

# **Bhutan 2009 Indicator Survey: Survey Description And Technical Report**

## **1. Introduction**

This document provides information on the firm-level data collected in Bhutan from 15 April 2009 to 4 June 2009 as part of the Bhutan 2009 Indicator Survey, an initiative of the World Bank's Enterprise Analysis Unit ([www.enterprisesurveys.com](http://www.enterprisesurveys.com)). In addition to the Indicator Survey, an Employee Survey was simultaneously conducted in Bhutan to capture perspectives on the work environment from employees.

An Enterprise Survey is a firm-level survey of a representative sample of the manufacturing and services sectors in an economy. The surveys cover a broad range of business-environment topics including access to finance, corruption, infrastructure, crime, competition, and performance measures. Firm-level datasets, the investment climate indicators derived from them, as well as research papers are available on the website. Objective data on the business environment as experienced by firms, performance measures, firm characteristics, and perceptions regarding obstacles to growth are collected via face-to-face interviews. An Indicator Survey is similar to an Enterprise Survey but has fewer questions and has a smaller number of targeted firms for interview. Indicator Surveys are fielded in economies that are smaller and/or where the number of eligible firms for interview does not support a full Enterprise Survey.

This report describes the sampling design of the Bhutan survey, the structure of the dataset and additional information that may be useful when using the data, including information on non-response rates, the calculation of sample weights and country-specific factors that may have affected survey implementation.

The survey was conducted in partnership with the private contractor Druk Associates located in Thimphu, Bhutan. The response rate for the Indicator Survey was 72%.

## **2. Survey Target Population**

The Survey is meant to be representative of the manufacturing and services sectors of the economy. It comprises: all manufacturing sectors according to the ISIC Revision 3.1 group classification (group D), construction sector (group F), services sector (groups G and H), transport, storage, and communications sector (group I), and sub-sector 72 which is IT firms. Note that this population definition excludes the following sectors: financial intermediation (group J), real estate and renting activities (group K, except sub-sector 72 which is IT firms), and all public or utilities-sectors. Please refer to the United Nations Statistics Division website (<http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=17>) for the full classification list.

For Bhutan, the sectors included in the sample by two-digit ISIC code are as follows:

Manufacturing: 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37  
Services: 45, 50, 51, 52, 55, 60, 61, 62, 63, 64, 72

The Indicator Survey for Bhutan targeted 250 registered establishments. Only establishments with 5 or more employees are eligible to be interviewed. The Employee Survey targeted 350 employees- approximately 10 employees in 35 firms.

In the Enterprise Surveys methodology, the requirements for registration are defined on a country-by-country basis using the information collected by Doing Business and information from the in-country contractors. Registered firms were defined as licensed manufacturing and services companies in Bhutan, as recorded in the quarterly updated master database of the Ministry of Economic Affairs of the Royal Government of Bhutan (the latest available dating from June 2008). The database also includes the companies listed with the Registrar of Companies.

### **3. Sampling for Registered Establishments**

The survey sample for establishments in Bhutan was selected using stratified random sampling with replacement, following the methodology explained in the *Sampling Manual*.<sup>1</sup> Three levels of stratification were used in the Bhutan sample: firm sector, firm size, and geographic region.

Industry stratification was designed at two levels: the universe was stratified into manufacturing and services industries. The initial sample design had a target of 125 interviews in manufacturing and 125 interviews in services.

Size stratification was defined following the standardized definition used for the Enterprise Surveys: small (5 to 19 employees), medium (20 to 99 employees), and large (100 or more employees). For stratification purposes, the size of the firm was obtained by a proxy firm size variable in the database obtained from the Ministry of Economic Affairs.

Regional stratification was defined in terms of the geographic regions with the main economic activity in the country: Paro/Thimphu, Phuentsholing, Gelephu/Sarpang, and Samdrup Jongkhar were the four metropolitan areas selected in Bhutan.

### **4. Sampling implementation**

Given the stratified design, sample frames containing a complete and updated list of establishments as well as information on all stratification variables (firm size, industry, and region) are required to draw the sample for the Enterprise Surveys.

