

# Working Life Table of Bhutan

Tashi Dorji<sup>1</sup>, Jigme Singye<sup>2</sup>, Yezer<sup>3</sup> and Sonam Wangmo<sup>4</sup>

<sup>1,2</sup> Department of Population and Development Studies,  
Sherubtse College, Royal University of Bhutan,  
Kanlung, Bhutan

<sup>3</sup> Department of Geography, Sherubtse College, Royal University of Bhutan,  
Kanlung, Bhutan

<sup>4</sup> Department of Life Science, Sherubtse College, Royal University of Bhutan,  
Kanlung, Bhutan

## Abstract

This study presents the results of the construction of working life table for male and female in Bhutan, 2005. The main objective of the study is to demonstrate application of life table techniques in the study of labor force dynamics. Finding demonstrates that females have slightly higher economically active life compared to male counterpart. For instance, it was estimated that male who survives to age 15 in 2005 is expected to spend 45.2 years in active status, while it was 46.7 years for a female. Further, the examination of annual losses from actual working population indicates a total of 2492 males left the labor force, out of which 1817 (72.9%) left on the account of death and 676 (27.1%) left due to causes other than death such as retirement, migration etc. The corresponding figures for the females are 1310, 960 (73.3%) and 350 (26.7%), respectively. Generally, it is observed that the main causes of withdrawal from the labor force for both the sexes were due to death.

**Keyword:** *Life table, Labor force, Bhutan*

## 1. Introduction

Life table is one of the most important tools in demography (UN manual, 1968; Shyrock & Siegel, 1979). Traditionally, life table is designed to measure mortality experience of a population and it is applied in various fields such as health, demography and actuary etc.

Importance of working life table in manpower planning is documented by numerous authors like Palamuleni (2009), Kpedekpo (1969), Gnanasekaran & Montigny (1975) etc. Several

attempts were made to construct working life tables for both developed (USA, Japan, Canada etc.) and developing countries (India, Ghana, South Africa, Malaysia). The popularity of working life table in the study of labor force is mainly because it provides information on expected average number of years of working life remaining for those of a given age. Working life table also shows rate of attrition/withdrawal from the labor force (Kpedekpo, 1969). This information is vital for planners and policy makers for comprehensive manpower planning and framing security policies. In addition, knowledge on length of working life is useful for individuals to make decisions for a better future in terms of accumulation of wealth and assets.

In Bhutan, no attempt has been made to construct working life tables but the demand for such study is high because there is need for comprehensive manpower planning in the country. Bhutan is in paradoxical situation, facing labor deficit and at the same time having acute problem of unemployment. Bhutan has to depend on India for its requirement of semi-skilled and unskilled labors especially in construction, mining, agro-based industries and hydropower projects (Dorji & Kinga, 2005). Unemployment problem mainly rises because Bhutanese view blue color job and farm work synonymous to backwardness and believe to be meant for those uneducated. Further, it is aggravated by lack of private sector development (Dorji & Kinga, 2005; LMIB, 2007).

Working life table would provide clear picture Bhutanese labor market and help assessing prospective employment opportunities in various occupations in future. This is because any decision on the number of additional jobs demanded by the communities should presumably take account of

the vacancies created by losses due to death and other factors.

This paper attempts use life table concepts in the study of labor force in Bhutan. In particular, the main objective of this paper is to estimate length of working life for male and female using Population and Housing Census (PHCB), 2005. The total and age pattern losses from working population for both male and female due to death and other causes will be estimated.

## 2. Data Source

The data for the study come from Population and Housing Census of Bhutan (PHCB, 2005), which is first of its kind conducted in the country. PHCB, 2005 was conducted based on the methodologies recommended by United Nations to make data comparable internationally. In present study two sets of data have been explored, namely mortality and economic activity data. First, mortality data collected based on the responses to the question “deaths in the household in the last 12 months” was used for construction of life table. The questions used to elicit information on death in PHCB, 2005 were the following:

- Was there any death in the household in the last 12 months?
- If yes, what was the name of the deceased?
- What was the age at the time of death?
- Nature of illness or accident that caused death?

