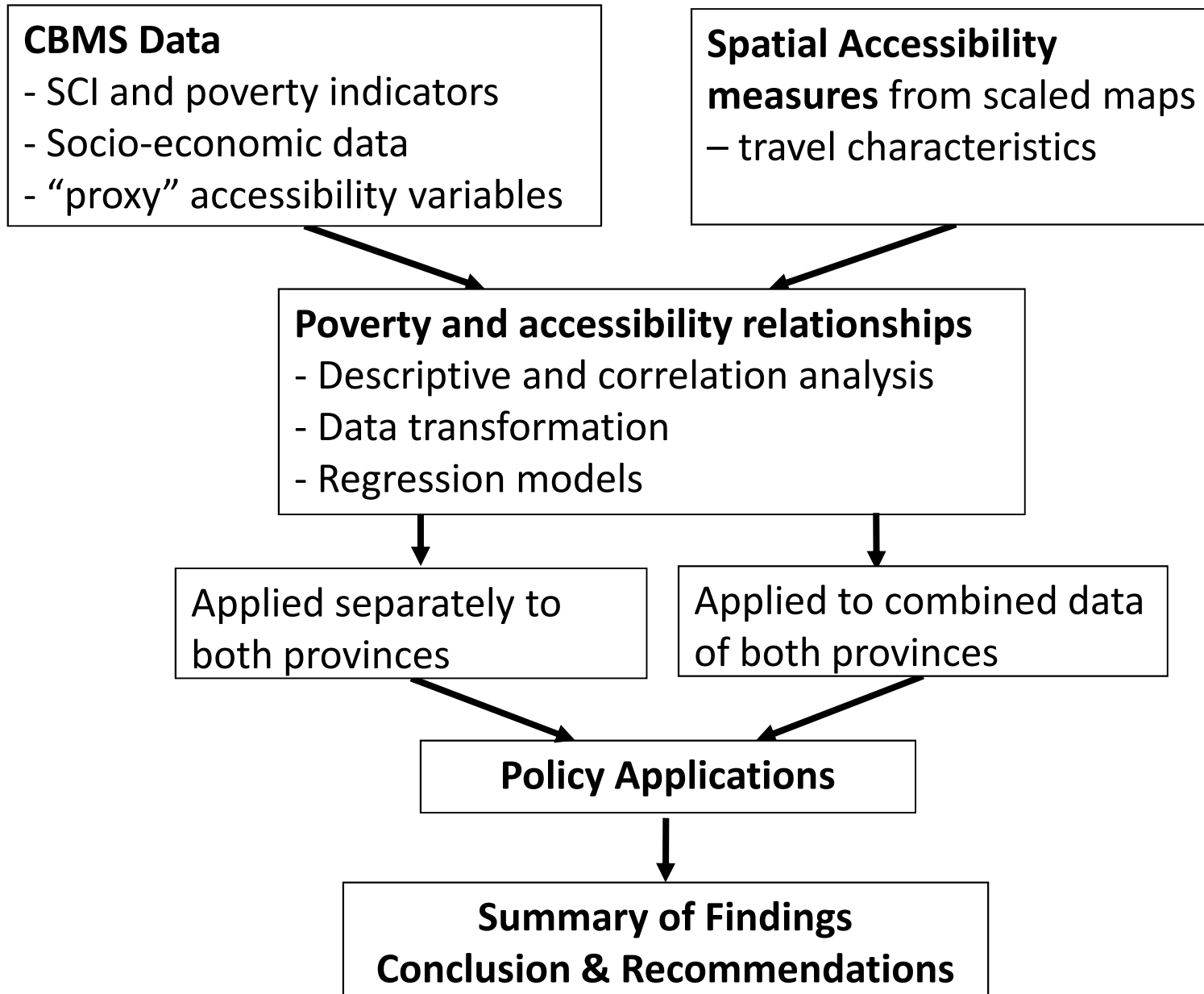
SCI = f(Accessibility) + ε

$$SCI = \alpha_0 + \sum_{i=1}^{n} \alpha_i \, x_i$$

where:

α_0 = the constant coefficient, error term, uncaptured poverty-related variables

α_i = the coefficient of significant accessibility variable x_i, $i = 1,..,n$

Methodology

CBMS Data
- SCI and poverty indicators
- Socio-economic data
- "proxy" accessibility variables

Spatial Accessibility measures from scaled maps – travel characteristics

Poverty and accessibility relationships
- Descriptive and correlation analysis
- Data transformation
- Regression models

Applied separately to both provinces

Applied to combined data of both provinces

Policy Applications

Summary of Findings Conclusion & Recommendations

Data and Analysis

Table 4.1 Number of accessibility variables in both the household, barangay, and municipal levels

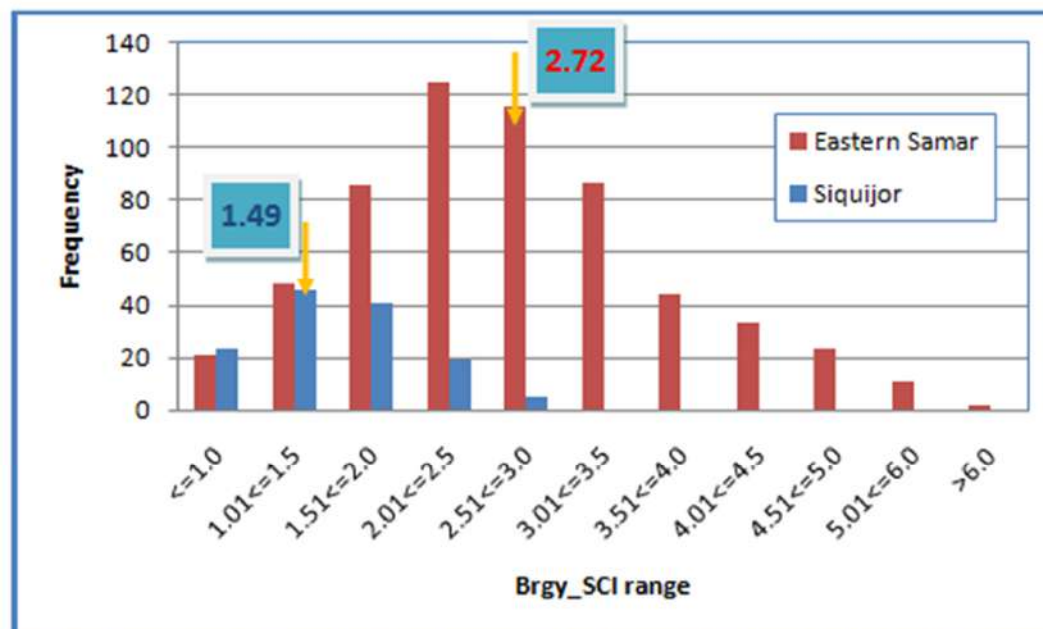| Province	Household Level	Barangay Level	Municipal Level
	No. of households and accessibility variables	No. of Barangays and accessibility variables	No. of municipalities and accessibility variables
Eastern Samar	65,535	596	23
Siquijor	19,311	134	6
Total	84,846	730	29

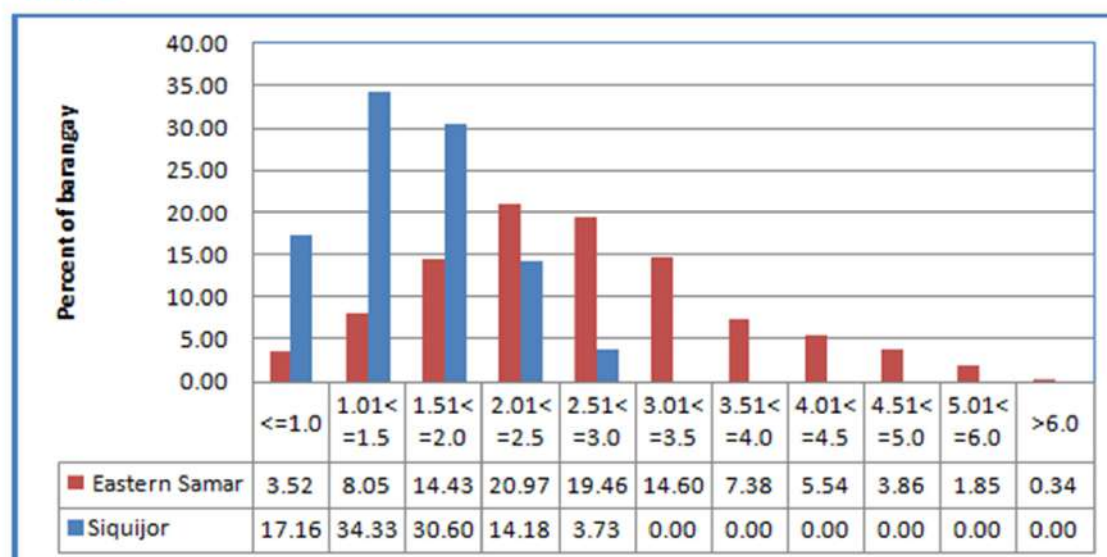Figure 5.1 The population distributions of the *Brgy_SCI* variables in Eastern Samar and Siquijor

	<=1.0	1.01<=1.5	1.51<=2.0	2.01<=2.5	2.51<=3.0	3.01<=3.5	3.51<=4.0	4.01<=4.5	4.51<=5.0	5.01<=6.0	>6.0
Eastern Samar	3.52	8.05	14.43	20.97	19.46	14.60	7.38	5.54	3.86	1.85	0.34
Siquijor	17.16	34.33	30.60	14.18	3.73	0.00	0.00	0.00	0.00	0.00	0.00

Figure 5.2 The population percent distributions of the *Brgy_SCI* variables in Eastern Samar and Siquijor

Table 5.2 Descriptive parameters of selected core indicators of the different municipalities in Eastern Samar (Barangay Level).

