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Public Health Care Expenditures in Nepal: Review, Analysis and Assessment



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Executive Summary

The present scenario of poor economic development in Nepal is reflected in per capita income of \$236.00 in 2001/2002 and Nepal being ranked 32nd from the bottom of 173 countries in UNDP's Human Development Report 2002 ; this later reflects low social and health indicators which are true even after many years of planned public expenditure. This deficiency has been acknowledged by His Majesty's Government of Nepal (HMG/N) and a number of reform measures are underway. Unfortunately, these reforms mainly address the question of accelerating economic growth, however for overall economic development, it is also essential to also address the poor social and health indicators. In this regard, HMG/N has initiated the process of health reform. However, it is necessary to have a deep understanding of the process so that past mistakes will not be repeated and that lessons learned will be addressed in future plans. The **objective** of this study is to provide that information by giving a review of the health care expenditure of Ministry of Health of HMG/N, which proxies for public health expenditure, during the 1989/90 to 2001/2002 period. Likewise, the paper assesses whether those expenditures had been able to favorably affect health indicators. The **methodology** for this examination is through a health production function which looks at health indicators, viz. infant mortality, child mortality, crude birth rate, crude death rate, life expectancy rate, as a dependent variable, against the contribution of health expenditures and a number of control variables such as literacy, annual immunization, and agricultural contribution to GDP (the proxy for economic structural change). The **empirical results** suggest that health expenditure did not have a statistically significant effect on health indicators. This suggests that there can be greater inter-linkages between health sector input (i.e. health care expenditure) and health sector output (i.e. health indicators). The recent policies such as the 10th development plan, as before, attempt to address this with the observation to move from simple "recommendation to concrete implementation". The paper ends with a **recommendation** for effective implementation of a National Health Account system in the country.

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List of Abbreviations

AGRI: Contribution of Agriculture to GDP

ALR: Adult Literacy Rate

CBR: Crude Birth Rate

CDR: Crude Death Rate

CMR: Child Mortality Rate

EPHCH: Budget Allocation on Primary Health Care

GDP: Gross Domestic Product

GDPN: Per Capita Income

HGDP: Public Expenditure on Health

HMG/N: His Majesty's Government of Nepal

IAI: Index of Annual Immunization

IMR: Infant Mortality Rate

LER: Life Expectancy Rate

MOH: Ministry of Health

MTEF: Medium Term Strategic Framework

MTSP: Medium Term Strategic Programme

PER: Public Expenditure Review

P1: Priority One Programme in the Health Sector

P2: Priority Two Programme in the Health Sector

P3: Priority Three Programme in the Health Sector

SLTHP: Second Long Term Health Plan

UNDP: United Nations Development Programme

I. Introduction

Nepal is an ancient kingdom located in South Asia with diverse geography and climates, sandwiched between the two giant countries of China to the north and India to the west, south and east. While Nepal is a serene kingdom, the economic activities of the country's 23 million people are quite dynamic with stable prices, strong balance of payments position and average annual economic growth of 4 percent, although contracting by 0.5% in the last fiscal year due to the present special situation. However, these features mask the prevalent poverty in the kingdom which is categorized as a least developed country with per capita Gross Domestic Product (GDP) of \$236.00 (His Majesty's Government of Nepal [HMG/N], Economic Survey 2002) and Nepal being ranked 32nd from the bottom of 173 countries in UNDP's Human Development Report 2002. This later reflects, in part, low health indicators viz. infant mortality rate per 1000 live births, child mortality rate per 1000 live births, crude birth rate per 1000 live birth and crude death rate per 1000 live births being 64.2, 91.0, 33.0 and 9.6 respectively while life expectancy is 59.7 years (Ministry of Finance [MOF] of HMG/N, 2002), which are generally below the average for the South Asian region and are dismal by international standards.

It is with the aim of addressing these that numerous reforms have been undergone, or are in the process or being undergone viz. financial sector reform, trade policy and legal reform, public sector reform etc. While these reform measures give focus mainly on accelerating economic growth, they have excluded the aspects of the country's social development thereby missing attainment of economic development (World Bank (1997), Hsiao (2000) etc.). This description is because both aspects of economic growth and social development are like two wings of a bird which are needed in equal strength to achieve flight (i.e. sustained economic development). In this regard, it has been acknowledged in Nepal that one important area of social development, is health sector reform for enhancing the allocation of scarce health resources to ensure health service delivery – this will improve efficiency, equity, transparency and accountability; and has been highlighted in National Health Policy (1991), Second Long-Term Health Policy (1997) and the recent health sector reform discussion, among others. Unfortunately, expenditure of the Ministry of Health (MOH) of HMG/N on health (both regular and development which will be used as a proxy for public health expenditure, caveats as below) was only 1.06% of GDP in 2001/02 and it had been proposed to be 5.06% of the budget in 2002/03. These figures are quite low by normal standards with the World Bank warning that concern is warranted if public expenditure is less than 2 percent of GDP in the health sector (World Bank, 1997). Further, there is the presence of low health indicators as shown above, even after many years of planned public expenditure in the country starting from the mid 1970s.

II. Statement of the Problem

The above scenario reveals that there has been limited effectiveness of public health expenditures in improving the health indicators of the Nepalese population. Fortunately, HMG/N has acknowledged the importance of health expenditure for improving health status, and thereby aid in poverty reduction. However, this motivation had a recent genesis only from 1975 and seen in both the 5th development plan and the first long term health plan (FLTHP, 1975 – 1990). Since then, there has been targeted focus in delivery

of primary health care services (up from the grass root level) reflected in the National Health Policy, 1991 and the subsequent development plans viz. 6th, 7th, 8th and 9th development plans, along with the Second Long Term Health Plan (SLTHP, 1997 – 2017).¹ Unfortunately, and as mentioned above, there has been concern about the efficacy of Public Health Expenditures especially with acceleration of decentralization (World Bank (2000b), Nepal Health Economics Association (2002) etc.). HMG/N has recognized this situation and decided to proceed with a definitive action plan whose primary objective is to improve the health status of the general population.

Towards this end, a strategic analysis to operationalize SLTHP was undertaken and Medium Term Strategic Health Plan (MTSP) log-framework was prepared in 2000. In MTSP, the areas of the health reforms have been identified and prioritized which are expected to contribute to both the strategic policy and reform measures embodied in Medium Term Expenditure Framework (MTEF), by enhancing efficiency, equity, transparency and accountability. This, along with the concept paper to the 10th Plan embodied in the Interim Poverty Reduction Strategy Paper (I-PRSP), had been presented and discussed at the recently concluded Nepal Development Forum held in Kathmandu. Likewise, there has been further discussion on this in the Health Sector Reform Strategy. The recently adopted 10th Development Plan has tried to address these issues.

However, there is serious concern that unless past deficiencies in public health care is well understood, there is the possibility of repeating those mistakes. Thus to reiterate, the problem observed is that *public health expenditures in Nepal have not been effective for improving the health indicators of the country's population.*

As such, the major objective of the study is to provide information to policy-makers for assisting them in formulation of appropriate public health sector policies in Nepal by reviewing the history of public expenditure activities, analyzing their shortcomings and assessing how present plans attempt to address the deficiencies, if any. Likewise, the Specific Objectives of the study are to:

- Review public expenditure on health sector to highlight the current situation;
- Analyze the deficiencies and shortcoming in health sector expenditures, if any;
- Assess the consistency of the above lessons with ongoing and future health plans;
- Finally, some observations and recommendations will be put forward regarding public health expenditure in Nepal, if appropriate.