The frame for Bhutan was obtained from the Royal Government of Bhutan Ministry of Economic Affairs (MoEA). Other sector-specific lists of registered companies were sought to cross-check the accuracy and completeness of the list obtained from MoEA. A list of construction companies and a list of hospitality firms (restaurants, hotels, tourism, etc.) were successfully obtained. All three lists contained firm name and limited contact information, ISIC code, and a proxy variable for firm size.

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<sup>1</sup> The complete text of the *Sampling Manual* can be found at [http://www.enterprisesurveys.org/documents/Sampling\\_Note.pdf](http://www.enterprisesurveys.org/documents/Sampling_Note.pdf)

The local contractor noted, through the course of survey fieldwork, that the list was not accurate; they found that many firms listed in the sample frame had discontinued business or had incorrect contact details. In some cases, the proxy firm size variable in the frame differed from the firm's actual size. Also there were repeated entries in the list, firms that were ineligible due to their actual sector of activity (e.g. education and financial services), and many firms were simply unable to be located.

Counts from the sample frame are shown below. The original sample design, with specific targets for these strata, is included in Appendix A.

### Original Universe Figures for Bhutan

Region	Size	Sector		Total
		Manuf	Services	
Thimphu/Paro	Small	42	458	500
	Medium	2	38	40
	Large	2	31	33
		46	527	573
Phuentsholing	Small	48	149	197
	Medium	23	7	30
	Large	21	8	29
		92	164	256
Gelephu/Sarpang	Small	15	20	35
	Medium	0	1	1
	Large	1	1	2
		16	22	38
Samdrup Jongkhar	Small	6	197	203
	Medium	2	10	12
	Large	3	16	19
		11	223	234
Grand total		165	936	1101

Given the Enterprise Surveys methodology of oversampling large sized firms and given the suboptimal sample frame, midway through fieldwork when the contractor was struggling to meet the targeted number of large firms and the targeted number of firms in the more remote geographical areas, the contractor was given permission to interview eligible firms that were not in the original, provided sample frame. 28 firms that were not in the original sample frame were identified and successfully interviewed.

Given the impact that non-eligible units included in the sample universe may have on the results, adjustments were made when computing the appropriate weights for individual observations. Breaking down by industry, the following numbers of establishments were surveyed:

### Achieved Sample

Region	Size	Sector		Total
		Manuf	Services	
Thimphu/Paro	Small	14	25	39
	Medium	7	29	36
	Large	1	10	11
		22	64	86
Phuentsholing	Small	16	20	36
	Medium	24	19	43
	Large	12	8	20
		52	47	99
Gelephu/Sarpang	Small	6	1	7
	Medium	1	9	10
	Large	1	0	1
		8	10	18
Samdrup Jongkhar	Small	1	32	33
	Medium	5	8	13
	Large	0	1	1
		6	41	47
Grand total		88	162	250

## 5. Database Structure

All variables in the database are named using, first, the letter of each section and, second, the number of the variable within the section, i.e. *a1* denotes section *A*, question *1*. Variable names preceded by a prefix “*BH*” indicate questions specific to Bhutan that are not included in the global roll-out questionnaire; these questions may not have been asked in Enterprise/Indicator Surveys conducted in countries in other regions. All other variables are global and are present in all country surveys conducted throughout the world. All variables are numeric with the exception of those variables with an “*x*” at the end of their names. The suffix “*x*” indicates that the variable is alpha-numeric.

The variable *idstd* uniquely identifies each establishment at the global level.

The variables *a2* (sampling region), *a6a* (sampling establishment’s size), and *a4a* (sampling sector) contain the establishment’s classification into the strata chosen for each country using information from the sample frame. These variables generate the strata cells for each industry/region/size combination. The variables containing the sample frame information are included in the data set for researchers who may want to further investigate statistical features of the survey and the effect of the survey design on their results.

-*a2* is the variable describing the sampling regions

-*a6a*: coded using the definition for small, medium, and large establishments as discussed above. Firms missing the code were firms the contractor interviewed that were not in the original sample frame.

