CHAPTER 3

ANALYSIS FACTOR FOR ESTABLISHING
BIO-WASTE TO ENERGY PROJECT

This chapter aims to analysis factor of waste management behavior and implementation for enhance waste management plan and appropriate operational system with harmonize to community cooperation network for Bio-waste separation at source for energy production, are also studied by classifying type of city such as Agricultural city, Industrial city, Tourist attraction and Service city and Commercial city. The results are used to creation of Model for enhancing waste management behavior and management plan with harmonizes to community cooperation network for Bio-waste separation at source to energy production.

The Interdisciplinary Research Approach is applied for investigation such as (1) Documentary research step, study for created criteria to decided target study area in survey research and classified by type of city such as agriculture city, industrial city, tourism city and commercial city. (2) Survey research step, study primary data by used questionnaire with people in target study area which selected. Scope of study in overview i.e. (1) Collection primary data on target site selected as representative of Thailand model, classified by 4 types of city i.e. agricultural, industrial, tourist attraction and commercial. (2) 1,600 cases were collected and divided in to 400 cases/type of city by 2 methods as letter questionnaire and interview. (3) Application the Binary Logistic Model for analysis of Behavior i.e. Bio-waste separation and acceptance of Bio-waste to energy project. The details of methodologies for this chapter are explained as following.

3.1 Scope of primary data collection

3.1.1 Determination for target study area

Study Sites are classified by type of city such as agricultural city, industrial city, tourism city and commercial city. These divided in to 2 groups by procedural of primary data collection such as door-stepping interviews and letter questionnaire and cover and as the best representative area of Thailand, detail as following,

Door-stepping interviews, collected by directly personal interviews followed questionnaire in decided area. The target area is purposive in Central and Eastern Region, because of that have a maximum waste volume is accumulated (5,499 tones per day in

2005)[3], shown in Table 2.1, and closely University. So, can be safe budget and time of study. The target areas are determined by many criteria and details will follow in sequence.

Letter questionnaire, data collected by questionnaires distributed to the residents and to respond. The collections ask for cooperation from the municipalities. Municipal offices as a coordinator to head local communities for distribute questionnaires to residents, reply and take back, sample size by the proportion method from overview.

3.1.1.1 Criteria and determination of target study area

(A) Door-stepping interview

The target area is purposive in outside Central and Eastern Region, fewer problems more (shown in Table 2.1). These so far from University, so letter covered interviews is suitable for collected primary data. The target areas are determined by prominent point that can indicated as a represent in each type of city (GPP: Gross Provincial Product) and details will follow in sequence.

Table 3.1: Amount of Thailand Municipal Solid Waste in 2004-2005 [27]

Area	Amount of Municipal Waste (tons per day)	
	2004	**2005**
1. Bangkok	9,356	8,291
2. Municipality area including Pattaya (1,156 locations)	12,500	12,635
2.1 Central and Eastern	**5,440**	**5,499**
2.2 Northern	*2,125*	*2,148*
2.3 Northeastern	*2,875*	*2,906*
2.4 Southern	*2,060*	*2,082*
3. Outside the municipality area	18,100	18,295
Total Country	**39,956**	**39,221**

Provincial Selection: Central and Eastern Regional is selected as a key target area of this method. It is consisted of 26 provinces, which are Bangkok, Samut Prakan, Samut Sakhon, Samut Songkhram, Nakhon pathom, Ratchaburi, Kanchanaburi, Phetchaburi, Prachuap khiri khan, Nakhon Nayok, Nonthaburi, Pathumthani, Pranakornsirayutthaya, Ang Thong, Singburi, Saraburi, Lopburi, Chainat, Suphanburi, Chachoengsao, Chonburi, Rayong,

Chanthaburi, Trat, Prachinburi, and Srakaeo as shown in Figure 3.1. Provincial selection criteria for target study area are consisted of 4 criteria as following.

First criteria, provinces are located in Central and Eastern Region except Bangkok and vicinity i.e. Samut Prakan, Samut Sakhon, Nonthaburi, Nakhon pathom, and Pathumthani as their boundary are closed to Bangkok; capital city of Thailand; is a center of all activities. Therefore, the population characteristic, urbanization, and activities in those cities are quite same as Bangkok of which result of study can not be representative of other.

So, there are only 20 provinces meaning these selection criteria that are Samut Songkhram, Ratchaburi, Kanchanaburi, Phetchaburi, Prachuap khiri khan, Nakhon Nayok, Pranakornsirayutthaya, Ang Thong, Singburi, Saraburi, Lopburi, Chainat, Suphanburi, Chachoengsao, Chonburi, Rayong, Chanthaburi, Trat, Prachinburi, and Srakaeo.

The second criteria, provinces have never had waste management pattern by using Bio-waste for power generating and using separator mill for separated waste before treatment. Therefore, Chon Buri and Rayong are excluded.

So, there are only 18 provinces meet this selection criteria that are Samut Songkhram, Ratchaburi, Kanchanaburi, Phetchaburi, Prachuap khiri khan, Pranakornsirayutthaya, Ang Thong, Singburi, Saraburi, Lopburi, Chainat, Suphanburi, Chachoengsao, Nakhon Nayok, Chanthaburi, Trat, Prachinburi, and Srakaeo.

The third criteria, provinces are located in 160 Km. radius from Bangkok as center. This figure (160 Km.) is a half of distance between Bangkok and Trad (315 Km. [28] that is the most far distance of Provinces with reference to location of King Mongkut's University of Technology Thonburi. This criteria is concerned with research's constrain (Budget and Time frame).

So, there are only 13 provinces met this selection criteria that are Samut Songkhram, Ratchaburi, Kanchanaburi, Phetchaburi, Pranakornsirayutthaya, Ang Thong, Singburi, Saraburi, Lopburi, Suphanburi, Chachoengsao, Nakhon Nayok, and Prachinburi.

The fourth criteria, there are indicators which clearly identify potential and characteristic of province 4 types: agricultural city, industrial city, tourist attraction & services city and commercial city (details in Table 2.2). Four indicators are as follows;

-Agricultural city indicator is gross provincial product (GPP) of agriculture sector. So province that has maximum GPP is Suphanburi Province.

-Industrial city indicator is gross provincial product (GPP) of industry sector. So province that has maximum GPP is Pranakornsirayutthaya Province.

-Tourist attractions and services city indicator is income from tourism activities. So province that has maximum tourism income is Phetchaburi Province.

- Commercial city is gross provincial product (GPP) of commerce sector (Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household Goods). So province that has maximum GPP is Kanchanaburi Province

City Selection: From above criteria, it can be specified that Pranakornsirayutthaya Province is representative of industrial city; Suphanburi Province is representative of agricultural city; Phetchaburi Province is representative of tourist attractions and services city and Kanchanaburi Province is representative of commercial city. Community selection criteria are as follows:

- Indicator for agricultural city is area for agricultural activities. In Suphanburi Province, the first rank district of agricultural area is Song Phi Nong District. The second rank is Muang District. Details are shown in Table 2.4. So municipalities which are located on Song Phi Nong District is selected i.e. Song Phi Nong and Thung Khoak Sub-District municipalities and located on Muang District is Tha-saded Sub-District municipalities

- Indicator for industrial city is a number of factories that are located on and a number of labors. The community where has maximum factories and labors is Bang Pa In District, Pranakornsirayutthaya province because it has 2 industrial estates; Bang Pa In and Banwha (Hi-tech) located on. Details are shown in Table 2.3. So Klong Jig, Ban Lane and Prain Tara Racha Sub-District municipalities are selected for study and followed area of factories is Wangnoi District, Lumtasoa Sub-District municipality is selected for study.

- Indicator for tourist attraction and services city is tourism income that is circulated in province. Due to statistical data of tourism income is recorded only Cha Um District [26] of Phetchaburi Province. However, tourism income of Cha Um District is more than total tourism income of Kanchanaburi Province; therefore, Cha Um municipality is selected for target study area.

- Indicator for commercial city is number of population in each area. Due to statistical data of population as showed in table 3.5 indicated to Muangkarn Disrict is

the first area that people living in. So Muangkarn Municipality is selected for target study area. Details and selection criteria for target study area are summarized in Table 2.6.

Table 3.2: Comparative Value of Gross Provincial Products (Million BTH) [29] and Tourism Income Distributed in Province 2006

Province	Distance from Bangkok (Kilometer) [28]	Agriculture sector [29]	Industrial & Manufacture sector [29]	Tourism: income [30]	Commerce sector [29]
Samut -Songkhram	72	1,020	66	334.95	3,171
Ratchaburi	100	13,800	26,537	463.84	10,194
Kanchanaburi	128	9,093	10,967	8,096.02	**12,721**
Phetchaburi	123	6,787	9,399	**8,235.65**	6,061
Pranakornsirayutthaya	76	5,590	**218,410**	5,118.30	9,978
Ang Thong	105	3,088	2,858	91.50	4,330
Sing Buri	142	3,201	4,937	228.50	3,807
Saraburi	107	6,554	67,930	2,140.84	9,677
Lopburi	153	8,660	23,565	2,768.31	8,612
Suphanburi	100	**16,450**	5,491	983.72	11,479
Chachoengsao	82	10,102	113,790	1,312.54	11,282
Nakhon -Nayok	107	3,289	1,002	1,685.99	3,439
Prachinburi	136	6,024	36,342	1,094.88	12,455
*Prachuap -Khiri Khan	281	-	-	-	-
*Srakaeo	237	-	-	-	-
*Chainat	194	-	-	-	-
*Chanthaburi	245	-	-	-	-
*Trat	315	-	-	-	-

*Provinces are located out of 160 Km. radius from Bangkok complying with item 2.3 of criteria

Table 3.3: Amount of Industrial's labor and factory in Pranakornsirayutthaya Province [31]

Industrial Estates	Districts	Year 2006		
		Amount	Capital (Million Bath)	Labors
Bang pa-in Industrial Estate	**Bang Pa In**	88	29,283.34	27,590
Banwha (Hi-tech) Industrial Estate	**Bang Pa In**	11	45,844.00	35,907
Saha-rathana-nakhorn Industrial Estate	Nakhon Luang	43	18,962.00	15.000
Factory land Wang noi Industrial OperationZone	Wang noi	73	9,827.41	4,957
Rojanha Industrial Park	Uthai	141	4,098.76	29,096
Outside Industrial Estate Factories		1,092	11,791.99	92,970
Total		**1,448**	**119,847.50**	**205,502**

Table 3.4: Agricultural Area in Suphanburi Province 2005 [31]

District	Area (Rai)						
	Rice farm	Fruit farm	Vegetable farm	Dry crop season	Short plant crop	Long plant crop	Total
Muang	373,291	15,183	1,621	175,173	539	1,500	567,307
Doem Bang Nang Buat	252,504	3,343	68	178,864	299	12,497	447,575
Dan Chang	2,480	7,397	1,144	0	41,217	98,355	150,593
Bang Pla Ma	356,080	1,640	460	105,850	20	0	464,050
Si Prachan	141,164	3,473	427	100,860	4,740	20	250,684
Don Chedi	144,957	2,270	2,200	60,240	2,410	16,930	229,007
Song Phi Nong	**355,187**	**305**	**1,712**	**194,382**	**0**	**189,840**	**741,426**
Sam Chuk	254,584	4,645	294	107,250	15	1,038	367,826
U-Thong	266,446	4,298	1,956	98,289	22,985	36,041	430,015
Nong Ya Sai	168,017	743	2,370	400	650	66,244	238,424
Total	**2,314,710**	**43,297**	**12,252**	**1,021,308**	**72,875**	**422,465**	**3,886,907**

Table 3.5: Number of population in Karnchanaburi, 2006 as classified by district [31]

District	In Municipality	Out Municipality	Total
Mueang Kanchanaburi	**46,748**	**110,778**	**157,526**
Tha Muang	21,289	81,681	102,970
Tha Maka	45,057	88,894	133,351
Phanom Thuan	9,791	42,096	51,887
Lao Khwan	4,700	50,581	55,281
Bo Phloi	9,441	44,652	54,093
Sai Yok	5,232	48,610	53,842
Thong Pha Phum	3,115	62,516	65,631
Si Sawat	935	23,746	24,681
Sangkhla Buri	3,187	39,394	42,581
Dan Makham Tia	2,461	30,003	32,464
Nong Prue	4,585	25,395	29,980
Huai Krachao	-	32,647	32,647
Total	**156,541**	**680,993**	**837,534**

Table 3.6: Details of criteria for selected Door-stepping interviews target

Criteria for selected	Level of area	Amount	Area
1. Waste volume (Regional level)	Region	26	*1-26
2. Provinces are located in Central and Eastern Region except Bangkok and vicinity	Province	20	*1,2,4,5,6,7,11,12,13,16,17,18,19, 20,21,22,23,24,25,26
3. Provinces have never had waste management pattern by using Bio-waste for power generating	Province	18	*1,2,4,5,6,7,11,12,13,16,17,18,19, 20,21,23,25,26
4. Distance from Bangkok	Province	13	*1,2,5,6,7,11,13,16,17,18,19,20,23
5. GPP and income from tourism activities	Province	3	Suphanburi, Pranakornsirayutthaya, Phetchaburi and Kanchanaburi Provinces
6. Agricultural areas	District	1	Song Pi Nong and Muang District, Suphanburi Province
7. Amount of Industrial's labor and factory	District	1	Bang Pa In and Wangnoi District, Pranakorn Sri Ayutthaya Province.
8. Income from tourism activities	District	1	Cha Um District, Petchaburi Province.
9. Number of population	District	1	Muangkarn District, Kanchanaburi Provinces

* 1. Ang Thong 2.Pranakornsirayutthaya 3.Bangkok 4.Chainat 5.Kanchanaburi 6.Lopburi
7.Nakhon Nayok 8.Nakhon Pathom 9.Nonthaburi 10.Pathumthani 11.Phetchaburi
12.Prachuap Khiri Khan 13.Ratchaburi 14.Samut Prakan 15.Samut Sakhon 16.Samut Songkhram
17.Saraburi 18.Sing Buri 19.Suphanburi 20.Chachoengsao 21.Chanthaburi 22.Chonburi
23.Prachinburi 24.Rayong 25.Srakaeo and 26.Trat

(B) Letter questionnaire

The target areas are outside Central and Eastern regions such as (1) Northeastern, (2) Northern and (3) Southern. These are determined by prominent point that can indicate as a represent in each type of city. The Gross Provincial Product (GPP) is used of all exception with tourist city that used income from tourism activities as criteria. The three top provinces in each region with the highest value of GPP for each branch are selected as representing each type of city (Table 2.7).