Selected Core Indicators (N = 596)	Population Parameters			
	Mean	Standard Deviation	Min.	Max.
Malnourished children 0-5 (%)	7.30	11.20	0.20	54.50
Child deaths 0-5 (%)	0.97	1.14	0.00	5.80
Women deaths due to pregnancy-related causes (%)	0.46	0.43	0.00	1.80
Children not attending elementary 6-12 (%)	24.53	5.52	15.60	40.90
Children not attending high school 13-16 (%)	45.73	11.09	33.90	78.00
Persons in the labor force who are unemployed (15 years old and above) (%)	20.65	5.61	11.00	35.30
Other Poverty-related Variables				
Households below poverty threshold (%)	67.62	9.11	47.20	84.40
Households below food threshold (%)	57.57	11.50	36.30	79.00
Households who experience food shortage (%)	18.39	14.91	5.20	68.40

Table 5.3 Descriptive parameters of selected core indicators of the different municipalities in Siquijor (Barangay Level)

Selected Core Indicators (N = 134)	Population Parameters			
	Mean	Standard Deviation	Min.	Max.
Malnourished children 0-5 yrs. old (%)	2.34	2.74	0.00	7.58
Child deaths 0-5 yrs. old (%)	0.35	0.28	0.00	0.60
Women deaths due to pregnancy-related causes (%)	0.90	0.86	0.00	1.80
Children not attending elementary 6-12 (%)	19.43	4.60	13.72	25.81
Children not attending high school 13-16 %	30.51	5.99	23.69	38.13
Persons in the labor force who are unemployed (15 years old and above) (%)	16.22	1.32	14.60	18.00
Other Poverty-related Variables				
Households below poverty threshold (%)	44.63	20.05	6.26	59.75
Households below food threshold (%)	33.82	16.46	4.56	49.49
Households who experience food shortage (%)	4.25	3.11	0.70	8.70

National road in mountainous area

Inland boat terminal Dolores town

Tricycle ride along national road

National road under rehabilitation area

Inland boat terminal Llorente town

National road junction Quinapondan town

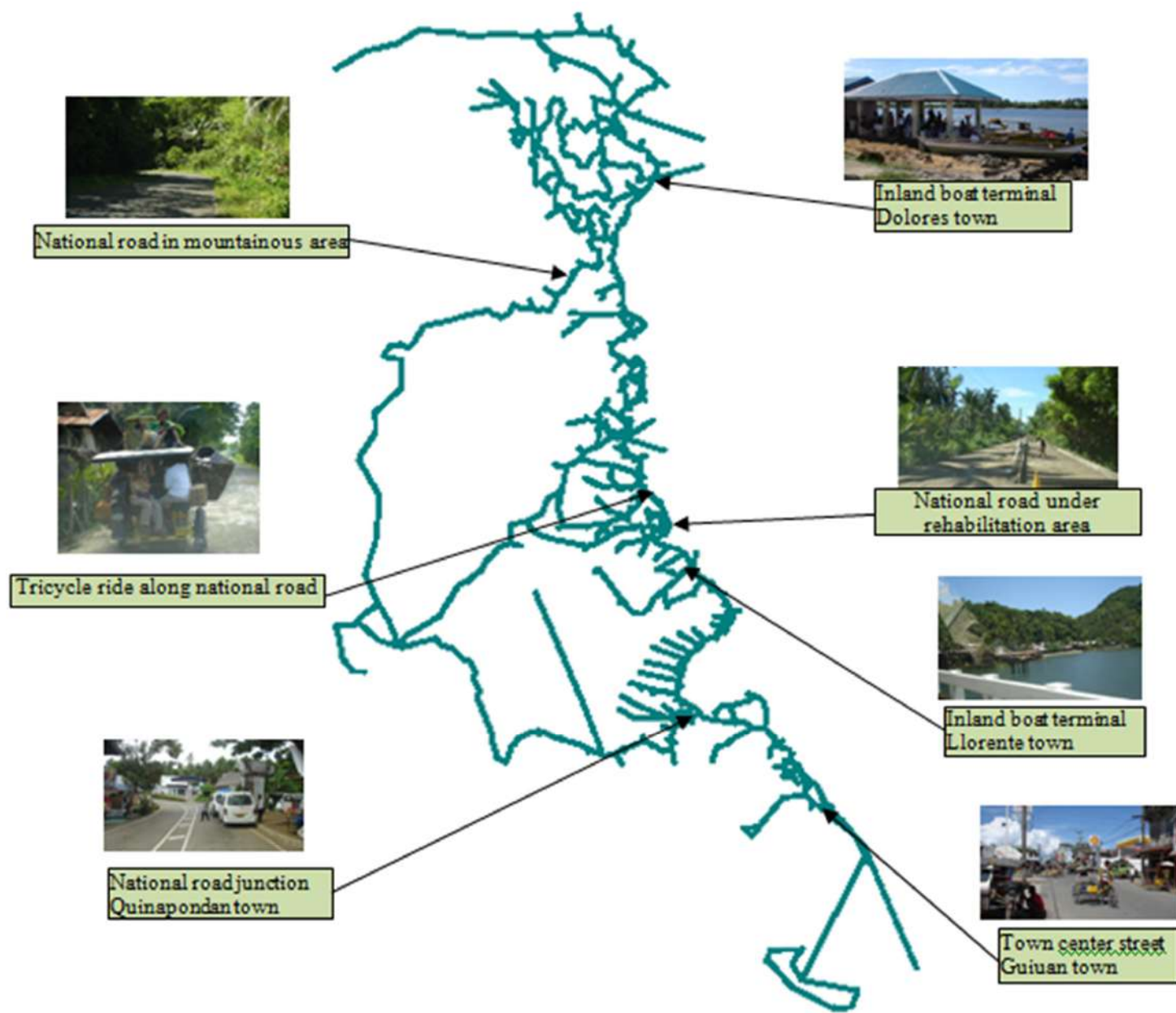Town center street Guiuan town

Figure 6.1 Transport network in Eastern Samar

Table 6.1 Average travel speed by transport mode in Eastern Samar Province.

Purpose and destination of travel	Prevalent Transport Mode	Average speed by road type (kph)			Water transport (kph, knots)	
		National Road	Provincial Road	Barangay Road	Inland water	Ocean Water
Elementary School	Tricycle	25	20	15	8	12
High School	Tricycle	25	20	15	8	12
Hospital	Private vehicle	40	30	20	8	12
Market/Economic Centers	Jeepney, Minibus	30	25	20	8	12

Table 6.2 Travel time equations for Eastern Samar Province.

Purpose/destination of travel	Prevalent Transport Mode on Land	Travel time equation (min)				
		National Road	Provincial Road	Barangay Road	Water transport	
					Inland water	Ocean Water
Elementary School	Tricycle	2.4S	3.0S	4.0S		
High School	Tricycle	2.4S	3.0S	4.0S		
Hospital	Private vehicle	1.5S	2.0S	3.0S	7.5S	5.0S
Market/Economic Centers	Jeepney, Minibus	2.0S	2.4S	3.0S		
	Walking		20.0S			

S = length of road/waterway, in km

Port of Larena, Siquijor

Concrete national road

Port of Siquijor, Siquijor

Interior provincial road

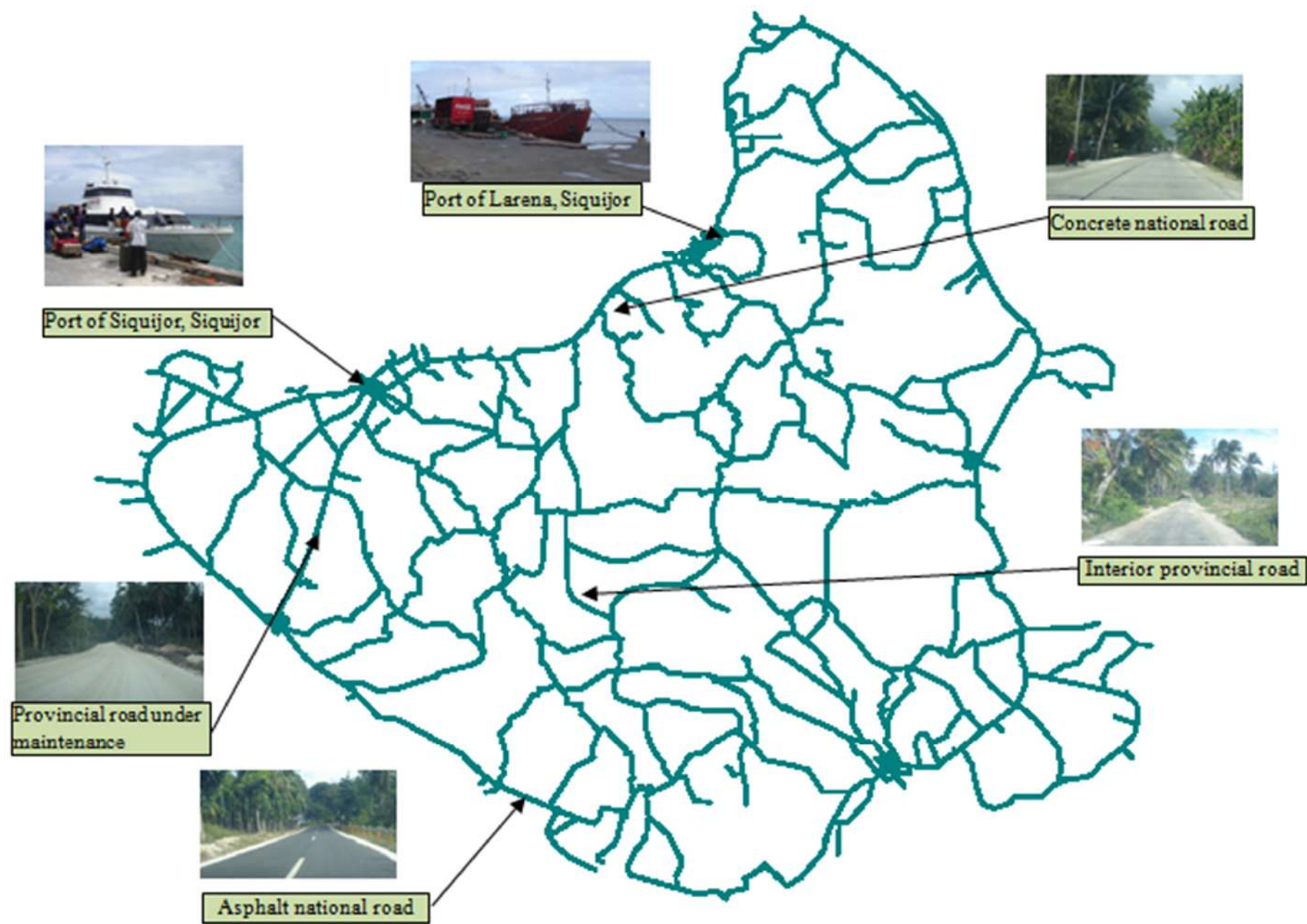Provincial road under maintenance

Asphalt national road

Figure 6.2 Transport network in Siquijor Island

Table 6.3 Average travel speed of transport modes in Siquijor Province.