Since PHCB, 2005 was first census carried out in the country, some errors problem associated with census data was observed particularly with mortality data. Therefore, final life tables computed are based on adjustment using South Asian families of United Nations Model life for developing countries.

Second, the information on economic activity was sought only from person 15 years and over and classified into two broad groups; economically active and economically inactive. In the census, economically active is defined as those people who are engaged or attempts to engage in production of goods and services during the reference period (past one week). Therefore, it not only includes those employed during the time of investigation but, also those willing to work and available for work (unemployed).

Economically inactive includes those who were not engaged in the production of goods and services or not looking for the job during the reference period. Housewives, students and disabled and ill person are grouped under economically inactive population.

In the construction of working life table, the economically active population outlined above constitutes working population.

## 3. Construction Of Working Life Tables

The construction of working life tables is essentially based on working population. First step in construction of tables of working life is determination of actual percentages ( ${}_n p_x$ ) working population in an age group from exact age  $x$  to  $x+n$ . These rates are obtained by dividing the working population by total population in each age group.

In estimating the expected years of working life and retirement in each age group this actual proportion cannot be used because not all entrants enters the labor force at same age. The total working life of generation includes work of those yet to enter. This problem may overcome by employing at the age groups when all entrants have not yet entered, not the actual proportion working, but the maximum value of this proportion attained in the other age groups. This hypothetical proportion ( ${}_n w_x^1$ ) may be interpreted as the proportion that have entered or are training for employment (Kpedekpo, 1969; Gnanasekaran & Montigny, 1975; Palamuleni, 2009).

Further, for the construction hypothetical proportion relating to the number of working person who have reached their  $x$ th birthday but not yet reached their  $x+5$ <sup>th</sup> birthday need to be converted to proportion which relates to  $x$ th birthday. These proportions are calculated using the relationship:

$${}_n W_x = \frac{1}{2} ({}_n W_x^1 + {}_n W_{x-n}^1) \quad \text{Eq. (1)}$$

Then  ${}_n W_x$  values, together with the  $l_x$ ,  ${}_n L_x$  and  $T_x$  values of ordinary life tables are the basis for the construction of working life tables. The working life tables for Bhutan by sex was computed and presented in Table 3 & 4 below.

Table 1: Actual and hypothetical percentage of male working population of Bhutan, 2005

Age group x to x+n	Actual percentage working in age group from x to x+n ( ${}_n n_x$ )	Hypothetical percentage working in the age group from x to x+n ( ${}_n w_x^1$ )	Hypothetical percentage working at exact age x ( ${}_n w_x$ )
(1)	(2)	(3)	(4)
15-19	31.60	90.00	90.00
20-14	74.20	90.00	90.00
25-29	87.30	90.00	90.00
30-34	89.60	90.00	90.00
35-39	90.00	90.00	90.00
40-44	88.80	88.80	89.40
45-49	86.60	86.60	87.70
50-54	82.00	82.00	84.30
55-59	74.80	74.80	78.40
60-64	63.30	63.30	69.00
65+	37.50	37.50	50.40

Table 2: Actual and hypothetical percentage of female working population of Bhutan, 2005

Age group x to x+n	Actual percentage working in age group from x to x+n ( ${}_n n_x$ )	Hypothetical percentage working in the age group from x to x+n ( ${}_n w_x^1$ )	Hypothetical percentage working at exact age x ( ${}_n w_x$ )
(1)	(2)	(3)	(4)
15-19	31.70	57.70	57.70
20-14	52.40	57.70	57.70
25-29	55.30	57.70	57.70
30-34	54.60	57.70	57.70
35-39	56.50	57.70	57.70
40-44	57.70	57.70	57.70
45-49	57.50	57.50	57.60
50-54	55.60	55.60	56.60
55-59	51.80	51.80	53.70
60-64	41.50	41.50	46.70
65+	22.80	22.80	32.20

## 4. Functions Of Working Life

### Table

The  $l_x^w$  column refers to the number of persons in the working population at the beginning of age interval out of the cohort 100,000 born;  $l_x^w = {}_n w_x l_x$ . The  ${}_n L_x^w$  column is the stationary economically active population in the age interval. It is based on the assumption that the withdrawal from the labor

force is uniformly distributed,  ${}_n L_x^w = 0.5 (l_x^w + l_{x+5}^w)$ .