Provincial Selection: Provincial representatively, each regional will have 3 provinces can be representing each type of city. However, some provinces are listed in three primary branches, such as Nakornratcha-sirma, Khonkane and Suratthani Songkhla. Thus, for best representation area that should be select covered all regional and distributed in many province and one province can be represent as just a one type of city. For this study, selected 2 provinces in each branches as a representation area for primary surveyed. The detail of criteria and provincial selection that decided for representative in each type of city as follows,

-Agricultural Province has a gross provincial product (GPP) of agriculture sector is criteria and selected Suratthani in southern and Khonkane in Northeastern as provincial representative for primary surveyed

-Industrial Province has a gross provincial product (GPP) of industry sector (Manufacturing) is criteria and selected Songkhla in southern and Lamphun in Northern as provincial representative for primary surveyed

-Tourist Attractions and Services Province has income from tourism activities that is circulated in province is criteria and selected Phukhet in southern and Chaingmai in Northern as provincial representative for primary surveyed

- Commercial Province has a gross provincial product (GPP) of commerce sector (Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household Goods) is criteria and selected Nakhon ratchasrima in Northeastern and Nakhonsawan in Northern as provincial representative for primary surveyed

Conclusion for provincial selection: this consists of 8 provinces in 4 types of cities and distributed according to each regional, such as Northeastern 2 provinces, Northern 3 provinces and Southern 3 provinces.

Table 3.7: Gross Provincial Product and other in top three provinces in each region, 2006[29].

Criteria	Regional					
	Northeastern(Ne)		Northern(N)		Southern(s)	
	Province	Million baht	Province	Million baht	Province	Million baht
Agriculture	Nakhon ratchasrima	23,719	Petchabul	24,283	Songkhla	44,842
	Kon khane	**13,119**	Nakornsawan	17,781	**Surathani**	**44,124**
	Burirum	10,156	Chiang Mai	15,535	Nakhonsri-thamarat	34,299
Manufacture	Kon khane	43,343	**Lamphun**	**40,099**	**Songkhla**	**44,696**
	Nakhon ratchasrima	29,761	Khampang -phet	20,644	Surathani	19,581
	Udon thani	6,986	Nakornsawan	14,519	Nakhonsri-thamarat	13,567
Income of tourist activity	Nakhon ratchasrima	6,261	**Chiang Mai**	**38,894**	**Phuket**	**94,239**
	Kon khane	5,712	Chiang Rai	9,819	Krabi	24,729
	Udon thani	4,551	Pitsanulok	4,951	Surathani	14,069
Commercial	**Nakhon ratchasrima**	**21,593**	Chiang Mai	17,878	Songkhla	16,165
	Kon khane	18,825	**Nakornsawan**	**10,974**	Nakhonsri-thamarat	15,168
	Ubon ratchathani	17,015	Chiang Rai	9,197	Surathani	10,926

City Selection: From the provincial selection, there are 8 provinces as a representative of each type of city. Then, select the appropriate city as a representative in each type of city, according each prominent point. The criteria are same with doorstepping interviews such as (1) target study area has to be located on one of this area only (Sub-District municipality or municipality, or metropolitan) and (2) indicators which clearly and can be identifying 4 types of city: agriculture, industry, tourist attraction and services and commercial communities

- Indicator for agricultural city is area for agricultural activities and number of households with agricultural career. Details are as follows;

Konkhane Province: the district with the most agricultural areas is Muang District, followed by Nampong District, and a district with the most agricultural career is Phuweing District, followed by Muang District (details in Table 2.8). Therefore, Muang District is suitable for representative area which selected representatives area by the secondary information that indicate major occupation of households is agriculture to include 3

municipalities such as 3 municipalities such as Pralub ,Savati and Bankhor Sub-district Municipality.

Suratthani Province: districts with the most agricultural areas are Phunpin District, followed by Phar-sang District, and a district with the most agricultural career is Kharnchanadit District, followed by Thachana District (details in Table 2.8). Thus, Kharnchanadit and Phunpin District are suitable for representative area. Kharnchanadit District has 3 Sub-district Municipality located and selected by maximum waste generated area as represented. So, Kharnchanadit Sub-district Municipality is a representation area.

- Indicator for industrial city is a number of factories that are located on and a number of labors. Details are as follows;

Lamphun Province: districts with the most factories are Muang District, followed by Mae tae District, and a district with the most number of labors is Muang District, followed by Pasange District (details in Table 2.9). Thus, Muang District is suitable for representative area. Muang District has 7 Sub-district Municipality and 1 Municipality. So, the representative is selected from maximum waste volume area such as Muang Municipality.

Songkhla Province: districts with the most factories are Hat Yai District, followed by Muang District, and districts with the most number of labors are Hat Yai District, followed by Muang District (details in Table 2.9). Thus, Hat yai District is suitable for representative area. Hat yai District has 4 Sub-district Municipalities: 4 Municipalities and 1 Metropolitan. Thus, selected representative area by the secondary information that indicates major occupation of households is labor, which is Khohong Municipality.

- Indicator for tourist attraction and services city is tourism income that is circulated in province. Chiang Mai and Phuket is a famous place and have been selected as a target in this study, particularly in the area in the city has many tourist activities both day and night. Thus, selected municipalities in urban districts represented in the study such as Chiang Mai Metropolitan and Phuket Metropolitan.

- Indicator for commercial city is number of population in each area. Most commercial center is in the Muang Districts. Therefore, selected municipalities in Muang districts as represented. Along with statistical data of population, as shown in Table 2.10, indicated Muang Disrict, of the two provinces, is the first area that people live in. So Nakhon Ratchasrima Metropolitan and Nakhon Sawan Metropolitan are selected for target.

Table 3.8: Details of indicators for agricultural city in Khonkane and Suratthani, 2006 [31]

Details	Khonkane		Surathani	
	District (Top 5)	Quantity	District (Top 5)	Quantity
Agricultural area (Rais)	Muang	368,562	Phunpin	540,211
	Nampong	326,684	Pharseang	457,946
	Mayhakiri	272,005	Keinsar	338,065
	Kranuan	253,739	Thachana	312,275
	Banphai	251,653	Kharnchanadit	307,754
Agricultural career (households)	Poewiyong.	17,246	Kharnchanadit	18,609
	Muang	16,709	Thachana	13,647
	Nongrua	15,457	Phunpin	13,484
	Chumpair	14,375	Kiriratnikhom	12,634
	Nongsonghong	12,214	Pharseang	11,809

Table 3.9: Details of indicators for industrial city in Lampune, Songkhla Province, 2006 [31]

Detail	Lamphun [9]		Songkhla [9]	
	District (Top 5)	Quantity	District (Top 5)	Quantity
Number of factories (Plants)	Muang	390	Hat Yai	90
	Mae tha	129	Muang	40
	Pasange	123	Sadoa	38
	Ban Thi	70	Ja Na	29
	Ban Honk	44	Ratha Phum	26
Number of labors (Persons)	Muang	16,957	Hat Yai	14,700
	Pasange	2,011	Muang	11,696
	Mae tha	1,829	Ja Na	6,174
	Ban Honk	908	Bangkam	2,671
	Ban Thi	537	Sadoa	2,531

Table 3.10: Details of indicators for commercial city in Nakhon Ratchasrima and Nakorn Sawan Province, 2006 [31]

Detail	Nakhon Sawan		Nakhon Ratchasrima	
	District (Top 5)	Quantity	District (Top 5)	Quantity
Number of Population (Persons)	Muang	238,505	Muang	269,071
	Ta Kli	114,774	Pak Chong	144,433
	Lat Yoa	90,905	Pi Miine	122,891
	Banpot Pisai	88,193	Dan Khuntod	119,934
	Pisali	70,801	Sikew	113,225

3.1.1.2 Summarization of target study area

(A) Doorsteping interview

- Representation of Agricultural city such as Song Pi Nong Sub-District Municipality and Thung Khoak Sub-District Municipality, located in of Song Pi Nong District, Suphanburi Province.

- Representation of Industrial city such as Klong Jig Sub-District Municipality, Ban Lane Sub-District Municipality, and Praintraracha Sub-District Municipality, located in Bang Pa In District, Pranakorn Sri Ayutthaya Province.

- Representation of Tourist attraction and service city is Cha Um Municipality, Cha Um District, Petchaburi Province.

- Representation of Commercial city is Muangkancity Municipality, Muang District, Kanchanaburi Province

(B) Letter questionnaire

- Representation of Agricultural city such as Pralub ,Savati and Bankhor Sub-district Municipality, located in Muang district , Kon khane Province and Kharnchanadit Sub-district, located in Kharnchanadit district, Suratthani Province.

- Representation of Industrial city such as Muanglamphun Municipality, located in Muang district, Lamphun Province and Khohong Municipality, located in Hat-Yai district, Songkhla Province.

- Representation of Tourist attraction and service city such as Chiang Mai Metropolitan, located in Muang district, Chiang Mai province and Phuket Metropolitan, located in Muang district, Pheket province.

- Representation of Commercial city such as, Nakhon Ratchasrima Metropolitan, located in Muang district, Nakhon Ratchasrima province and Nakhon Sawan Metropolitan, located in Muang district, Nakhon Sawan province.

3.1.2 Determination for data collection

3.1.2.1 Research Tool

Closed-ended questionnaire is applied except some issues or items should be blank form (opened answer) for free answer and open-ended data. Questionnaire is developed for primary data collection from household sample in target study area with applying following principle.

Main – second issue of question will be developed from objective and scope of study that are set forth. Therefore questionnaire is composed of 3 parts as following.

Part 1 Personnel, Economic and Social Factors; closed end questionnaire

Part 2 Knowledge, Attitude and Behavior of waste disposal Factors; closed end questionnaire with 5 levels answer score of Likert Scale

Part 3 Project Acceptance and Project Benefit Factors; A closed end questionnaire with 5 levels answer score of Likert Scale is applied.

3.1.2.2 Sample size

The population samples were assigned in the area selected by the selection area above. Target area in a city level will be chosen to represent. After that, Purposive Sampling method is applied for household level sampling target population for collection is household in target area purposive with head of household or representative (18 years up).

The Taro Yamane formula (equation 3.1) is applied for determine sample size of each type of city representative. Sample size was calculated in differently percentage of reliability by the formula (Table 2.11). This study concentrated of household in many target area around of country which many population (more than 100,000 people). So, the sample size should be calculation with highly percentage of reliability, 97.5% of reliability is suitable for determination. From table 2.11, over all sample size for study is 1,600 cases.

The objective of study was classified type of city in 4 types such as agricultural, industrial, tourist attraction and commercial. So, sample size for collected primary data is 400 cases/ type of city, refers to 95% of reliability (Table 2.11). The collection is divided into 2 methods as doorsteping interview and letter questionnaire. The doorsteping interview method is two-way communication which participation between interviewer and household, contrast in second method. So, the first is to get high reliability of data, but should not have too many

cases because of costly and long period for collection. Therefore, this study assigned to 40 % of all cases collection by doorstepping interview method (640 cases).

Summary, overall sample sizes are 1,600 cases (400 cases/type of city), divided in 640 cases of doorstepping interview groups (160 cases/type of city) and 960 cases of letter questionnaire group (240 cases/type of city), details in Table 2.12.