-*a4a*: coded using ISIC codes for the industries that comprise the manufacturing (1) and services categories (2) used in the stratification. Firms missing the code were firms the contractor interviewed that were not in the original sample frame.

Note that these variables may not coincide with reality for some establishments as sample frames may contain information that is later found to be inaccurate.

The surveys were implemented following a two stage procedure. In the first stage a screener questionnaire was administered over the phone (or in the case of Bhutan, more likely in person) to determine sampled establishment's eligibility for the survey and to make appointments; in the second stage, a face-to-face interview took place with the Manager/Owner/Director of each establishment. The variables *a4b* and *a6b* contain the industry and size of the establishment from the screener questionnaire. Variables *a8* to *a11* contain additional information that was collected in the screening phase.

The main questionnaire contains variables for location (*a3x*), industry (*d1a2*), and number of employees (*l1*, *l6* and *l8*) that more accurately reflect the characteristics of establishments than the information provided on these variables in the sample frame or the screener.

A distinction should be made between the variable *a4a* and *d1a2* (*industry expressed as ISIC rev. 3.1 code*). The former gives the establishment's classification into industry-strata based on information available from the sample frame, whereas variable *d1a2* indicates the actual ISIC code of the main output of the establishment as answered by the interviewee. This variable is probably the most accurate variable with which to classify establishments by activity.

Variable *a3x* indicates the actual location of the establishment. There may be divergences between the location in the sampling frame and the actual location, as establishments may be listed in one place on the sample frame but the actual physical location is in another place.

Variables *l1*, *l6* and *l8* provide a more accurate measure of employment and account for both permanent and temporary employment. Special efforts were made to make sure that this information was not missing for most establishments.

## **6. Sample Eligibility and Universe Estimates**

Special care is given to the correct computation of universe estimates and weights in the Enterprise Surveys. Considering the varying quality of sample frames across countries, it is important to accurately adjust the universe totals within each region/industry/size stratum to account for the presence of ineligible units in the sampling frame. Information on ineligible firms in the sample frame is used to scale down the universe estimate for each cell by the observed proportion of ineligible units within the cell.

Information on the eligibility of all contacted firms in the sample frame is collected during the screening process. Each contacted firm is assigned a status detailed in the table below. The contractor indicated that they made several efforts to complete incomplete firm contact information and to track down firms listed in the sample frame. It is estimated that 50% of firms

that could not be located were very likely out of business altogether. Hence in the table below, 72 firms that were unable to be located were partitioned to Eligible and Ineligible.

### Eligibility Characteristics of 583 Firms Contacted

<b>Eligible (345 firms)</b>	
Successful interview (firm from provided frame)	222
Successful interview (firm not in original frame)	28
Could not locate firm	36
Unclear why firm not interviewed	18
Firm located elsewhere in different eligible region	15
Could not get appointment	11
Firm refused to participate	7
Incomplete interview	6
Firm closed temporarily	1
Travel too difficult to reach firm	1
<b>Ineligible (238 firms)</b>	
Firm has been shut down	136
Could not locate firm	36
Firm has less than 5 employees	32
Firm is a repeat entry of another firm	13
Firm is government/education/finance	11
Firm is outside eligible geographic regions	7
Is really a person not a firm	3

Universe estimates for the number of establishments in each industry-region-size cell in Bhutan were produced. Appendix B shows the universe estimates of the numbers of registered establishments based on the weak and median estimates. Median estimates take into account the proportion of firms that were found to be ineligible during fieldwork among the small, services firms. All of the untouched firm listings were small, services firms. Amongst small, services firms that were contacted, there were 138 ineligible firms vs. 139 eligible firms (59 eligible not interviewed + 78 eligible interviewed). So the reduction rate for untouched firm listings was calculated at 50%. Due to the high proportion of ineligible firms in the sample frame elicited during fieldwork, only median weights (w median) are recommended for use when analyzing the dataset.

