

COMPARING THE RELATIONSHIP BETWEEN SUSTAINABLE DEVELOPMENT INDICATORS AT HOUSEHOLDS AND TOWNSHIP LEVEL IN YANGON CITY, MYANMAR

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1. Introduction

Sustainable Development is the idea that was mentioned by Brundtland at “Our Common Future”⁽¹⁾ at 1987, and it involves three pillars, such as social, economic, and environmental sphere. The dimension of this idea is “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”, and this idea for development is necessary for not only developed countries but also developing countries. It is also necessary for Myanmar because Myanmar is proceeding development of government system, and at the same time, Myanmar has 5 ~ 8 % economic growth rate in recently years⁽²⁾. Under these political and economic growth, the Government of Myanmar designed “The Myanmar Sustainable Development Plan”⁽³⁾ to ensure the right balance between political, economic growth, and environmental protection. In order to proceed the sustainable development, it is necessary to comprehend the relationship between sustainable development contents in Myanmar.

United Nation defined the Sustainable Development Goals (SDGs) into 17 Goals and 169 targets from three pillars, and each targets have one or more indicators and total indicators are 232⁽⁴⁾. These indicators are calculated at national or township levels. However, some indicators seemed to be more relevant to households level, so the relevance of each indicators would be different between at national or township levels and households level.

In this research, it was focused on to calculate the relationship between sustainable development contents at township and households level in Myanmar, and compare the both of result. From these comparing the result, it will be discussed the difference of target level and which level is better to comprehend the relationship between sustainable development contents in Myanmar.

2. Survey method

2.1 Investigation method

In order to comprehend the relationship between sustainable development contents in Myanmar, it was used the Households Interview survey (HIS)⁽⁵⁾ in Yangon city, Myanmar. This survey was conducted to comprehend the state of urban development and collect the households data in Yangon city by Japan International Cooperation Agency (JICA). The detail of HIS is summarized in Table 1. In this survey, 10,069 households answered, and it was equal to 1.0 ~ 1.2 % of Yangon city population. The valid households number and population was 9,739 and 41,906. Others were not considerable because of lack for the data to calculate.

Table 1 Summary of detail of HIS

Method	Interview Survey
Term	22 Sep 2012 – 16 Nov 2012
Target	Households in Yangon City
Number of Sample	10,069 Households

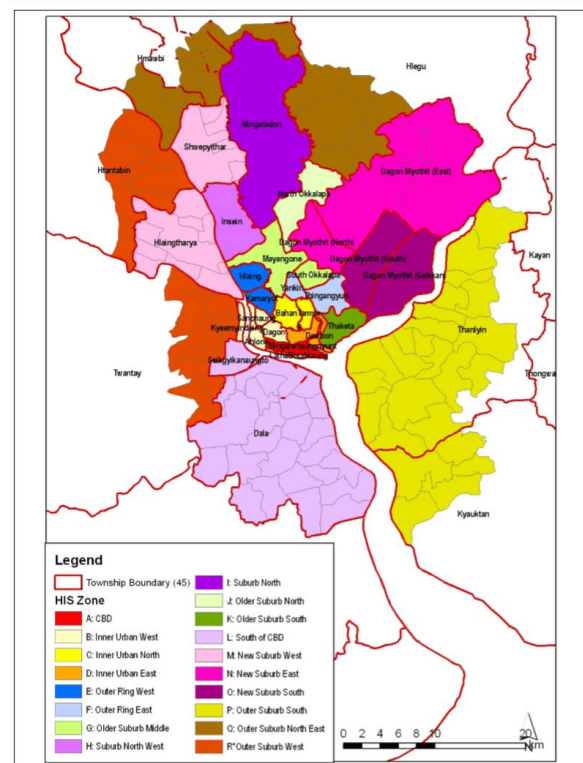
2.2 Township definition

HIS distinguished Yangon city into 18 township (HIS Zone) and they are defined based on the number of households. Each HIS Zone have 400 households to secure the confidence of sample size. The number of households and proportion of each HIS Zone is summarized in Table 2, and the distribution of HIS Zone was shown in Figure 1.

