

## Forecasting Manpower Requirements in Bahrain

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### Introduction

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Manpower forecasting is an important ingredient in any serious effort at selecting proper economic policies or managing economic problems and issues at the national level. In fact, determining accurately the sectoral manpower needs enables the authorities to initiate appropriate labor and population policies. In countries such as the Gulf States a keen shortage of manpower persists. As such, the need for forecasting becomes extremely important as it ties the labor and population policies to immigration policies.

The main objective of this paper is to use the available input-output table for the State of Bahrain in an econometric manpower planning model to project sectoral labor force requirements mixture (i.e. nationals Vs non nationals and males Vs females) to the year 2002. This will be carried out based on historical rates of growth in the various sectors of the Bahraini economy. Furthermore, the most important features of sectoral manpower distribution will be discussed. Finally, the sectoral labor input requirements of nationals vs. non nationals and males vs. females will be determined for the Bahraini economy under an alternative scenario.

### Manpower Characteristics in Bahrain

The Bahraini economy suffers from acute dependence on foreign labor. This stems from the limited population and a shortage of skilled labor needed for activities in the various sectors of the economy. In fact, out of a total population numbering 434,724 in 1986, the economically active portion numbered 183,179 which represents 42.14 percent of the total population. The total number of nationals considered economically active was only 81,027 which translates into a share of 44.23 percent of the total labor force in 1986. The remaining work force numbering 102,152 were non-nationals that are allowed access to the Bahrain labor market through immigration policies.

In Table (1), the distribution of the economically active population in different sectors of the economy in 1986 is shown. The table shows that in 1986, community and personal services sector absorbed 36.53 percent of total economically active population. Construction came second with 20.99 percent while Wholesale and Retail absorbed 13.45 percent to be the third and Transport, Storage & Communication was fourth with 9.41 percent. Manufacturing sector and Finance & Business absorbed 7.84 and 4.20 percent respectively.

Table (1): Economically Active Population by Sector in Bahrain, 1986.

Sector	Total	% of Total
	Economically Active	Economically Active
	Population	Population
Agriculture	3654	1.99
Mining and Quarrying	6374	3.48
Manufacturing	14364	7.84
Electricity, Gas & Water	3869	2.11
Construction	38444	20.99
Wholesale and Retail Trade	24634	13.45
Transport, Storage & Communication	17236	9.41
Finance & Business	7693	4.20
Community & Personal Services	66911	36.53
Total	183179	100.00

Source: United Nations Economic and Social Commission for Western Asia, 1988.

As indicated above, the availability (supply) of skilled manpower in the State of Bahrain is far short of demand. The nationals could not meet even 50 percent of the demand. Therefore, it is necessary to assess the future manpower requirements. The assessment should cover nationals and non-nationals separately. In addition, the future demand for male and female work force has to be assessed separately also.

## Methodology of Forecasting Manpower Requirements

In what follows we present the notation and the model used in forecasting Bahrain's manpower requirements:<sup>1</sup>

$GNP_i^0$  = Gross national product in the  $i$ th sector in the base year 0 (1985);

$E_i^0$  = Employment in the  $i$ th sector in the base year 0 (1985);

$\Pi_i^0$  = Productivity in the  $i$ th sector in the base year 0 (1985)

=  $GNP_i^0 / E_i^0$  ;

Components of final demand in the  $i$ th sector in Bahrain are as follows:

$C_{pi}$  = Private consumption in the  $i$ th sector;

$C_{gi}$  = Government consumption in the  $i$ th sector;

$I_i$  = Investment in the  $i$ th sector;

$E_i$  = Exports in the  $i$ th sector;

$M_i$  = Imports in the  $i$ th sector;

$r_{ij}$  = Growth rate of the  $j$ th component of the  $i$ th sector during the period 1980-1985;

$F_{ij}^k$  = Final demand in the  $j$ th component in the  $i$ th sector in the  $k$ th year

=  $(1 + r_{ij})^n * F_{ij}^0$

Years of reference are: 0 = 1985; K = 1994, 1998, and 2002 ;

n = number of years;

<sup>1</sup>. Haji, J. A. Sectoral Analysis of Kuwait Economy with special reference to manufacturing industries. Ph.D. Thesis. The Vectorial University of Manchester, 1981, ch. 9.