Taro Yamane Formula:

$$n = N / 1 + Ne^2 \quad \text{------------------------- equation 3.1 [32]}$$

Where   n = Sample size   N = Total population in target study area

e = Statistical significant [(100 - % of reliability)/ 100]

Table 3.11: Sample Size (n) in any % of reliability by Taro Yamane Formula

Size of Population(N)	Sample Size (n) in any %reliability							
	99%	98%	97.5%	97%	96.5%	96%	95%	90%
500	476	417	381	345	310	278	222	83
1,000	909	714	615	526	449	385	206	91
2,000	1,667	1111	889	714	580	476	333	95
3,000	2,308	1,364	1,043	811	642	517	353	97
4,000	2,857	1,538	1,143	870	678	541	364	98
5,000	3,333	1,667	1,212	909	702	556	370	98
6,000	3,750	1,765	1,263	938	719	566	375	98
7,000	4,118	1,842	1,302	959	731	574	378	99
8,000	4,444	1,905	1,333	976	741	580	381	99
9,000	4,737	1,957	1,358	989	748	584	383	99
10,000	5,000	2,000	1,379	1,000	755	588	385	99
50,000	8,333	2,381	1,550	1,087	803	617	397	100
100,000	9,001	2,439	1,575	1,099	810	621	398	100
200,000	9,524	2,469	1,587	1,105	813	623	399	100
300,000	9,677	2,479	1,592	1,107	814	624	399	100
400,000	9,756	2,484	1,594	1,108	815	624	400	100
500,000	9,804	2,488	1,595	1,109	815	624	400	100
∞	10,000	2,500	1,600	1,111	816	625	**400**	100

Table 3.12: Summary of sample size (n) for collection of primary data

Type of city	Doorsteping Interview		Letter Questionnaire	
	City/Province/Region	n	City/Province/Region	n
Agricultural	1.Song Phi Nong Sub-District Municipality /Suphanburi/Central	53	1.Pralub Sub-District Municipality /Kon khane/Northeastern	40
	2.Thung Khoak Sub-District Municipality /Suphanburi/Central	53	2.Savati Sub-District Municipality / Kon khane / Northeastern	40
	3.Tha-saded Sub-District Municipality /Suphanburi/Central	54	3.Bankhor Sub-District Municipality / Kon khane / Northeastern	40
	-	-	4.Kharnchanadit Sub-District Municipality/Suratthani/Southern	120
	Total	160	Total	240
Industrial	1.Klong Jig Sub-District Municipality /Pranakorn Sri Ayutthaya/Central	40	1.Muanglamphun Municipality / Lamphun/Northern	120
	2.Ban Lane Sub-District Municipality /Pranakorn Sri Ayutthaya/Central	40	2.Khohong Municipality /Songkhla /Southern	120
	3.Prain TaraRacha Sub-District Municipality /Pranakorn Sri Ayutthaya/Central	40	-	-
	4.Lumtasoa Sub-District Municipality /Pranakorn Sri Ayutthaya/Central	40	-	-
	Total	160	Total	240
Tourist Attraction	1.Cha Um Municipality/Petchaburi/Central	160	1.Chiang Mai Metropolitan/Chiang Mai/ Northern	120
	-	-	2.Phuket Metropolitan/Phuket /Southern	120
	Total	160	Total	240
Commercial	1.Muangkarn Municipality /Kanchanaburi/ Central	160	1.Nakhon Ratchasrima Metropolitan / Nakhon Ratchasrima/Northeastern	120
	-	-	2.Nakhon Sawan Metropolitan/Nakhon Sawan/Northern	120
	Total	160	Total	240

3.2 Scope of primary data analysis and application

3.2.1 Analysis of influential factor for establish Bio-waste to energy project

3.2.1.1 Approach of analysis

This section is implemented to investigate the factors that influence with Bio-waste to energy project. Raw data from completed questionnaire are analyzed by personnel computer with Microsoft Eviews version 5.0 application program for Windows.

The application is processed by Binary Logistic Regression Model, used for analyzed correlation between dependent variable (Y) and independent variable (X) when dependent variable as dichotomous variable (binary variable or binary outcome) and independent variable as quantity or dummy variable.

Binary Logistic Regression analyzed, where the dependent variable is a dichotomous variable, i.e., Y=1 if the household is engaged in Bio-waste separation and Y=0 if it does not, regressed on some socio-economic household characteristics such as income, education, house space or etc as independent variable. The model will describe probability of each independent variable that influential with dependent variable.

3.2.1.2 Model of analysis

(A) Equation of analysis

The model for analysis is applied principle of regression analysis to examined which used for analyzed correlation between dependent variable (Y) and independent variable (X), equation for analysis i.e.,

$$Y = a + b_1 X_{1i} + b_2 X_{2i} + b_3 X_{3i} + b_4 X_{4i} + \ldots + b_k X_{ki} + e \text{ -- equation 3.2}$$

Where, Y = Dependent variable (situation)

a = Constant value

b_k = Coefficient value of independent variable

X_{ki} = Independent variable e = Error

This study has two related situations which as a key factor with Bio-waste to energy project namely Bio-waste separation practice and Acceptance with Bio-waste to energy project. The possibility of factors which effect and influential with that situation are selected for 14 related factors in this study (provide details on next item). The equations for analysis of each situation in this study i.e.

- Bio-waste separation practice (SEP_B)

$$SEP\_B = a + b_1 ED_i + b_2 IC_i + b_3 MO_i + b_4 MS_i + b_5 LP_i + b_6 HS_i + b_7 FZ_i + b_8 KW_i + b_9 MP_i + b_{10} RP_i + b_{11} A1_i + b_{12} A2_i + b_{13} A3_i + b_{14} A4_i + e$$

- Acceptance with Bio-waste to energy project (ACEPT)

$$ACEPT = a + b_1ED_i + b_2IC_i + b_3MO_i + b_4MS_i + b_5LP_i + b_6HS_i + b_7FZ_i + b_8KW_i + b_9MP_i + b_{10}RP_i + b_{11}A1_i + b_{12}A2_i + b_{13}A3_i + b_{14}A4_i + e$$

(B) Variable of analysis

(1) Dependent variable (Y):

- Bio-waste separation practice (SEP_B), data for analysis is from completed questionnaire, where Y=1, if household is engaged in Bio-waste separation, regularly and often practice and Y=0, if household is not engaged in Bio-waste separation, never and sometime practice.

- Acceptance with Bio-waste to energy project (ACEPT), data for analysis is from completed questionnaire which determined by attitude level of all acceptance stage i.e. perception, incentive, decision making, application and insistency stage which five questions in each stage (overall 25 question). The level of attitude in each question is applied as a score i.e. strongly agree = 5, agree = 4, uncertainly = 3, disagree = 2 and strongly disagree =1. The identification of acceptance with Bio-waste to energy project is used total score of all questions. So, maximum score is 125. The score is over or equal 100, meaning that attitude level is in strongly agree and agree level or decision for acceptable with project, if does not is deny for participation with project. So, the dependent variable is a dichotomous variable as following,

Y=1, if household is acceptable with project when average of attitude level on all question followed questionnaire is in strongly agree and agree level.

Y=0, if household is deny with project when average of attitude level on all question followed questionnaire is in strongly disagree, disagree and uncertainly with project.

(2) Independent variable (X): The potentially of factors that effect with household waste behavior is modeled as a function of two sets of factors, i.e,

(2.1) Personal characteristics -related attributes:

- Level of education (ED), is a variable for the personal education as a dummy variable, where 1= Bachelor degree and more and 0= Primary or High school are used for analysis.

- Personal income (IC), is a variable for the personal income as a dummy variable, where 1= Over average of national income per capita and 0= Under average of national income per capita are used for analysis. These are determined by

information of Office of Nation Economic and Social Development Board. The average of income per capita on last five years (2005-2009) [33] is around 84,000 baht per year or 7,000 per month. So, this information is used for variable of this study.

- Major occupation (MO), is a variable for the personal occupation as a dummy variable, where 1= Employee or certainly time and salary from career and 0= independent or uncertainly time and salary from career are used for analysis.

- Social Membership Status (MS), is a variable for the personal membership status of community group which has activity for development of community base as a dummy variable, where 1= Ever been or present member and 0= Never been membership are used for analysis.

- Living period in area (LP), is a variable for the personal living period in area, where 1= Old comer or stay in area more than 11 years and 0= New comer or stay in area less than 10 years are used for analysis.

- House space (HS), is a variable for the house space or house type of family, where 1= High space which mean living in trade building or detached house and 0= Low space which mean living in apartment or townhouse. These are used for analysis.

- Family size (FZ), is a variable for the number of person in household. This information is able to refer of household waste volume which low accuracy from primary data collection. This factor is a quantity variable, used trend for interpretation of result such as big family or small family.

(2.2) Waste management practice-related attributes

- Knowledge of waste management (KW) is a variable for person's basic knowledge of waste separation. The information is indentified by score which followed questionnaire, maximum score is 50. This factor is a quantity variable, used trend for interpretation of result such as highly knowledge or lower knowledge.

- Waste minimization practice (MP) is a variable for personal practice of waste minimization. Data for analysis is from completed questionnaire which determined by frequency level of each practice i.e. reject, repair and recycle. The level of frequency in each practice is applied as a score i.e. regularly = 4, often = 3, sometime = 2 and never =1. The identification of waste minimization practice is used total score of all practice. So, maximum score is 12. The score is over or equal 9 (maximum 12), meaning that frequency level is in regularly and often level or good waste minimization practice, if

does not is poor practice. This factor is dummy variable, where 1= Good waste minimization practice and 0= Poor waste minimization practice.

- Recyclable separation practice (RP) is a variable for personal practice of recyclable separation as a dummy variable, where 1= Good recyclable separation practice which regularly or often practice and 0= Poor recyclable separation practice which sometime or never practice, are used for analysis.

- Awareness for separation (A1) is a variable for personal attitude on awareness with Bio-waste separation practice. Data for analysis is from completed questionnaire which determined by awareness level of each question, composed of 3 questions. The level of attitude in each question is applied as a score i.e. strongly awareness = 5, awareness = 4, uncertainly = 3, unawareness = 2 and strongly unawareness =1. The identification of awareness level is used total score of all questions followed by questionnaire. So, maximum score is 15. The score is over or equal 12, meaning that attitude level is in strongly awareness and awareness level or concern, if does not is ignore. This factor is dummy variable, where 1= Concern or good awareness and 0= Ignore or unawareness.

- Economic incentive for separation (A2) is a variable for personal attitude on economic incentive with Bio-waste separation practice. Data for analysis is from completed questionnaire which determined by attitude level of each question, composed of 3 questions. The level of attitude in each question is applied as a score i.e. strongly no incentive = 5, no incentive = 4, uncertainly = 3, incentive = 2 and strongly incentive =1. The identification of concern level is used total score of all questions followed by questionnaire. So, maximum score is 15. The score is over or equal 12, meaning that attitude level is in strongly no incentive and no incentive level or ignore on economic incentive with separation, if does not is concern. This factor is dummy variable, where 1= Ignore on economic incentive with separation and 0= Concern on economic incentive with separation.

- Satisfaction on Management and service system (A3) is a variable for personal attitude on Management & service system with Bio-waste separation practice. Data for analysis is from completed questionnaire which determined by attitude level of each question, composed of 3 questions. The level of attitude in each question is applied as a score i.e. strongly satisfaction = 5, satisfaction = 4, uncertainly = 3, dissatisfaction = 2 and strongly dissatisfaction =1. The identification of satisfaction level is

used total score of all questions followed by questionnaire. So, maximum score is 15. The score is over or equal 12, meaning that attitude level is in strongly satisfaction and satisfaction level or satisfaction on management & service system with separation, if does not is dissatisfaction. This factor is dummy variable, where 1= Satisfaction on management & service system with separation and 0= Dissatisfaction on management & service system with separation.

- Attitude on obstacle of separation (A4) is a variable for personal attitude on Bio-waste separation practice. Data for analysis is from completed questionnaire which determined by attitude level of each question, composed of 3 questions. The level of attitude in each question is applied as a score i.e. strongly agree = 5, agree = 4, uncertainly = 3, disagree = 2 and strongly disagree =1. The identification of concern level is used total score of all questions followed by questionnaire. So, maximum score is 15. The score is over or equal 12, meaning that attitude level is in strongly agree and agree level or attitude as obstacle for Bio-waste separation , if does not is disagree or attitude as not obstacle. This factor is dummy variable, where 1= Agree as obstacle for separation and 0= Disagree as not obstacle for separation. These are used for analysis.

(C) Interpretation of analysis

- Probability value (P-values): The analysis is estimated in S-shaped or Sigmoid Curve, the probability of situation has value between 0-1 (Principle of Probability). This study is concentration on probability at than 90% (P-values<0.1) will be an influential factor of good situation (Y=1) and used for planning scheme in further.