Table 2 HIS Zoning

HIS Zone	No. of the sample households	HIS Zone	No. of the sample households
A	495 (1.22 %)	J	571 (1.00 %)
B	546 (1.08 %)	K	431 (1.00 %)
C	556 (1.14 %)	L	380 (1.00 %)
D	411 (1.13 %)	M	1,123 (1.00 %)
E	397 (1.00 %)	N	596 (1.00 %)
F	492 (1.00 %)	O	805 (1.00 %)
G	675 (1.00 %)	P	700 (1.39 %)
H	533 (1.00 %)	Q	500 (1.70 %)
I	489 (1.00 %)	R	300 (2.08 %)

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Source: JICA Study Team

Figure 1 Distribution of HIS Zone

Table 3 The indicators to evaluate sustainable development in this research

Goal	Modified Indicator	Reference categories					
1	1.1.1 Proportion of households below the international poverty line (1.90\$ per a day)	Poverty households 197 (2.02 %)			Not poverty households 9,542 (97.98%)		
	1.2.1 Proportion of households below the national poverty line, average income (3.31\$ per a day)	Poverty households 623 (6.40 %)			Not poverty households 9,116 (93.60 %)		
	1.4.1 Proportion of households with access to 5 basic service aspects (0~5 points)	Electric	Safe water	Sewage	Telecom	Solid waste	Total Ave
		8,673 (89.05 %)	3,952 (40.58 %)	4,376 (44.93 %)	2,553 (26.21 %)	7177 (73.69 %)	2.70
	1.4.2 Proportion of households with secure tenure rights to land with legally recognized documentation	Land holder 6,397 (65.68 %)			Not land holder 3,342 (34.32 %)		
	1.5.1 Number of deaths and directly affected persons attributed to disaster based on townships	Death 54 (0.55 %)			Injury 81 (0.83%)		
2	2.3.2 Average income of food producers on every townships	Average food producer's income 269.42 US\$					
4	4.2.2 Participation rate in organized each learning stage	Primary 9,506 (97.60 %)		Middle 8,562 (87.91 %)		High 5,987 (61.47 %)	
6	6.1.1 Proportion of households using safely managed drinking water services	Safety 3,952 (40.58 %)			Unsafety 5,787 (59.42 %)		
	6.2.1 Proportion of households using safely managed sanitation services	Safety 4,856 (49.86 %)			Unsafety 4,883 (50.14 %)		
	6.3.1 Proportion of households whose wastewater safely treated	Safety 4,376 (44.93 %)			Unsafety 5,363 (55.07 %)		
7	7.1.1 Proportion of households with access to electricity	Accessed 8,673 (89.06 %)			Unaccessed 1,066 (10.94 %)		
8	8.5.2 Unemployment rate	Population over 18 years old 34,656 (82.70 %)			Population unemployment over 18 years old 13,886 (40.07 %)		
	8.7.1 Proportion of children aged 5-17 years engaged in child labor	Population 5-17 years old 7,527 (17.96 %)			Population of employment 5-17 years old 418 (5.55 %)		
9	9.c.1 Proportion of households covered by a mobile network	Covered 5,263 (54.04 %)			Not covered 4,476 (46.96 %)		
10	10.2.1 Proportion of households living below 50 per cent of median income	Under 50 % 3,806 (39.08 %)			Over 50 % 5,933 (60.92 %)		
11	11.1.1 Proportion of households living in adequate housing.	Adequate 5,591 (57.41 %)			Inadequate 4,148 (42.59 %)		
	11.2.1 Proportion of households that has convenient access to public transport	Convenient 7,157 (73.49 %)			Not convenient 2,582 (26.51 %)		
	11.5.1 Number of deaths and directly affected persons attributed to disaster based on townships	Death 54 (0.55 %)			Injury 81 (0.83%)		
	11.6.1 Proportion of households that solid waste is regularly collected and with adequate final discharge	Regularly collected 7,177 (73.69 %)			Not regularly collected 2,562 (26.31 %)		
	11.7.1 Proportion of households that has open space for public use for all in their neighborhood	Having open space 3,594 (36.90 %)			Not having open space 6,145 (63.10 %)		
13	13.1 Number of deaths and directly affected persons attributed to disaster based on townships	Death 54 (0.55 %)			Injury 81 (0.83%)		
	13.3.1 Proportion of households that has educated mitigation, adaptation, impact reduction and early warning into primary, secondary, and tertiary education.	Educated 8,408 (86.33 %)			Uneducated 1,331 (13.67 %)		
17	17.8.1 Proportion of individuals using the Internet	Provided 896 (9.20 %)			Unprovided 8,843 (91.80 %)		

The percentage of (1.5.1), (11.5.1), and (13.1) are calculated based on the total households numbers.