The  $T_x^w$  shows the economically active person years that would be lived after age x by the number of hypothetical cohort.  $T_x^w$  values are obtained by cumulating  ${}_n L_x^w$  from downward.

The  $e_x^w$  represents the average number of economically active years expected to be lived per

person in the hypothetical cohort at birth and among survivors at each age;  $e_x^w = T_x^w / l_x^w$ .

The  ${}_n s_x^w$  refers to the net change of those entering or leaving the labor force and is obtained by  ${}_n s_x^w = l_x^w - l_{x-5}^w$ . For extreme age groups '15-19' and '65+', survivors in the age group '15-19' and those in the age group were taken as  $S(w_x)$  values, respectively.

The  ${}_n d_x^w$  indicates the number of people dying in the age interval  $x$  to  $x+n$ . This is based on assumption that the death rate in the working population is the same as in the total population. Thus  ${}_n d_x^w = {}_n d_x / L_x n L_x^w$ .

The  ${}_n r_x^w$  is the age-specific rate of retirement per 1000 active individuals and is computed by  ${}_n r_x^w (-) = {}_n d_x^w / L_x n L_x^w$  (Kpedepo, 1969; Palamuleni, 2001).

The procedure adopted in this study is found appropriate and several studies have employed similar approach (Kpedepo, 1969; Palamuleni, 2001; Krishnan, 1977). However, the construction of working life table is based on the following assumption:

- A uni-modal curve of age-specific activity rate;
- The mortality rate remains same for working population and overall population.
- The observed mortality and age-sex specific activity rates for both sexes will remain constant in the near future.

- No withdrawal from the labor force before the age of maximum participation (except death)

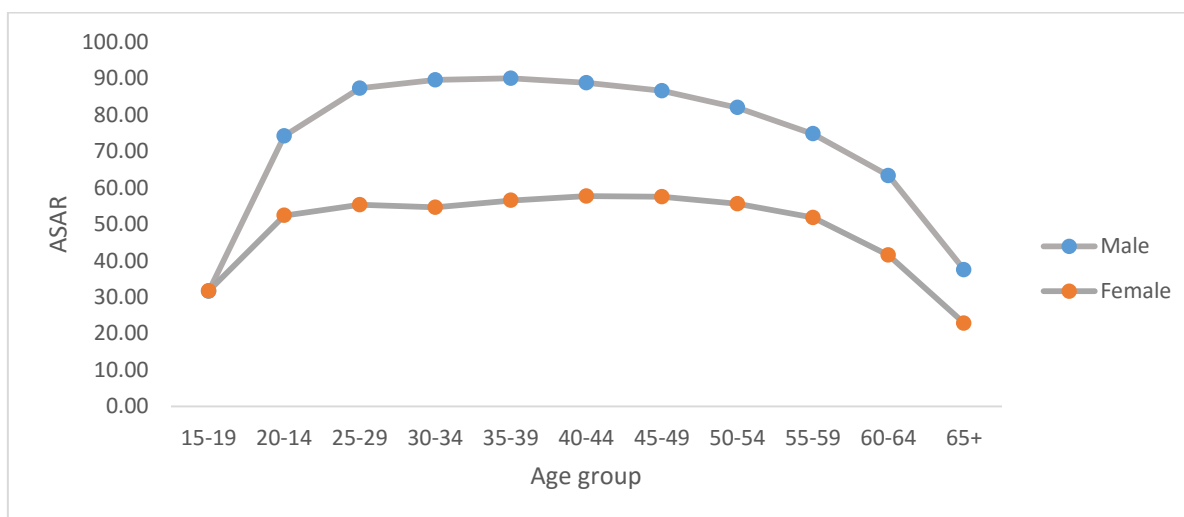
### 5. Results

In 2005, the Bhutanese labor force participation rate as a whole for the total population aged 15 years and above (also termed as crude activity rate) is 60 percent. The male and female Crude Activity Rates (CAR) is 72 and 48 percent respectively. The results highlight that male CAR is 23.8 percentage points higher than female CAR. Since CAR is not meaningful, Age-Sex Specific Activity Rates (ASAR) was calculated and is presented in Table 1 & 2 and figure 1 below

