

CHAPTER 4

RESULTS AND DISCUSSION



4.1. Analysis of resources flow in to the health sector

Table 4.1 reports results of the flow of resources into the health sector under the PoW. The results showed that, there was a significant increase in health resource, but the margin of increase was not stable. From the beginning to the middle of the programme (1997 to 1999) saw a progressive percentage increase from 8 to 135 percent. While the last two years (2000 to 2001) saw decline in percentage increase from 32 to 1.8 percent. The higher percentage increase in 1999 may be due to full commitment by both donor and government.

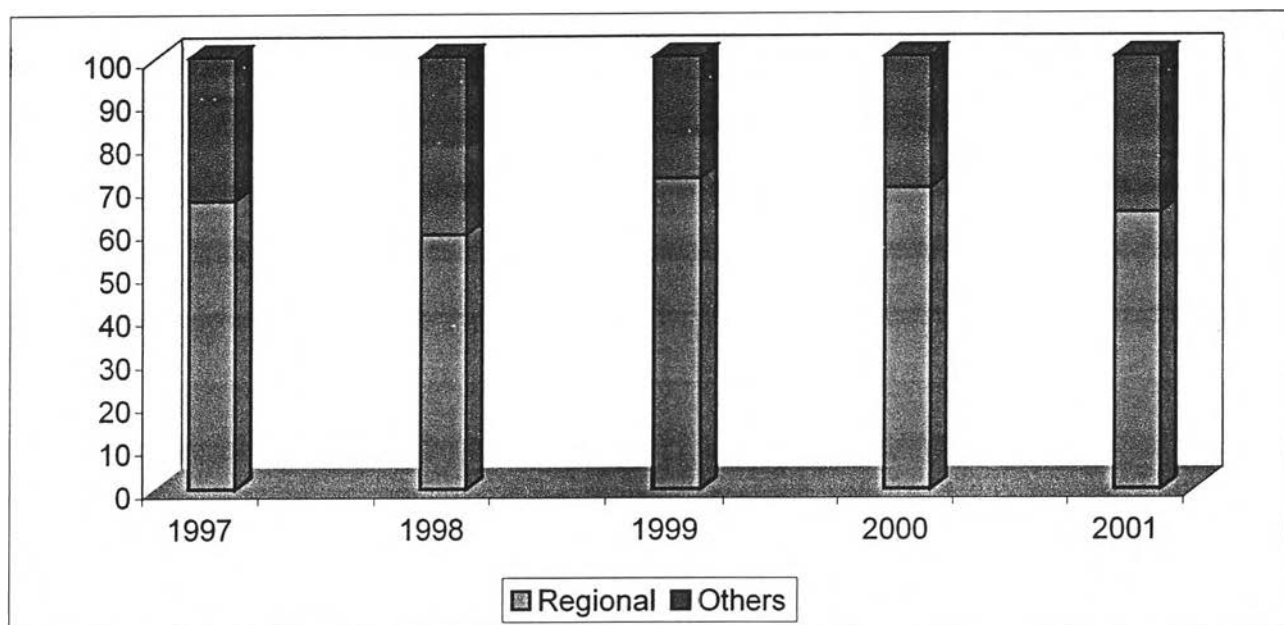
The result of the analysis is consistent with per capital health expenditure and total share of health expenditure against total national expenditure.

Percentage share of regional budget indicates that regions got more than half of the total health budget throughout the programme (66.75, 58.94, 71.82, 69.57 and 63.79) respectively. This means that efforts were made to resource regional BMCs which are the main service agencies of the Ministry of Health. This is shown in table 4.3. Regional allocations exhibited by the analysis followed the national resource allocation pattern. This implies that government gave priority to the provision of primary health care than others such as tertiary care offered by teaching hospitals and regulations of the health sector through the statutory bodies.

Table: 4. 1: Annual percentage increase and regional share of national health budget
1997- 2001

Year	Regional	Others	% increase
1997	66.75	33.25	7.91
1998	58.94	41.06	41.01
1999	71.82	28.18	135.49
2000	69.57	30.43	32.4
2001	63.79	36.18	1.84

Figure 4.1: Regional share of national budget



4.2. Allocative equity

Several steps were employed to derive allocative equity across regions under the Programme of Work. The main three measures of budget allocation: U5MR, poverty and distance were used to adjust the population needs of a region. Equations (1) and (3) were used to determine a region's adjusted population needs and expected budget respectively. Equity was evaluated by comparing expected budget with actual budget by using equation (4).