- Coefficient of independent variable: This study is not discussion on Coefficient value which necessary for in-depth mathematic analysis, but concentration on Coefficient sign which able to apply for created direction scheme, highest priority of study goal. The Coefficient sign of each variable are briefly in table 3.13.

- McFadden R^2 Value: When analyzing data with a logistic regression, an equivalent statistic to R-squared does not exist. However, to evaluate the goodness-of-fit of logistic models, several pseudo R-square have been developed. These are "pseudo" R-square because they look like R-squared in the sense that they are on a similar scale, ranging from 0 to 1 [34]. McFadden R^2 is one approach for calculated Pseudo R-Squared which as out come from Microsoft Eviews application and high accuracy. This value is explanation on (1) variability and (2) correlation, range from 0 to 1, or the accuracy of model between dependent and all independent variables.

Table 3.13: Summary of independent variables for Binary logistic analysis

Code	Definitions	Dummy variable	Interpretation	
			Positive Coefficient (+)	Negative Coefficient (-)
ED	Level of education	0= Primary or High school 1=Bachelor and more	Bachelor and more	Primary or High school
IC	Personal income	0= Under average of national income/ capita 1= Over average of national income/ capita	Over average of national income per capita	Under average of national income per capita
MO	Major Occupation	0= Owner /Independent 1 = Employee	Employee	Owner
MS	Membership Status	0= Never been 1= Ever or present member	Ever or present membership	Never been a membership
LP	Living period in area	0= new comers (1-10 years) 1= Old comer(11 year up)	Long comers (more than 11 years)	New comers (less than 10 years)
HS	House space	0= Low (Apartment or Townhouse) 1= High (Trade building or Detached house)	High space	Low space
FZ	*Family size*	*Quantity Variable*	*Big family or highly number*	*Small family or lower number*
KW	*Knowledge of waste separation*	*Quantity Variable*	*Highly knowledge*	*Lower knowledge*
MP	Waste minimization practice	0= poor (never, sometime) 1= good (often, regularly)	Good waste minimization practice (often, regularly)	Poor waste minimization practice (never, sometime)
RP	Recyclable separation practice	0= poor (never, sometime) 1= good (often, regularly)	Good recyclable separation practice	Poor recyclable separation practice
A1	Awareness for separation	0= Ignore (Level 1-3) 1= Concern (Level 4-5)	Concern or good of awareness for separation	Ignore or bad awareness of awareness for separation
A2	Economic incentive for separation	0= Concern (Level 1-3) 1= Ignore (Level 4-5)	Ignore on economic incentive for separation	Concern on economic incentive for separation
A3	Satisfaction on management& service	0= dissatisfaction (Level 1-3) 1= Satisfaction (Level 4-5)	Satisfaction of management & service system	Dissatisfaction of management & service system
A4	Attitude on obstacle for separation	0= Disagree or not obstacle (Level 1-3) 1= Agree or obstacle (Level 4-5)	Poor attitude as obstacle for separation	Good attitude as no obstacle for separation

3.2.2 Analysis of management plan for establish Bio-waste to energy project

According of binary logistic analysis, this study concentrated on 2 behaviors for establish Bio-waste to energy project such as Bio-waste separation practice and Acceptance with Bio-waste to energy project. The factors that influential with household waste behavior are modeled as a function of two sets of variables i.e. Personal characteristics and waste management practice. So, this section is summarized all of influential factor into management plan for establish Bio-waste to energy project such as (1) Suitable campaign for establish Bio-waste to energy project and (2) Suitable Characteristic for Promote campaign of enhancement. The approach for analysis as following,

3.2.2.1 Suitable characteristic for enhancement

This section is summarized especially personal characteristic-related attributes factors which suitable to promote campaign for enhancing performance Bio-waste to energy project. Details for analysis as following,

(1) Descriptive analysis: This section is described on characteristic of raw data from completed questionnaire of each type of city which are related for analysis of influential factor for Bio-waste to energy project. These factors are analyzed by personnel computer with SPSS application program for Windows. The application is processed by descriptive statistic i.e. Mean and Percentage. The result of analysis is used to comparison which described of city situation. These are composed of 2 categories i.e.,

(1) Rank, to rank of profiles when compared by type of city, where 1 = highest position, 2= relatively high position, 3 = relatively low position and 4 = lowest position

(2) Status, to compare of profiles between all entries and each type of city, where High is mean higher value than all entries and low is mean lower value than all entries (results in appendix b).

(2) Potential Analysis: This analysis is implemented for investigation of suitable characteristic which should be concentrated to provide promotion campaign. The interpretation and result from analysis to assign as following;

- Strong Point (SP): used influential factor (P- values < 0.1) to interpret as strong characteristic for good performance of practice (Y=1).

- Weak Point (WP): the opposite profiles of strong point to interpret as weak characteristics for good performance of practice (Y=1).

- **The Potential:** analyzed for suitable characteristic which has a great opportunity to enhance performance for establish Bio-waste to energy project. The potential is divided into 2 situations i.e.

(1) Positive Potential (PP), decided by information of strong characteristic, when percentage of strong characteristic is higher than good performance of practice (Y=1).

(2) Negative Potential (NP), decided by information of strong characteristic, when percentage of strong characteristic is lower than good performance of practice (Y=1).

3.2.2.2 Suitable promotion campaign for enhancement

This section is summarized especially waste management practice-related attributes factors which able to creation of campaign and suitable for promotion. So, this study is concentrated on 7 types of management campaign for promotion, potentially to improvement behavior for establish Bio-waste to energy project which cited from result of Binary logistic model. The suitable campaign for promote with people, suitable characteristics from Potential analysis, when regarded by coefficient sign of each variables has details as followed,

(1) Campaign for improving basic knowledge of waste separation is suitable promote with people when knowledge of waste management factor has probability values less than 0.1(P-values<0.1) and positive of coefficient sign (+KW). Meaning that, the highly knowledge of waste separation has influential for good performance of establish Bio-waste to energy project (Y=1 of dependent variable). Negative of coefficient sign, meaning that low of knowledge is still good performance for establish Bio-waste to energy project, unnecessary to promote.

(2) Campaign for improving waste minimization practice is suitable promote with people when waste minimization practice factor has probability values less than 0.1(P-values<0.1) and positive of coefficient sign (+MP). Meaning that, good waste minimization practice has influential for good performance of establish Bio-waste to energy project (Y=1 of dependent variable). Negative of coefficient sign, meaning that poor waste minimization practice is still good performance for establish Bio-waste to energy project, unnecessary to promote.

(3) Campaign for improving recyclable separation practice is suitable promote with people when recyclable separation practice factor has probability values less than 0.1(P-values<0.1) and positive of coefficient sign (+RP). Meaning that, good

recyclable separation practice has influential for good performance of establish Bio-waste to energy project (Y=1 of dependent variable). Negative of coefficient sign, meaning that poor recyclable separation practice is still good performance for establish Bio-waste to energy project, unnecessary to promote.

(4) Campaign for improving awareness of people is suitable promote with people when awareness for separation factor has probability values less than 0.1(P-values<0.1) and positive of coefficient sign (+A1). Meaning that, concern or good awareness for separation has influential for good performance of establish Bio-waste to energy project (Y=1 of dependent variable). Negative of coefficient sign, meaning that ignore or poor awareness for separation is still good performance for establish Bio-waste to energy project, unnecessary to promote.

(5) Campaign for improving economic incentive is suitable promote with people when economic incentive for separation factor has probability values less than 0.1(P-values<0.1) and negative of coefficient sign (-A2). Meaning that, concern on economic incentive for separation has influential for good performance of establish Bio-waste to energy project (Y=1 of dependent variable). Positive of coefficient sign, meaning that ignore on economic incentive for separation is still good performance for establish Bio-waste to energy project, unnecessary to promote

(6) Campaign for improving management and service system is suitable promote with people when satisfaction on management and service factor has probability values less than 0.1(P-values<0.1) and positive of coefficient sign (+A3). Meaning that, satisfaction of management and service system for separation has influential for good performance of establish Bio-waste to energy project (Y=1 of dependent variable). Negative of coefficient sign, meaning that dissatisfaction of management and service system for separation is still good performance for establish Bio-waste to energy project, unnecessary to promote.

(7) Campaign for improving attitude of people is suitable promote with people when attitude for separation factor has probability values less than 0.1(P-values<0.1) and negative of coefficient sign (-A4). Meaning that, good attitude for separation has influential for good performance of establish Bio-waste to energy project (Y=1 of dependent variable). Positive of coefficient sign, meaning that poor attitude for separation for separation is still good performance for establish Bio-waste to energy project, unnecessary to promote.

3.3 Result and discussion

3.3.1 Model for establishment Bio-waste to energy project in agricultural city

3.3.1.1 Model for enhance Bio-waste separation practice

According to the analysis, the people who engaged to separation of Bio-waste is accounted for 38.5% which higher than all entries (35.44%) and highest position when comparison with other city. The factor that influential with Bio-waste separation practice, significant at 90% (P-value <0.1), is applied for management plan as following. (Details are summarized in Table 3.14 and Appendix B)

(A) Suitable characteristic for enhancing practice

This section is summarized especially personal characteristic-related attributes factors which suitable to provided campaign for enhance Bio-waste separation practice. Details for analysis as following (see on table 3.14 and 3.15)

(1) Personal income (IC): the result show positive sign of coefficient and 0.0230 of P-value for this factor. Meaning that, the person who has income more than nation average (84,000 Baht/year) is engage for Bio-waste separation which is 97.70% of possibility. This is a strength characteristic and accounted for 21.00% which lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city. The strength characteristic is a threat and unnecessary for provide campaign, lower number than the good Bio-waste separation practice in present.

So, the person who has income lower than national average, weak point, is suitable for promotes campaign because this group of person is accounted for 79.00% which higher number than the people who engaged to separation of Bio-waste (38.50%). This is a great opportunity for enhancing Bio-waste separation practice in future.

(2) Major occupation (MO), the result show positive sign of coefficient and 0.0176 of P-value for this factor. Meaning that, the person who has employee occupation is engage for Bio-waste separation which is 98.24% of possibility. This is a strength characteristic and accounted for 29.50% which lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city. The strength characteristic is a threat and unnecessary for provide campaign, lower number than the good Bio-waste separation practice in present.

So, the person who has independent occupation, weak point, is suitable for promotes campaign because this group of person is accounted for 70.50%

which higher number than the people who engaged to separation of Bio-waste (38.50%). This is a great opportunity for enhance Bio-waste separation practice in future.

(3) Social Membership Status (MS), the result shows negative sign of coefficient and 0.0805 of P-value for this factor. Meaning that, the person who never been a social membership is engage for Bio-waste separation which is 91.95% of possibility. This is a strength characteristic and accounted for 50.50% which lower than average of Thailand and low position (3rd rank) when comparison with other city.

So, the person who never been a social membership, strength point, is suitable for promotes campaign because this group of person is accounted for 50.50% which higher number than the people who engaged to separation of Bio-waste (38.50%). This is a great opportunity for enhance Bio-waste separation practice in future.

Moreover, the Personal characteristic factors e.g. Level of education (ED), Living period in area (LP), House space (HS) and Family size (FZ) are not influential with Bio-waste separation practice which no effect from provided campaign.

(B) Suitable promotion campaign for enhance practice

The suitable campaign is summarized especially waste management practice-related attributes factors which able to creation of campaign and suitable for promotion. According to influential factor analysis, the suitable campaign which potentially to improvement Bio-waste separation practice i.e. (details on table 3.14)

(1) Campaign for improving basic knowledge of waste separation, the result show positive sign of coefficient and 0.0029 of P-value for this factor (+KW). Meaning that, the person who has highly knowledge of waste separation is engage for Bio-waste separation which is 99.71% of possibility. This situation is lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city.

These refer to the highly knowledge of waste separation has influential for good performance of Bio-waste separation practice. So, the campaign for improving basic knowledge of waste separation is suitable to promote with people in area which able to enhance Bio-waste separation practice.

(2) Campaign for improving waste minimization practice, the result show positive sign of coefficient and 0.0027 of P-value for this factor. Meaning that, the person who has good waste minimization practice is engage for Bio-waste separation which is 99.73% of possibility. This situation is accounted for 86.50%, higher than average of Thailand (all entries) and highest position (1st rank) when comparison with other city.

These refer to good waste minimization practice has influential for good performance of Bio-waste separation practice. So, campaign for waste minimization practice is suitable to promote with people in area which able to enhance Bio-waste separation practice.

(3) Campaign for improving recyclable separation practice, the result show positive sign of coefficient and 0.0027 of P-value for this factor. Meaning that, the person who has good recyclable separation practice is engage for Bio-waste separation which is 99.73% of possibility. This situation is accounted for 29.25%, lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city.