The ASARs for male starts from a low of 32 percent at the age group 15-19, then increases with rising age and reaches its peak at 90 percent among those in age group 35-39. Then it gradually declines reaching a low value of 38 percent at the age group 65+. For females, from a low value of ASAR observed at the age group 15-19 of 32 percent, it reaches highest level at the age groups 40-49 with 58 percent. The lowest ASAR among female is registered among the older age group 65+ with 23 percent. For all the age groups (except 15-19), age specific activity rates for the females are lower than those of males.

The age patterns of activity rates are concerned, for both the sexes it is uni-modal with mode of 90.0 and 57.7 percent for male (35-39) and female (40-49), respectively.

Figure 1: Age specific Activity Rate of Bhutan by sex



#### 5.1. Length Of Working Life

The length of working life for male and female of Bhutan in 2005 is shown in Table 3&4. It is observed from the table that expectation of economically active life at age 15 for males was

45.2 years and gradually decreased to 7.5 years in the last age group (60-64). In other words, the male who starts participating in the labor force at age 15 will expect to remain economically active for 45.2 years on average.

Table 3: Abridged working life table for Bhutan 2005: Male

Number of working population per 100,000 born alive								Losses from Working Population					
								Total		Due to death		Due to other causes	
Age group x to x+n	Population t exact age x	Population in the age interval	Percent of population	At exact age	From exact age x to x+n	Exact age x and above	Economically active life	Number	per 1000 population	number	per 1000 population	number	per 1000 population
Age	$l_x$	$L_x$	$W_x$	$l^w_x$	${}_nL^w_x$	$T^w_x$	$e^w_x$	$5S^w_x$	$1000 {}_5m_x$	${}_5d^w_x$	$1000 {}_5m^d_x$	${}_5r^w_x$	$1000 {}_5r^w_x$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
15-19	90483	450541	90.0	8143461	40548676	367677630	45.2	70960	1.8	70960	1.8	0.0	0.0
20-14	89694	446087	90.0	8072501	40147811	327128955	40.5	88727	2.2	88727	2.2	0.0	0.0
25-29	88709	440757	90.0	7983775	39668089	286981144	35.9	104327	2.6	104327	2.6	0.0	0.0
30-34	87549	434030	90.0	7879447	39062728	247313055	31.4	140626	3.6	140626	3.6	0.0	0.0
35-39	85987	424974	90.0	7738822	38247657	208250327	26.9	238184	6.2	186649	4.9	51536	1.3
40-44	83913	413264	89.4	7500637	36939968	170002670	22.7	370869	10	234569	6.4	136300	3.7
45-49	81289	398514	87.7	7129769	34953329	133062701	18.7	554433	15.9	292210	8.4	262224	7.5
50-54	77957	379077	84.3	6575335	31973441	98109372	14.9	826304	25.8	392314	12.3	433990	13.6
55-59	73306	347394	78.4	5749031	27244438	66135931	11.5	1273459	46.7	665037	24.4	608422	22.3
60-64	64826	289999	69.0	4475572	20021432	38891494	8.7	1945373	97.2	1008680	50.4	936699	46.8
65+	50216	374508	50.4	2530194	18870061	18870061	7.5	2530194	134.1	2530194	134.1	0.0	0.0