Purpose of travel	Prevalent Transport Mode	Average speed by road type (kph)		
		National Road	Provincial Road	Barangay Road
Going to Elementary School	Tricycle	25	20	15
Going to High School	Tricycle	25	20	15
Going to Hospital	Private vehicle	40	30	20
Going to Market/ Economic Centers	Jeepney/Minibus	30	25	20

Table 6.4 Travel time equations for Siquijor Island

Purpose/destination of travel	Prevalent Transport Mode	Travel time equation (min)		
		National Road	Provincial Road	Barangay Road
Elementary School	Tricycle	2.4S	3.0S	4.0S
High School	Tricycle	2.4S	3.0S	4.0S
Hospital	Private vehicle	1.5S	2.0S	3.0S
Market/Economic Centers	Jeepney, Minibus	2.0S	2.4S	3.0S
	Walking	20.0S		

S = length of road/waterway, in km

The following parameters of accessibility were considered for each barangay:

1. Estimated travel time (in min) going to the elementary school campus (x_1)
2. Estimated travel time (in min) going to the high school campus (x_2)
3. Estimated travel time (in min) going to a hospital (x_3)
4. Estimated travel time (in min) going to the town center (x_4)
5. Estimated travel time (in min) going to major markets and economic centers (x_5)
6. Whether the barangay is in the poblacion (town center) or not (x_6) – a dummy variable
7. Location of the barangay with respect to the national road (x_7) – a dummy variable
8. Number of households with telephone in the barangay (x_8)
9. Whether the barangay is an island barangay or not (x_9) - a dummy variable
10. Number of households with vehicles in the barangay (x_{10})
11. Number of households with telephone and computer in the barangay (x_{11})

Siquijor Provincial Science High School
Siquijor, Siquijor

Enrique Villanueva National High School
Enrique Villanueva, Siquijor

Catulayan National High School
Catulayan, San Juan, Siquijor

Campalanas National High School
Campalanas, Lazi, Siquijor
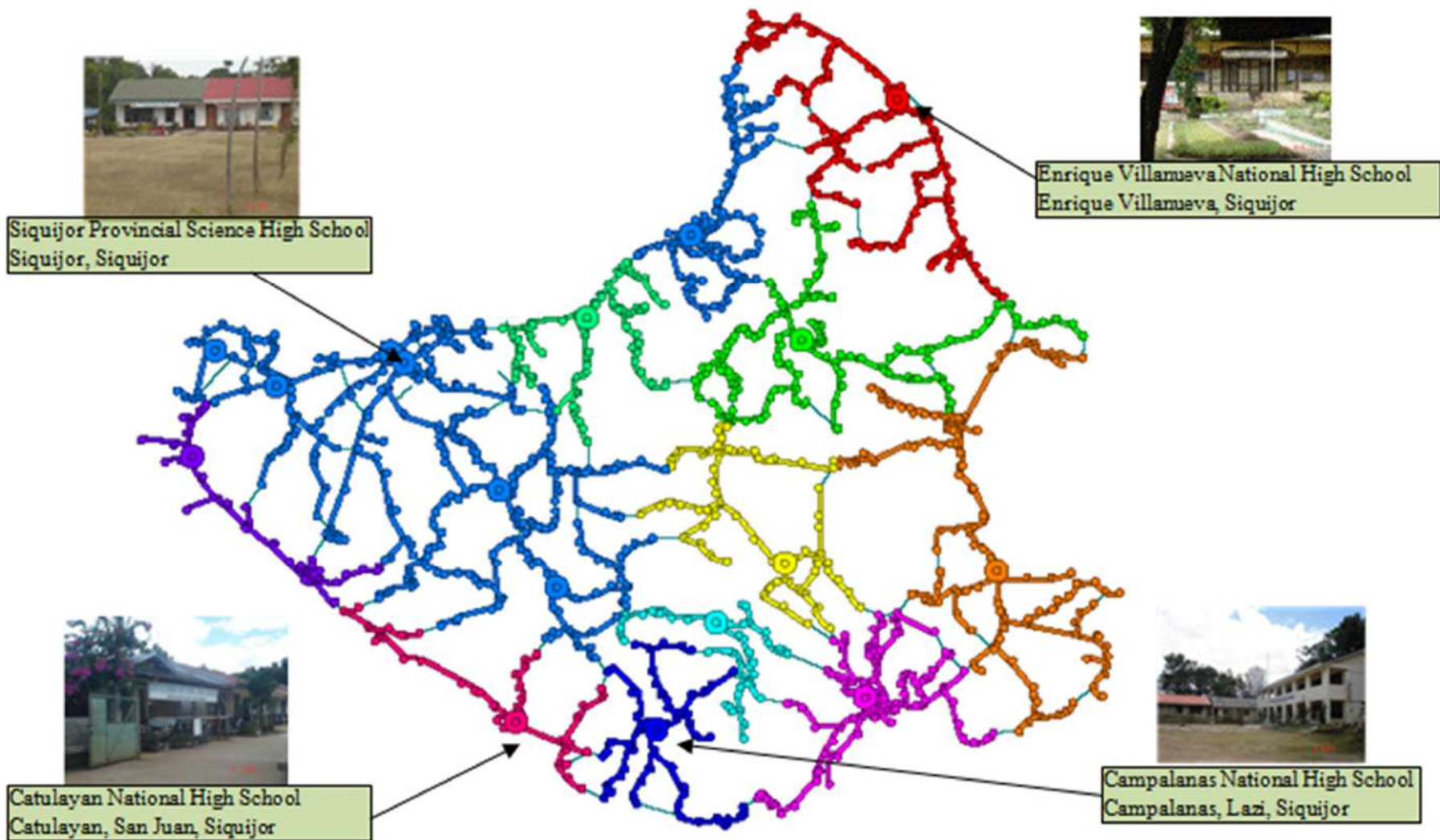
Accessibility of High Schools in the Island Province of Siquijor
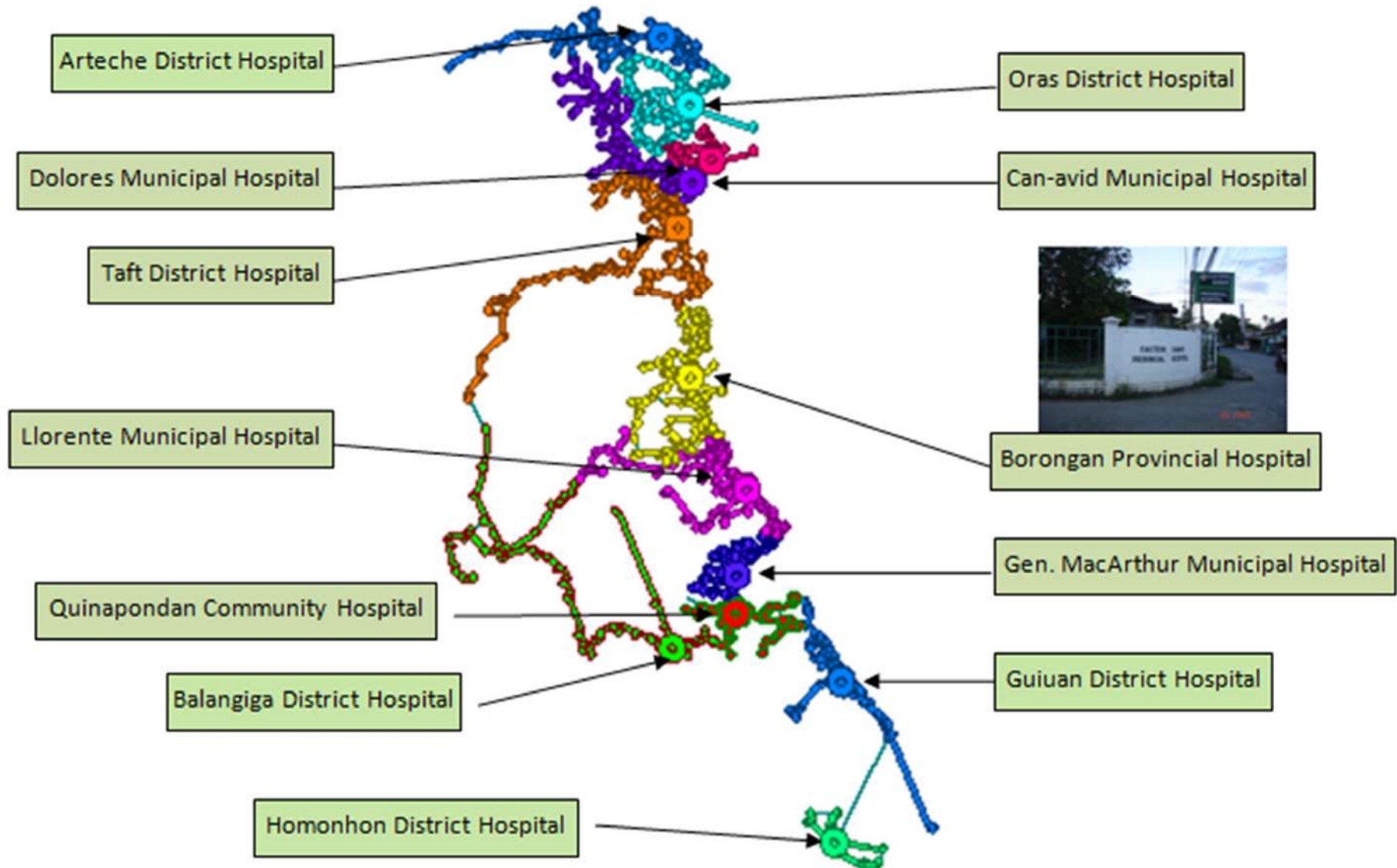
Accessibility of Hospitals in Eastern Samar