III. Literature Review

There have been a number of articles which go about examining the efficacy of public health expenditure.

The most common is for a public expenditure review (PER). This examines and evaluates the impact of increase and other trends in the composition of public expenditure. Such an examination is routinely done in country to assess the effectiveness of their public expenditures. A similar study had been done for Nepal in World Bank (2000a) where as the publication of World Bank (2000b) had focused mainly on the health sector. World Bank (2000b) focused on public spending on health care through simple presentation of trends up to fiscal year 97/98, as well as having some discussion

¹ For a chronological discussion of this, see Adhikari et al. (2002) and citations.

on private spending, which is a fairly recent phenomenon in the country. The general conclusion is that public expenditure in Nepal has not been used effectively and appropriately targeted. This same conclusion had been reached by the report of the Nepal Health Economics Association (2002) which had been submitted at the recent 2002 discussion on Health Sector Reform Strategy in Nepal.

While this exercise is important, the expenditure of the health sector does not give a sense of the effectiveness with respect to health targets. This perspective can be obtained by examining an input-output model for the health sector (Hsiao, 2000). In the health sector, inputs are both public and private expenditures however for developing countries this is mainly limited to public expenditures (used by a number of authors such as Hsiao (2000)). The ultimate outcome in the health sector is the increase in the life expectancy. However, in the context of developing countries, indicators like infant mortality rate, child mortality rate, crude birth rate, crude death rate etc. can also be included (Stiglitz, 1999). This aspect had been examined by Adhikari et al. (2002) for the period 1989/90 - 2000/2001 using public expenditure on health, as a percent of GDP and of budget respectively, with outputs being child death rate, child mortality rate, infant mortality rate and life expectancy rate. Likewise, the authors also had a graphical examination of extension of health services over that period.

Unfortunately, this form of analysis does not give an indication of statistical significant as well as the strength, of the relationships and may be misleading if all the variables are not captured. To address this problem, there has been recourse to a health production function which assumes the existence of a technical relationship between inputs and outputs in the health sector (i.e. a change in input leads to a change in output by some constant factor). This had been used by Filmer and Pritchett (1999) who had used a health production function where $Y_i = f(X_{1i}, X_{2i}, Z_i)$. In that equation, the dependent variable "Y", is related to " X_{1i} " which is log of mean per capita income, " X_{2i} " which the log of the share of public health as a fraction of GDP and "Z", which are independent variables controlling for a variety of other socio-economic factors. Filmer and Pritchett had used child and infant mortality as "Y", log of mean per capita income as " X_{1i} ", the log of the share of public health as a fraction of GDP as " X_{2i} ", and female literacy rate plus other socio-economic variable as "Z". They have done an analysis across 45 countries and found that public expenditure has a small, but significant, effect on the expressed health indicators.

This analysis had likewise been applied to Nepal by Adhikari et al. (2002) for the period 1989/90 - 2000/2001 looking at the child death rate, child mortality rate, infant mortality rate and life expectancy rate, as the dependent variables, in relation to the above independent variables (i.e. log of per capita income and the log of the share of public health as a fraction of GDP) although for socio-economic control variable, data on adult literacy rate could only be obtained. The empirical results of Adhikari et al. (2002) were consistent with Filmer and Pritchett (1999) with public expenditure not being statistically significant, although the effect of the adult literacy variable was significant in reducing infant mortality and child death rate.

However, the conclusion based on aggregate public expenditure may not give the whole picture of public expenditure on health. The analysis had been further refined by Gupta, Verhoeven and Tiongson (1999) who, in addition to the above example, looking

at the allocation to different programs within the health sector (i.e. primary health care). The authors apply this analysis to 50 developing and transitional economies and find that the expenditure allocations within the sector are important, as with adult literacy rate – this was true even using different empirical techniques.

IV. Conceptual Framework and Empirical Methodology

Based on literature review of such analysis as well as in comparison with other countries, a modified health production function, as described earlier, is appropriate. This equation relates the log of the dependent variable to the log of the independent and control variables. Specifically, the dependent variables viz. health status measured in terms of infant mortality, child mortality, crude death rate, life expectancy rate, and independent variables viz. per capita incomes, public expenditures on health,² budget allocation on primary health care, adult literacy rate, immunization and contribution of agriculture to GDP, will be determined based on the mentioned literature review as well as on data availability. These conceptual variables and equation is concretized below through the function equation for estimation. This is:

$$\ln(M_i) = \beta_1 \ln\left(\frac{GDP_i}{N_i}\right) + \beta_2 \ln\left(\frac{H_i}{GDP_i}\right) + \beta_3 \left(\frac{PHC_i}{HB}\right) + \beta_4 X + \varepsilon$$

Where, "M" is the dependent variable, as described above, to the log of per capita income, the log of the share of public health as a fraction of GDP, log of the budget allocation for primary health care to the total health budget and a vector of independent variables which control for a variety of other socio-economic factors described above and denoted by "X".

V. Review, limitations and caveats on Nepalese expenditures of MOH of HMG/N

The above mentioned statement of the problem gives a broad review of the policy environment, which has guided expenditures of MOH of HMG/N. The specific expenditures are given below in the form of an input-output model:

² While public health expenditure (proxied by expenditure of Ministry of Health of His Majesty's Government of Nepal) as a percentage of both total budget and GDP are important, the later percentage was only used since (i) using both time series did not give additional information as both were positively correlated – this is reflected in a 70% coefficient of correlation in levels and a 67% coefficient of correlation in log levels, both of which are significant at the 1 % level of confidence (ii) the choice of percentage of public health expenditure to GDP is the norm used in other countries and papers.

Table 1: Input-Output Model for Health Sector*

I	Fiscal Year	MOH of HMG/N Expenditure on Health		Per capita RGDP	OUTPUTS				
		As % of Total Budget	As % of GDP		Infant mortality rate	Child mortality rate	Crude Birth Rate	Crude Death Rate	Life Expectancy Rate
N	1989/90	4.60	0.93	3102.3	128	197	41.6	16.9	53.5
	1990/91	3.84	0.88	3230.7	107	197	39.6	14.8	54.0
P	1991/92	3.62	0.84	3308.5	107	197	39.6	14.85	54.0
	1992/93	3.40	0.64	3329.2	102	165	39.6	14.85	54.02
U	1993/94	4.85	1.08	3501.8	102	165	39.6	14.0	54.0
	1994/95	4.91	1.21	3531.2	102	165	37.5	14.0	54.0
T	1995/96	5.99	1.44	3642.9	102	165	37.5	13.8	54.0
	1996/97	6.19	1.42	3727.1	79	118	37.8	11.9	54.5
S	1997/98	5.70	1.37	3766.8	74.7	118	35.4	11.5	56.1
	1998/99	5.69	1.34	3829.9	69.42	111.72	34.54	10.7	57.52
	1999/00	6.09	0.80	3987.6	66.78	108.78	34.1	10.3	58.25
	2000/01	4.52	0.56	4164.3	65.3	105.44	35.58	10.0	59.0
	2001/02	5.26	1.06	4248.8	64.20	91.00	33.00	9.60	59.7

Note: The following are the raw data for Infant Mortality Rate (per 1000 live births), Child Mortality Rate (per 1000 live births), Crude Birth Rate (per 1000 live births) and Crude Death Rate (per 1000 live births) respectively. The public health expenditure as a percentage of national budgets and the GDP are based on actual figures while the figure for 2001/02 is based on estimate.