The results of the weighted population of the various regions from 1997 to 2001 using equal and different weights for the main three measures of resource allocation, are presented in appendix 1.

Table 4.2 reports the results of equity of health budget allocation across regions under the Programme of Work, by sharing resources equally among the main determinants of budget. The general result showed that there was inequity in the distribution of resources under the entire Programme of Work. Some regions were over provided while others were under provided. One surprising factor is, the deprived regions which were supposed to have benefited from the programme's allocation formula did not, compare with ratios of the well to do regions. The results indicated that the programme did not influence the status quo much. Affluent regions enjoyed to the detriment of the deprived ones.

Greater Accra region continued to enjoy much resource than all the regions even though it is considered the most affluent region, see table 4.2 Greater Accra region was over provided constantly two times more than its expected need to the detriment of the deprived regions. It had ratio of 2.93 in 1997, 3.50 in 1998, 2.09 in 1999, 2.67 in 2000 and 2.47 in 2001. It must be noted that, the over provision (inequality) may be due to its large personnel position as pointed out earlier that it controls about 42 percent of the total

medical doctors in the public sector and 18 percent of the government and mission hospital.

Volta and Eastern regions were also over provided throughout the programme with the exception of 1999 and 2000 respectively. According to allocation option of equal weights for U5MR, poverty and distance, Volta region had the following ratios 1.47 in 1997, 1.35 in 1998, 0.82 in 1999, 1.49 in 2000 and 1.38 in 2000. Eastern region also exhibited similar results with ratios of 1.17, 1.25, 1.36, 0.87 and 1.05. Interestingly, Upper West one of the poor regions and deprived regions benefited from the programme. It attained equity most of the years under this and other allocation options.

Similarly, Central region was comparatively better resourced (0.9, 1.08, 0.60, 1.09 and 1.27) than the northern and upper east regions, the remaining poor and deprived regions which, were expected to have benefited from the formula. Upper east and northern regions suffered perpetual inequality of under provision. Northern region with its large population spread across large area, poor health status and high level of deprivation and should have been the most benefactor of the allocation formula under all scenarios surfed the reverse with ratios of 0.67, 0.66, 0.95, 0.65 and 0.44. Upper East, one of the underserved regions, with high U5MR and large number of people living below poverty line (8 out of 10) had ratios of 0.67, 0.56, 0.73, 0.80 and 0.86.

Comparatively, Ashanti region with large population over relatively large area suffered more inequity (0.71, 0.64, 0.39, 0.67 and 0.61) than the rest of the average regions like western and Brong Ahafo regions. The level of inequity indicates that allocation of health budget was more than the initial three factors stipulated by the programme, which calls for more studies in the future. The high level of inequalities may be due to allocation of

personnel budget which is based on civil service scale and the staff position of a region and investment budget which in most circumstances is under pressure from the politicians.

Table 4.2: Ratio of weighted population on U5MR, distance and Poverty

Year	1997	1998	1999	2000	2001
Region					
UWR	1.01	0.94	0.97	1.19	1.81
UER	0.67	0.56	0.73	0.80	0.86
NR	0.67	0.66	0.95	0.65	0.44
BAR	0.79	0.65	1.87	0.91	0.80
ASH	0.71	0.64	0.39	0.67	0.61
ER	1.17	1.25	1.36	0.87	1.05
VR	1.47	1.35	0.82	1.49	1.38
CR	0.95	1.08	0.69	1.09	1.27
WR	0.94	0.94	0.81	0.87	0.91
GAR	2.93	3.50	2.09	2.67	2.47

4.3. Sensitivity analysis

This section presents the results of the sensitivity analysis on poverty and U5MR. To test how sensitive each of the measures determining budget allocation is, different weights between 0 and 1 were given to U5MR and poverty separately to adjust regional population in order to calculate for a region's expected budget and evaluate allocative equity. The results of the weighted population and expected budgets for the respective regions are presented in appendix 2

Table 4.3 presents the results of the ratios of adjusted population on U5MR. Comparing the results with that of weighted population on U5MR, distance and poverty there was not much change in the equity ratios. Inequities in the allocations of budget were still evident. Greater Accra region still maintains its lead in over provision. Comparing U5MR allocation scenario to both under five and poverty, Greater Accra region lost about half of its budget, yet it was over provided. This is a true reflection, because it has the best U5MR of 62 per 1000 live birth, which is lower than national average. For example the ratios of Greater Accra region reduced from 2.93 in 1997 to 1.93, 3.50 to 2.31, 2.09 to 1.30, 2.67 to 1.77 and 2.47 to 1.64 in 1998, 1999, 2000 and 2001 respectively. Upper West region maintains its equity status of average ratio 1.13 from 1997 to 2000 and jumped to a ratio of 2.01 in 2001 an over provision of 100 percent.