Table 4: Abridged life table for Bhutan 2005: female

Number of working population per 100,000 born alive								Losses from Working Population					
								Total		Due to death		Due to other causes	
Age group x to x+n	Population t exact age x	Population in the afe interval	Percent of population	At exact age	From exact age x to x+n	Exact age x and above	Economically active life	Number	per 1000 population	number	per 1000 population	number	per 1000 population
Age	$l_x$	$L_x$	$W_x$	$l^w_x$	${}_n l^w_x$	$T^w_x$	$e^w_x$	$5S^w_x$	$1000 {}_5m_x$	${}_5d^w_x$	$1000 {}_5m^d_x$	${}_5r^w_x$	$1000 {}_5r^w_x$
(1)	(2)	(4)	(5)	(6)	(7)	(8)	(9)	(11)	(12)	(13)	(14)	(15)	(16)
15-19	91425	455351	57.7	5275249	26273725	246196053	46.7	45287	1.7	42931	1.6	1356.0	0.1
20-14	90681	451288	57.7	5229961	26027581	219922328	42.1	50233	1.9	50233	1.9	0.0	0.0
25-29	89810	446601	57.7	5179728	25757253	193894746	37.4	59139	2.3	59139	2.3	0.0	0.0
30-34	88785	440434	57.7	5120589	25401610	168137493	32.8	84740	3.3	84740	3.3	0.0	0.0
35-39	87316	432122	57.7	5035850	24922186	142735883	28.3	107315	4.3	107315	4.3	0	0.0
40-44	85455	421502	57.7	4928535	24309708	117813697	23.9	145810	6.0	139878	5.8	5932	0.2
45-49	83030	407303	57.6	4782725	23461697	93503989	19.6	273455	11.7	189993	8.1	83462	3.6
50-54	79731	388268	56.6	4509270	21958806	70042292	15.5	460510	21	245302	11.2	215209	9.8
55-59	75394	364297	53.7	4048760	19563237	48083486	11.9	785418	40.1	292959	15	492459	25.2
60-64	69939	327775	46.7	3263342	15294003	28520249	8.7	1333817	87.2	463974	30.3	869843	56.9
65+	59995	411245	32.2	1929525	13226246	13226246	6.9	1929525	145.9	1929525	145.9	0.0	0.0

In case of females, the expectation of economically active life at age 15 was 46.7 years and it gradually decreased to 6.9 years at the last age group (Table 4). Other way interpreting the table is a Bhutanese female who survives to age 15 is expected to spend 46.7 years in active status. It is noted that the length of working life is consistently higher for females compared to males in all the age groups except last two age groups (60-64 and 65+).

## 5.2. Estimated Losses From The Working Population

One important use of working life table is the estimation of annual losses from the actual working population assuming that the population experiences the prevailing age-specific death rates (mortality) and age-specific activity rates used to construct the working life table (Palamuleni, 2001; Kpedepo, 1969; Krishnan, 1977). The total and age and sex-specific losses for males and females from the actual working population of Bhutan in 2005 are shown in Table 5 & 6.

Total number of males estimated to have left labor force in 2005 was 2492 of which 1817 (or 72.9%) left on the account of death and 676 (or 27.1%) left

on the account of causes other than death. Similar figures for female population indicate that 1310 females left the working population of which 960 (or 73.3%) left on the account of death and remaining 350 (or 26.7%) left on the causes other than death. The causes other than death refer to retirement, voluntary withdrawal from labor force, migration, and the like.

Focusing on age and sex-specific pattern of losses for both sexes, it appears that for both sexes the major cause of attrition in the working population is due to death. This is evident across all age groups with increasing rate of loss due to mortality as age increases. However there is marked indication of the effect of mortality at older age groups. Losses due to causes other than death are markedly concentrated at the older age groups (55+). This might be because the majority of the pension and voluntary withdrawal cases occur at this age group.

It is significant to note that for the younger age 15-34 for males and 15-39 for the females, losses from the working population have exclusively been demonstrated to be due to death. In other words, the young working population generally does not withdraw voluntarily from work.