* These are figures for expenditures on health made through the MOH of HMG/N Nepal only. Expenditures made in health through other ministries such as the expenditures of Teaching Hospital under the Ministry of Education, Police Hospital under the Ministry of Home Affairs and Army Hospital under Ministry of Defense have been excluded from the present analysis.

Source: Economic Survey, 2002 and various issues of Nepalese budget speeches

The average public expenditures on health (i.e. the supply side of the health sector) as a percentage of both the total budget and of GDP is 4.97% and 1.04% respectively, which, overtime, is within a broad band of 20% and 30% respectively. Further, Nepalese health sector expenditures as a percentage of GDP compare favorably to some South Asian countries: Bangladesh-1.6, India-0.6, Pakistan-0.9 and Sri Lanka-1.4 (WDR, 2000/2001). However, it should be noted that according to the strategy of *Health for All by the Year 2000* guideline prepared by WHO, at least five percent of the GNP should be spent on health sector with the World Bank warning that concern is warranted if public expenditure is less than 2 percent of GDP in the health sector (World Bank, 1997). In this regard a major deficiency has been that the public health expenditure for Nepal over the above period has been consistently less than the 2% level of GDP.

While there is a deficiency in the level of expenditures of MOH of HMG/N expenditure, the figures shows that there has been, except for a number of years, an increasing trend. However, it is important to look at the composition of Public Expenditure on Health, whose time series is given below:

Table 2: Expenditures on Primary Care

<i>Year</i>	<i>Expenditures on Primary Care</i>
1989/90	81.16
1990/91	80.89
1991/92	78.6
1992/93	75.8
1993/94	72.8
1994/95	63.1
1995/96	63.4
1996/97	63.9
1997/98	57.2
1998/99	70.3
1999/00	74.2
2000/01	72.3
2001/02	68.0

Note: Primary care comprises of service delivery, support services and national health program expenditures. Service delivery includes all expenditures (regular and development) up to the district level Nepal; support services includes training information, education and communication, management information systems, laboratory services, epidemiology, and related services; national health program includes various health related programs of HMG

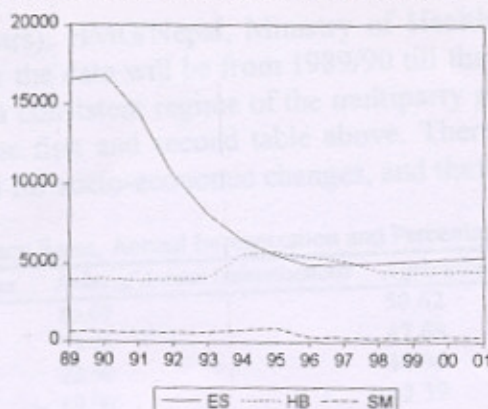
Source: Red Books (various issues), Ministry of finance HMG Nepal

The above table seems to indicate that for the period from 1989/1990 up to 1997/1998, there had been an decreasing trend of expenditures on primary care, which had increased and stabilized at roughly seventy percent from 1998/1999 to 2001/2001. A shortcoming of the composition of MOH of HMG/N expenditures is their inconsistency with the National Health Policy, 1991 document.

In addition to reviewing expenditure data, it is also important to put forward the limitations and caveats for the analysis. First, the span of the data is limited to the period 1989/90 to 2001/2002. This situation is in part a result of the non-availability of data, which puts forth so-called "holes" in the time series and thus forces a limit to its span. Likewise, this period covers the full span of the multiparty democracy period, which can be seen most directly with National Health Policy, 1991 as well as in the above policy documents. The actual performance is mixed since the above analysis on expenditure on primary health suggests non-adherence however the below graph of the extension of health services,³ suggests otherwise. As such, this limitation, while unfortunate, is justifiable.

³ The figures suggest that there has been a sharp increase in Extension of Services (ES) in terms of population per service (hospitals, health centers, health posts, Ayurvedic service centers, sub-health posts and primary health centers) since 1990 which has stabilized after 1995 leading to the decline of population per service from 16532 in 1990 to 4915 in 1997 and a slight rise to 5413 in 2001. The population per hospital bed (HB) has been relatively fluctuating rising from 3947 to 5780 in 1995 and 4525 persons in 2001. The supply of skilled manpower (SM) has shown gradual improvement with 648 persons in 1990 to 295 persons per skilled manpower in 2001. These graphs suggest however that, after 2000 ES, HB and SM have had marginal deteriorating. Some inconsistencies in the data have arisen due to introduction of new type of health system such as the Primary Health Centre (PHC). Health Posts were upgraded into PHC such that there has been reduction in quantity but improvement in quality of health services.

Figure 1: Extension of Health Services (1989/1990 – 2001/2002)



Second, some limitations are placed on the data. First, the data simply reflect expenditure data of MOH of HMG/N but may not reflect the full public expenditure. While this representation may be appropriate given that there is a consistent undervaluation, since the early 1990's, there has been greater participation of the private sector in health expenditure. For example, Rana (2001, p.5) suggests that the government public expenditures in 1995/96 met only 13 percent of the cost (or Rs. 83 of the total estimated cost of Rs. 525 per person) being made in the Nepalese health sector (based in part on Hotchkiss et al. (1998) and other analysis).⁴ This fact is also shown in NSAC (1998) who find that the households provide largest share of the health expenditure funds (76 percent out of total health expenditures) while the government (10 percent), development partners and donors etc. (14 percent) accounted for much smaller levels (NSAC, 1998). These evidences should be taken in perspective since there have been many important developments since their time. In other words, this suggests that simply examining MOH of HMG/N expenditure as the input may have not been appropriate, especially after the mid-1990s.⁵

Given these limitations and caveats, the next section commences with the empirical analysis.

VI. Empirical Results

The empirical exercise simply runs the above conceptual equation with current data. As such, this portion is broken down into three parts: first, discussion of data sources and examination of data trends; second the empirical results from running a number of regressions; and lastly some empirical analysis.

VI.A Data Sources

The main source will be mainly secondary data largely from government publications viz. HMG/Nepal, Ministry of Finance (such as budget speeches, economic survey, and

⁴ Rana (2001, p.5) goes further to state that although the government is only responsible for a small portion of total health expenditures, it remains the major, if at times only, provider of health services for the poor especially those located in the remote areas of the country.