Once accurate estimate of the universe cells were made, weights were computed using the number of completed interviews for each cell.

## 7. Weights

Since the sampling design was stratified and employed differential sampling of the strata, individual observations should be properly weighted when making inferences about the population. Under stratified random sampling, unweighted estimates are biased unless sample

sizes are proportional to the size of each stratum. With stratification the probability of selection of each unit is, in general, not the same. Consequently, individual observations must be weighted by the inverse of their probability of selection (probability weights or *pa* in Stata.)<sup>2</sup>

Weights for each cell were computed using the weak and median assumptions on establishment eligibility. The universe cell estimates are divided by the achieved cell counts. Appendix C shows the cell weights for registered establishments in Bhutan.

## 8. Non-response

The Enterprise Surveys, along with all other surveys, suffer from both survey non-response and item non-response. The former refers to refusals to participate in the survey altogether whereas the latter refers to the refusals to answer some specific questions. Different strategies were used to address these issues. The overall survey response rate for the Bhutan Indicator Survey was 72% (250 completed interviews / 345 eligible firms).

Survey non-response was addressed by maximizing efforts to contact establishments that were initially sampled. When the survey frame was extracted from the sampling frame, several establishments with the same strata characteristics were randomly selected for each interview and each establishment was assigned a preference number.<sup>3</sup> Substitutions of replacement establishments were made in order to help achieve targets on the number of interviews for each stratum. Extensive efforts were made to complete interviews with each first preference establishment before contact with a replacement establishment was allowed. At least four attempts were made to contact each sampled establishment for an interview at different times/days of the week before a replacement establishment was allowed to be contacted for an interview.

The Bhutan Indicator Survey response rate was quite high for establishment-level surveys and the contractor did an excellent job at encouraging respondents to respond to sensitive questions (thereby minimizing item non-response). For example the item response rate for variable *d2*, establishment's total annual sales in the last fiscal year, one of the most sensitive questions, had a 100% item response rate.

In completed surveys, item non-response was addressed by two strategies:

- a- For sensitive questions that may generate negative reactions from the respondent, such as corruption or business-government relations, enumerators were instructed to collect the refusal to respond (-7) as a different option from don't know (-9).
- b- Establishments with incomplete information on critical productivity variables including total sales, cost figures and employment levels were re-contacted in order to

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<sup>2</sup> This is equivalent to the weighted average of the estimates for each stratum, with weights equal to the population shares of each stratum.

<sup>3</sup> In cases where the number of contacts initially drawn from the sample frame are insufficient to obtain an interview with the targeted number of establishments in a given strata, additional contacts for that strata may be drawn from the sampling frame. When all establishments in strata had already been contacted and the sample target had not been reached, the contractor was encouraged to identify and interview eligible firms that did not exist in the original sample frame as presented to them by the World Bank.

complete this information and minimize item non-response. However, re-contacts did not fully eliminate low response rates for some items.

The contractor achieved a much higher number of employee surveys than originally targeted. The contractor successfully interviewed 486 employees in 61 firms.

This report summarizes statistics on rejection rates, eligibility rates, and item non-response to alert researchers of these issues when using the data and when making inferences. Item non-response, selection bias, and imperfect sampling frames are not unique to Bhutan or the Enterprise Surveys. All surveys suffer from these issues.

## **9. Country-specific comments**

The following information was provided by the contractor.

### Staffing Solution

In total, 7 enumerators and 3 supervisors were engaged in the field survey. For the data entry, 3 enumerators were used, and they were overseen by 1 supervisor. Some of the enumerators withdrew due to the initial delay in starting the survey.

### Translation

Druk Associates was requested by the World Bank to translate the Employee questionnaire in Dzongkha. The Indicator Survey was fielded in English and no translation was deemed necessary. This Employee Survey translation could not be put to effective use during the assignment as the employees interviewed were comfortable with English (and occasionally Nepali, Sharchokpa or Hindi was required).

### Training

First step of the assignment was to recruit enumerators and supervisors. Enumerators were advertised for in the local newspaper, Bhutan Today, while supervisors were identified through Druk Associates' existing professional network.