Table 5: Estimated losses from male working population of Bhutan, 2005

Age group x to x+n	Working population	Rate of loss per 1000 per popn	Total losses	Losses due to death		Loss due to other cause	
				1000 ${}_5m^d_x$ (5)	(6)	1000 ${}_5r^w_x$ (7)	(8)
(1)	(2)	1000 ${}_5m_x$ (3)	(4)	1000 ${}_5m^d_x$ (5)	(6)	1000 ${}_5r^w_x$ (7)	(8)
15-19	11848	1.8	21	1.8	21	0	0
20-24	29886	2.2	66	2.2	66	0	0
25-29	27406	2.6	72	2.6	72	0	0
30-34	20799	3.6	75	3.6	75	0	0
35-39	19017	6.2	118	4.9	93	1.3	26
40-44	14223	10	143	6.4	90	3.7	52
45-49	12906	15.9	205	8.4	108	7.5	97
50-54	9664	25.8	250	12.3	119	13.6	131
55-59	6556	46.7	306	24.4	160	22.3	146
60-64	4786	97.2	465	50.4	241	46.8	224
65+	5749	134.1	771	134.1	771	0	0
<b>Total</b>	<b>162840</b>		<b>2492</b>		<b>1817</b>		<b>676</b>

Table 6: Estimated losses from Female working population of Bhutan, 2005

Age group x to x+n	Working population	Rate of loss per 1000 per popn	Total losses	Losses due to death	Loss due to other cause		
(1)	(2)	1000 $\sum m_x$ (3)	(4)	1000 $\sum m^d_x$ (5)	(6)	1000 $\sum r^w_x$ (7)	(8)
15-19	11945	1.7	21	1.6	20	0.1	1
20-24	15893	1.9	31	1.9	31	0.0	0
25-29	14364	2.3	33	2.3	33	0.0	0
30-34	10706	3.3	36	3.3	36	0.0	0
35-39	9939	4.3	43	4.3	43	0.0	0
40-44	8004	6.0	48	5.8	46	0.2	2
45-49	7345	11.7	86	8.1	59	3.6	26
50-54	5707	21.0	120	11.2	64	9.8	56
55-59	3953	40.1	159	15.0	59	25.2	100
60-64	2909	87.2	254	30.3	88	56.9	166
65+	3290	145.9	480	145.9	480	0.0	0
<b>Total</b>	<b>94055</b>		<b>1310</b>		<b>960</b>		<b>350</b>

### 6. Summary and Discussion

The constructed working life table by sex shows the following main findings:

- Males have higher labor force participation rate (or activity rate) compared to females in all age groups;
- The age-specific activity rate is low at younger age group; it increases with age up to certain age group and thereafter decreases reaching to a low value at the older age group;
- Expectation of economically active life for both sexes is highest at age 15 and gradually decreases to a low level at age 65+;
- Females have slightly higher economically active life than males in all age groups;
- For both sexes, majority of losses from labor force occurred as result of death;
- Age pattern of losses are concerned, withdrawal from labor force as a result of death and causes other than death increases with advancing age.

The foregoing findings are consistent with findings of many studies both in developed and developing countries. The higher labor force participation among males relative to females has been generally been established by the fact that women tend to

withdraw from labor market to give birth and raise children (Rahman, 2005; Tesfaghiorhis et al, 1974; NLFS, 2008; Linacre, 2007). Moreover, women are affected more during labor market fluctuations compared to males (Echebiri, 2005; Higgins, 1997). In Bhutan the gender difference exists which is promoted by Bhutanese tradition, culture and attitude of women working outside home. Majority of women are engaged in domestic chores which are not considered as part of economic activity. The situation is similar in neighboring countries like India, Bangladesh and Nepal (Rahman, 2005).

The study reveals the inverted U-shape relationship between age and activity rates with low ASAR at age 15-19, it increases with age reaching its highest level at age group 30-39 and thereafter it begins to decline. The low ASAR among 15-19 (younger) cohorts may be due to the fact that most of them are still in schools, which delays entry into the labor market (NLFS, 2008). Youths also lack relevant skills and work experience compared to adults and olds which discourage youths' from seeking job or employment. In case of olds, old age prevents them from working.