⁵ While this suggests the possibility of omitted variables to capture the liberalization period of Nepal, the limited degrees of freedom did not allow for concrete test of structural (or "floating" structural) breaks.

red books of various years); HMG/Nepal, Ministry of Health; Nepal Health Research Council etc. The span for the data will be from 1989/90 till the present; this is arbitrarily limited since it captures a consistent regime of the multiparty period. Part of the required data is put forward in the first and second table above. There are, however, additional time series which control for socio-economic changes, and these are given below:

Table 3: Adult Literacy Rates, Annual Immunization and Percentage of Urban Population

Year	Adult Literacy Rates	Index of Annual Immunization#	Agriculture Contribution to GDP
1989/90	25.6	80.66	50.62
1990/91	25.6	73.75	47.68
1991/92	25.6	72.50	44.96
1992/93	26.3	69.00	42.39
1993/94	27.0	69.00	42.06
1994/95	27.5	79.28	40.75
1995/96	32.8*	82.25	40.48
1996/97	38.1	87.25	40.36
1997/98	39.1	88.48	38.82
1998/99	39.2	81.58	40.11
1999/00	40.4	83.5	39.49
2000/01	41.8	82.4	37.88
2001/02	50.7	82.4	38.10

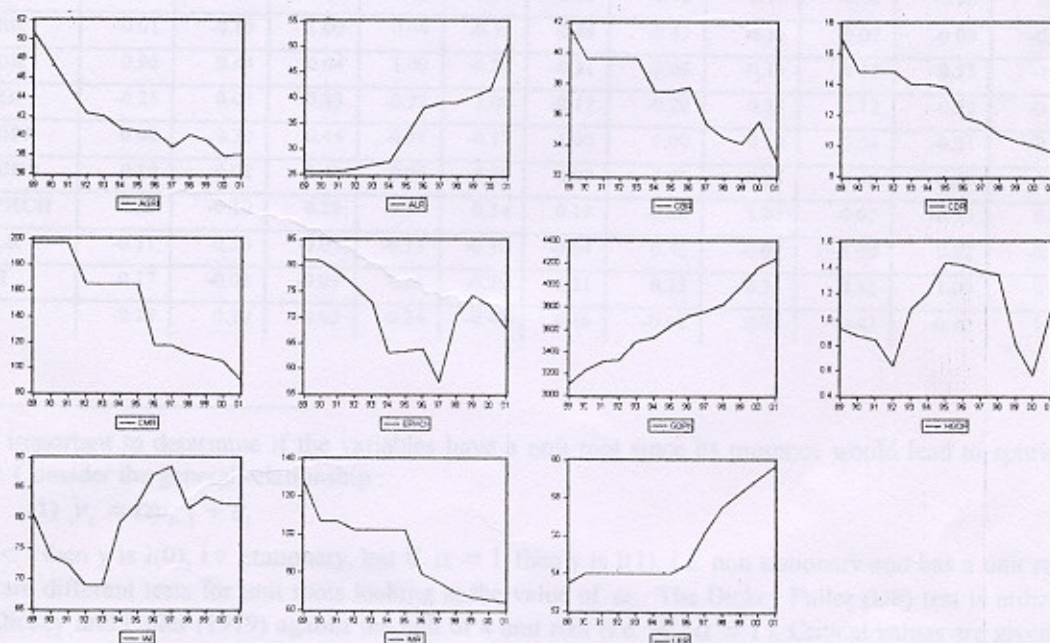
Note: “*” denotes simple interpolation of data (i.e. average of FY 1995 and 1997)

Obtained as the arithmetic mean of the percentage of population covered under various immunization categories (BCG, DPT3, OPV3 and Measles)

Source: Adult Literacy rates: Human Development Report 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000 and 2001, 2002 UNDP; Index of Annual Immunization: Annual Report 1997/98 and 2001/02, Department of Health Services, Ministry of Health; Agriculture Contribution to GDP: Economic Survey, 2002

These time series are shown graphically below:

Figure 2: Time series of the variables (1989/1990 – 2001/2002)



The summary statistics of the data are given in table 4:

VI.B. Regression Outputs

Regression will be run using Ordinary Least Squares (OLS; as Filmer and Pritchett, 1999, Gupta, Verhoeven and Tiongson, 1999 and others) on the above determined functional equation. First, the time series are tested for unit roots,⁶ this limits the possibility of a spurious regression. A caveat is that with only twelve data points, the empirical tests have low power. Running tests for unit root, using the Augmented Dickey-Fuller (ADF) test, on the log levels of the above time series suggests that most of variables cannot reject the null of a unit root at greater than 20% level of confidence, except for agricultural contribution to GDP. Tests are once again run after having taken the log difference each of the variables. Two things occur: first, the ADF statistics, in general, increase in confidence with a handful of the variables able to reject the null at the 5% level, however the majority of the variables are still unable to reject the null of no unit root at the normal levels of confidence (i.e. at the 5% and 10% level). This is understandable given the limited data set where the degrees of freedom have decreased by one after having taken the log differences. However, the test statistics are generally able to reject the null in at least the 15%, if not the 20%, level of confidence. Conditional on this caveat of limited degrees of freedom, a "looser" acceptance of the variables is allowed and the time series are taken to be acceptable. Likewise, the correlations of the different time series are examined, to get a flavor of their exogeneity from each other. This chart is put forth below.

Table 4: Correlation Coefficients of the Variables

	DLIM R	DLC MR	DLCB R	DLC DR	DLL ER	DLG DPN	DLHG DP	DLEP HCH	DLAL R	DLIAI	LAGR I
DLIMR	1.00	0.63	-0.01	0.90	-0.25	0.00	0.19	-0.25	-0.11	0.17	-0.27
DLCMR	0.63	1.00	-0.15	0.44	0.01	0.30	-0.02	-0.10	-0.50	-0.08	0.20
DLCBR	-0.01	-0.15	1.00	0.04	-0.33	0.44	-0.43	0.29	-0.07	-0.09	-0.03
DLCDR	0.90	0.44	0.04	1.00	-0.28	-0.31	-0.06	-0.35	-0.13	0.25	-0.24
DLLER	-0.25	0.01	-0.33	-0.28	1.00	-0.17	-0.20	0.34	-0.12	-0.29	-0.42
DLGDPN	0.00	0.30	0.44	-0.31	-0.17	1.00	0.00	0.19	-0.04	-0.21	0.16
DLHGDP	0.19	-0.02	-0.43	-0.06	-0.20	0.00	1.00	-0.26	0.48	0.15	-0.03
DLEPHCH	-0.25	-0.10	0.29	-0.35	0.34	0.19	-0.26	1.00	-0.09	-0.55	0.02
DLALR	-0.11	-0.50	-0.07	-0.13	-0.12	-0.04	0.48	-0.09	1.00	0.32	-0.43
DLIAI	0.17	-0.08	-0.09	0.25	-0.29	-0.21	0.15	-0.55	0.32	1.00	-0.40
AGRI	-0.27	0.20	-0.03	-0.24	-0.42	0.16	-0.03	0.02	-0.43	-0.40	1.00

⁶ It is important to determine if the variables have a unit root since its presence would lead to spurious results. Consider the general relationship:

$$(1) y_t = \alpha y_{t-1} + \varepsilon_t$$

If $|\alpha| < 1$ then y is $I(0)$, i.e. stationary, but if $\alpha = 1$ then y is $I(1)$, i.e. non stationary and has a unit root. There are different tests for unit roots looking at the value of α . The Dickey Fuller (DF) test is utilized, from Dickey and Fuller (1979) against the null of a unit root (i.e. $H_0: \alpha = 1$). Critical values are given in Davidson and Mackinnon (1993) with the lag length arbitrarily set at one.