Oras Town Center

Dolores Public Market
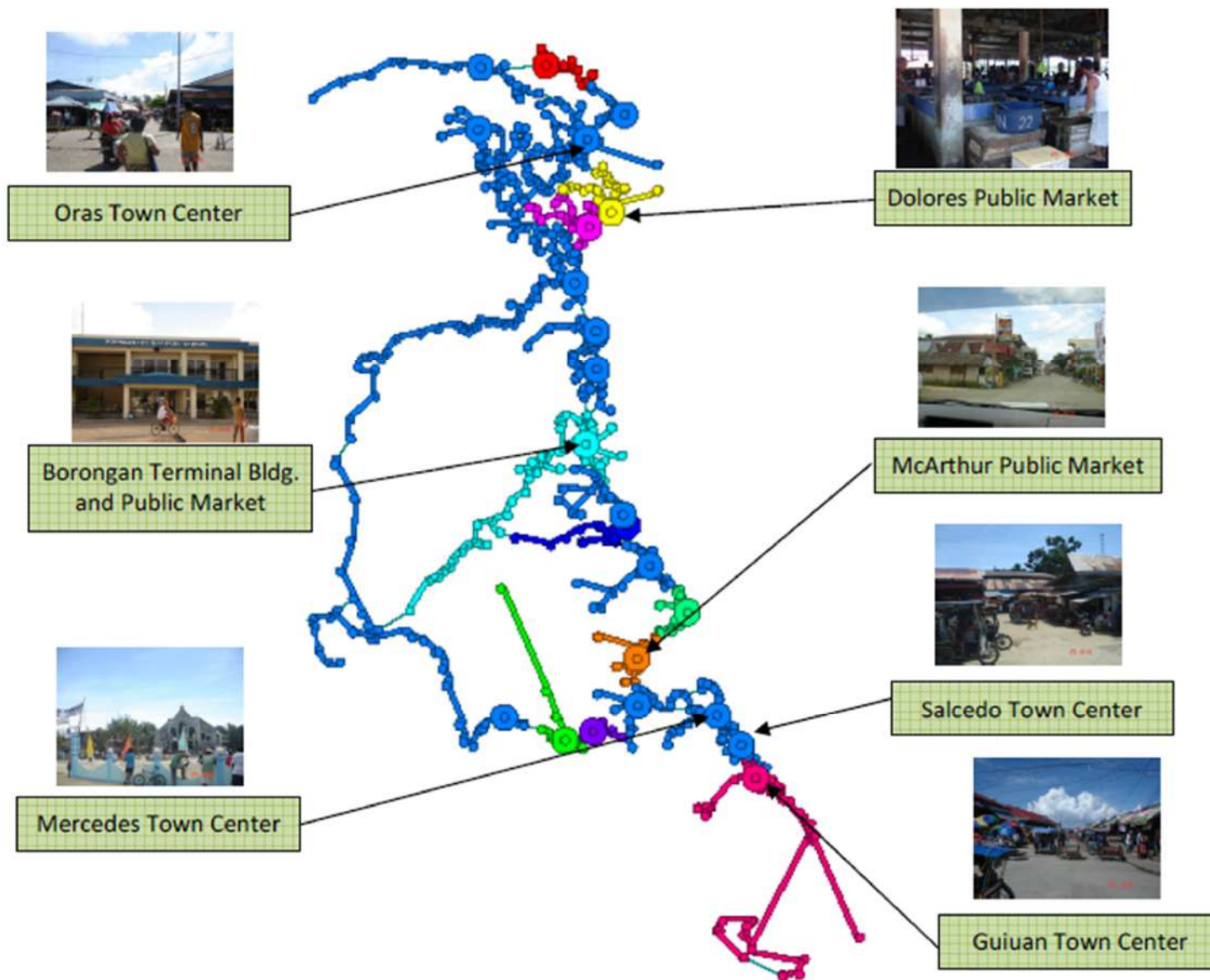
Borongan Terminal Bldg. and Public Market

McArthur Public Market

Salcedo Town Center

Mercedes Town Center

Guiuan Town Center

Figure 6.9 Estimated location of some public markets and economic centers in Eastern Samar
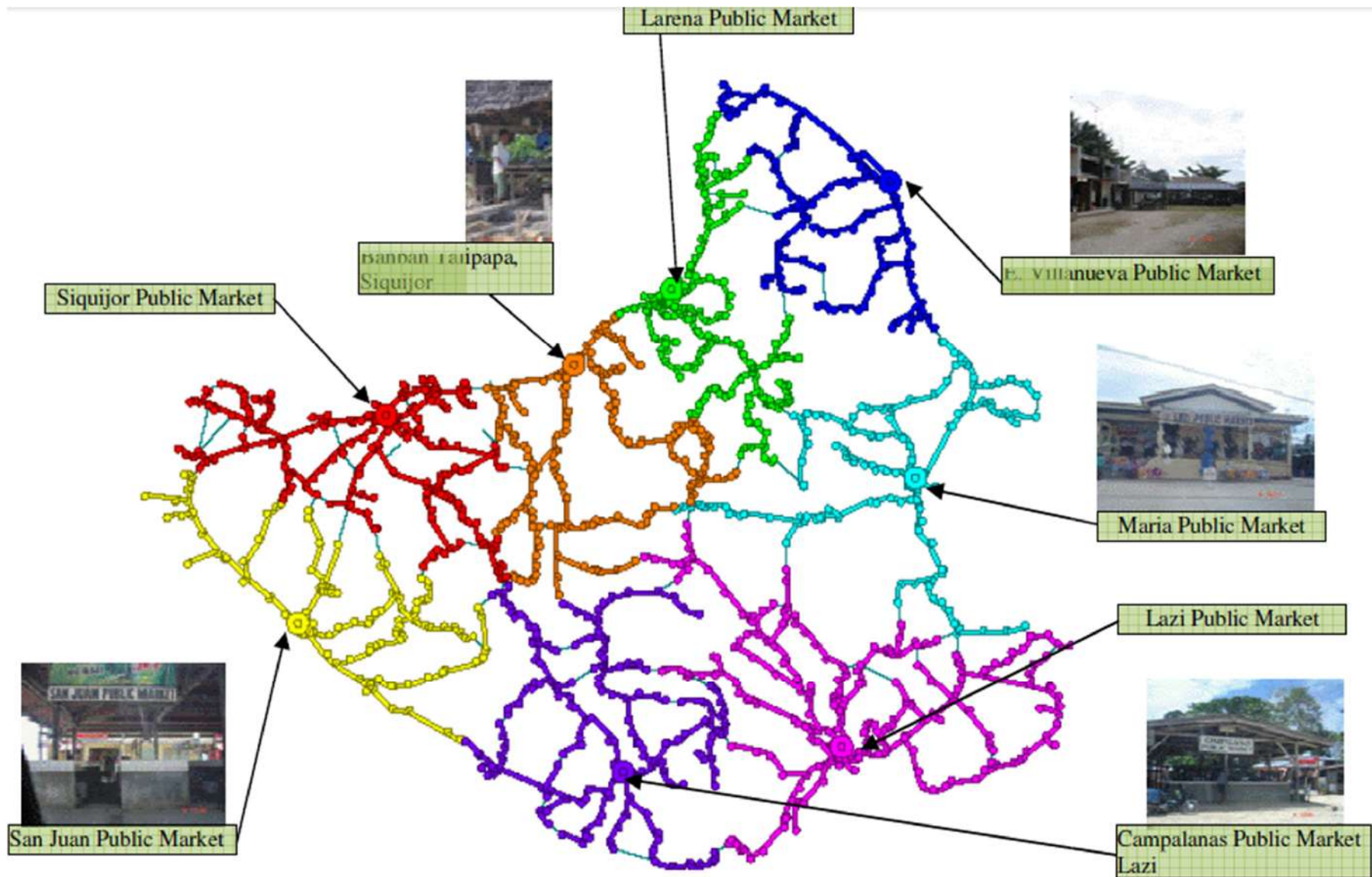
Figure 6.10 Estimated locations of public markets and town centers in Siquijor Province

Table 7.1 Description of important parameters related to accessibility

Parameter	Eastern Samar		Siquijor	
	Population mean	Standard Deviation	Population mean	Standard Deviation
Estimated travel time going to the elementary school campus (x_1, in min)	7.32	5.86	5.08	4.15
Estimated travel time going to the high school campus (x_2, in min)	32.07	43.67	8.79	5.05
Estimated travel time going to a hospital (x_3, in min)	43.17	57.07	15.11	7.53
Estimated travel time going to the town center (x_4, in min)	37.74	66.54	11.25	6.06
Estimated travel time going to major markets and economic centers in the province (x_5, in min)	63.82	79.15	16.13	7.84
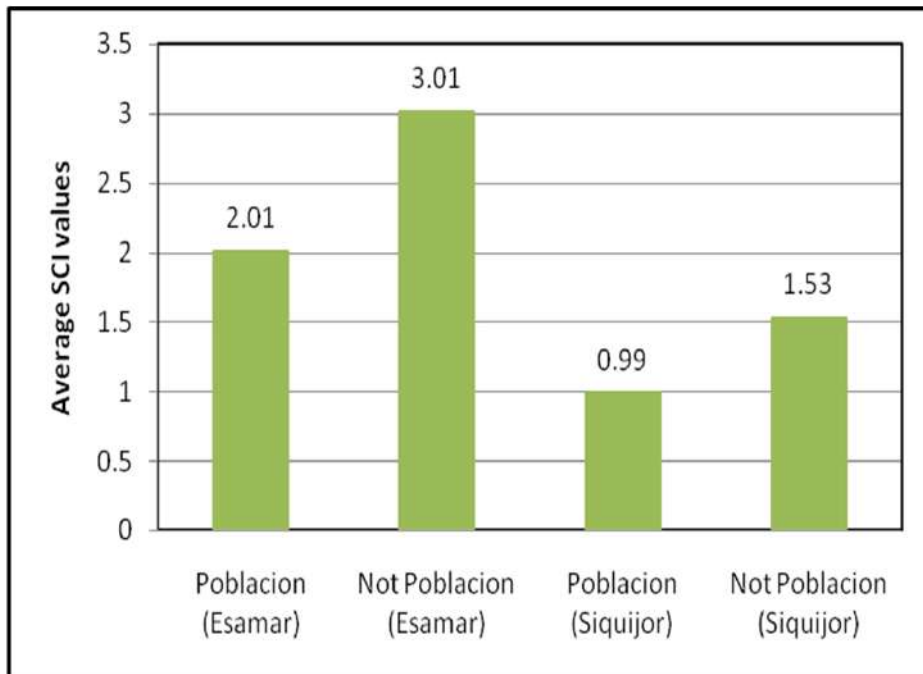
Figure 7.6 Comparison of average SCI values whether the barangay is a poblacion barangay or not (x6)
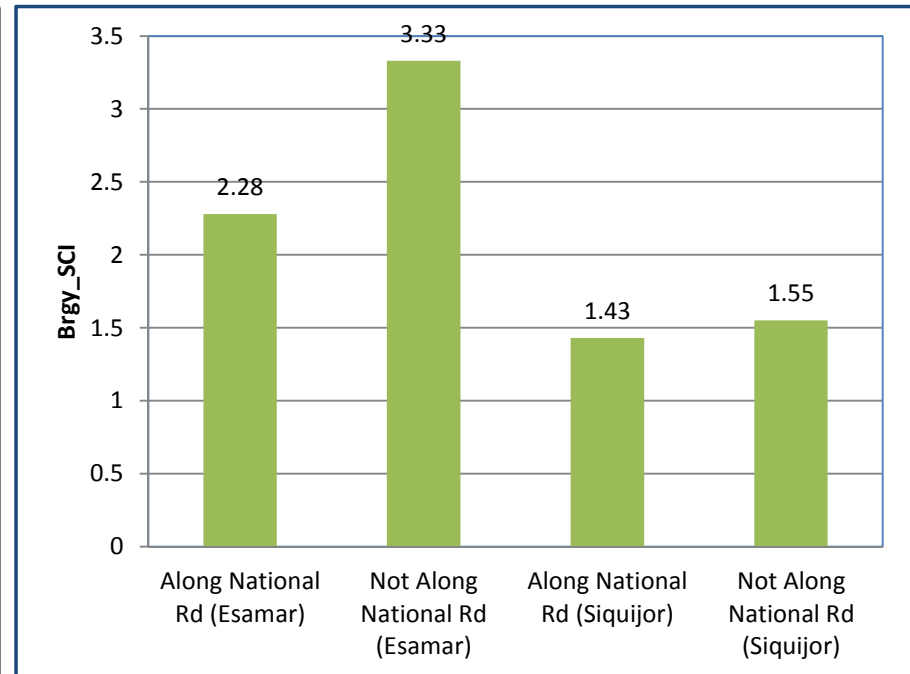
Figure 7.7 Comparison of average barangay SCI values with respect to the location of the barangay to the national road (x7)
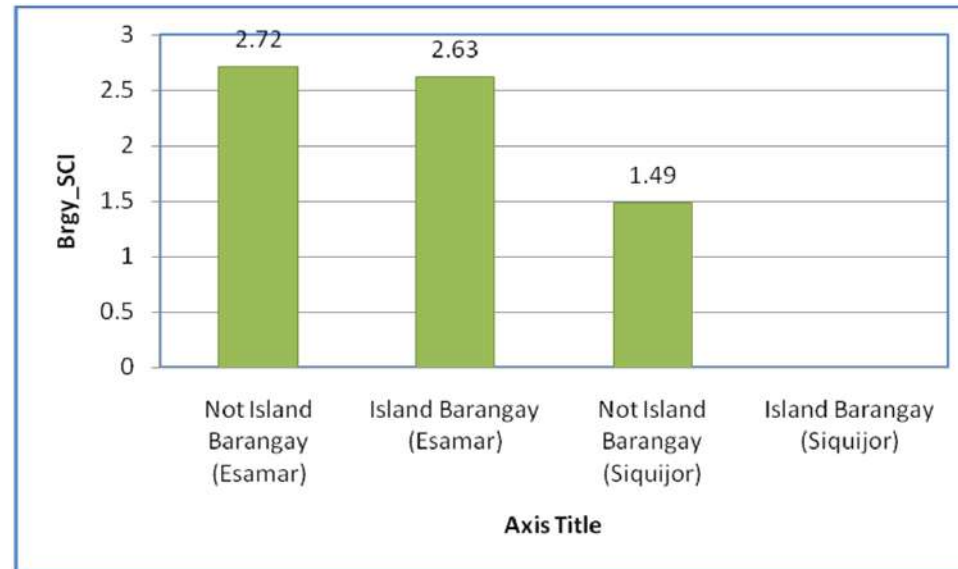
Figure 7.8 Island or not an island barangay SCI comparison between Eastern Samar and Siquijor (x9)