The working life table demonstrates high economically active lives at the younger age groups but decreases with advancing age and reach lowest at the age group 65+ which may be due to higher risk of dying at older ages than at younger ages. The higher survival for female is the sole reason for higher economically active life for females compared to male counterpart.



In the present study indicates that withdrawal from the labor force for both the sexes is due to death. A lot of questions need to be asked why this is so despite government claim of 100 Percent coverage of Basic Health Unit (BHU) and free medical care enjoyed in the country. There could be many reasons for the deaths ranging from culture, quality services provided in these health centers, environment of the working conditions, hereditary factors, policies and health education to mention a few. The Ministry of Health (MoH) is handicapped with lack of human resources. This statement is supported by Bhutan Observer news reported by Pem (2011, P. 1) "...Bhutan has an acute shortage of doctors. To address this problem, Bhutan signed a memorandum of understating (MOU) with Bangladesh Ministry of Health and Family Welfare. According to the MoU, Bhutan will recruit various categories of specialist medical officers and retired doctors from Bangladesh until

Bhutan is in a position to meet its human resource gap..." Further, there are only few hospitals equipped with modern health care facilities to meet the needs of the population.

## 7. Conclusion

The working life tables are immensely useful in the study of labor force dynamics. The indicators generated like length of economically active and inactive life, withdrawal from labor force due to death and causes other than death are of great help to the policy makers, planners and insurance companies. Despite their usefulness, the construction is daunting especially for Bhutan because of limited data and absence of vital registration system (Mortality data). The adjustments of age-specific death rates have to be made which may question the robustness of these findings.

## 8. References

- [1] Echebiri, N. Raphael (2005). Characteristics and determinants of urban youth unemployment in Umuahia, Nigeria: Implications for rural development and alternative labour market variables. Department of Agriculture Economics, Michael Okpara University of Agriculture, Umudike, PMB 7267 Umuahia, Nigeria.
- [2] Higgins, O. Niall (1997). The challenge of youth unemployment: Action programme on youth unemployment. Employment and Labour Market Policies Branch, Employment and Training Department, ILO Office, Geneva.
- [3] Kpedepo, G.M.K (1969). On working life tables in Ghana with particular reference to the female working population: Journal of the Royal Statistical Society., Series A (General), Vol. 132, No. 3, PP. 431-441. Blackwell Publishing for the Royal statistical society.
- [4] Kpedepo, G.M.K (1969). On working life tables in Ghana with particular reference to the male working population: Journal of American Statistical Association., Vol. 64, and PP.102-110. American Statistical Association.
- [5] Linacre, S. (2007). Australian Social Trends: labor force participation: an international comparison. Australian Bureau of statistics.
- [6] Ohadike, O. Patrick and Tesfaghiorghis, H. (1974). The Popoulation of Zambia: C.I.C.R.E.D. Series.
- [7] Palamuleni, E. Martin (2001) Working life tables for South Africa, 1996-2001. Population Training and Research Unit, North west University Mafikeng campus, Private Bag X2046, South Africa.
- [8] Pem, T. (2011) Bangladesh to send medical professionals to Bhutan accessed on 26/9/2011 from Bhutan Observer website [www.bhutanobserver.com.bt](http://www.bhutanobserver.com.bt)
- [9] Rahman, I. Rushidan (2005). The dynamics of labor market and employment in Bangladesh: A focus on gender dimension. Employment Policy Unite, Employment Strategy Department.
- [10] Royal Government of Bhutan, Ministry of labor and Human Resources, National Labor force survey report, 2008.
- [11] Royal Government of Bhutan, Minstry of Health, Health Bulletin, 2004
- [12] Royal Government of Bhutan, Office of census Commissioner (2005). Population and Housing Census. Langjuphaka, Thimphu.
- [13] Shryock, S. Henry and Siegel, S. Jocab (1976). The Method and Materials of Demography. Academic Press Inc. (London) LTD. 24/28 Oval Road, London NW1.
- [14] United Nations, economic and Social Affarirs (1968). Popoulation studies, No. 43: Method of Analyzing census Data on Economic activities of the population. United Nations Publicctions, New York