The above table suggests that the time series do not have significant correlation with each other, and thus would not be a problem during the regression. Given this conclusion, the specific estimating equation is based on the conceptual equation given in section four. There are five different five separate regressions are run on each specification with the respective dependent variable being: infant mortality (IMR), child mortality (CMR), crude death rate (CDR), life expectancy rate (LER) and the constant independent variables viz. per capita incomes (GDPN), public expenditures on health (HGDP), budget allocation on primary health care (EPHCH), adult literacy rate (ALR). The second and third cluster of five regressions will include the above regression but will add respectively index of annual immunization (IAI) and contribution of agriculture to GDP (AGRI), and the clusters are named respectively I, II and III.⁷ Thus, fifteen regressions in total will be run in three different variations of increasing number of independent variable, whose results are given in the fifth table, below.

⁷ The addition of a "D" and an "L" refer to the time series being difference and in log form (or being log differenced).

Table 5: Summary statistics of health policy variables

	IMR	CMR	CBR	CDR	LER	GDPN	HGDP	EPHCH	ALR	IAI	AGRI
Mean	89.95385	146.4569	37.34000	12.86154	55.58385	3643.931	1.043846	70.89615	33.82308	79.38846	41.82308
Median	102.0000	165.0000	37.50000	13.80000	54.02000	3642.900	1.060000	72.30000	32.80000	81.58000	40.48000
Maximum	128.0000	197.0000	41.60000	16.90000	59.70000	4248.800	1.440000	81.16000	50.70000	88.48000	50.62000
Minimum	64.20000	91.00000	33.00000	9.600000	53.50000	3102.300	0.560000	57.20000	25.60000	69.00000	37.88000
Std. Dev.	20.79963	38.77590	2.627978	2.314551	2.240571	355.8981	0.297168	7.457533	8.235103	6.384921	3.805792

Note: IMR= infant mortality; CMR= child mortality; CBR= crude birth rate; CDR= crude death rate; LER= life expectancy rate; and GDPN= per capita incomes; HGDP= public expenditures on health; EPHCH= budget allocation on primary health care; ALR= adult literacy rate; IAI= index of adult immunization; and AGRI= contribution of agriculture to GDP.

Table 6: Regressions

Variable	DIMR			DCMR			DCBR		
	I	II	III	I	II	III	I	II	III
C	-0.049450 (0.4727)	-0.047097 (0.5265)	2.047960 (0.3556)	-0.073661 (0.3244)	-0.071647 (0.3763)	0.632752 (0.7989)	-0.050019 (0.0696)	-0.049327 (0.0981)	-0.078469 (0.9255)
DLGDPN	0.169341 (0.9332)	0.247405 (0.9100)	0.485592 (0.8259)	2.183991 (0.3282)	2.250849 (0.3547)	2.330931 (0.3855)	1.006281 (0.1930)	1.029261 (0.2215)	1.025947 (0.2721)
DLHGDP	0.061688 (0.5607)	0.067824 (0.5588)	0.086869 (0.4669)	0.075849 (0.5042)	0.081104 (0.5152)	0.087508 (0.5282)	-0.053006 (0.1868)	-0.051199 (0.2418)	-0.051464 (0.2929)
DLEPHCH	-0.195074 (0.5871)	-0.112160 (0.8081)	-0.197240 (0.6770)	-0.187645 (0.6237)	-0.116633 (0.8134)	-0.145239 (0.7921)	0.036896 (0.7728)	0.061303 (0.7131)	0.062487 (0.7386)
DLALR	0.281665 (0.5522)	-0.345275 (0.5302)	-0.557017 (0.3605)	-0.904946 (0.1021)	-0.959424 (0.1346)	-1.030616 (0.1725)	0.096043 (0.5715)	0.077319 (0.6929)	0.080264 (0.7297)
DLIAI		0.213491 (0.7479)	-0.014479 (0.9835)		0.182842 (0.7967)	0.106194 (0.8971)		0.062843 (0.7923)	0.066015 (0.8129)
LAGRI		0.145149	-0.562871 (0.3453)			-0.189248 (0.7768)			0.007830 (0.9723)
R-2	0.129016	0.145149	0.297567	0.417436	0.424392	0.434520	0.413842	0.421156	0.421311
Adj R-2	-0.368690	-0.567227	-0.545352	0.084542	-0.055282	-0.244056	0.078894	-0.061213	-0.273116
F-stat	0.259221	0.203753	0.353020	1.253961	0.884752	0.640341	1.235542	0.873099	0.606703
P (F-stat)	0.895096	0.949157	0.881369	0.371381	0.543746	0.700300	0.377522	0.549580	0.720904

Source: summary of regressions as given in the first, second and third appendix

Note: Equation I, II and III are regression which increase the number of independent variables

Table 6 (cont): regressions

Variable	DCDR			DLER		
	I	II	III	I	II	III
C	-0.022960 (0.5657)	-0.021964 (0.6127)	0.861233 (0.5191)	0.014557 (0.1051)	0.014217 (0.1407)	0.401370 (0.1026)
DLGDPN	-0.827931 (0.4908)	-0.794867 (0.5426)	-0.694457 (0.6144)	-0.163900 (0.5062)	-0.175175 (0.5111)	-0.131160 (0.5586)
DLHGDP	-0.012956 (0.8326)	-0.010357 (0.8775)	-0.002328 (0.9741)	-0.002398 (0.8489)	-0.003285 (0.8105)	0.000235 (0.9839)
DLEPHCH	-0.191208 (0.3718)	-0.156090 (0.5695)	-0.191957 (0.5171)	0.041015 (0.3523)	0.029039 (0.6025)	0.013317 (0.7774)
DLALR	-0.090415 (0.7418)	-0.117356 (0.7132)	-0.206619 (0.5718)	-0.008661 (0.8775)	0.000526 (0.9935)	-0.038603 (0.5165)
DLIAI		0.090421 (0.8163)	-0.005682 (0.9895)		-0.030835 (0.6985)	-0.072962 (0.3236)
LAGRI			-0.237285 (0.5087)			-0.104015 (0.1121)
R-2	0.217738	0.225343	0.296531	0.186767	0.208559	0.545570
Adj R-2	-0.229270	-0.420204	-0.547632	-0.277938	-0.450976	0.000254
F-stat	0.487101	0.349074	0.351272	0.401904	0.316221	1.000466
P (F-stat)	0.746036	0.865925	0.882431	0.802057	0.886397	0.510358

Source: summary of regressions as given in the first, second and third appendix

Note: Equation I, II and III are regression which increase the number of independent variables

VI.C Discussion of Regression Results

In general, the regression results suggest no relation between health output and expenditure input. This is reflected from two perspectives. First, values of R-2 are non-significant⁸ at the 5 % level although two are significant at the 10% level, with the values being both positive and negative. Further, most of the F-statistics are not significant (reflected in high p-values) suggesting the inability to reject the joint hypothesis of all the coefficient being zero. The second perspective is to look at the specific coefficient by themselves suggest a similar conclusion where most are not significant at even the 10% level of confidence, except for a handful of variables which may be attributed to chance.