Table 7.2 Other parameters that could be related to accessibility

Parameter	Eastern Samar		Siquijor	
	Population mean	Standard Deviation	Population mean	Standard Deviation
Number of hh with vehicles in the barangay (x_{10}, veh)	15.60	22.52	40.18	30.94
Number of hh with phone in the barangay (x_8, phones)	28.97	39.42	-	-
Number of hh with phone and computer in the barangay (x_{11}, no. of both phone and computer)	2.87	6.66	-	-

Pearson's correlation of variables for Eastern Samar

	BRGY_SCI	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
BRGY_SCI	1											
x_1	.1521	1										
x_2	.4022	.1828	1									
x_3	.5031	.2917	.7366	1								
x_4	.3296	.1396	.9388	.7080	1							
x_5	.4400	.2162	.8197	.8479	.8427	1						
x_6	-.4409	.0471	-.3452	-.2900	-.3348	-.2253	1					
x_7	-.5032	-.1646	-.5406	-.5706	-.5228	-.4879	.4954	1				
x_8	-.5000	-.0882	-.3158	-.3493	-.2940	-.3310	.2825	.4298	1			
x_9	-.0167	-.0516	.2685	.0407	.3559	.2103	-.1287	-.2349	-.0299	1		
x_{10}	-.4048	-.1016	-.2127	-.2640	-.1742	-.2446	.1474	.2872	.8667	.0574	1	
x_{11}	-.4064	-.0626	-.2052	-.2282	-.1978	-.2807	.2409	.2780	.8421	-.0680	.7881	1

Pearson's correlation of variables for Siquijor

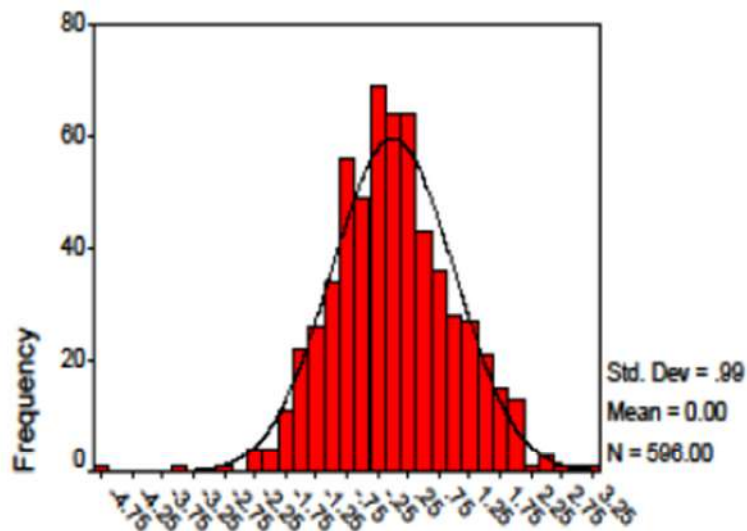|	BRGY_SCI	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_{11}
BRGY_SCI	1								
x_1	.1907	1							
x_2	.2709	.4839	1						
x_3	.3620	.2169	.3910	1					
x_4	.2176	.0107	.2648	.3081	1				
x_5	.4645	.0637	.4911	.6860	.4142	1			
x_6	-.2657	-.0174	-.1722	-.0962	-.3703	-.1426	1		
x_7	-.1237	-.2328	-.3598	-.1703	-.4997	-.1042	.2892	1	
x_{10}	-.4455	-.3251	-.4722	-.4229	-.3636	-.4611	.5071	.3515	1

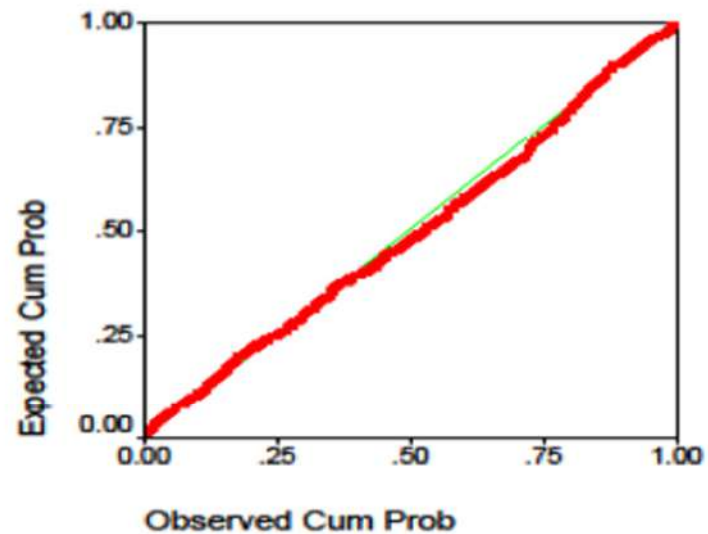Figure 7.15 Histogram of the residuals of Eq. (12)

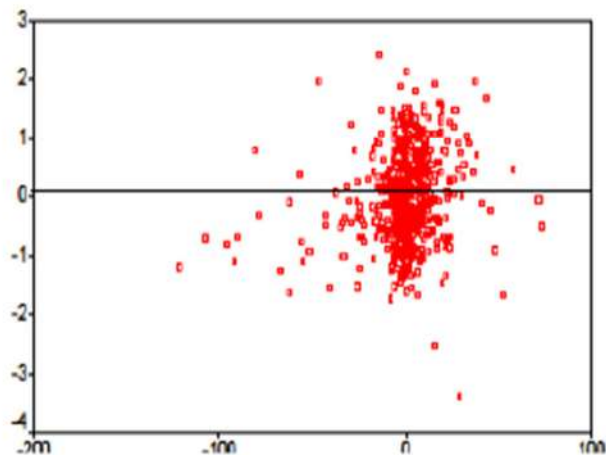Figure 7.16 Normal probability plot of the residuals of Eq. (12).

Figure 7.17 Partial regression plot of the regression residual with x_2
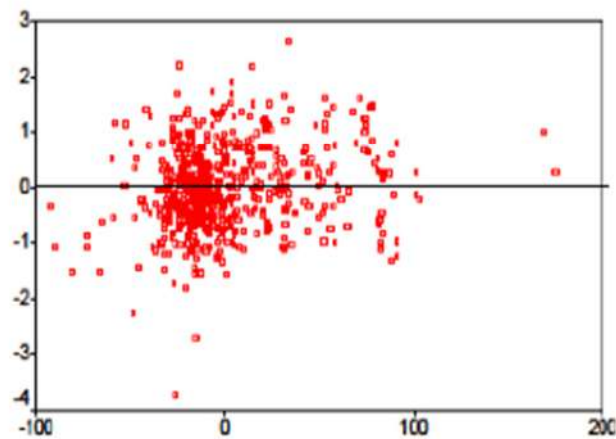

Figure 7.18 Partial regression plot of the regression residuals with x_5

Other indicators of poverty in the CBMS

povp_% - which is the percentage of household in the barangay level below the poverty threshold,
subp_% - which is the percentage of household in the barangay living below the food threshold, and
fshort_% - is the percentage of household in the barangay level that are experiencing food shortage.

