APPENDIX
Methodology

1. Sample Design

A Stratified Two–stage Sampling was adopted for the survey. Provinces were considered to be constituted strata.   There were altogether 76 strata, each stratum was divided into two parts according to the type of local administration, namely, municipal areas, and non-municipal areas.

1) Selection of Primary Sampling Units

The sample selection of blocks/villages was performed separately and independently in each part by using probability proportional to the total number of households in that block or village.

2) Selection of Secondary Sampling Units

In this stage, private households were the ultimate sampling units. Households in every sample block and village were listed to serve as the sampling frame then the set of households was rearranged by size of household (classified by number of household members) and type of economic household (determined on the basis of the occupational type which produces the highest income in the household). Finally, private sampled households were selected by using the systematic method in each type of local administration with the following sample sizes :

(1) 15 households from each of sample blocks in municipal areas

(2) 10 households from each of sample villages in non–municipal areas

The total number of private sampled households for the whole year was 52,000 households.

2. Method of Estimation

The results of the survey were presented at regional levels and separately for Bangkok Metropolitan and the three provinces (Nonthaburi, Pathum Thani and Samut Prakan) and other regions, i.e. Central, Northern, Northeastern and Southern region. The estimation processes were the following stages:

1) Estimation of Total

Let k = $1, 2, 3, \ldots, m_{hij}$ (sample / village)

       j = $1, 2$ (type of local administration)

       i = $1, 2, 3, \ldots, A_h$ (province)

       h = $1, 2, 3, 4, 5$ (region)

(1) Adjusted estimate of the total number of characteristic X of household for the hth region was based on the formula :

$$x''_h = \sum_{i=1}^{A_h} \sum_{j=1}^{2} \frac{x'_{hij}}{y'_{hij}} Y_{hij} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

where Y_{hij} is the estimate, based on the population projection, of the total number of households [1] in the jth area, i^{th} province, h^{th} region.

       x'_{hij} is the ordinary estimate of the total number of characteristic X of household in the jth area, i^{th} province, h^{th} region.

$$x'_{hij} = \frac{1}{m_{hij}} \sum_{k=1}^{m_{hij}} \frac{1}{P_{hijk}} \frac{N_{hijk}}{n_{hijk}} x_{hijk}$$

       y'_{hij} is the ordinary estimate of the total number of households in the jth area, i^{th} province, h^{th} region.

$$y'_{hij} = \frac{1}{m_{hij}} \sum_{k=1}^{m_{hij}} \frac{1}{P_{hijk}} \frac{N_{hijk}}{n_{hijk}} n'_{hijk}$$

that x_{hijk} is the characteristic X of every sample household in the kth sample block / village, j^{th} area, i^{th} province, h^{th} region.

       N_{hijk} is the number of listing households in the kth sample block / village, j^{th} area, i^{th} province, h^{th} region.

       n_{hijk} is the number of enumerating sample households in the kth sample block / village, j^{th} area, i^{th} province, h^{th} region.

       P_{hijk} is the probability of selection of the kth sample block / village, j^{th} area, i^{th} province, h^{th} region.

m_{hij} is the number of sample blocks / villages in the jth area, i^{th} province, h^{th} region.

n'_{hijk} is the number of the interviewed households in the kth sample block / village, j^{th} area, i^{th} province, h^{th} region.