$$\begin{aligned} \text{GNP}_i^k &= (I - A)^{-1} \sum_{j=1}^5 F_{ij}^k \\ &= \text{Gross National Product (output) in the } i\text{th sector in the } K\text{th year.} \\ E_i^k &= \text{Employment requirement for the } i\text{th sector in the } k\text{th year} \\ &= \text{GNP}_i^k / \Pi_i^0 ; \\ \sum_{i=1}^9 E_i^k &= \text{Total manpower requirements in the } k\text{th year of reference.} \end{aligned}$$

The forecasts of manpower requirements for Bahrain for the years 1994, 1998, and 2002 have been made based on the 9X9 input-output tables for the year 1985 in Bahrain.<sup>2</sup> Initially, the growth rate of each of five components of final demand in each sector during the period 1980-1985 is determined. Next, the final demand for each component for the years 1994, 1998, and 2002 is extrapolated. Finally, the Gross National Product for the sector was obtained by multiplying the sum of all the components of the sector by  $(I-A)^{-1}$  for the years 1994, 1998, and 2002 separately.<sup>3</sup>

For elaboration purposes, demographic and related socio-economic data published by United Nations Economic and Social Commission for Western Asia have been used. From this report, the employment figures in each sector in Bahrain during the years 1984 and 1986 were obtained.<sup>4</sup> Using the employment figures in these two years, the employment figures for the year 1985 was calculated using geometric average technique. Utilizing the sectoral employment figures for the year 1985, productivity in each sector for the year 1985 was determined. This is done by using the output figures obtained from the 9X9 matrix input-output table for the year 1985 mentioned previously. On the basis of productivity in 1985, the employment figures for the years 1994, 1998, and 2002 were estimated using the Gross National Product for each sector in the corresponding year.

<sup>2</sup> Haji, J. A. Aggregation & Disaggregation of input-output tables by RAS for Bahrain, Kuwait University, 1992.

<sup>3</sup> Haji, J. A. Compilation of input-output tables for Bahrain, Kuwait University, 1990.

<sup>4</sup> United Nations Economic and Social Commission for Western Asia, 1988.

## Results

The total manpower requirements forecasted for Bahrain for the years 1994, 1998, and 2002 along with the 1986 employment figures are shown in Table(2). Clearly, Bahrain's labor force is expected to rise significantly, over the period 1986-2002, reaching 264,870 persons in 2002 as compared to 183,179 in 1986.

Table (2): Forecasts of Manpower Requirements in Bahrain for Selected Years

Year	1986	1994	1998	2002
Manpower Requirements	183,179	218,769	240,803	264,870

The forecasts at the sectoral level were also obtained. Table (3) shows that community and personal services engage 37 percent of total manpower requirement in Bahrain. Next comes construction sector which absorbs 21 percent of the manpower requirement. Wholesale and Retail trade employs about 13 percent, Transport, Storage, Communication and Manufacturing sectors absorb each about 8 to 9 percent. Other sectors like Finance and Business; Agriculture; Mining and Quarrying; Electricity, Gas and Water absorb 4 percent; 3-4 percent; 3 percent and 2 percent respectively of total requirements of economically active population in Bahrain.

Table (3): Manpower Requirements Sector-Wise for Bahrain for the years  
1994, 1998, and 2002.

Sector	1994	1998	2002	% of Total
1. Agriculture	7116	9039	11096	4.19
2. Mining & Quarrying	6456	6858	7274	2.75
3. Manufacturing	18383	20556	22906	8.65
4. Electricity, Gas & Water	4426	4878	5369	2.03
5. Construction	45867	50334	55205	20.84
6. Wholesale & Retail Trade	27892	30039	32361	12.22
7. Transport, Storage & Communication	18977	20300	21733	8.20
8. Finance & Business	8506	9280	10121	3.82
9. Community & Personal Services	81146	89519	98805	37.30
Total	218769	240803	264870	100.00

In addition, We forecast the manpower requirements for Bahrain by nationality (i.e. nationals and non-nationals) and by male and female categories for the years 1994, 1998, and 2002. The estimated figures are shown in Table (4).

The estimates of the requirements of economically active population show that nationals and non-nationals are in the ratio of 44 to 56 in Bahrain. it may be noted that in 1986, the same ratio prevailed. Table (A-1) in the appendix shows the sector-wise requirements of national and non-national manpower for the years 1994, 1998, and 2002 in Bahrain.