These refer to good recyclable separation practice has influential for good performance of Bio-waste separation practice. So, campaign for improving recyclable separation practice is suitable to promote with people in area which able to enhance Bio-waste separation practice.

(4) Campaign for improving management and service system, the result show negative sign of coefficient and 0.0027 of P-value for this factor. Meaning that, the person who dissatisfactory on management & service system is engages for Bio-waste separation which is 99.73% of possibility. This situation is accounted for 48.25%, lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city.

These refer to dissatisfaction of management and service system for separation has influential for good performance of Bio-waste separation practice. So, campaign for improving management and service system is unnecessary to promote with people in area because dissatisfaction of management and service system for separation is still good performance of Bio-waste separation practice.

Moreover, the campaigns e.g. improving awareness of people, improving economic incentive and campaign for improving attitude of people are not influential with Bio-waste separation practice. So, these are not suitable to promote.

3.3.1.2 Model for enhance acceptance for Bio-waste to energy project

According to the analysis, the people who accept to participate with Bio-waste to energy project is accounted for 61.25% which lower than all entries (63.35%) and third rank when comparison with other city. The factor that influential with acceptance on Bio-waste to energy project, significant at 90% (P-value <0.1), is applied for management plan as following. (Details are summarized in Table 3.14 and Appendix B)

(A) Suitable characteristics to enhance acceptance

This section is summarized especially personal characteristic-related attributes factors which suitable to provided campaign for enhance acceptance with Bio-waste to energy project. Details for analysis as follows (see on Table 3.14 and 3.15)

(1) Living period in area (LP), the result show negative sign of coefficient and 0.0360 of P-value for this factor. Meaning that, the person who lives in area less than 10 years (New comer) is engage for acceptance with Bio-waste to energy project which is 96.40% of possibility. This is a strength characteristic and accounted for 17.00% which lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city. The strength characteristic is a threat and unnecessary for provide campaign, lower number than acceptance with Bio-waste to energy project.

So, the person who lives in area more than 10 years (Old comer, weak point, is suitable for promotes campaign because this group of person is accounted for 83.00% which higher number than the people who engaged to acceptance with Bio-waste to energy project (61.25%). This is a great opportunity for enhance acceptance with Bio-waste to energy project in future.

(2) House space (HS), the result show negative sign of coefficient and 0.0526 of P-value for this factor. Meaning that, the person who lives in low space of house (apartment or townhouse) is engage for acceptance with Bio-waste to energy project which is 97.47% of possibility. This is a strength characteristic and accounted for 22.00% which lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city. The strength characteristic is a threat and unnecessary for provide campaign, lower number than acceptance with Bio-waste to energy project.

So, the person who lives in high space of house (trade building or detached house), weak point, is suitable to promote campaigns because this group of person is accounted for 78.00% which higher number than the people who engaged to

acceptance with Bio-waste to energy project (61.25%). This is a great opportunity for enhance acceptance with Bio-waste to energy project in future.

Moreover, the factors e.g. Level of education (ED), Personal income (IC), Major occupation (MO), Social Membership Status (MS) and Family size (FZ) are not influential for acceptance on Bio-waste to energy project which no effect from provided campaign.

(B) Suitable promotion campaign for enhance acceptance

The suitable campaign is summarized especially waste management practice-related attributes factors which able to creation of campaign and suitable for promotion. According to influential factor analysis, the suitable campaign which potentially to improvement acceptance with Bio-waste to energy project i.e. (details on Table 3.14)

(1) Campaign for improving attitude of people, the result showed negative sign of coefficient and 0.0422 of P-value for this factor. Meaning that, the person who disagrees on obstacle for separation is engage for acceptance with Bio-waste to energy project with Bio-waste to energy project which is 95.78% of possibility. This situation is accounted for 37.75%, lower than average of Thailand (all entries) and low position (3rd rank) when comparison with other city.

These refer to good attitude (disagrees on obstacle for separation) has influential for acceptance with Bio-waste to energy project. So, campaign for improving attitude of people is suitable to promote with people in area which able to enhance acceptance with Bio-waste to energy project.

(2) Campaign for improving basic knowledge of waste separation, the result showed negative sign of coefficient and 0.0001 of P-value for this factor. Meaning that, the person who has lowly knowledge of waste separation is engage for acceptance with Bio-waste to energy project which is 99.99% of possibility. This situation is lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city.

These refer to the lowly knowledge of waste separation has influential for acceptance with Bio-waste to energy project. So, campaign for improving basic knowledge of waste separation is unnecessary to promote with people in area because lowly knowledge of waste separation is still acceptation with Bio-waste to energy project.

(3) Campaign for improving waste minimization practice, the result showed negative sign of coefficient and 0.001 of P-value for this factor. Meaning that, the person who has poor waste minimization practice is engage for acceptance with Bio-waste to energy project which is 99.99% of possibility. This situation is accounted for 13.50%, lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city.

These refer to poor waste minimization practice has influential for acceptance with Bio-waste to energy project. So, campaign for improving waste minimization practice is unnecessary to promote with people in area because poor waste minimization practice is still acceptation with Bio-waste to energy project.

(4) Campaign for improving awareness of people, the result showed negative sign of coefficient and 0.0096 of P-value for this factor. Meaning that, the person who has poor awareness or ignored is engage for acceptance with Bio-waste to energy project which is 99.04% of possibility. This situation is accounted for 39.00%, lower than average of Thailand (all entries) and lowest position (3rd rank) when comparison with other city.

These refer to poor awareness or ignored has influential for acceptance with Bio-waste to energy project. So, campaign for improving awareness of people is unnecessary to promote with people in area because poor awareness or ignored is still acceptation with Bio-waste to energy project.

Moreover, the campaigns e.g. improving recyclable separation practice, improving economic incentive and campaign for improving management & service system are not influential for acceptation with Bio-waste to energy project. So, these are not suitable for promote.

Table 3.14: Summary of study profiles for established Bio-waste to energy project (B2E) in agricultural city

| Factors | | Descriptive analysis | | | | Binary logistic analysis | | | |
| | | Information | | Situation | | SEP_B | | ACEPT | |
Code	Definition	Characteristic	Data	**Rank	***Status	Coefficient sign	Probability values	Coefficient sign	Probability values
1. Dependent variable for analysis influential factor on Bio-waste to energy project (B2E)									
SEP_B	Bio-waste separation practice	Regular or often	38.50%	1	High				
ACEPT	Acceptance with B2E	Acceptable	61.25%	3	Low				
2. Independent variable for analysis influential factor on Bio-waste to energy project (B2E)									
ED	Level of education	Bachelor or more	9.50%	4	Low	-	0.1384	+	0.3216
IC	Personal income	Over nation average	21.00%	4	Low	+	*0.0230	+	0.8193
MO	Major occupation	Employee	29.50%	4	Low	+	*0.0176	+	0.7215
MS	Member of community group	Ever or present	49.50%	2	High	-	*0.0805	-	0.9810
LP	Living period in area	Old comer,>10 yrs	83.00%	1	High	-	0.1559	-	*0.0360
HS	Space of house	High space	78.00%	1	High	-	0.1446	-	*0.0526
FZ	Family size (Number of person)	Average number	4.81	1	High	-	0.8275	+	0.3862
KW	Knowledge of waste separation	Average score	31.64	4	Low	+	*0.0029	-	*0.0001
MP	Minimization practice	Regularly or often	86.50%	1	High	+	*0.0027	-	*0.0001
RP	Recyclable separation practice	Regularly or often	29.25%	4	Low	+	*0.0027	-	0.5924
A1	Awareness for separate	Concern or good	61.00%	2	High	-	0.7968	-	*0.0096
A2	Economic incentive for separate	Ignore	77.75%	1	High	+	0.5433	+	0.9903
A3	Management and service system	Satisfaction	51.75%	1	High	-	*0.0270	-	0.3881
A4	Attitude on obstacle for separate	Agree	62.25%	2	High	-	0.2154	-	*0.0422
McFadden R²							0.0736		0.1435

* Significant at 90% of probability or P-values<0.1.

** Rank, to rank of profiles when compared by type of city. 1=highest position 2=relatively high position 3=relatively low position 4=lowest position

***Status, to compare of profiles between all entries with each type of city. High is mean higher value than all entries and low is mean lower value than all entries.

Table 3.15: Potential Analysis for establish Bio-waste to energy project in agricultural city

			Behavior for establish Bio-waste to energy project							
			Bio-waste separation practice (Accounted for 38.50% of all)				Acceptance on Bio-waste to energy project (Accounted for 61.25% of all)			
			Characteristic		Potential for promote		Characteristic		Potential for promote	
Code	Characteristic	Information	Strong point	Weak point	Positive Potential	Negative Potential	Strong point	Weak point	Positive Potential	Negative Potential
ED	Bachelor or more (+ED)	9.50%	NI	NI	NI	NI	NI	NI	NI	NI
	Primary or High school (-ED)	90.50%	NI	NI	NI	NI	NI	NI	NI	NI
IC	Over nation average (+IC)	21.00%	√	x	x	√	NI	NI	NI	NI
	Under nation average (-IC)	79.00%	x	√	√	x	NI	NI	NI	NI
MO	Employee (+MO)	29.50%	√	x	x	√	NI	NI	NI	NI
	Owner /Independent (-MO)	70.50%	x	√	√	x	NI	NI	NI	NI
MS	Ever or present (+MS)	49.50%	x	√	x	√	NI	NI	NI	NI
	Never been a member (-MS)	50.50%	√	x	√	x	NI	NI	NI	NI
LP	Old comer,>10 yrs (+LP)	83.00%	NI	NI	NI	NI	x	√	√	x
	New comers, < 10 yrs (-LP)	17.00%	NI	NI	NI	NI	√	x	x	√
HS	High space (+HS)	78.00%	NI	NI	NI	NI	x	√	√	x
	Low space (-HS)	22.00%	NI	NI	NI	NI	√	x	x	√
FZ	Big family or highly (+FZ)	> 4.81	NI	NI	NI	NI	NI	NI	NI	NI
	Small family or lower (-FZ)	< 4.81	NI	NI	NI	NI	NI	NI	NI	NI

√ is a correct factor or suitable, X is incorrect factor or unsuitable, and NI is no-influential factor.

3.3.2 Model for establishment Bio-waste to energy project in Industrial city

3.3.2.1 Model for enhance Bio-waste separation practice

According to the analysis, the people who engaged to separation of Bio-waste is accounted for 36.00% which higher than all entries (35.44%) and high position when comparison with other city (2nd rank). The factor that influential with Bio-waste separation practice, significant at 90% (P-value <0.1), is applied for management plan as following. (Details are summarized in Table 3.16 and Appendix B)

(A) Suitable characteristic for enhance practice

This section is summarized especially personal characteristic-related attributes factors which suitable to provided campaign for enhance Bio-waste separation practice. Details for analysis as following (see on Table 3.16 and 3.17)

(1) House space (HS), the result show negative sign of coefficient and 0.0002 of P-value for this factor. Meaning that, the person who lives in low space of house (apartment or townhouse) is engage for acceptance with Bio-waste to energy project which is 99.98% of possibility. This is a strength characteristic and accounted for 61.25% which higher than average of Thailand (all entries) and highest position (1st rank) when comparison with other city.

So, the person who lives in low space of house (apartment or townhouse), strength point, is suitable for promotes campaign because this group of person is accounted for 61.25% which higher number than the people who engaged to separation of Bio-waste (36.00%). This is a great opportunity for enhance Bio-waste separation practice in future.

Moreover, the Personal characteristic factors e.g. Level of education (ED), Personal income (IC), Major occupation (MO), Social Membership Status (MS), Living period in area (LP) and Family size (FZ) are not influential with Bio-waste separation practice which no effect from provided campaign.

(B) Suitable promotion campaign for enhance practice

The suitable campaign is summarized especially waste management practice-related attributes factors which able to creation of campaign and suitable for promotion. According to influential factor analysis, the suitable campaign which potentially to improvement Bio-waste separation practice i.e. (details on Table 3.16)

(1) Campaign for improving recyclable separation practice, the result show positive sign of coefficient and 0.0456 of P-value for this factor. Meaning that,

the person who has good recyclable separation practice is engage for Bio-waste separation which is 95.44% of possibility. This situation is accounted for 32.50%, lower than average of Thailand (all entries) and low position (3rd rank) when comparison with other city.

These refer to good recyclable separation practice has influential for good performance of Bio-waste separation practice. So, campaign for improving recyclable separation practice is suitable to promote with people in area which able to enhance Bio-waste separation practice.

(2) Campaign for improving awareness of people, the result show positive sign of coefficient and 0.0001 of P-value for this factor. Meaning that good awareness or concerned is engages for Bio-waste separation which is 99.99% of possibility. This situation is accounted for 48.75%, lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city.

These refer to good awareness or concerned has influential for good performance of Bio-waste separation practice. So, campaign for improving awareness of people is suitable to promote with people in area which able to enhance Bio-waste separation practice.