46 candidates responded to the advertisement for enumerators. 18 candidates were short-listed and interviewed and finally 8 candidates were selected based on their professional qualification and personality. As Druk Associates already had 1 permanent enumerator employed, 9 enumerators in total were invited for the training apart from the three supervisors. Integrated in the applicant interviews was a short role play to assess communication skills and how the interviewees coped with an unfamiliar situation. This proved to be a good exercise.

In total, 7 enumerators and 3 supervisors were engaged in the field survey. For the data entry, 3 enumerators were used, and they were overseen by 1 supervisor. Some of the enumerators withdrew due to the initial delay in starting the survey.

Although most of the enumerators had some previous experience with field surveys, it was obvious that they were not familiar with a survey of this size and complexity. Proper and intensive training was therefore quickly identified as a very important exercise.

The identified enumerators and supervisors were all obliged to participate in the training workshop as well as in both pilot study and the evaluation exercise after that. The initial workshop was undertaken at the Golf Club Canteen in Thimphu, and in total 9 enumerators and 3 supervisors attended.

The training programme was divided into 3 phases:

1. 2-day workshop
2. Pilot Study
3. Evaluation and follow-up workshop

The objective of the 2-day workshop was primarily to prepare the enumerators and supervisors on their role and responsibilities as well as to introduce them thoroughly to the questionnaires and the show cards. The programme was a combination of 1-way presentations by the training facilitator, discussions, role plays etc. The combination of presentations, discussions, role plays, pilot study and continuous evaluation proved extremely valuable.

### Sampling Frame

The list of enterprises that was provided to Druk Associates was not fully up to date, and it was only helpful to a limited degree. Many enterprises were listed without proper address or telephone number, and the names of some enterprises were vague bearing the name of a person rather than the name of an enterprise. In some cases, there were addresses and telephone numbers, but for most enterprises they were not correct. For instance, the telephone number of one enterprise that we called was picked up by the Ministry of Foreign Affairs and while calling what was thought to be a construction company, it was picked up by a school. In yet other cases, we could locate the address, but the name of the enterprise had been changed several times. In the field we were told that some of the enterprises that were listed had not been in existence since the 1970s.

After initial problems, Druk Associates informed the World Bank during a conference call about the sample list. MoEA and the Regional Trade and Industry Office were also approached to find out if they had an updated list. However, Druk Associates was informed that the same list that was used was the same one that they had with them. Therefore, Druk Associates had to approach many other related organizations and agencies for additional information. The following agencies/institutions were approached for help in an attempt to gather additional information:

- The Construction Association of Bhutan (CAB)
- Association of Bhutanese Tour Operators (ABTO)
- Bhutan Telecom
- Road Safety and Transport Authority
- Bhutan Chamber of Commerce and Industries

Published documents like the Business Directory, Telephone Directory and Yellow Pages were also used.

Even with information obtained this way, it proved to be quite futile. The screener questionnaires could not be used as intended because of the lack of correct information. Initially, the World Bank procedures were followed very diligently, and team members called for interviews, wherever

telephone numbers existed for few enterprises. But as soon as these enterprises were asked about employee numbers, they would either cut the conversation or make excuses and it would not be possible to make any appointment. Therefore, the enumerators and supervisors had no choice, but to resort to physically combing the selected area to hunt for enterprises and to simply walk in to ask for an interview. This proved successful because most managers were hesitant to outright refuse the enumerator standing there, and our enumerators and supervisors turned out to be good at getting appointments in a discreet and polite manner without offending anyone.

Initially, Druk Associates was very mindful of the target requirements of sector, size and number of enterprises. As successful surveys were entered into the dataset, the achieved distribution of firms was cross-checked with the proposed sample design. Early in the assignment, it turned out that it would be difficult to meet the target of 250 enterprises with the list provided. Preference 2 enterprises therefore had to be identified and in some regions even preference 3.

With regard to the employee requirements, Druk Associates did not face any challenges.