Correlation of Poverty Indicators

Barangays in Eastern Samar

	SCI	povp_%	supb_%	fshort_%
SCI	1			
povp_%	0.784	1		
supb_%	0.763	0.968	1	
fshort_%	0.502	0.222	0.214	1

Barangays in Siquijor

	SCI	povp_%	subp_%	fshort_%
SCI	1			
povp_%	0.874	1		
subp_%	0.875	0.962	1	
fshort_%	0.316	0.134	0.102	1

Summary of regression models developed relating poverty and accessibility in the *barangay* level

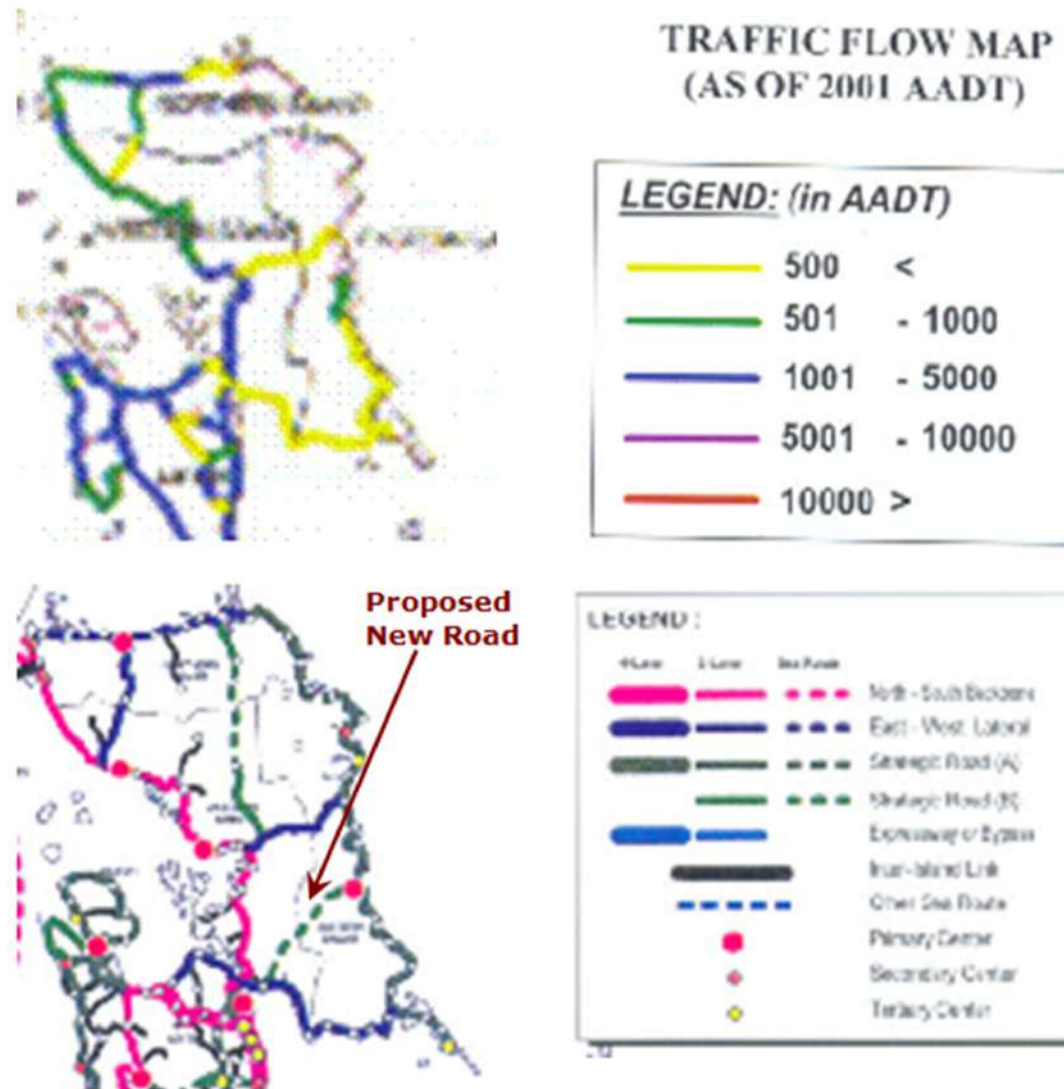| Eq. No.	Regression Models	R^2
	Eastern Samar Models	
12	$SCI = 3.0040 + 0.0073x_2 + 0.0022x_3 - 0.0102x_4 + 0.0040x_5 - 0.5952x_6 - 0.3047x_7 - 0.0072x_8$	0.486
14	$SCI = 2.2581 + 0.1579 \ln x_2 + 0.1307 \ln x_3 - 0.1792 \ln x_4 + 0.1592 \ln x_5 - 0.2865 x_7 - 0.4781 x_6 - 0.0063 x_8$	0.447
15 or 16	$SCI = x_5^{0.0712} \cdot e^{\left(0.9491 - 0.1936 x_6 - 0.0535 x_8^{\left(\frac{1}{2}\right)}\right)}$	0.463
17	$povp\_\% = 78.0578 - 0.0565x_4 + 0.0604x_5 - 18.9906x_6 - 4.6689x_7 - 0.1820x_8$	0.448
	Siquijor Models	
13	$SCI = 0.9755 + 0.0197x_1 + 0.0277x_5 - 0.4110x_6$	0.282
18	$povp\_\% = 22.194 + 0.837 x_1 + 1.201 x_5 - 17.519 x_6$	0.260
	Integrated Models	
19	$SCI = 2.5167 + 0.0094x_{22} + 0.0029x_{23} - 0.0107x_{24} + 0.0049x_{25} - 0.5198x_{26} - 0.0130x_{20}$	0.464
20 or 21	$SCI = x_{22}^{0.0622} \cdot x_{23}^{0.0604} \cdot x_{24}^{-0.0717} \cdot x_{25}^{0.1416} \cdot e^{\left(0.4198 - 0.2210 x_{26} - 0.0546 x_{20}^{0.5}\right)}$	0.463
22	$SCI = x_{25}^{0.1716} \cdot e^{\left(0.4984 - 0.2185 x_{26} - 0.0588 x_{20}^{0.5}\right)}$	0.448
23	$povp\_\% = 70.542 - 0.380 x_{20} + 0.061 x_{25} - 16.547 x_{26}$	0.404
24	$povp\_\% = 65.585 - 3.955 x_{20}^{\wedge 1/2} + 4.302 \ln x_{25} - 12.992 x_{26}$	0.453

POLICY APPLICATIONS

- **Road Improvement in Eastern Samar**
- **Consolidation of Hospitals in Eastern Samar**
- **Elementary School in Every Barangay in Siquijor**

Estimated the impact of these policies/programs on poverty levels through the developed equations of poverty and accessibility

A. Road Improvement in Eastern Samar

TRAFFIC FLOW MAP
(AS OF 2001 AADT)

LEGEND: (in AADT)

500	<
501	- 1000
1001	- 5000
5001	- 10000
10000	>

Proposed New Road

LEGEND:

Source: DPWH, 2005

Figure 8.1 Proposed road development plan for Eastern Samar (DPWH, 2005)