2.3 Relation of the SDGs to the HIS

As it was mentioned above, the sustainable development involves three spheres, such as social, economic, and environmental sphere. United Nation defined the Sustainable Development Goals (SDGs) into 17 Goals and 169 targets from three pillars, and each targets have one or more indicators and total indicators are 232⁽⁴⁾. In this research, in order to calculate the relationship between sustainable development contents by using HIS data, 11 Goals and 23 indicators were selected that were related to HIS contents, and other indicators were removed that were not related to the households divisions, such as the amount of government expenditure for water-and sanitation- related official development assistance, or the number of local governments that adopt and implement local strategies for reduction of disaster risk. The used indicators to calculate the relationship and the reference categories are summarized in Table 3. In the selected indicators, some indicators, such as (1.4.1), (1.5.1), (4.2.2), (11.1.1), (11.5.1), (13.1), and (13.3.1), were modified the definition of indicators in order to estimate the state of sustainable development in Yangan city by HIS data. Also, (6.3.1), (11.6.1), and (11.7.1), that were focused on the proportion of the amount of wastewater, the proportion of collected solid waste appropriately, and the proportion of open space in one town, were altered into the proportion of households that treated wastewater safely, the proportion of households whose solid

waste were collected regularly, and the proportion of households have open space closely. (1.5.1), (11.5.1), and (13.1) were used same indicators. (1.4.1) was indicators for the house adequate levels and it was composed that the access to electric, safe water, sewage, telecom, and solid waste collection. The access to electric, safe water, sewage, and solid waste collection were equal to (7.1.1), (6.1.1), (6.3.1), and (11.6.1).

2.4 Method to calculate the relationship

In order to evaluate the relationship between every indicators, it was calculated by Pearson product-moment correlation coefficient. Based on the relationship of indicators, the correlation coefficient is able to become positive or negative. The degree of relationship with correlation coefficient are distributed from strong positive relationship, positive relationship, weak positive relationship, none relationship, weak relationship, negative relationship, to strong negative relationship. The strong positive relationship is from +0.71 to +1.00, the positive relationship is from +0.41 to +0.70, the weak positive relationship is from +0.21 to +0.40, the none relationship is from -0.20 to +0.20, the weak relationship is from -0.40 to -0.21, the negative relationship is from -0.70 to -0.41, and the strong negative relationship is from -1.00 to -0.71.

Table 5 Results of correlation coefficient at Households levels

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w			
a (1.1.1)	1.00																									
b (1.2.1)	0.55	1.00																								
c (1.4.1)	-0.05	-0.15	1.00																							
d (1.4.2)	-0.01	0.01	-0.19	1.00																						
e (1.5.1)	0.00	0.00	-0.03	0.01	1.00																					
f (2.3.2)	0.01	0.00	-0.03	0.00	0.80	1.00																				
g (4.2.2)	0.01	0.03	-0.32	0.14	-0.01	-0.01	1.00																			
h (6.1.1)	-0.13	-0.21	0.41	-0.02	0.00	-0.01	-0.13	1.00																		
i (6.2.1)	-0.03	-0.08	0.71	-0.17	-0.01	-0.01	-0.18	0.25	1.00																	
j (6.3.1)	-0.03	-0.08	0.54	-0.10	-0.01	-0.01	-0.18	0.25	0.36	1.00																
k (7.1.1)	-0.01	-0.08	0.74	-0.13	-0.03	-0.03	-0.19	0.27	0.40	0.51	1.00															
l (8.5.2)	-0.07	-0.17	0.58	-0.05	0.00	-0.01	-0.32	0.35	0.26	0.26	0.27	1.00														
m (8.7.1)	-0.01	-0.02	0.02	0.03	0.00	0.00	-0.02	0.07	0.01	0.03	0.01	0.04	1.00													
n (9.e.1)	-0.01	0.00	-0.17	-0.01	0.00	0.00	0.07	-0.15	-0.09	-0.11	-0.17	-0.17	-0.05	1.00												
o (10.2.1)	-0.08	-0.17	0.41	-0.04	-0.03	-0.04	-0.12	0.39	0.26	0.27	0.28	0.29	0.01	-0.14	1.00											
p (11.1.1)	0.18	0.33	-0.29	0.03	0.00	0.01	0.06	-0.31	-0.17	-0.18	-0.19	-0.20	-0.02	0.07	-0.35	1.00										
q (11.2.1)	-0.05	-0.14	0.47	-0.07	0.01	-0.01	-0.11	0.34	0.29	0.34	0.35	0.30	0.01	-0.14	0.37	-0.27	1.00									
r (11.5.1)	0.01	0.00	0.05	-0.01	0.01	0.01	-0.03	0.00	0.02	0.04	0.04	0.05	0.01	-0.02	0.00	0.00	-0.01	1.00								
s (11.6.1)	0.00	0.00	-0.01	0.01	0.14	0.11	0.00	0.01	-0.01	0.01	-0.01	0.00	0.01	0.00	-0.01	-0.01	0.01	0.01	1.00							
t (11.7.1)	0.00	0.00	-0.01	0.01	0.14	0.11	0.00	0.01	-0.01	0.01	-0.01	0.00	0.01	0.00	-0.01	-0.01	0.01	0.01	1.00	1.00						
u (13.1)	-0.05	-0.12	0.69	-0.16	-0.04	-0.04	-0.33	0.28	0.33	0.33	0.36	0.44	0.02	-0.13	0.25	-0.20	0.27	0.07	-0.02	-0.02	1.00					
v (13.3.1)	-0.01	-0.02	0.07	-0.06	-0.01	-0.02	0.01	0.04	0.09	0.05	0.03	0.00	-0.01	-0.01	0.05	-0.05	0.04	0.01	-0.01	-0.01	0.05	1.00				
w (17.8.1)	0.00	0.00	-0.01	0.01	0.14	0.11	0.00	0.01	-0.01	0.01	-0.01	0.00	0.01	0.00	-0.01	-0.01	0.01	0.01	1.00	1.00	-0.02	-0.01	1.00			
x (17.8.1)	0.00	0.00	-0.01	0.01	0.14	0.11	0.00	0.01	-0.01	0.01	-0.01	0.00	0.01	0.00	-0.01	-0.01	0.01	0.01	1.00	1.00	-0.02	-0.01	1.00			
y (17.8.1)	-0.04	-0.07	0.23	-0.05	-0.01	-0.01	-0.14	0.14	0.12	0.15	0.15	0.21	0.01	-0.06	0.12	-0.07	0.11	-0.02	-0.03	-0.03	0.22	0.01	-0.03	-0.03	1.00	
z (17.8.1)	-0.02	-0.06	0.27	-0.04	-0.02	-0.02	-0.07	0.20	0.18	0.17	0.19	0.11	0.00	-0.06	0.28	-0.19	0.22	0.00	0.00	0.00	0.14	0.06	0.00	0.00	0.04	1.00