(3) Campaign for improving management and service system, the result show positive sign of coefficient and 0.0876 of P-value for this factor. Meaning that, the person who satisfactory on management & service system is engages for Bio-waste separation which is 91.24% of possibility. This situation is accounted for 37.50%, lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city.

These refer to satisfactory on management & service system has influential for good performance of Bio-waste separation practice. So, campaign for improving management and service system is suitable to promote with people in area which able to enhance Bio-waste separation practice.

Moreover, the campaigns e.g. improving basic knowledge of waste separation, improving waste minimization practice, improving economic incentive and campaign for improving attitude of people are not influential with Bio-waste separation practice. So, these are not suitable for promote.

3.3.2.2 Model for enhance acceptance for Bio-waste to energy project

According to the analysis, the people who accept to participate with Bio-waste to energy project is accounted for 39.00% which lower than all entries (63.35%) and lowest when comparison with other city (4th rank). The factor that influential with acceptance on Bio-waste to energy project, significant at 90% (P-value <0.1), is applied for management plan as following. (Details are summarized in Table 3.16 and Appendix B)

(A) Suitable characteristic for enhance acceptance

This section is summarized especially personal characteristic-related attributes factors which suitable to provided campaign for enhance acceptance with Bio-waste to energy project. Details for analysis as following (see on Table 3.16 and 3.17)

(1) Major occupation (MO), the result show positive sign of coefficient and 0.0722 of P-value for this factor. Meaning that, the person who has employee occupation is engage for Bio-waste separation which is 93.78% of possibility. This is a strength characteristic and accounted for 60.75% which higher than average of Thailand (all entries) and highest position (1st rank) when comparison with other city.

So, the person who has employee occupation, strength point, is suitable for promotes campaign because this group of person is accounted for 60.75% which higher number than the people who engaged to acceptance with Bio-waste to energy project (39.00%). This is a great opportunity for enhance acceptance with Bio-waste to energy project in future.

Moreover, the Personal characteristic factors e.g. Level of education (ED), Personal income (IC), Social Membership Status (MS), Living period in area (LP) and Family size (FZ) are not influential for acceptance on Bio-waste to energy project which no effect from provided campaign.

(B) Suitable promotion campaign for enhance acceptance

The suitable campaign is summarized especially waste management practice-related attributes factors which able to creation of campaign and suitable for promotion. According to influential factor analysis, the suitable campaign which potentially to improvement acceptance with Bio-waste to energy project i.e. (details on Table 3.16)

(1) Campaign for improving economic incentive, the result show negative sign of coefficient and 0.0467 of P-value for this factor. Meaning that, the person who concentrated on economic incentive for separation is engage for acceptance with Bio-

waste to energy project with Bio-waste to energy project which is 95.33% of possibility. This situation is accounted for 54.00%, higher than average of Thailand (all entries) and highest position (1st rank) when comparison with other city.

These refer to concentrated on economic incentive for separation has influential for acceptance with Bio-waste to energy project. So, campaign for improving economic incentive is suitable to promote with people in area which able to enhance acceptance with Bio-waste to energy project.

Moreover, the campaigns e.g. improving basic knowledge of waste separation, improving waste minimization practice, improving recyclable separation practice, improving awareness of people, improving management & service system and campaign for improving attitude of people are not influential for acceptation with Bio-waste to energy project. So, these are not suitable for promote.

Table 3.16: Summary of study profiles for established Bio-waste to energy project (B2E) in Industrial city

| Factors | | Descriptive analysis | | | | Binary logistic analysis | | | |
| | | Information | | Situation | | SEP_B | | ACEPT | |
Code	Definition	Characteristic	Data	**Rank	***Status	Coefficient sign	Probability values	Coefficient sign	Probability values
1. Dependent variable for analysis influential factor on Bio-waste to energy project (B2E)									
SEP_B	Bio-waste separation practice	Regular or often	36.00%	2	High				
ACEPT	Acceptance with B2E	Acceptable	39.00%	4	Low				
2. Independent variable for analysis influential factor on Bio-waste to energy project (B2E)									
ED	Level of education	Bachelor or more	16.50%	3	Low	+	0.6325	-	0.6799
IC	Personal income	Over nation average	38.00%	3	Low	-	0.2793	-	0.9596
MO	Major occupation	Employee	60.75%	1	High	+	0.7081	+	*0.0722
MS	Member of community group	Ever or present	31.75%	4	Low	-	0.9365	+	0.8319
LP	Living period in area	Old comer,>10 yrs	34.25%	4	Low	-	0.8387	+	0.1353
HS	Space of house	High space	38.75%	4	Low	-	*0.0002	-	0.2837
FZ	Family size (Number of person)	Average number	3.85	4	Low	+	0.8836	+	0.9219
KW	Knowledge of waste separation	Average score	32.75	3	High	-	0.6139	-	0.3774
MP	Minimization practice	Regularly or often	76.75%	4	Low	-	0.9467	-	0.1732
RP	Recyclable separation practice	Regularly or often	32.50%	3	Low	+	*0.0456	-	0.2732
A1	Awareness for separate	Concern or good	48.75%	4	Low	+	*0.0001	-	0.6866
A2	Economic incentive for separate	Ignore	46.00%	4	Low	-	0.5780	-	*0.0467
A3	Management and service system	Satisfaction	37.50%	4	Low	+	*0.0876	-	0.2461
A4	Attitude on obstacle for separate	Agree	75.50%	1	High	-	0.3838	+	0.9138
	McFadden R^2						0.0760		0.0333

* Significant at 90% of probability or P-values<0.1.
** Rank, to rank of profiles when compared by type of city. 1=highest position 2=relatively high position 3=relatively low position 4=lowest position
***Status, to compare of profiles between all entries with each type of city. High is mean higher value than all entries and low is mean lower value than all entries.

Table 3.17: Potential Analysis for establish Bio-waste to energy project in Industrial city

			Behavior for establish Bio-waste to energy project							
Factor			Bio-waste separation practice (Accounted for 36.00% of all)				Acceptance on Bio-waste to energy project (Accounted for 39.00% of all)			
			Characteristic		Potential for promote		Characteristic		Potential for promote	
Code	Characteristic	Information	Strong point	Weak point	Positive Potential	Negative Potential	Strong point	Weak point	Positive Potential	Negative Potential
ED	Bachelor or more (+ED)	16.50%	NI	NI	NI	NI	NI	NI	NI	NI
	Primary or High school (-ED)	83.50%	NI	NI	NI	NI	NI	NI	NI	NI
IC	Over nation average (+IC)	38.00%	NI	NI	NI	NI	NI	NI	NI	NI
	Under nation average (-IC)	62.00%	NI	NI	NI	NI	NI	NI	NI	NI
MO	Employee (+MO)	60.75%	NI	NI	NI	NI	√	X	√	X
	Owner /Independent (-MO)	39.25%	NI	NI	NI	NI	X	√	X	√
MS	Ever or present (+MS)	31.75%	NI	NI	NI	NI	NI	NI	NI	NI
	Never been a member (-MS)	68.25%	NI	NI	NI	NI	NI	NI	NI	NI
LP	Old comer,>10 yrs (+LP)	34.25%	NI	NI	NI	NI	NI	NI	NI	NI
	New comers, < 10 yrs (-LP)	65.75%	NI	NI	NI	NI	NI	NI	NI	NI
HS	High space (+HS)	38.75%	X	√	X	√	NI	NI	NI	NI
	Low space (-HS)	61.25%	√	X	√	X	NI	NI	NI	NI
FZ	Big family or highly (+FZ)	> 3.85	NI	NI	NI	NI	NI	NI	NI	NI
	Small family or lower (-FZ)	< 3.85	NI	NI	NI	NI	NI	NI	NI	NI

√ is a correct factor or suitable, X is incorrect factor or unsuitable, and NI is no-influential factor.

3.3.3 Model for establishment Bio-waste to energy project in Tourist city
3.3.3.1 Model for enhance Bio-waste separation practice

According to the analysis, the people who engaged to separation of Bio-waste is accounted for 32.00% which lower than all entries (35.44%) and lowest position when comparison with other city (4th rank). The factor that influential with Bio-waste separation practice, significant at 90% (P-value <0.1), is applied for management plan as following. (Details are summarized in Table 3.18and Appendix B)

(A) Suitable characteristic for enhance practice

This section is summarized especially personal characteristic-related attributes factors which suitable to provided campaign for enhance Bio-waste separation practice. Details for analysis as following (see on Table 3.18 and 3.19)

(1) Personal income (IC), the result show positive sign of coefficient and 0.0849 of P-value for this factor. Meaning that, the person who has income more than nation average (84,000 Baht/year) is engage for Bio-waste separation which is 91.51% of possibility. This is a strength characteristic and accounted for 57.00% which higher than average of Thailand (all entries) and highest position (1st rank) when comparison with other city.

So, the person who has income more than national average (84,000 Baht/year), strength point, is suitable for promotes campaign because this group of person is accounted for 57.00% which higher number than the people who engaged to separation of Bio-waste (32.00%). This is a great opportunity for enhance Bio-waste separation practice in future.

(2) House space (HS), the result show negative sign of coefficient and 0.0001 of P-value for this factor. Meaning that, the person who lives in low space of house (apartment or townhouse) is engage for acceptance with Bio-waste to energy project which is 99.99% of possibility. This is a strength characteristic and accounted for 54.75% which higher than average of Thailand (all entries) and high position (2nd rank) when comparison with other city.

So, the person who lives in low space of house (apartment or townhouse), strength point, is suitable for promotes campaign because this group of person is accounted for 54.57% which higher number than the people who engaged to separation of Bio-waste (32.00%). This is a great opportunity for enhance Bio-waste separation practice in future.

Moreover, the Personal characteristic factors e.g. Level of education (ED), Major occupation (MO), Social Membership Status (MS), Living period in area (LP) and Family size (FZ) are not influential with Bio-waste separation practice which no effect from provided campaign.

(B) Suitable promotion campaign for enhance practice

The suitable campaign is summarized especially waste management practice-related attributes factors which able to creation of campaign and suitable for promotion. According to influential factor analysis, the suitable campaign which potentially to improvement Bio-waste separation practice i.e. (details on Table 3.18)

(1) Campaign for improving waste minimization practice, the result show negative sign of coefficient and 0.1000 of P-value for this factor. Meaning that, the person who has poor waste minimization practice (sometime or never) is engage for Bio-waste separation which is 90.00% of possibility. This situation is accounted for 20.50%, higher than average of Thailand (all entries) and highest position (2nd rank) when comparison with other city.

These refer to poor waste minimization practice has influential for good performance of Bio-waste separation practice. So, campaign for improving waste minimization practice is unnecessary to promote with people in area because poor waste minimization practice is still good performance of Bio-waste separation practice.

(2) Campaign for improving recyclable separation practice, the result show positive sign of coefficient and 0.0832 of P-value for this factor. Meaning that, the person who has good recyclable separation practice is engage for Bio-waste separation which is 91.68% of possibility. This situation is accounted for 55.75%, higher than average of Thailand (all entries) and highest position (1st rank) when comparison with other city.

These refer to good recyclable separation practice has influential for good performance of Bio-waste separation practice. So, campaign for improving recyclable separation practice is suitable to promote with people in area which able to enhance Bio-waste separation practice.

Moreover, the campaigns e.g. improving basic knowledge of waste separation, improving awareness of people, improving economic incentive, improving management & service system and campaign for improving attitude of people are not influential with Bio-waste separation practice. So, these are not suitable for promote.

3.3.3.2 Model for enhance acceptance for Bio-waste to energy project

According to the analysis, the people who accept to participate with Bio-waste to energy project is accounted for 85.50% which higher than all entries (63.35%) and highest when comparison with other city (1st rank). The factor that influential with acceptance on Bio-waste to energy project, significant at 90% (P-value <0.1), is applied for management plan as following. (Details are summarized in Table 3.18 and Appendix B)

(A) Suitable characteristic for enhance acceptance

This section is summarized especially personal characteristic-related attributes factors which suitable to provided campaign for enhance acceptance with Bio-waste to energy project. Details for analysis as following (see on Table 3.18 and 3.19)

(1) Level of education (ED), the result show negative sign of coefficient and 0.0024 of P-value for this factor. Meaning that, the person who educated or graduated under bachelor degree (primary or high school) is engage for acceptance on Bio-waste to energy project which is 93.78% of possibility. This is a strength characteristic and accounted for 77.50% which lower than average of Thailand (all entries) and highest position (4th rank) when comparison with other city. The strength characteristic is a threat and unnecessary for provide campaign, lower number than acceptance with Bio-waste to energy project (85.50%).

So, the person who educated or graduated on bachelor, weak point, is suitable for promotes campaign because this group of person is accounted for 22.50% which higher number than the people who engaged to acceptance with Bio-waste to energy project (85.50%). This is a great opportunity for enhance acceptance with Bio-waste to energy project in future.