The ratios of Eastern and Volta regions remained stable under U5MR allocation scenario of allocative equity. These regions were over provided though their under five mortality rates are better than Central, Northern, Upper East and West. Events repeating itself, the four deprived regions (Northern, Upper East and West and Central) with the highest under five mortality rates, with the exception of Upper West were constantly under provided throughout the programme, though, they should have gotten more if there was equity in distribution. Northern region with the worse under five mortality rate of 171 per 1000 live birth and was expected to have gotten much of the resources with a policy direction with priority on maternal and child health was under provided all years with ratios of 0.68, 0.66, 0.97, 0.66 and 0.44. Ashanti region was again, constantly under provided under this allocation option.

Table 4.3: Ratios of weighted population on U5MR using equation 4

Year	1997	1998	1999	2000	2001
Region					
UWR	1.11	1.03	1.07	1.32	2.01
UER	0.75	0.63	0.82	0.90	0.97
NR	0.68	0.66	0.97	0.66	0.44
BAR	0.72	0.60	1.72	0.84	0.74
ASH	0.79	0.71	0.44	0.75	0.68
ER	1.41	1.51	1.65	1.06	1.28
VR	1.57	1.45	0.88	1.60	1.48
CR	0.81	0.92	0.59	0.93	1.09
WR	0.90	0.90	0.78	0.84	0.88
GAR	1.93	1.31	1.30	1.77	1.64

Table 4.4 presents the results of poverty driven allocation. Poverty was given a weight of 1 as the main allocation's measure to adjust population. The results were not different from the first two measures U5MR, distance and poverty and U5MR alone. Allocative inequalities were again evident. Affluent regions like Greater Accra, Western and Volta were allocated more resources than the poorer ones. It is said that 8 out of 10 and 7 out of 10 people in upper east and northern regions are poor but according to this allocation measure they were under provided throughout the programme. For example the allocative equity ratio of Upper East from 1997 to year 2001 were as follows 0.68, 0.66, 0.82, 0.90 and 0.97. Upper West, like the previous allocation measures was better resourced than the rest of the so-called deprived regions.

Table 4 .4: Ratio of weighted population on poverty using equation 4

Year	1997	1998	1999	2000	2001
Region					
UWR	0.86	0.80	0.83	1.03	1.57
UER	0.55	0.46	0.60	0.66	0.70
NR	0.82	0.80	1.16	0.80	0.53
BAR	1.09	0.90	2.58	1.26	1.11
ASH	0.71	0.65	0.40	0.68	0.62
ER	1.06	1.14	1.23	0.80	0.96
VR	1.48	1.36	0.82	1.51	1.40
CR	0.80	0.91	0.58	0.92	1.08
WR	1.60	1.60	1.37	1.49	1.56
GAR	1.56	1.80	1.11	1.43	1.33

Results from budget allocation based on distance (proxy for cost) did not present much different results. Greater Accra region the most accessible region maintained its lead. It was over provided all the five years emphasising inequality in allocation of health budget under the programme. Two of the deprived regions central and upper west gained from this allocation option. Upper West got two times more than it expected need. Northern and upper east two of the deprived and under service regions lost to this allocation option. Northern region had ratios of 0.73, 0.72, 1.04, 0.71 and 0.48. Ashanti region continued to struggle for equity. Comparatively, it is the main loser to this allocation option with the following ratios 0.61, 0.55, 0.34, 0.58 and 0.52. Refer to table 4.5 below.