Table (4): National and Non-National Manpower Requirements for Bahrain

Year	Nationals	Non-Nationals	Male	Female	Total
1994	96770	121999	187952	30817	218769
1998	106739	134064	206976	33827	240803
2002	117620	147250	227726	37144	264870
	(44.41)	(55.59)	(85.98)	(14.02)	(100.00)

Figures in parentheses indicate percentage of total for the year.

The estimates of manpower requirement by sex in Bahrain for the years 1994, 1998, and 2002 are also shown in Table (4). The above figures show that the ratio of male and female in the economically active population in Bahrain is 86 to 14. It is observed that the same ratio prevailed in 1986.

Table (A-2) in the appendix shows the distribution of male and female work force in different sectors for the years 1994, 1998, and 2002 in Bahrain.

### Forecasting Manpower Requirements Under a Different Scenario

So far we have discussed the estimation of manpower requirements based on historical growth. In what follows we forecast manpower requirements for Bahrain for the indicated future years under a different scenario which postulates a growth rate of 5 percent annually in the Gross National Product over 1985 GNP. Based on this rate of growth in output, the manpower requirements for the years 1994, 1998, and 2002 in Bahrain are forecasted and shown in Table (5).

Table (5): Manpower Requirements for Selected Years Under the Alternative Scenario

Year	1994	1998	2002
Manpower Requirements	198,464	208,389	218,807

The manpower requirements in different sectors of the economy for the years 1994, 1998, and 2002 are shown in Table (6).

Table (6): Manpower Requirements by Sector for 1994, 1998, and 2002 in Bahrain  
Under an Alternative Scenario

Sectors	1994	1998	2002	% of Total
1. Agriculture	3998	4198	4409	2.02
2. Mining & Quarrying	6282	6596	6926	3.17
3. Manufacturing	15996	16796	17636	8.06
4. Electricity, Gas, & Water	4002	4202	4412	2.02
5. Construction	41899	43996	46196	21.11
6. Wholesale & Retail Trade	26536	27862	29256	13.37
7. Transport, Storage & Communication	18323	19240	20202	9.23
8. Finance & Business	7865	8258	8671	3.96
9. Community & Personal Services	73563	77241	81099	37.06
Total	198464	208389	218807	100.00

In addition, the manpower requirements by nationality (i.e. nationals and non-nationals) as well as by male and female categories for the years 1994, 1998, and 2002 were estimated and are presented in Table (7).



Table (7): Manpower Requirements for Bahrain by Nationality and Sex  
for 1994, 1998, and 2002 Under the alternative Scenario

Year	Nationals	Non-Nationals	Male	Female	Total
1994	87329	111135	170254	28210	198464
1998	91696	116693	178769	29620	208389
2002	96281	122526	187707	31100	218807
	(44.00)	(56.00)	(85.79)	(14.21)	(100.00)

Figures in parentheses indicate percentages of total for the year.

The distribution of national and non-national manpower in different sectors for the years 1994, 1998, and 2002 in Bahrain is shown in Table (A-3) in the appendix. Similarly, the break-up of the work force into male and female in the different sectors for the same years is presented in Table (A-4) in the appendix.

## Conclusion

In this paper we presented forecasts of Bahrain's manpower requirements for the period upto 2002. It is observed that this country will continue its severe dependence on foreign labor. Thus, it is necessary for Bahrain to implement changes in its labor laws and create appropriate incentives to encourage larger female participation in the economy. In addition, education and training have to be intensified to create a more skilled indigenous labor force which is able to replace the foreign component over time.

## Appendix

Table (A-1): Sectoral Manpower Requirements in Bahrain By Nationality for the Years 1994, 1998 and 2002.