#### Piloting and Pre-Testing

The pilot survey was undertaken in Thimphu among 10 enterprises. All trained enumerators and supervisors interviewed one enterprise and one employee during the pilot survey. The pilot survey exercise was extremely useful because everyone faced one problem or the other and so we were able to discuss as a team, share experiences and better prepare ourselves for the real survey.

#### Survey Implementation

The Indicator Survey questionnaire included a large number of questions and was quite complex. However it was clear that it had been used before and was well thought through. Some Bhutan specific questions were incorporated, but except for this, Druk Associates did not have many suggestions for the questionnaire, and modifications were limited. With regard to the show cards, Druk Associates did, however, find that there was some inconsistency with regard to their placement in the questionnaire, and so the questionnaire along with the show cards was revised, upon agreement and endorsement from the World Bank.

On the Employee questionnaire, several modifications were made. The formatting needed a revision, and some questions did not reflect the context in which they were to be used. The Employee questionnaire did not come with preset show cards, but Druk Associates developed a few where ever necessary, as it proved very effective during the training.

The field survey commenced from 15<sup>th</sup> April 2009, and was completed by 4<sup>th</sup> June 2009. The timeline for individual regions were as follows:

- Interviews for Thimphu/Paro region were conducted over a period from 15<sup>th</sup> April to 4<sup>th</sup> June 2009. 7 enumerators and 3 supervisors were engaged.
- Gelephu region was conducted from 28<sup>th</sup> April to 1<sup>st</sup> May. 3 enumerators and 1 supervisor were engaged.
- Phuentsholing/Chukha region was conducted over a period from 7<sup>th</sup> May to 2<sup>nd</sup> June 2009. 7 enumerators and 3 supervisors were engaged.

- Samdrup Jongkhar region was conducted over a period from 14<sup>th</sup> to 27<sup>th</sup> May 2009. 3 enumerators and 1 supervisor were engaged.
- After appointments were made, most enterprises were cooperative. In all instances it was possible to interview the decision-maker. In a few situations the indicator interview was conducted with two different respondents, however, in some instances the enumerators had to visit the establishments more than once to complete the interview. The supervisors were also involved in conducting the interviews wherever possible to ensure quality aspects.
- With regard to the Employee survey, the enumerators were in almost all interviews able to select the respondent based on an employee list, i.e. the employees were randomly selected based on a list. The managers would not oversee the interview, and generally the employees would respond freely. Druk Associates does, however, have a feeling that the question with regard to the employee's satisfaction with their employer does not fully reflect realities. This is however, very much based on Bhutanese culture, where a superior is not criticized under any circumstances.
- In few instances Druk Associates had to call the respondents again to obtain missing information, which were mostly spontaneous responses like 'Don't Know'. In the beginning of the survey the enumerator would not push for an answer in these situations, because it was stressed by the World Bank that a 'Don't Know (spontaneous)' was a valid answer. However, it became obvious that this option was used by respondents in too many cases, and the enumerators therefore started pushing more for answers.
- The length of the Indicator interview was on average approximately 45 minutes and for the Employee interview approximately 10 minutes. With particular reference to the Indicator interview, there were however, large deviations, and some interviews could last more than 90 minutes.

#### Non-response

Although Druk Associates informed every respondent that the information shared would be very confidential, many were very reluctant to provide information, especially to the sensitive questions regarding informal gifts and payments. Some respondents even said that it would be futile to ask this question because nobody would give the correct answer. In Bhutan, both parties, the one who takes bribes and also the one who gives it, is liable for punishment under law and the anti-corruption commission is very vigilant about this. Therefore people are not forthcoming. Given this, it is doubtful if the true scenario has been captured by the survey.

#### Data Entry

Immediately after the first meetings with the World Bank, Druk Associates started preparing the data entry as this exercise was identified as being of utmost importance. Druk Associates engaged a local database consultant, who also participated in some of the training activities to get an in-depth understanding of the task at hand. Together with a supervisor and an assisting team leader, the consultant developed an MS Access database for entry of the data. MS Access was chosen because data analysis was not part of the assignment, and with Access it is easy to build user friendly entry forms.