VII. Some Analysis of Empirical Results

The analysis is based on the empirical results from the above regression. Before moving to the analysis, a salient feature is the low allocated budget in the health sector which will have to be increased⁹. This is important since it has been shown that good health is essential for the nation's economic development; however in Nepal there has presently been limited allocation in the health sector which has average approximately 1.04% of GDP during the period 1989/90 to 2000/2001. A first step in this direction would therefore be to increase the amount of health sector budget to breach the 2% critical threshold (as put forward by the World Bank in their 1997 report) as a positive signal in this regard.¹⁰ Having said this and prior to interpreting the results, a note of caution is necessary. The limited data set, low degree of freedom and resulting poor power of the test suggest that these results should, at best, be indicative only especially given the "looser" regression results. Because of this, caution is called for in the interpretation.

The striking results are the absence of a relationship for the health outcomes and the level of MOH of HMG/N expenditure. This result is consistent across all the empirical regressions. While the result can be interpreted as having a problem in the conceptual framework, the experience of other countries and also partly for Nepal, suggest otherwise. Another problem may be due to data quality, such as omitted aspects etc.¹¹ While this is certainly one possible interpretation, another is that there is no clear inter-linkage between inputs and outputs in Nepal. This can, in part, be reflected through an examination of the efficiency of use of resources in health care reflected in the absorptive capacity, which is given below:

⁸ The formula $Z = \frac{1}{2} \sqrt{N-3} \{ \ln[(1+r)(1-\rho) / (1-r)(1+\rho)] \}$ is utilized to test for the significance of correlation's (Romano 1970: 156-160) with $H_0: \rho = 0$ versus $H_A: \rho \neq 0$ using $\alpha = 0.05, 0.01$ where the rejection region is $Z = \frac{1}{2} \sqrt{N-3} \{ \ln[(1+r) / (1-r)] \} > 1.96, 2.58$.

⁹ 5.09 percent of the total budget has been allocated in the health sector for the year 2003/04 (HMG/N, 2003)

¹⁰ A corollary to this is the acceptance of the broadness of the health sector to affect and to be affected which is seen in the indicative regression results, where health indicators are responsive to education. Therefore, an increase in educational expenditures will complement the health sector outcomes.

¹¹ For example, there may be under reporting by the public sector, external development partners and private sector, as highlighted in NHEA (2002).

Table 7: Health care budget allocation and expenditures (absorptive capacity)

Description	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00
Regular budget allocation	541.6	710.9	954.3	973.0	1138.8	1255.9	1545.1
Amount spent	505.1	637.0	808.9	885.4	1049.0	1137.4	1324.8
Percentage spent	93.3	89.6	84.8	98.3	92.1	90.6	85.7
Development budget allocation	931.5	1361.0	1594.7	2485.0	2380.2	2716.0	2851.7
Amount spent	560.5	858.6	915.4	1621.2	2076.1	1677.2	2126.7
Percentage spent	60.2	63.1	57.4	71.9	87.2	61.8	74.6

Source: Red Books (various issues); Ministry of finance HMG Nepal

Lack of absorptive capacity is seen in the percentage unspent of development budget, which had been over 25% in 1999/00 and fluctuated from over 10% to over 40% of the development budget. This may reflect a number of problems such as frequent delays in disbursement, low project implementation, and other systematic weaknesses in MOH, which had led to low absorptive capacity. The regular budget has, in general been generally more utilized, which may reflect inflexible spending on health personnel. In other words, there is some basis to the feeling that public expenditure has not been effectively utilized.

Given this above interpretation of inefficient utilization of public health expenditure, it is important to assess whether present and ongoing health sector strategy and programs in the Tenth Plan¹² are able to address the apparent non-interlinkage of the above. Examining the Plan document suggest that relatively clearer strategies have been adopted to deal the problems of the health sector from economic rationality perspective. This objective has also been highlighted to be achieved through the creation of performance measures to assist in health sector evaluation. It is especially encouraging that the plan has programs for the preparation of a National Health Account that will guide formulation of policies and programs to ensure cost effectiveness, sustainability, capacity and equity aspects in the health sector programs, as well as provide analysis (and comparability with other countries) leading importantly to accurate evaluation. The Health Economics and Financing Unit (HEFU) have already been established in the MOH of HMG/N to facilitate in attaining this goal. It is felt that HEFU will contribute to having health sector expenditures formulated and prioritized from a health economics perspective.¹³ This would increase the appropriate allocation and efficient utilization of the limited health sector resources.

Likewise, in terms of percentage share the Medium Term Expenditure Framework (MTEF) had proposed ten percent of the total budget for the tenth plan period. The Tenth Plan has, however, allocated only six percent of the total budget to the health sector. This

¹² The tenth plan has been more realistic in identifying the problems in the health care financing in the public sector. It has been accepted that financial management so far has not been undertaken and implemented on the basis of economy, cost effectiveness, and demand and supply of resources. Similarly, it has been realized that the capacities of the local communities has not uplifted adequately to enable them to bear the cost of necessary health services and their extension.

¹³ This may simply be doing cost-benefit, cost-effectiveness, cost-utility etc. analysis using various tools such as the concept of the disability adjusted life year.

figure could have been raised to ten percent for better health sector outcome. This figure is also conservative compared to earlier annual budgets for instance it was 6.19 in 1996/97 and 6.09 in 1999/00 (see table below). Another positive aspect of the tenth Plan is the allocation of the budget on the basis of priority programs which is given below.

Table 8: Allocation of Budget in the health sector priority programs in the Tenth Plan

Priority Order	At Expected Growth Rate (6.2%)		At Normal Growth Rate (4.3%)	
	Amount (million)	Percentage	Amount (million)	Percentage
i. P ₁	8713.9	62.3	7558.0	70.7
ii. P ₂	3875.9	27.0	3011.9	28.2
iii. P ₃	1500.4	10.7	122.0	1.1
Total	14000.2	100.0	10691.9	100.0

Source: Tenth Plan document, NPC

The above distribution of the budget reveals that some inconsistency exists under two growth rate projections. Under the normal growth rate the allocation is more rational in terms of priority such that P₁ receives the highest priority while P₃ receives the least priority. This priority is abandoned under the Expected growth rate with P₃ receiving greater weight-age (10.7) compared to P₃ in Normal growth rate (1.1).

It is also important to both understand and harness the private sector in contributing to positive outcomes of the health sector (i.e. a nation's health) and thus to overall economic development in general. This is especially important given the increasing role played by the private sector in Nepal. Further, with greater liberalization of health services envisaged with Nepal's entry into the World Trade Organization, it is not only important to understand this inter-relationship but essential to put forward appropriate rules and regulations to heighten both competition and provide quality¹⁴ in this sector for ensuring the nation's health.¹⁵

VIII. Summary and Concluding Remarks

The present scenario of poor economic development in Nepal is reflected in per capita income of \$236.00 in 2001/2002 and Nepal being ranked 32nd from the bottom of 173 countries in UNDP's Human Development Report 2002; this later reflects low social and health indicators which are true even after many years of planned public expenditure. This deficiency has been acknowledged by HMG/N and a number of reform measures are underway. Unfortunately, these reforms mainly address the question of accelerating economic growth, however for overall economic development, it is also essential to also address the poor social and health indicators. In this regard, HMG/N has initiated the process of health reform. However, it is necessary to have a deep understanding of the process so that past mistakes will not be repeated and that lessons learned will be addressed in future plans. This paper reviews the health care expenditure of Ministry of Health of HMG/N, which proxies for public health expenditure, during the 1989/90 to 2001/2002 period and find that it did not have a statistically significant effect on health

¹⁴ Interestingly, the midterm review of the ninth five year plan has reported that the quality of health care provided by the private as well as by NGOs, cannot be assured.