Sector	1994		1998		2002	
	Nationals	Non-Nationals	Nationals	Non-Nationals	Nationals	Non-Nationals
1. Agriculture	5402	1714	6862	2177	8424	2672
2. Mining & Quarrying	5016	1440	5328	1530	5651	1623
3. Manufacturing	6785	11598	7587	12969	8455	14451
4. Electricity, Gas & Water	2919	1507	3218	1660	3541	1828
5. Construction	4839	41028	5310	45024	5824	49381
6. Wholesale & Retail Trade	8978	18914	9670	20369	10417	21944
7. Transport, Storage & Communication	14339	4638	15339	4961	16421	5312
8. Finance & Business	5679	2827	8506	3085	6757	3364
9. Community & Personal Services	42813	38333	81146	47230	89519	52130
Total	96770	121999	218769	134064	240803	117620
						264870

Table (A-2): Sectoral Manpower Requirements in Bahrain By Sex for the Years 1994, 1998 and 2002

Sector	Total			Total			Total		
	Male	Female	1994	Male	Female	1998	Male	Female	2002
1. Agriculture	7034	82	7116	8935	104	9039	10968	128	11096
2. Mining & Quarrying	6164	292	6456	6548	310	6858	6945	329	7274
3. Manufacturing	17743	640	18383	19841	715	20556	22109	797	22906
4. Electricity, Gas & Water	4137	289	4426	4559	319	4878	5018	351	5369
5. Construction	45450	417	45867	49876	458	50334	54703	502	55205
6. Wholesale & Retail Trade	26344	1548	27892	28372	1667	30039	30565	1796	32361
7. Transport, Storage & Communication	15998	2979	18977	17113	3187	20300	18321	3412	21733
8. Finance & Business	5383	3123	8506	5873	3407	9280	6406	3715	10121
9. Community & Personal Services	59699	21447	81146	65859	23660	89519	72691	26114	98805
Total	187952	30817	218769	206976	33827	240803	227726	37144	264870

Table (A-3): Sectoral Manpower Requirements in Bahrain by Nationality for the Years 1994, 1998 and 2002  
(The Alternative Scenario)

Sectors	Nationals	Non- Nationals	Total	Nationals	Non- Nationals	Total	Nationals	Non- Nationals	Total
1. Agriculture	3035	963	3998	3187	1011	4198	3347	1062	4409
2. Mining & Quarrying	4880	1402	6282	5124	1472	6596	5381	1545	6926
3. Manufacturing	5904	10092	15996	6199	10597	16796	6509	11127	17636
4. Electricity, Gas, & Water	2640	1362	4002	2772	1430	4202	2910	1502	4412
5. Construction	4420	37479	41899	4642	39354	43996	4874	41322	46196
6. Wholesale & Retail Trade	8542	17994	26536	8969	18893	27862	9418	19838	29256
7. Transport, Storage & Communication	13845	4478	18323	14538	4702	19240	15265	4937	20202
8. Finance & Business	5251	2614	7865	5513	2745	8258	5789	2882	8671
9. Community & Personal Services	39812	34751	73563	40752	36489	77241	42788	38311	81099
Total	87329	111135	198464	91696	116693	208389	96281	122526	218807

Table (A-4): Sectoral Manpower Requirements in Bahrain by Sex for the Years 1994, 1998 and 2002  
(The Alternative Scenario)

Sectors	Total			Total			Total		
	Male	Female	1994	Male	Female	1998	Male	Female	2002
1. Agriculture	3952	46	3998	4150	48	4198	4358	51	4409
2. Mining & Quarrying	5998	284	6282	6298	298	6596	6613	313	6926
3. Manufacturing	15439	557	15996	16211	585	16796	17022	614	17636
4. Electricity, Gas, & Water	3740	262	4002	3927	275	4202	4123	289	4412
5. Construction	41518	381	41899	43596	400	43996	45776	420	46196
6. Wholesale & Retail Trade	25063	1473	26536	26316	1546	27862	27632	1624	29256
7. Transport, Storage & Communication	15446	2877	18323	16219	3021	19240	17030	3172	20202
8. Finance & Business	4978	2887	7865	5226	3032	8258	5488	3183	8671
9. Community & Personal Services	54120	19443	73563	56826	20415	77241	59665	21434	81099
Total	170254	28210	198464	178769	29620	208389	187707	31100	218807

## References:

- 1- Haji, J. A. Sectoral Analysis of Kuwait Economy with special reference to manufacturing industries. Ph. D. Thesis. The Vectorial University of Manchester, 1981, ch. 9.
- 2- Haji, J. A. Compilation of input-output tables for Bahrain, Kuwait University, 1990.
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- 4- United Nations Economic and Social Commission for Western Asia, 1988.