Table 6 Results of correlation coefficient at HIS Zone levels

	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w			
a (1.1.1)	1.00																									
b (1.2.1)	0.92	1.00																								
c (1.4.1)	-0.21	-0.54	1.00																							
d (1.4.2)	0.41	0.59	-0.57	1.00																						
e (1.5.1)	0.13	0.29	-0.32	0.26	1.00																					
	0.12	0.28	-0.30	0.19	0.98	1.00																				
f (2.3.2)	-0.23	-0.20	0.00	-0.28	-0.04	-0.13	1.00																			
g (4.2.2)	-0.69	-0.88	0.69	-0.77	-0.26	-0.25	0.28	1.00																		
h (6.1.1)	-0.44	-0.63	0.68	-0.78	-0.23	-0.21	0.28	0.86	1.00																	
i (6.2.1)	-0.52	-0.71	0.77	-0.79	-0.21	-0.16	0.06	0.90	0.90	1.00																
j (6.3.1)	-0.52	-0.74	0.74	-0.82	-0.25	-0.22	0.23	0.95	0.90	0.96	1.00															
k (7.1.1)	-0.83	-0.94	0.73	-0.72	-0.31	-0.28	0.19	0.91	0.73	0.81	0.84	1.00														
l (8.5.2)	-0.57	-0.59	0.30	-0.48	0.24	0.22	0.06	0.63	0.53	0.65	0.63	0.70	1.00													
m (8.7.1)	0.62	0.79	-0.68	0.77	0.21	0.19	-0.21	-0.94	-0.83	-0.90	-0.93	-0.91	-0.76	1.00												
n (9.e.1)	-0.64	-0.83	0.75	-0.83	-0.26	-0.25	0.26	0.98	0.88	0.94	0.97	0.91	0.65	-0.95	1.00											
o (10.2.1)	0.67	0.87	-0.70	0.73	0.28	0.28	-0.24	-0.97	-0.84	-0.87	-0.90	-0.86	-0.53	0.85	-0.95	1.00										
p (11.1.1)	-0.50	-0.73	0.69	-0.80	-0.10	-0.10	0.30	0.94	0.85	0.88	0.95	0.77	0.57	-0.87	0.94	-0.93	1.00									
q (11.2.1)	-0.42	-0.48	0.03	-0.28	0.20	0.12	0.05	0.49	0.35	0.38	0.40	0.44	0.65	-0.49	0.48	-0.47	0.50	1.00								
r (11.5.1)	0.13	0.29	-0.32	0.26	1.00	0.98	-0.04	-0.26	-0.23	-0.21	-0.25	-0.31	0.24	0.21	-0.26	0.28	-0.10	0.20	1.00							
	0.12	0.28	-0.30	0.19	0.98	1.00	-0.13	-0.25	-0.21	-0.16	-0.22	-0.28	0.22	0.19	-0.25	0.28	-0.10	0.12	0.98	1.00						
s (11.6.1)	-0.78	-0.90	0.63	-0.75	-0.38	-0.34	0.18	0.91	0.77	0.84	0.86	0.97	0.66	-0.92	0.92	-0.85	0.77	0.40	-0.38	-0.34	1.00					
t (11.7.1)	0.04	-0.08	0.06	-0.45	-0.26	-0.31	0.31	0.22	0.34	0.18	0.24	0.13	0.07	-0.22	0.28	-0.24	0.30	0.54	-0.26	-0.31	0.18	1.00				
u (13.1)	0.13	0.29	-0.32	0.26	1.00	0.98	-0.04	-0.26	-0.23	-0.21	-0.25	-0.31	0.24	0.21	-0.26	0.28	-0.10	0.20	1.00	0.98	-0.38	-0.26	1.00			
	0.12	0.28	-0.30	0.19	0.98	1.00	-0.13	-0.25	-0.21	-0.16	-0.22	-0.28	0.22	0.19	-0.25	0.28	-0.10	0.12	0.98	1.00	-0.34	-0.31	0.98	1.00		
v (13.3.1)	-0.84	-0.85	0.42	-0.55	-0.33	-0.28	0.12	0.75	0.56	0.68	0.70	0.87	0.58	-0.73	0.74	-0.69	0.57	0.23	-0.33	-0.28	0.88	-0.08	-0.33	-0.28	1.00	
w (17.8.1)	-0.32	-0.58	0.74	-0.85	-0.24	-0.23	0.38	0.87	0.85	0.84	0.91	0.69	0.46	-0.83	0.90	-0.85	0.94	0.37	-0.24	-0.23	0.70	0.42	-0.24	-0.23	0.43	1.00