3 enumerators were engaged in punching the data: 2 for the Indicator database and 1 for the Employee database. They were trained thoroughly, and this staffing was not changed during the assignment, i.e. the same 3 employees were used for all punching. The quality of their work was constantly overseen, and daily backups were provided.

#### Dataset

Automated skip patterns and value controls were built in to the Access database to minimize data entry errors, but all data was also manually controlled before exporting it to its final dataset. This manual control was done visually in the tables of Access.

After this control, the data would be imported into Stata SE 10 with the help of StatTransfer. A final quality control of data would be done manually in Stata.

Further, after receiving feedbacks from the World Bank, every form was revisited and typo errors corrected. Wherever there was a need, respondents were called, or physical verification again carried out and information was updated both in the database as well as in the hardcopy questionnaire.

## Appendix A

### Original Sample Design

Region	Size	Sector		Total
		Manuf	Services	
Thimphu/Paro	Small	20	25	45
	Medium	2	19	21
	Large	2	12	14
		24	56	80
Phuentsholing	Small	33	9	42
	Medium	23	5	28
	Large	21	6	27
		77	20	97
Gelephu/Sarpang	Small	13	2	15
	Medium	0	1	1
	Large	1	1	2
		14	4	18
Samdrup Jongkhar	Small	5	19	24
	Medium	2	10	12
	Large	3	16	19
		10	45	55
Grand total		125	125	250

## Appendix B

**Bhutan Weak Universe Estimates:** Achieved interviews (250) + Eligible establishments not interviewed (95) + Untouched firm listings (546) = 891 firms.

Region	Size	Sector		Total
		Manuf	Services	
Thimphu/Paro	Small	20	445	465
	Medium	7	39	46
	Large	1	16	17
		28	500	528
Phuentsholing	Small	18	48	66
	Medium	25	23	48
	Large	13	8	21
		56	79	135
Gelephu/Sarpang	Small	6	9	15
	Medium	1	9	10
	Large	1	0	1
		8	18	26
Samdrup Jongkhar	Small	4	181	185
	Medium	6	8	14
	Large	1	2	3
		11	191	202
Grand total		103	788	891

**Bhutan Median Universe Estimates:** Achieved interviews (250) + Eligible establishments not interviewed (95) + [.5\*Untouched firm listings (546)] = 618 firms.

Region	Size	Sector		Total
		Manuf	Services	
Thimphu/Paro	Small	20	243	263
	Medium	7	39	46
	Large	1	16	17
		28	298	326
Phuentsholing	Small	18	48	66
	Medium	25	23	48
	Large	13	8	21
		56	79	135
Gelephu/Sarpang	Small	6	6	12
	Medium	1	9	10
	Large	1	0	1
		8	15	23
Samdrup Jongkhar	Small	4	113	117
	Medium	6	8	14
	Large	1	2	3
		11	123	134
Grand total		103	515	618

## Appendix C

### Bhutan Weak Cell Weights

Weights		Manuf	Services
Thimphu/Paro	Small	1.43	17.80
	Medium	1.00	1.34
	Large	1.00	1.60
Phuentsholing	Small	1.13	2.40
	Medium	1.04	1.21
	Large	1.08	1.00
Gelephu/Sarpang	Small	1.00	9.00
	Medium	1.00	1.00
	Large	1.00	
Samdrup Jongkhar	Small	4.00	5.66
	Medium	1.20	1.00
	Large		2.00

### Bhutan Median Cell Weights

Weights		Manuf	Services
Thimphu/Paro	Small	1.43	9.72
	Medium	1.00	1.34
	Large	1.00	1.60
Phuentsholing	Small	1.13	2.40
	Medium	1.04	1.21
	Large	1.08	1.00
Gelephu/Sarpang	Small	1.00	6.00
	Medium	1.00	1.00
	Large	1.00	
Samdrup Jongkhar	Small	4.00	3.53
	Medium	1.20	1.00
	Large		2.00