¹⁵ Some suggestions in this regard are put forward in Rana (2001).

indicators viz. infant mortality, child mortality, crude birth rate, crude death rate, life expectancy rate. This suggests that there can be greater inter-linkages between health sector input (i.e. health care expenditure) and health sector output (i.e. health indicators), with a number of suggestions given, to most salient of which is to implement the National Health Accounting system in the country.

Of course, the observation on the ineffectiveness of expenditure of MOH of HMG/N is, as mentioned above, nothing new with it being consistent with numerous publications such as the recent Medium-Term Expenditure Plan on the health sector. As such, the analysis and conclusions put forward in the paper are not earth shattering. Rather, the plethora of publications with similar conclusions suggests that there is a need to move from simple "recommendation to concrete implementation" (Adhikari et al., 2002). It is felt, based on the above empirical analysis that an important first step would be to implement a system of National Health Accounts. This would give the necessary information to monitor and evaluate health programs, to be effectively directed for attaining the ultimate goal of Nepal's sustainable economic development.

References:

- Adhikari, Shiva Raj, Nephil Matangi Maskay and Bishnu Prasad Sharma. "Nepalese Health Policies: Some Observations from an Economic Development Perspective." *Economic Review (of Nepal Rastra [Central] Bank)*. Occasional Paper Number 14 (April 2002) 55 – 72.
- Filmer, Deon and Lant Pritchett. "The impact of public spending on health: does money matter?" *Social Science & Medicine*. 49 (1999) 1309 - 1329.
- Davidson, Russell and James G. Mackinnon. Estimation and Inference in Econometrics. New York: Oxford University Press. (1993).
- Dickey, D. A., and W. A. Fuller. "Distribution of the estimators for autoregressive time series with a unit root." *Journal of the American Statistical Association*. 74 (1979) 427-31.
- Gupta, Sanjeev, Marijn Verhoeven and Erwin Tiongson. "Does Higher Government Spending Buy Better Results in Education and Health Care?" *IMF Working Paper: WP/99/21*. (February 1999).
- His Majesty's Government of Nepal. Ministry of Health. "First Long Term Health Plan 1975 – 1990." Kathmandu, Nepal. (1975).
- _____. National Health Policy 1991. Published in cooperation with World Health Organization. Kathmandu. (1993).
- _____. "Second Long Term Health Plan 1997 – 2017." Kathmandu, Nepal. (August 1999).
- _____. "Health Component of 10th Plan." Draft Report. (2002).
- _____. "Medium Term Expenditure Program (MTEF) to Operationalize 1st Three Years of 10th Five Year Plan's Health Programmes" (28 January 2002).
- _____. Health Information Bulletin. (Various issues).
- His Majesty's Government of Nepal. Ministry of Finance. "Budget Speech" Kathmandu. (Various issues).
- _____. "Red Books." Kathmandu. (Various issues).
- _____. *Economic Survey*. Kathmandu. (Various issues).
- His Majesty's Government, National Planning Commission Secretariat. The Fifth Plan (2032 - 2037). Kathmandu: (2032 BS - equivalent date 1975 AD).
- _____. The Sixth Plan (2037 - 2042). Kathmandu: (2037 BS - equivalent date 1980 AD).
- _____. The Seventh Plan (2042 - 2047). Kathmandu: (2042 BS - equivalent date 1985 AD).
- _____. The Eighth Plan (2049 - 2054). Kathmandu: (2049 BS - equivalent date 1992 AD).
- _____. The Ninth Plan (2054 - 2058). Kathmandu: (2054 BS - equivalent date 1997 AD).
- Hotchkiss, David R, Jeffrey J. Rous, Keshav Karmacharya and Prem Sangroula. (1998). "Household Health Expenditures in Nepal: Implications for Health Care Financing Reform". *Health Policy and Planning* **13** (4): 371-383

Hsiao, William. "What Should Macroeconomists Know About Health Care Policy? A Primer". *IMF Working Paper WP/00/136*. (2000).

Nepal Health Economics Association. "Health Care Financing and Financial Management in Nepal: Review, Assessment and Suggestions of present and future public health care financing and financial management in Nepal." A report submitted to the Health Sector Reform Strategy. (2002).

Nepal South Asian Centre. Nepal Human Development Report, 1998. Kathmandu: (1998).

Rana, Tirtha. "Nepal: Public and Private Partnership in Health Sector." delivered in a National Workshop on "Private Investment in Health Sector: Opportunities and Challenges" organized by Industrial Information Center on 14 - 15 October 2001 held in Kathmandu, Nepal.

Stiglitz, J. E. "Incentives and Institutions in the Provision of Health Care in Developing Countries: Towards an Efficient Health Care Strategy." IHEA Meeting, Rotterdam. (7 June 1999).

United Nations Development Programme. Nepal Human Development Report 2001. UNDP. Kathmandu (2002)

United Nations Development Programme. Human Development Report 2002. UNDP. (2003). New York

World Bank. Sector Strategy: Health, Nutrition and Population. Washington DC: The World Bank Group. (1997).

_____. "Nepal Public Expenditure Review". **Report No. 20211-NEP**. (31 March 2000).

_____. "Nepal Operational Issues and Prioritization of Resources in the Health Sector. **Report No. 19613**. (8, June 2000).

	Constant	Age	Sex	Urban
C	0.071441	-0.000003	-0.000021	0.0244
AGE	-0.000001	0.000001	0.000001	0.0000
SEX	0.000000	0.000000	0.000000	0.0000
URBAN	-0.000000	-0.000000	-0.000000	-0.0000
LA	-0.000000	0.000000	-0.000000	0.0000
Constant	0.017416	Mean dependent var		0.000000
Unadjusted R-squared	0.000000	R-squared		0.000000
Adjusted R-squared	0.000000	Adjusted R-squared		0.000000
Sum of squared resid	0.000000	Sum of squared resid		0.000000
F-statistic	1.140000	F-statistic		1.140000
Prob > F	0.000000	Prob > F		0.000000

Dependent Variable: OLS

Method: Least Squares

Date: 07/07/01 Time: 10:34

Sample: 1990 2001

Included observations: 12 after adjusting end-points

	Constant	Age	Sex	Urban
C	0.071441	-0.000003	-0.000021	0.0244
AGE	-0.000001	0.000001	0.000001	0.0000
SEX	0.000000	0.000000	0.000000	0.0000
URBAN	-0.000000	-0.000000	-0.000000	-0.0000
LA	-0.000000	0.000000	-0.000000	0.0000
Constant	0.017416	Mean dependent var		0.000000

First Appendix

Dependent Variable: DIMR

Method: Least Squares

Date: 07/07/03 Time: 10:11

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.049450	0.065157	-0.758933	0.4727
DLGDPN	0.169341	1.948149	0.086924	0.9332
DLHGDP	0.061688	0.101016	0.610675	0.5607
DLEPHCH	-0.195074	0.342837	-0.569000	0.5871
DLALR	-0.281665	0.451182	-0.624282	0.5522
R-squared	0.129016	Mean dependent var		-0.057502
Adjusted R-squared	-0.368690	S.D. dependent var		0.080237
S.E. of regression	0.093871	Akaike info criterion		-1.599464
Sum squared resid	0.061682	Schwarz criterion		-1.397420
Log likelihood	14.59678	F-statistic		0.259221
Durbin-Watson stat	1.987500	Prob(F-statistic)		0.895096