Moreover, the Personal characteristic factors e.g. Personal income (IC), Major occupation (MO), Social Membership Status (MS), Living period in area (LP), Space of house(HS) and Family size (FZ) are not influential for acceptance on Bio-waste to energy project which no effect from provided campaign.

(B) Suitable promotion campaign for enhance acceptance

The suitable campaign is summarized especially waste management practice-related attributes factors which able to creation of campaign and suitable for promotion. According to influential factor analysis, the suitable campaign which potentially to improvement acceptance with Bio-waste to energy project i.e. (details on Table 3.18)

(1) Campaign for improving awareness of people, the result show negative sign of coefficient and 0.0876 of P-value for this factor. Meaning that, the person who poor awareness for separation or ignored is engage for acceptance with Bio-waste to energy project which is 91.24% of possibility. This situation is accounted for 33.00%, lower than average of Thailand (all entries) and lowest position (4th rank) when comparison with other city.

These refer to poor awareness for separation or ignored has influential for acceptance with Bio-waste to energy project. So, campaign for improving awareness of people is unnecessary to promote with people in area because poor awareness for separation is still acceptation with Bio-waste to energy project from people.

Moreover, the campaigns e.g. improving basic knowledge of waste separation, improving waste minimization practice, improving recyclable separation practice, improving awareness of people, improving management & service system and campaign for improving attitude of people are not influential for acceptation with Bio-waste to energy project. So, these are not suitable for promote.

Table 3.18: Summary of study profiles for established Bio-waste to energy project (B2E) in Tourist city

| Factors | | Descriptive analysis | | | | Binary logistic analysis | | | |
| | | Information | | Situation | | SEP_B | | ACEPT | |
Code	Definition	Characteristic	Data	**Rank	***Status	Coefficient sign	Probability values	Coefficient sign	Probability values
1. Dependent variable for analysis influential factor on Bio-waste to energy project (B2E)									
SEP_B	Bio-waste separation practice	Regular or often	32.00%	4	Low				
ACEPT	Acceptance with B2E	Acceptable	85.50%	1	High				
2. Independent variable for analysis influential factor on Bio-waste to energy project (B2E)									
ED	Level of education	Bachelor or more	22.50%	1	High	-	0.7029	-	*0.0024
IC	Personal income	Over nation average	57.00%	1	High	+	*0.0849	+	0.7632
MO	Major occupation	Employee	34.25%	3	Low	+	0.2896	-	0.3609
MS	Member of community group	Ever or present	46.50%	3	High	-	0.2384	+	0.7780
LP	Living period in area	Old comer,>10 yrs	44.75%	3	Low	-	0.8477	-	0.7888
HS	Space of house	High space	45.25%	3	Low	-	*0.0001	+	0.6868
FZ	Family size (Number of person)	Average number	4.25	3	Low	-	0.4436	-	0.7161
KW	Knowledge of waste separation	Average score	33.73	1	High	-	0.9700	-	0.2043
MP	Minimization practice	Regularly or often	79.50%	3	Low	-	*0.1000	+	0.3669
RP	Recyclable separation practice	Regularly or often	55.75%	1	High	+	*0.0832	-	0.5417
A1	Awareness for separate	Concern or good	67.00%	1	High	+	0.5961	-	*0.0876
A2	Economic incentive for separate	Ignore	64.00%	2	High	-	0.3704	+	0.7958
A3	Management and service system.	Satisfaction	47.25%	3	High	-	0.3052	+	0.7166
A4	Attitude on obstacle for separate	Agree	22.50%	4	Low	+	0.2869	-	0.1287
McFadden R^2							0.0656		0.0500

* Significant at 90% of probability or P-values<0.1.

** Rank, to rank of profiles when compared by type of city. 1=highest position 2=relatively high position 3=relatively low position 4=lowest position

***Status, to compare of profiles between all entries with each type of city. High is mean higher value than all entries and low is mean lower value than all entries.

Table 3.19: Potential Analysis for establish Bio-waste to energy project in Tourist city

Code	Characteristic	Information	Behavior for establish Bio-waste to energy project							
			Bio-waste separation practice (Accounted for 32.00% of all)				Acceptance on Bio-waste to energy project (Accounted for 85.50% of all)			
			Characteristic		Potential for promote		Characteristic		Potential for promote	
			Strong point	Weak point	Positive Potential	Negative Potential	Strong point	Weak point	Positive Potential	Negative Potential
ED	Bachelor or more (+ED)	22.50%	NI	NI	NI	NI	X	√	√	X
ED	Primary or High school (-ED)	77.50%	NI	NI	NI	NI	√	X	X	√
IC	Over nation average (+IC)	57.00%	√	X	√	X	NI	NI	NI	NI
IC	Under nation average (-IC)	43.00%	X	√	X	√	NI	NI	NI	NI
MO	Employee (+MO)	34.25%	NI	NI	NI	NI	NI	NI	NI	NI
MO	Owner /Independent (-MO)	65.75%	NI	NI	NI	NI	NI	NI	NI	NI
MS	Ever or present (+MS)	46.50%	NI	NI	NI	NI	NI	NI	NI	NI
MS	Never been a member (-MS)	53.50%	NI	NI	NI	NI	NI	NI	NI	NI
LP	Old comer,>10 yrs (+LP)	44.75%	NI	NI	NI	NI	NI	NI	NI	NI
LP	New comers, < 10 yrs (-LP)	55.25%	NI	NI	NI	NI	NI	NI	NI	NI
HS	High space (+HS)	45.25%	X	√	X	√	NI	NI	NI	NI
HS	Low space (-HS)	54.75%	√	X	√	X	NI	NI	NI	NI
FZ	Big family or highly (+FZ)	>4.25	NI	NI	NI	NI	NI	NI	NI	NI
FZ	Small family or lower (-FZ)	<4.25	NI	NI	NI	NI	NI	NI	NI	NI

√ is a correct factor or suitable, X is incorrect factor or unsuitable, and NI is no-influential factor.

3.3.4 Model for establishment Bio-waste to energy project in Commercial city

3.3.4.1 Model for enhance Bio-waste separation practice

According to the analysis, the people who engaged to separation of Bio-waste is accounted for 32.25% which lower than all entries (35.44%) and low position when comparison with other city (3rd rank). The factor that influential with Bio-waste separation practice, significant at 90% (P-value <0.1), is applied for management plan as following. (Details are summarized in Table 3.20 and Appendix B)

(A) Suitable characteristic for enhance practice

This section is summarized especially personal characteristic-related attributes factors which suitable to provided campaign for enhance Bio-waste separation practice. Details for analysis as following (see on table 3.20 and 3.21)

(1) House space (HS), the result show negative sign of coefficient and 0.0004 of P-value for this factor. Meaning that, the person who lives in low space of house (apartment or townhouse) is engage for acceptance with Bio-waste to energy project which is 99.96% of possibility. This is a strength characteristic and accounted for 47.25% which higher than average of Thailand (all entries) and low position (3rd rank) when comparison with other city.

So, the person who lives in low space of house (apartment or townhouse), strength point, is suitable for promotes campaign because this group of person is accounted for 47.25% which higher number than the people who engaged to separation of Bio-waste (32.25%). This is a great opportunity for enhance Bio-waste separation practice in future.

Moreover, the Personal characteristic factors e.g. Level of education (ED), Personal income (IC), Major occupation (MO), Social Membership Status (MS), Living period in area (LP) and Family size (FZ) are not influential with Bio-waste separation practice which no effect from provided campaign.

(B) Suitable promotion campaign for enhance practice

The suitable campaign is summarized especially waste management practice-related attributes factors which able to creation of campaign and suitable for promotion. According to influential factor analysis, the suitable campaign which potentially to improvement Bio-waste separation practice i.e. (details on Table 3.20)

(1) Campaign for improving awareness of people, the result show positive sign of coefficient and 0.0824 of P-value for this factor. Meaning that good

awareness or concerned is engages for Bio-waste separation which is 91.76% of possibility. This situation is accounted for 58.50%, lower than average of Thailand (all entries) and low position (3rd rank) when comparison with other city.

These refer to good awareness or concerned has influential for good performance of Bio-waste separation practice. So, campaign for improving awareness of people is suitable to promote with people in area which able to enhance Bio-waste separation practice.

(2) Campaign for improving economic incentive, the result show negative sign of coefficient and 0.0680 of P-value for this factor. Meaning that, the person who concentrated on economic incentive for separation is engage for acceptance with Bio-waste to energy project with Bio-waste to energy project which is 94.20% of possibility. This situation is accounted for 37.50%, higher than average of Thailand (all entries) and high position (2nd rank) when comparison with other city.

These refer to concentrated on economic incentive for separation has influential for acceptance with Bio-waste to energy project. So, campaign for improving economic incentive is suitable to promote with people in area which able to enhance acceptance with Bio-waste to energy project.

Moreover, the campaigns e.g. improving basic knowledge of waste separation, improving waste minimization practice, improving recyclable separation practice, improving management & service system and campaign for improving attitude of people are not influential for Bio-waste separation practice. So, these are not suitable for promote.

3.3.4.2 Model for enhance acceptance for Bio-waste to energy project

According to the analysis, the people who accept to participate with Bio-waste to energy project is accounted for 67.25% which higher than all entries (63.35%) and high position when comparison with other city (2nd rank). The factor that influential with acceptance on Bio-waste to energy project, significant at 90% (P-value <0.1), is applied for management plan as following. (Details are summarized in Table 3.20 and Appendix B)

(A) Suitable characteristic for enhance acceptance

This section is summarized especially personal characteristic-related attributes factors which suitable to provided campaign for enhance acceptance with Bio-waste to energy project. Details for analysis as following (see on Table 3.20 and 3.21)

(1) Personal income (IC), the result show positive sign of coefficient and 0.0007 of P-value for this factor. Meaning that, the person who has income more than nation average (84,000 Baht/year) is engage for acceptance on Bio-waste to energy project which is 99.93% of possibility. This is a strength characteristic and accounted for 44.25% which higher than average of Thailand (all entries) and high position (2nd rank) when comparison with other city. The strength characteristic is a threat and unnecessary for provide campaign, lower number than acceptance with Bio-waste to energy project (67.25%).

So, the person who has income lower than nation average, weak point, is suitable for promotes campaign because this group of person is accounted for 55.75% which higher number than the people who engaged to acceptance with Bio-waste to energy project (67.25%). This is a great opportunity for enhance acceptance with Bio-waste to energy project in future.

(2) Major occupation (MO), the result show negative sign of coefficient and 0.0037 of P-value for this factor. Meaning that, the person who has independent occupation is engage for acceptance on Bio-waste to energy project which is 99.63% of possibility. This is a strength characteristic and accounted for 58.75% which higher than average of Thailand (all entries) and low position (3rd rank) when comparison with other city. The strength characteristic is a threat and unnecessary for provide campaign, lower number than acceptance with Bio-waste to energy project (67.25%).

So, the person who has employee occupation, weak point, is suitable for promotes campaign because this group of person is accounted for 41.25% which higher number than the people who engaged to acceptance with Bio-waste to energy project (67.25%). This is a great opportunity for enhance acceptance with Bio-waste to energy project in future.

Moreover, the Personal characteristic factors e.g. Level of education (ED), Social Membership Status (MS), Living period in area (LP), House space (HS) and Family size (FZ) are not influential for acceptance on Bio-waste to energy project which no effect from provided campaign.

(B) Suitable promotion campaign for enhance acceptance

The suitable campaign is summarized especially waste management practice-related attributes factors which able to creation of campaign and suitable for promotion. According to influential factor analysis, the suitable campaign which

potentially to improvement acceptance with Bio-waste to energy project i.e. (details on Table 3.20)

(1) Campaign for improving economic incentive, the result show negative sign of coefficient and 0.0444 of P-value for this factor. Meaning that, the person who concentrated on economic incentive for separation is engage for acceptance with Bio-waste to energy project which is 95.56% of possibility. This situation is accounted for 37.50%, higher than average of Thailand (all entries) and highest position (2nd rank) when comparison with other city.

These refer to concentrated on economic incentive for separation has influential for acceptance with Bio-waste to energy project. So, campaign for improving economic incentive is suitable to promote with people in area which able to enhance acceptance with Bio-waste to energy project.

(2) Campaign for improving attitude of people, the result show negative sign of coefficient and 0.0000 of P-value for this factor. Meaning that, the person who disagrees on obstacle for separation is engage for acceptance with Bio-waste to energy project with Bio-waste to energy project which is 100.00% of possibility. This situation is accounted for 49.75%, higher than average of Thailand (all entries) and high position (2nd rank) when comparison with other city.

These refer to good attitude (disagrees on obstacle for separation) has influential for acceptance with Bio-waste to energy project. So, campaign for improving attitude of people is suitable to promote with people in area which able to enhance acceptance with Bio-waste to energy project.