3. Relation between each indicators

3.1 At HIS Zone levels

The relevance of each indicators at households levels was calculated by Pearson product-moment correlation coefficient, and they are summarized in Table 5. At households levels, almost of relationship between each indicators were none relationship. It would be said that the difference of attainment level in each indicator were disconnected in each households, and the influences of one indicator to other sustainable development attainment level are not shown at households level.

3.2 At HIS Zone levels

The relevance of each indicators at HIS Zone level was calculated by Pearson product-moment correlation coefficient, and they are summarized in Table 6. At HIS Zone level, there were a lot of strong positive or negative relationships. Especially, indicators for social condition, such as (6.1.1), (6.2.1), (6.3.1), (7.1.1), (11.1.1), and (11.6.1), had more than eight strong positive or negative relationship between other indicators. It seems that how each social condition were improved in one HIS Zone were same. Also, (4.2.2) were very related to the indicators for the social conditions. It would mean that the higher or lower education attainment level have influences to the improvement of social conditions. In the relationship without social indicators, damage of disaster, such as (1.5.1), (11.5.1), and (13.1), didn't have strong positive or negative relationship with other indicators. It can be said that damage of disaster don't have influence to other sustainable development improvement, and damage of disaster can be happened to all people. At last, (9.c.1) and (10.2.1) have strong negative relationship more than ten. It seems that the proportion in one HIS Zone, such as the proportion that households have children who engaged in labor, or the proportion that households income is above the national median, reflects the sustainable development improvement in one HIS Zone. Although (1.1.1) and (1.2.1) also shows the relationship between economy and other sustainable development improvement, (10.2.1), as median income, was stronger relationship than (1.1.1) and (1.2.1) between other sustainable development improvement.

Thus, from the relationship that mentioned above, it can be said that relationship between each indicators were shown at HIS Zone level. It would be thought that this is because the tendency of sustainable development improvement in each households were integrated and most distinguished features are remained at HIS Zone level.

4. Conclusion

The relevance between each modified SDGs indicators were calculated at households level and HIS Zone level. At households level, the relationship between each indicators were not shown in Pearson product-moment correlation coefficient, because the tendency of sustainable development improvement was disconnected in each households. On the other hand, the relationship between each indicators in HIS Zone level were shown in the Pearson product-moment correlation coefficient. This is because the tendency of sustainable development improvement in each households were integrated and most distinguished features were remained at HIS Zone level. Therefore, it is better to comprehend the relationship between sustainable contents at township level than at households level.

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