- Using Eq. (22) to estimate the impact of road development on poverty through access to major economic centers (x_{25}) in Eastern Samar.
- Since $x_{26} = 0$ (the barangays affect are not poblacion barangays and $x_{20} = 0$, there is no household with vehicles in each of the hinterland barangay affected
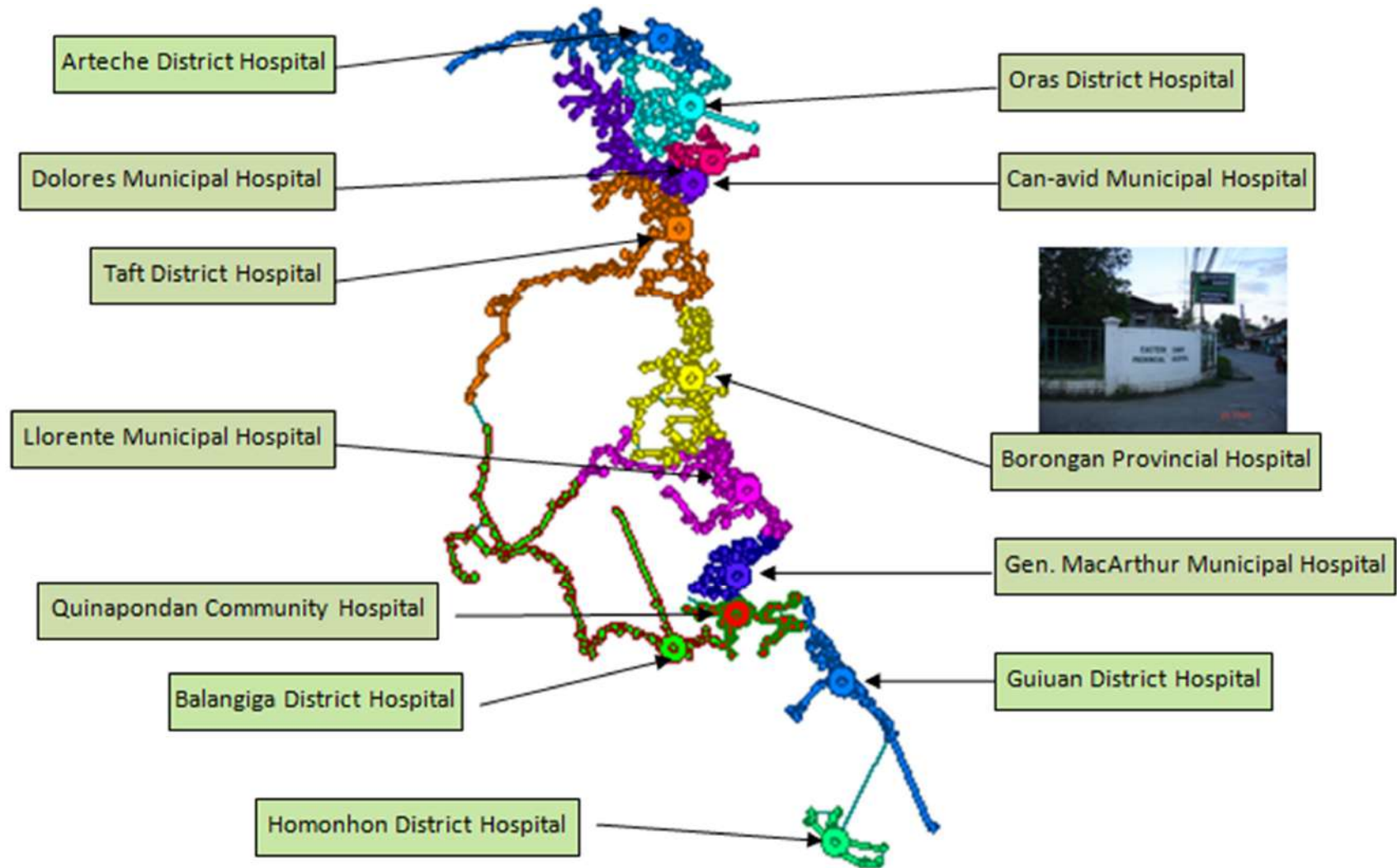
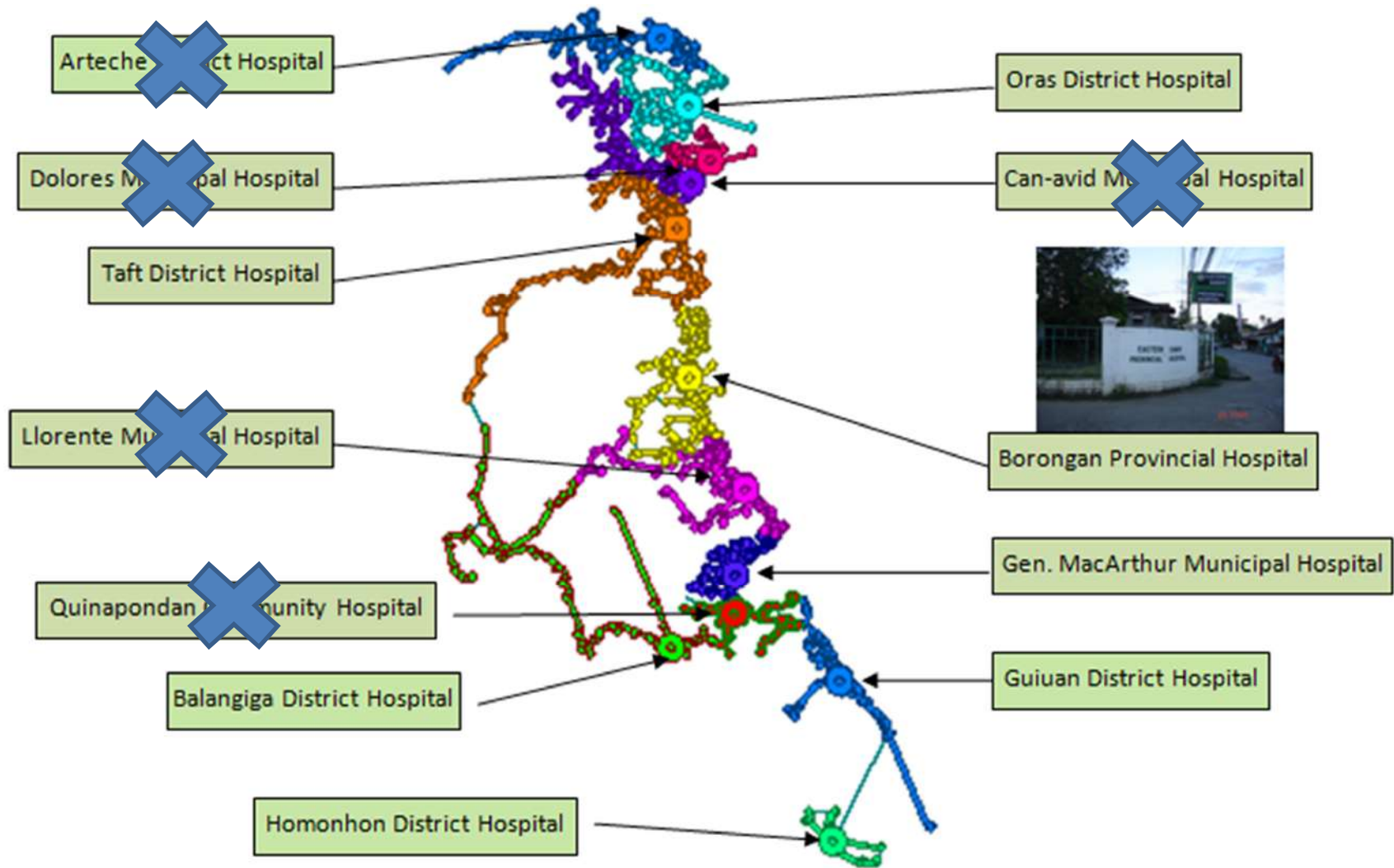$$SCI = x_{25}^{0.1716} \cdot e^{(0.4984 - 0.2185x_{26} - 0.0588x_{20}^{0.5})}$$

Table 8.2 Impact of road development on poverty through access to major economic markets in Eastern Samar using Eq. (22)

Barangays in Borongan	SCI Values due to access to major economic markets (x_{25})		Difference in SCI values
	Before road development	After road development	
Pinanag-an	3.799	3.517	0.282
Campesao	2.293	2.277	0.016
San Gabriel	3.138	2.973	0.165
San Juan	3.104	2.994	0.110
Sohutan	2.657	2.502	0.155
Surok	2.962	2.931	0.031
Total	17.953	17.194	0.759
Average	2.992	2.866	0.127
% Decrease = [(Total SCI$_{before}$ − Total SCI$_{after}$)/Total SCI$_{before}$] x 100 = 4.23 %			

- total aggregated decrease in the SCI values (due to access to major economic markets only) in all six towns totaled 0.759 (4.23%).

B. Consolidation of Hospitals in Eastern Samar

Arteche [District] Hospital

Oras District Hospital

Dolores M[unicipal] Hospital

Can-avid M[unicipal] Hospital

Taft District Hospital

Borongan Provincial Hospital

Llorente Mu[nicipal] Hospital

Quinapondan C[ommunity] Hospital

Gen. MacArthur Municipal Hospital

Balangiga District Hospital

Guiuan District Hospital

Homonhon District Hospital

- Proposed to close 5 of the 12 hospital in the province of Samar

Table 8.3 Impact of hospital consolidation in Eastern Samar on poverty

Municipality	Impact of travel time to the nearest hospital on poverty through the SCI variable		Change in SCI
	Current Available Hospitals	With Hospital Consolidation	
Arteche	0.60	0.76	- 0.16
Balangiga	0.44	0.44	0.00
Balangkayan	0.53	0.63	- 0.10
Borongan	0.47	0.47	0.00
Can-avid	0.50	0.62	- 0.12
Dolores	0.53	0.68	- 0.15
Gen. Macarthur	0.50	0.50	0.00
Giporlos	0.51	0.59	- 0.08
Guiuan	0.40	0.40	0.00
Hernani	0.56	0.58	- 0.02
Jipapad	0.92	0.94	- 0.02
Lawaan	0.54	0.54	0.00
Llorente	0.32	0.66	- 0.34
Maslog	0.90	0.91	- 0.01
Maydolong	0.63	0.64	- 0.01
Mercedes	0.45	0.45	0.00
Oras	0.59	0.60	- 0.01
Quinapondan	0.40	0.56	- 0.16
Salcedo	0.57	0.58	- 0.01
San Julian	0.57	0.57	0.00
San Policarpio	0.52	0.55	- 0.03
Sulat	0.56	0.56	0.00
Taft	0.43	0.43	0.00
Total	12.44	13.66	- 1.22
Average	0.54	0.59	- 0.05
% Decrease = [(Total SCI_{before} − Total SCI_{after})/Total SCI_{before}] x 100 = -9.81%			

$$SCI = 2.2581 + 0.1579 \ln x_2 + 0.1307 \ln x_3 - 0.1792 \ln x_4 + 0.1592 \ln x_5 - 0.2865\, x_7 - 0.4781\, x_6 - 0.0063\, x_8$$

- the potential effect of the consolidation of hospitals in Eastern Samar from the current 12 hospitals to the proposed consolidated seven hospitals would be a 9.81% increase in the poverty level of the province through the *SCI* parameter (due to access to hospitals only)

C. Elementary School in Every Barangay in Siquijor

Table 8.4 Existing number of barangays with elementary schools in Siquijor

Municipality	With Elementary School Number (%)	Without Elementary School Number (%)	Total Number (%)
Enrique Villanueva	4 (28.6)	10 (71.4)	14 (100.0)
Larena	5 (21.7)	18 (78.3)	23 (100.0)
Lazi	14 (77.8)	4 (22.2)	18 (100.0)
Maria	11 (50.0)	11 (50.0	22 (100.0)
San Juan	9 (60.0)	6 (40.0)	15 (100.0)
Siquijor	15 (35.7)	27 (64.3)	42 (100.0)
	58 (43.3)	76 (56.7)	134 (100.0)

Table 8.5 Impact of an elementary school in every barangay on poverty in Siquijor

Municipality	Impact of travel time to the nearest elementary schools on poverty through the SCI variable		Change in SCI
	Existing elementary schools	Elementary school in every barangay	
Enrique Villanueva	0.121	0.040	0.081
Larena	0.137	0.039	0.098
Lazi	0.042	0.025	0.017
Maria	0.146	0.083	0.063
San Juan	0.056	0.034	0.022
Siquijor	0.089	0.034	0.055
Total	0.591	0.255	0.336
Average	0.100	0.042	0.056
% Decrease = [(Total SCI_{before} − Total SCI_{after})/Total SCI_{before}] x 100 = 56.85%			

$$SCI = 0.9755 + 0.0197x_1 + 0.0277x_5 - 0.4110x_6$$

• By providing an elementary school in every barangay in Siquijor, the estimated effect on poverty through the SCI parameter would be an estimated aggregate total decrease of around 0.336.