Table 4.5: Results of weighted population on distance using equation 4

Year	1997	1998	1999	2000	2001
Region					
UWR	1.26	1.17	1.21	1.49	2.28
UER	0.86	0.73	0.98	1.04	1.11
NR	0.73	72.00	1.04	0.71	0.48
BAR	0.75	0.62	1.78	0.87	0.76
ASH	0.61	0.55	0.34	0.58	0.52
ER	1.31	1.21	1.32	0.85	1.02
VR	1.40	1.29	0.78	1.42	1.32
CR	1.20	1.36	0.87	1.38	1.62
WR	0.80	0.80	0.68	0.74	0.77
GAR	2.65	3.16	1.89	2.42	2.24

Further sensitivity analyses of different weights between 1 and 0 assigned to measures of allocation did not change much the level of inequality. Greater Accra region continued to be the main gainer of all the various allocation options. Assigning more weight to poverty as against distance and U5MR deepened the inequality in favour of Greater Accra region. In some years it was over provided four times more than its expected need. This is due to the fact that it is the most affluent region with only two out of ten people living below the poverty line compare with nine out of ten in the upper west region. The ratio results of the rest of sensitivity analyses can be found at appendix 2 b.

4.4. Gini coefficient

The value of Gini coefficient is restricted to the range of 0 to 1. A simple diagonal distribution curve (Lorenz curve) means perfect equity. The value of Gini coefficient is 0. Skewed resources to one side means perfect inequity and has a Gini coefficient of 1. Gini coefficient is adapted to measure the variation of health resources among different regions. The Gini index is derived from the inequality ratios obtained from equation 4. The method is that the percentage ratios are arranged from the least affluent region to the most affluent one. The mean of the ratios was determined, and the following formula was used.

$$G = \frac{2 \text{Cov}(X, F)}{\mu}$$

X = the inequality ratio of region i

F = the cumulative distribution of X

μ = the mean of X

Below is an example of how Gini index is derived.

Table 4.6: calculation of Gini coefficient

Ratios (x)	F	Ranked x	U
1.01	0.1	0.67	1.12
0.67	0.2	0.68	
0.68	0.3	0.71	
0.79	0.4	0.79	
0.71	0.5	0.94	
1.11	0.6	0.95	
1.41	0.7	1.01	
0.95	0.8	1.11	
0.94	0.9	1.41	
2.93	1	2.93	

$$\text{Gini} = \text{Cov} (0.67: 2.93, 0.1: 1) * 2 / 1.12 = 0.252$$

The inequality ratios showed that there were some inequalities in the distribution of health budget between 1997 and 2001. Rich and well served regions got more resources than the poor and deprived regions. The richest region Greater Accra was over provided more than its expected needs in all the allocation options. Upper west gained mostly in all the allocation options. The rest of the poor and deprived regions – central, north and upper east were mostly under provided.

The calculated inequality index revealed that inequality was not much severe. This means that, all budget were not allocated to rich regions, though they were over provided in many years in various allocation options. In most cases allocation seems close to equity. Table 4.7 shows the Gini coefficients of allocation based on each of the measure and equal distribution of resources among the measures. Comparatively, allocation based on U5MR gives relatively stable Gini coefficients, while poverty gives relatively better Gini coefficients. This implies that in most case poverty driven allocation was close to fair.

Table 4.7. Gini coefficients of weighted population on U5MR, distance and Poverty

Allocation measure	1997	1998	1999	2000	2001
U5MR	0.201	0.247	0.219	0.178	0.240
Poverty	0.189	0.154	0.277	0.172	0.089
U5MR, Poverty, Distance	0.252	0.308	0.255	0.162	0.267
Distance	0.238	0.207	0.236	0.236	0.306

Below is graphical presentation of the above ratios. From the graph it is evident that allocation base on U5MR provided fairly low and consistent Gini coefficients for four years and change in the last year. The change in favour of poverty may be due to policy

emphasis on poverty. A study on health inequalities in Ghana by Bonsu et al 2002 revealed that there is not much relationship between U5MR and poverty, eventhough all the poor regions have high U5MR compare with the rich ones. Comparatively poverty gave the best Gini coefficients (0.189, 0.154, 0.277, 0.172 and 0.089) under the programme and seems to have been the main budget guide to achieve equity. The low Gini coefficients obtained in allocation based on poverty reaffirms government commitment to poverty reduction. The strategy is to allocate more resources to the poor and deprived areas to help improve access. Distance produced relatively stable high Gini coefficients compare to U5MR and poverty. While the main allocation method of equal budget for all the three measures, comparatively produces the worse Gini coefficients in all years after distance. The graph below shows the pattern of Gini coefficients of all budget allocation options for various years under the programme.

Figure 4.2 Pattern of Gini coefficient of budget allocations from 1997 to 2001