(3) Campaign for improving awareness of people, the result show negative sign of coefficient and 0.0060 of P-value for this factor. Meaning that, the person who has poor awareness or ignored is engage for acceptance with Bio-waste to energy project which is 99.60% of possibility. This situation is accounted for 41.50%, higher than average of Thailand (all entries) and high position (2nd rank) when comparison with other city.

These refer to poor awareness or ignored has influential for acceptance with for acceptance with Bio-waste to energy project. So, campaign for improving awareness of people is unnecessary to promote with people in area because poor awareness or ignored is still acceptation with Bio-waste to energy project.

(4) Campaign for improving management and service system, the result show negative sign of coefficient and 0.0039 of P-value for this factor. Meaning that, the person who dissatisfactory on management & service system is engages for acceptance with Bio-waste to energy project which is 99.61% of possibility. This situation is accounted for 51.25%, lowest than average of Thailand (all entries) and low position (3rd rank) when comparison with other city.

These refer to dissatisfactory on management & service system has influential for acceptance with Bio-waste to energy project. So, campaign for improving management and service system is unnecessary to promote with people in area because poor awareness or ignored is still acceptation with Bio-waste to energy project.

Moreover, the campaigns e.g. improving basic knowledge of waste separation, improving waste minimization practice and improving recyclable separation practice are not influential for acceptation with Bio-waste to energy project. So, these are not suitable for promote.

Table 3.20: Summary of study profiles for established Bio-waste to energy project (B2E) in Commercial city

Factors		Descriptive analysis				Binary logistic analysis			
		Information		Situation		SEP_B		ACEPT	
Code	Definition	Characteristic	Data	**Rank	***Status	Coefficient sign	Probability values	Coefficient sign	Probability values
1. Dependent variable for analysis influential factor on Bio-waste to energy project (B2E)									
SEP_B	Bio-waste separation practice	Regular or often	35.25%	3	Low				
ACEPT	Acceptance with B2E	Acceptable	67.25%	2	High				
2. Independent variable for analysis influential factor on Bio-waste to energy project (B2E)									
ED	Level of education	Bachelor or more	18.25%	2	High	-	0.4966	-	0.8640
IC	Personal income	Over nation average	44.25%	2	High	-	0.4373	+	*0.0007
MO	Major occupation	Employee	41.25%	2	Low	+	0.2139	-	*0.0037
MS	Member of community group	Ever or present	51.25%	1	High	+	0.8637	-	0.6365
LP	Living period in area	Old comer,>10 yrs	47.75%	2	Low	-	0.2013	-	0.8217
HS	Space of house	High space	52.75%	2	Low	-	*0.0004	-	0.2705
FZ	Family size (Number of person)	Average number	4.31	2	High	-	0.4174	+	0.5498
KW	Knowledge of waste separation	Average score	32.79	2	High	-	0.6225	-	0.2036
MP	Minimization practice	Regularly or often	80.00%	2	Low	+	0.4856	-	0.2307
RP	Recyclable separation practice	Regularly or often	41.25%	2	High	-	0.9014	+	0.4020
A1	Awareness for separate	Concern or good	58.50%	3	Low	+	*0.0824	-	*0.0060
A2	Economic incentive for separate	Ignore	62.50%	3	Low	-	*0.0680	-	*0.0444
A3	Management and service system	Satisfaction	48.25%	2	High	-	0.8933	-	*0.0039
A4	Attitude on obstacle for separate	Agree	50.25%	3	Low	+	0.8614	-	*0.0000
McFadden R²							0.0514		0.1367

* Significant at 90% of probability or P-values<0.1.
** Rank, to rank of profiles when compared by type of city.1=highest position 2=relatively high position 3=relatively low position 4=lowest position
***Status, to compare of profiles between all entries with each type of city. High is mean higher value than all entries and low is mean lower value than all entries.

Table 3.21: Potential Analysis for establish Bio-waste to energy project in Commercial city

Code	Characteristic	Information	Bio-waste separation practice (Accounted for 35.25% of all)				Acceptance on Bio-waste to energy project (Accounted for 67.25% of all)			
			Characteristic		Potential for promote		Characteristic		Potential for promote	
			Strong point	Weak point	Positive Potential	Negative Potential	Strong point	Weak point	Positive Potential	Negative Potential
ED	Bachelor or more (+ED)	18.25%	NI	NI	NI	NI	NI	NI	NI	NI
ED	Primary or High school (-ED)	81.75%	NI	NI	NI	NI	NI	NI	NI	NI
IC	Over nation average (+IC)	44.25%	NI	NI	NI	NI	√	X	X	√
IC	Under nation average (-IC)	55.75%	NI	NI	NI	NI	X	√	√	X
MO	Employee (+MO)	41.25%	NI	NI	NI	NI	X	√	√	X
MO	Owner /Independent (-MO)	58.75%	NI	NI	NI	NI	√	X	X	√
MS	Ever or present (+MS)	51.25%	NI	NI	NI	NI	NI	NI	NI	NI
MS	Never been a member (-MS)	48.75%	NI	NI	NI	NI	NI	NI	NI	NI
LP	Old comer,>10 yrs (+LP)	47.75%	NI	NI	NI	NI	NI	NI	NI	NI
LP	New comers, < 10 yrs (-LP)	52.25%	NI	NI	NI	NI	NI	NI	NI	NI
HS	High space (+HS)	52.75%	X	√	X	√	NI	NI	NI	NI
HS	Low space (-HS)	47.25%	√	X	√	X	NI	NI	NI	NI
FZ	Big family or highly (+FZ)	> 4.31	NI	NI	NI	NI	NI	NI	NI	NI
FZ	Small family or lower (-FZ)	< 4.31	NI	NI	NI	NI	NI	NI	NI	NI

√ is a correct factor or suitable, X is incorrect factor or unsuitable, and NI is no-influential factor.

3.4 Conclusions

Actually, the launch of campaign is selected by official who responsible in each area, but at present, lack of information to supported decision making. According to result, some campaign is not impacted and influential with in any behavior that wasting time and budget in promotion. This conclusion is focus on the effectiveness campaign for improving behavior by type of city e.g. (1) Bio-waste separation practice and (2) Acceptance with Bio-waste to energy project. In fact, information for supported project are necessary to provided before project launch but some campaign are help to improving that performance as in-directly.

So, result of logistic analysis and Potential Analysis are applied to support in this conclusion, to definition of suitable campaign and characteristic for provided. Details as summarized in Table 3.22 and 3.23.

3.4.1 Agricultural city

(A) Bio-waste separation practice

The implementation of campaign for agriculture city which effectiveness to enhance Bio-waste separation practice namely (1) Campaign for improving basic knowledge of waste separation (2) Campaign for improving waste minimization practice and (3) Campaign for improving recyclable separation practice. These campaigns are suitable to concentrate with the person who has characteristics i.e. (1) income is under nation average or less than 84,000 Bath/ year, (2) independent or owner of occupation and (3) never been a membership of social group. This pattern is able to raise Bio-waste separation practice with people in agriculture city.

(B) Acceptance with Bio-waste to energy project

The implementation of campaign for agriculture city which effectiveness to enhance acceptance with Bio-waste to energy project is only Campaign for improving attitude of people. This campaign is suitable to concentrate with the person who has characteristics i.e. (1) old comer or lived in area more than 10 years and (2) living in high space house such as trade building or detached house. This pattern is able to raise acceptation on Bio-waste to energy project with people in agriculture city.

3.4.2 Industrial city

(A) Bio-waste separation practice

The implementation of campaign for industrial city which effectiveness to enhance Bio-waste separation practice namely (1) Campaign for improving recyclable

separation practice, (2) Campaign for improving awareness of people, and (3) Campaign for improving management and service system. These campaigns are suitable to concentrate with the person who living in low space house such as apartment or townhouse. This pattern is able to raise Bio-waste separation practice with people in industrial city.

(B) Acceptance with Bio-waste to energy project

The implementation of campaign for industrial city which effectiveness to enhance acceptance with Bio-waste to energy project is only Campaign for improving economic incentive. This campaign is suitable to concentrate with the person who has employee occupation. This pattern is able to raise acceptation on Bio-waste to energy project with people in industrial city.

3.4.3 Tourist City

(A) Bio-waste separation practice

The implementation of campaign for tourist city which effectiveness to enhance Bio-waste separation practice is only campaign for improving recyclable separation practice. This campaign is suitable to concentrate with the person who (1) income is over nation average or more than 84,000 Bath/ year and (2) living in low space house such as apartment or townhouse. This pattern is able to raise Bio-waste separation practice with people in tourist city.

(B) Acceptance with Bio-waste to energy project

The campaign which influential with practice is only Campaign for improving awareness of people but unnecessary to provided. In fact, this no impacted for practice because level of acceptance with Bio-waste to energy project in this city is in very high level or accounted for 80.50%.

3.4.4 Commercial city

(A) Bio-waste separation practice

The implementation of campaign for commercial city which effectiveness to enhance Bio-waste separation practice namely (1) Campaign for improving awareness of people and (2) Campaign for improving economic incentive. These campaigns are suitable to concentrate with the person who living in low space house such as apartment or townhouse. This pattern is able to raise Bio-waste separation practice with people in commercial city.

(B) Acceptance with Bio-waste to energy project

The implementation of campaign for commercial city which effectiveness to enhance acceptance with Bio-waste to energy project namely (1) Campaign for improving economic incentive and (2) Campaign for improving attitude of people. This campaign is suitable to concentrate with the person who has characteristics i.e. (1) income is under nation average or less than 84,000 Bath/year and (2) has employee occupation. This pattern is able to raise acceptation on Bio-waste to energy project with people in commercial city.

Table 3.22: Summarization of suitable characteristic for provided campaign to enhance performance of Bio-waste to energy project

Code	Factor / Characteristic	Behavior for establish Bio-waste to energy project				Acceptance on Bio-waste to energy project (ACEPT)			
		Bio-waste separation practice (SEP_B)							
		Agriculture	Industrial	Tourist	Commercial	Agriculture	Industrial	Tourist	Commercial
ED	Bachelor or more	NI	NI	NI	NI	NI	NI	√	NI
	Primary /High school	NI	NI	NI	NI	NI	NI	X	NI
IC	Over nation average	X	NI	√	NI	NI	NI	NI	X
	Under nation average	√	NI	X	NI	NI	NI	NI	√
MO	Employee	X	NI	NI	NI	NI	√	NI	√
	Owner /Independent	√	NI	NI	NI	NI	X	NI	X
MS	Ever or present	X	NI	NI	NI	NI	NI	NI	NI
	Never been a member	√	NI	NI	NI	NI	NI	NI	NI
LP	Old comer,>10 yrs	NI	NI	NI	NI	√	NI	NI	NI
	New comers, < 10 yrs	NI	NI	NI	NI	X	NI	NI	NI
HS	High space	NI	X	X	X	√	NI	NI	NI
	Low space	NI	√	√	√	X	NI	NI	NI
FZ	Big family	NI	NI	NI	NI	NI	NI	NI	NI
	Small family	NI	NI	NI	NI	NI	NI	NI	NI

√ is suitable characteristic for provide campaign, as a great opportunity to received high performance of behavior for establish Bio-waste to energy project.

X is unsuitable characteristic, unnecessary to provide campaign for received high performances of behavior for establish Bio-waste to energy project.

NI is no-influential factor with practice and unnecessary to provide campaign.

Table 3.23: Summarization of suitable campaign for provided with people to enhance performance of Bio-waste to energy project

Campaign	Behavior for establish Bio-waste to energy project							
	Bio-waste separation practice (SEP_B)				Acceptance on Bio-waste to energy project (ACEPT)			
	Agriculture	Industrial	Tourist	Commercial	Agriculture	Industrial	Tourist	Commercial
Campaign for improving basic knowledge of waste separation	√ (+KW)	NI	NI	NI	X (-KW)	NI	NI	NI
Campaign for improving waste minimization practice	√ (+MP)	NI	X (-MP)	NI	X (-MP)	NI	NI	NI
Campaign for improving recyclable separation practice	√ (+RP)	√ (+RP)	√ (+RP)	NI	NI	NI	NI	NI
Campaign for improving awareness of people	NI	√ (+AI)	NI	√ (+AI)	X (-AI)	NI	X (-AI)	X (-AI)
Campaign for improving economic incentive	NI	NI	NI	√ (-A2)	NI	√ (-A2)	NI	√ (-A2)
Campaign for improving management & service system	X (-A3)	√ (+A3)	NI	NI	NI	NI	NI	X (-A3)
Campaign for improving attitude of people	NI	NI	NI	NI	√ (-A4)	NI	NI	√ (-A4)

√ is suitable campaign for provide with people in area, to received high performance of behavior for establish Bio-waste to energy project.

X is unsuitable campaign, as unnecessary to provide with people in area for received high performance of behavior for establish Bio-waste to energy project.

NI is no-influential factor with practice and unnecessary to provide with people in area