• The decrease is 56.85% in the aggregate total of the SCI of all the barangays (due to access to elementary schools only) in the current situation

Poverty, Accessibility and Gender

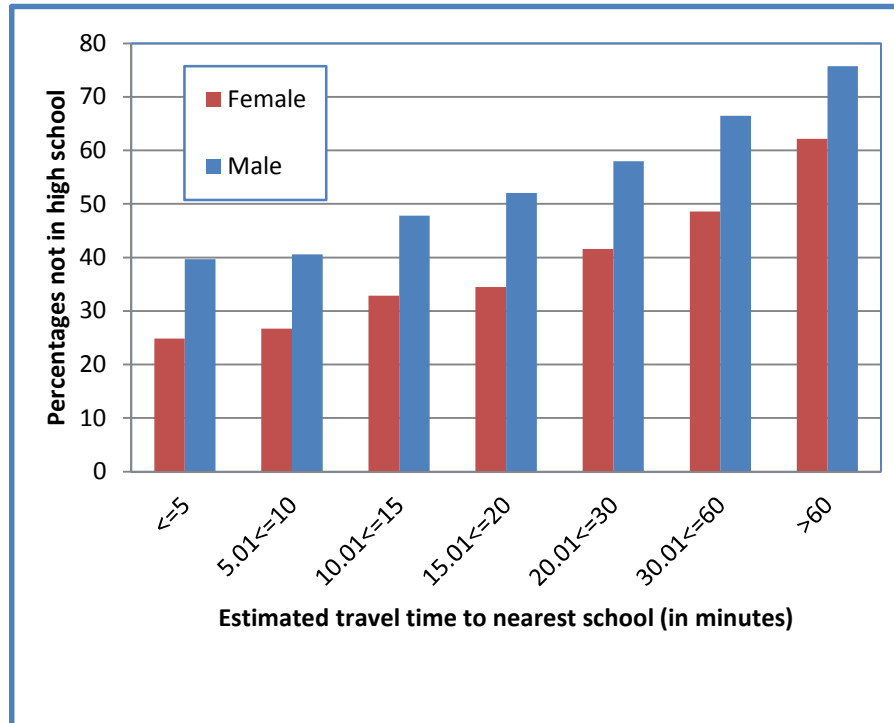# Relationship of poverty, accessibility and gender in Eastern Samar

Figure 7.27 Population percentages of males and females not in high school in Eastern Samar in relation to travel time to the nearest high school location
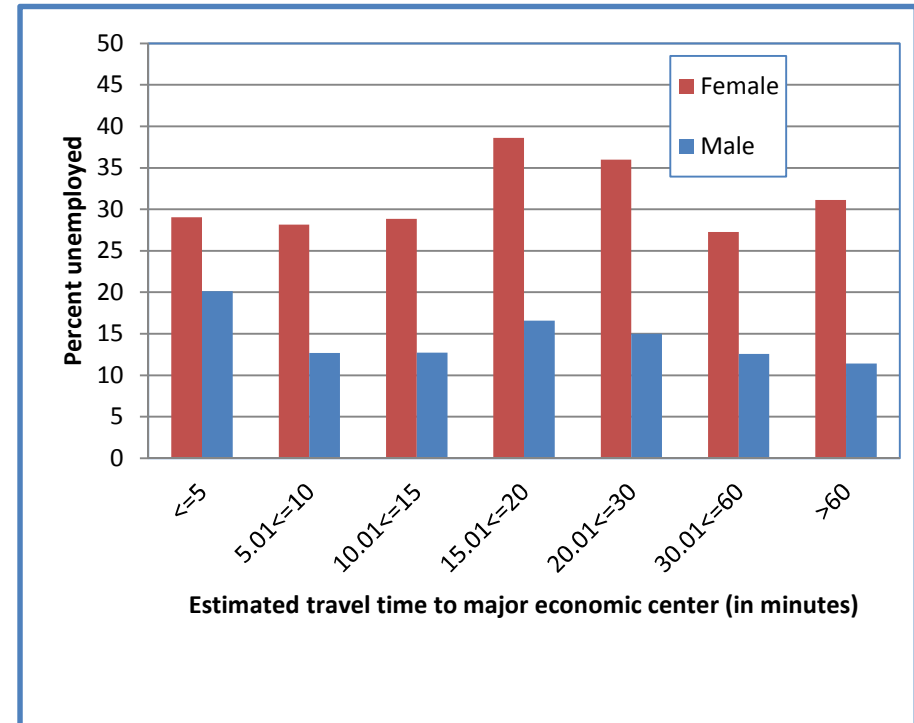
Figure 7.29 Population percentages of unemployed males and females in Eastern Samar in relation to the nearest major economic center

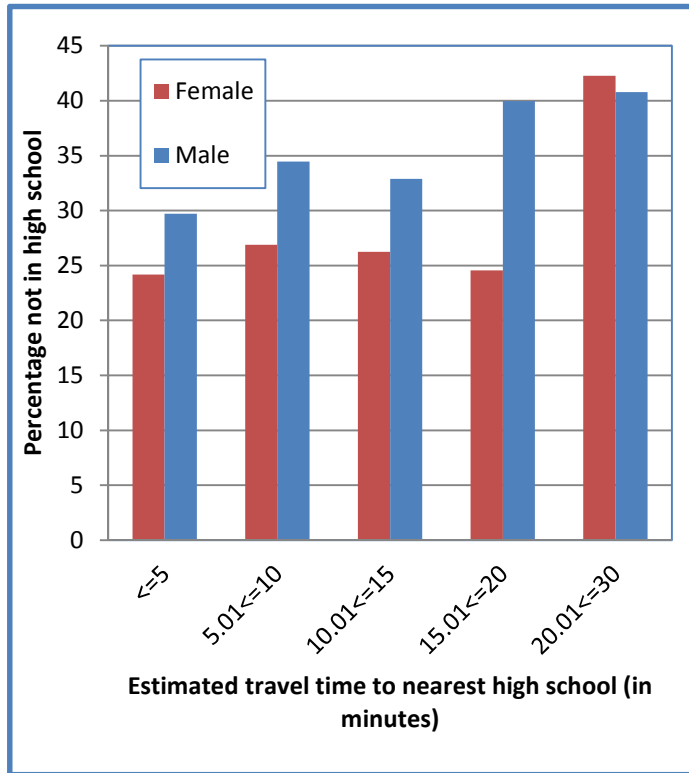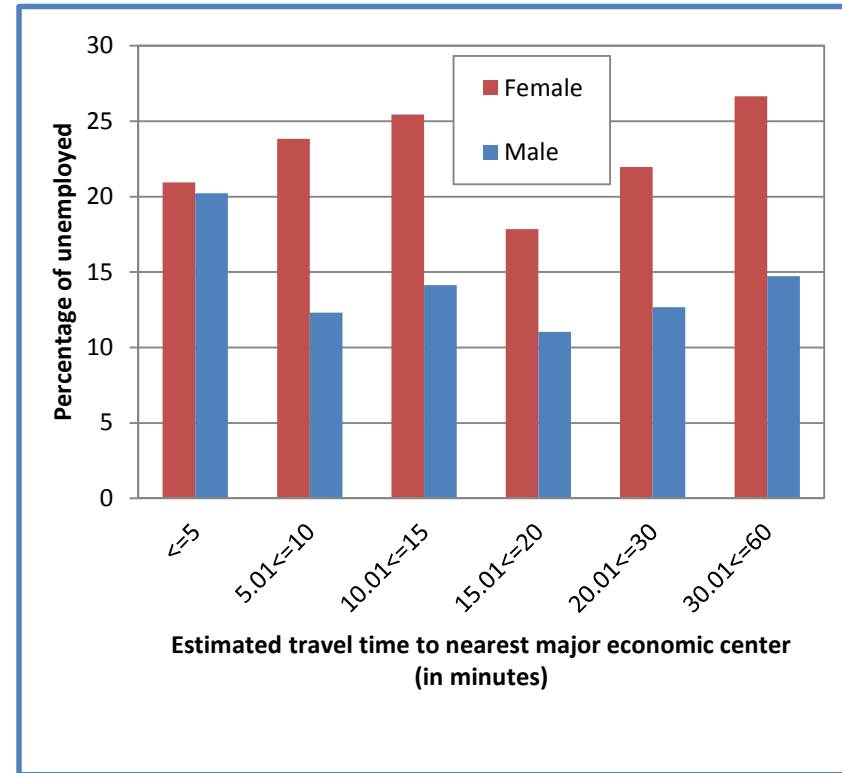# Relationship of poverty, accessibility and gender in Siquijor

Figure 7.31 Population percentages of males and females not in high school in Siquijor in relation to high school location

Figure 7.33 Population percentages of unemployed males and females in Siquijor in relation to the nearest major economic center

Summary of Findings and Conclusion

In the case of Eastern Samar, the important exogenous accessibility variables that could be related to poverty in the barangay level are
• the estimated travel time to a high school campus,
• the estimated travel time to the municipal center,
• the estimated travel time to a hospital,
• the estimated travel time to major markets in the province, and
• dummy variables
  - whether the barangay is a barangay in the poblacion or not and
  - whether the barangay is located along the national road or not.

• Proxy variables that could be related to accessibility
  - the no. of households with telephones in the barangay
  - the no. of households with vehicles in the barangay

Summary of Findings and Conclusion

In the case of Siquijor, the important exogenous accessibility variables that could be related to poverty in its barangays are

- the estimated travel time to an elementary school campus,
- the estimated travel time to the major economic centers, and
- the dummy variable - whether the barangay is a barangay in the poblacion or not.

Summary of Findings and Conclusion

• The model fit represented by the multiple coefficient of determination (R^2) between poverty (SCI) and accessibility aggregated in the barangay level in all the models developed ranged from **0.448 to 0.486 for Eastern Samar** and is a bit lower in **Siquijor which ranged from 0.260 to 0.282**.

• The lower fit in Siquijor shows that a good network of roads connecting all the major social services and economic centers would reduce the relevance of accessibility in the poverty equation.

Summary of Findings and Conclusion

1. The most significant indicator of spatial accessibility that is highly correlated to other poverty indicators is access to the major economic centers in both provinces in terms of travel time.

   - The spatial assignment of markets is a strategic poverty alleviation measure

2. Regardless of access to schools more males are not in school than females. On the other hand, regardless of access to places of employment (i.e. town centers and major municipal markets), more females of working age are unemployed than males.

   - Children of school age, regardless of gender, should be given equal opportunity to study
   - Equal employment or livelihood opportunities to the youth of working age regardless of gender

Recommendations

1. The CBMS data was done at the household level. In order to conduct an accessibility analysis in the household level, the household locations have to be properly located in space in order to obtain accurate accessibility measures from the household going toward the points of destination of the members of the household.

2. In the measure of accessibility, only travel time from the barangay to the point of destination was used. It would also be interesting to obtain information about the cost of travel like how much fare is needed to go to a given destination. Considering the cost of travel in the accessibility measure and when cost is combined with travel time, a generalized measure of cost can be used to express accessibility.

Recommendations

The policy applications showed a clear link between poverty and accessibility using CBMS data, and more importantly, could be used to predict the impact of planned social infrastructures on poverty levels.

• This approach could be used in guiding periodic planning activities of local governments such as the forecasting and programming of social infrastructure and services at the sectoral level.

• Also applicable to the development of specific programs and projects by the private sector (e.g., aid agencies, non-government organizations), especially in relation to poverty alleviation and their appropriate site location.

Acknowledgment

THE END

Thank you for listening!