(2) Adjusted estimate of the total number of characteristic X of household for the whole kingdom was based on the formula :

$$x'' = \sum_{h=1}^{5} x''_h \quad \text{...(2)}$$

2) Estimation of Average

(1) The estimate of the average of characteristic X per household for the hth region was based on the formula :

$$\bar{x}_h = \frac{x''_h}{Y_h} \quad \text{...(3)}$$

where Y_h is the estimate, based on the population projection, of the total number of households in the hth region

$$Y_h = \sum_{i=1}^{A_h} \sum_{j=1}^{2} Y_{hij}$$

(2) The estimate of the average of characteristic X per household for the whole kingdom was based on the formula :

$$\bar{x} = \frac{x''}{Y} \quad \text{...(4)}$$

where Y is the estimate, based on the population projection, of the total number of households in the whole kingdom

$$Y = \sum_{h=1}^{5} Y_h$$

3) Estimation of Coefficient of Variation of the Total Number of Characteristic *X* of Household

(1) The estimate coefficient of variance of x''_{hij} was

$$cv(x''_{hij}) = \frac{\sqrt{\hat{V}(x''_{hij})}}{x''_{hij}} \times 100\ \% \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(5)$$

(2) The estimate coefficient of variance of x''_{hi} was

$$cv(x''_{hi}) = \frac{\sqrt{\hat{V}(x''_{hi})}}{x''_{hi}} \times 100\ \% \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(6)$$

(3) The estimate coefficient of variance of x''_{hj} was

$$cv(x''_{hj}) = \frac{\sqrt{\hat{V}(x''_{hj})}}{x''_{hj}} \times 100\ \% \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(7)$$

(4) The estimate coefficient of variance of x''_{h} was

$$cv(x''_{h}) = \frac{\sqrt{\hat{V}(x''_{h})}}{x''_{h}} \times 100\% \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(8)$$

(5) The estimate coefficient of variance of x''_{j} was

$$cv(x''_{j}) = \frac{\sqrt{\hat{V}(x''_{j})}}{x''_{j}} \times 100 \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(9)$$

(6) The estimate coefficient of variance of x'' was

$$cv(x'') = \frac{\sqrt{\hat{V}(x'')}}{x''} \times 100 \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots(10)$$

3. Annual Percentage Change

$$g_{t+n} = \left\{ \left[\frac{V_{t+n}}{V_t} \right]^{1/n} - 1 \right\} \times 100$$

g_{t+n} is annual percentage change between year t+n and year t.

V_{t+n}, V_t are values in year t+n and year t, respectively.

t is the based year (in this context : 2007, 2009).

n is number of comparable year (in this context : 2).

4. Real Income

$$Z_{t+n}^{R} = \frac{CPI_t}{CPI_{t+n}} \times Z_{t+n}$$

Z_{t+n}^{R} is real income in year t+n.

Z_{t+n} is nominal income in year t+n.

CPI_{t+n}, CPI_t are consumer price indices in year t+n , and year t, respectively.

t is the based year (in this context : 2007).

n is number of comparable year (in this context : 2, 4).

5. Data Collection

The sample of about 52,000 households, in both municipal and non-municipal areas, was divided into twelve equally representative sub–samples. Each sub–household group was interviewed for the period of one–month. The survey data was collected by an interviewing method. The interviewers were sent out to interview the household head or other household members of the sample households. The period of data collection started from January to December 2011.

6. Data Processing

All recorded questionnaires were preliminarily reviewed, edited and encoded in each provincial office before sending the raw data file to the NSO headquarter. All raw data were, consequently, computerizedly edited for the final review. After several stages of data correction, the results were then tabulated.

Estimation of Coefficient of Variation (CV) of the Totle Number of Income and Expenditure, Region and Area

Region	c.v. %					
	Total	Income		Total	Expenditure	
		Municiple Area	Non-municiple Area		Municiple Area	Non-municiple Area
Whole Kingdom	**1.60**	**2.91**	**1.42**	**0.87**	**1.53**	**0.94**
Greater Bangkok [1]	5.29	5.82	5.55	2.88	3.22	3.96
Central	1.55	2.51	1.95	1.26	1.92	1.67
North	2.21	2.64	3.14	1.38	2.18	1.77
Northeast	1.97	2.41	2.63	1.34	1.85	1.72
South	2.73	3.77	3.63	1.71	2.28	2.29

1/ Including Nonthaburi, Pathum Thani and Samut Prakan.