Dependent Variable: DCMR

Method: Least Squares

Date: 07/07/03 Time: 10:18

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.073661	0.069503	-1.059822	0.3244
DLGDPN	2.183991	2.078111	1.050950	0.3282
DLHGDP	0.075849	0.107755	0.703905	0.5042
DLEPHCH	-0.187645	0.365708	-0.513100	0.6237
DLALR	-0.904946	0.481281	-1.880288	0.1021
R-squared	0.417436	Mean dependent var		-0.064362
Adjusted R-squared	0.084542	S.D. dependent var		0.104654
S.E. of regression	0.100133	Akaike info criterion		-1.470305
Sum squared resid	0.070186	Schwarz criterion		-1.268261
Log likelihood	13.82183	F-statistic		1.253961
Durbin-Watson stat	2.781818	Prob(F-statistic)		0.371381

Dependent Variable: DCBR

Method: Least Squares

Date: 07/07/03 Time: 10:24

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.050019	0.023367	-2.140563	0.0696
DLGDPN	1.006281	0.698665	1.440291	0.1930
DLHGDP	-0.053006	0.036227	-1.463138	0.1868
DLEPHCH	0.036896	0.122952	0.300087	0.7728
DLALR	0.096043	0.161808	0.593565	0.5715
R-squared	0.413842	Mean dependent var		-0.019299

Adjusted R-squared	0.078894	S.D. dependent var	0.035077
S.E. of regression	0.033665	Akaike info criterion	-3.650390
Sum squared resid	0.007933	Schwarz criterion	-3.448345
Log likelihood	26.90234	F-statistic	1.235542
Durbin-Watson stat	2.125707	Prob(F-statistic)	0.377522

Dependent Variable: DCDR

Method: Least Squares

Date: 07/07/03 Time: 10:33

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.022960	0.038090	-0.602786	0.5657
DLGDPN	-0.827931	1.138865	-0.726979	0.4908
DLHGDP	-0.012956	0.059053	-0.219397	0.8326
DLEPHCH	-0.191208	0.200419	-0.954041	0.3718
DLALR	-0.090415	0.263756	-0.342799	0.7418

R-squared	0.217738	Mean dependent var	-0.047129
Adjusted R-squared	-0.229270	S.D. dependent var	0.049494
S.E. of regression	0.054876	Akaike info criterion	-2.673159
Sum squared resid	0.021079	Schwarz criterion	-2.471114
Log likelihood	21.03895	F-statistic	0.487101
Durbin-Watson stat	2.071016	Prob(F-statistic)	0.746036

Dependent Variable: DLER

Method: Least Squares

Date: 07/07/03 Time: 10:55

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.014557	0.007824	1.860490	0.1051
DLGDPN	-0.163900	0.233942	-0.700603	0.5062
DLHGDP	-0.002398	0.012130	-0.197724	0.8489
DLEPHCH	0.041015	0.041169	0.996245	0.3523
DLALR	-0.008661	0.054180	-0.159862	0.8775

R-squared	0.186767	Mean dependent var	0.009138
Adjusted R-squared	-0.277938	S.D. dependent var	0.009971
S.E. of regression	0.011272	Akaike info criterion	-5.838589
Sum squared resid	0.000889	Schwarz criterion	-5.636545
Log likelihood	40.03154	F-statistic	0.401904
Durbin-Watson stat	1.137886	Prob(F-statistic)	0.802057

Method: Least Squares

Date: 07/07/03 Time: 11:34

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.040525	0.041307	-0.981044	0.3501
DLGDPN	1.029251	0.234351	4.394071	0.0005
DLHGDP	-0.051199	0.051943	-0.985738	0.3428
DLEPHCH	0.001203	0.152796	0.007881	0.9921

Second Appendix

Dependent Variable: DIMR

Method: Least Squares

Date: 07/13/03 Time: 11:25

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.047097	0.070072	-0.672130	0.5265
DLGDPN	0.247405	2.097530	0.117951	0.9100
DLHGDP	0.067824	0.109622	0.618711	0.5588
DLEPHCH	-0.112160	0.441927	-0.253798	0.8081
DLALR	-0.345275	0.518485	-0.665930	0.5302
DLIAI	0.213491	0.634433	0.336506	0.7479
R-squared	0.145149	Mean dependent var	-0.057502	
Adjusted R-squared	-0.567227	S.D. dependent var	0.080237	
S.E. of regression	0.100448	Akaike info criterion	-1.451494	
Sum squared resid	0.060539	Schwarz criterion	-1.209041	
Log likelihood	14.70896	F-statistic	0.203753	
Durbin-Watson stat	2.087248	Prob(F-statistic)	0.949157	

Dependent Variable: DCMR

Method: Least Squares

Date: 07/13/03 Time: 11:25

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.071647	0.074997	-0.955331	0.3763
DLGDPN	2.250849	2.244947	1.002629	0.3547
DLHGDP	0.081104	0.117326	0.691274	0.5152
DLEPHCH	-0.116633	0.472986	-0.246590	0.8134
DLALR	-0.959424	0.554925	-1.728927	0.1346
DLIAI	0.182842	0.679022	0.269273	0.7967
R-squared	0.424392	Mean dependent var	-0.064362	
Adjusted R-squared	-0.055282	S.D. dependent var	0.104654	
S.E. of regression	0.107508	Akaike info criterion	-1.315650	
Sum squared resid	0.069348	Schwarz criterion	-1.073197	
Log likelihood	13.89390	F-statistic	0.884752	
Durbin-Watson stat	2.901819	Prob(F-statistic)	0.543746	

Dependent Variable: DCBR

Method: Least Squares

Date: 07/13/03 Time: 11:24

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.049327	0.025207	-1.956844	0.0981
DLGDPN	1.029261	0.754551	1.364071	0.2215
DLHGDP	-0.051199	0.039435	-1.298338	0.2418
DLEPHCH	0.061303	0.158976	0.385613	0.7131

DLALR	0.077319	0.186516	0.414544	0.6929
DLIAI	0.062843	0.228227	0.275356	0.7923
R-squared	0.421156	Mean dependent var	-0.019299	
Adjusted R-squared	-0.061213	S.D. dependent var	0.035077	
S.E. of regression	0.036135	Akaike info criterion	-3.496281	
Sum squared resid	0.007834	Schwarz criterion	-3.253827	
Log likelihood	26.97768	F-statistic	0.873099	
Durbin-Watson stat	2.163740	Prob(F-statistic)	0.549580	

Dependent Variable: DCDR

Method: Least Squares

Date: 07/13/03 Time: 11:23

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.021964	0.041147	-0.533796	0.6127
DLGDPN	-0.794867	1.231676	-0.645354	0.5426
DLHGDP	-0.010357	0.064370	-0.160898	0.8775
DLEPHCH	-0.156090	0.259501	-0.601502	0.5695
DLALR	-0.117356	0.304456	-0.385463	0.7132
DLIAI	0.090421	0.372541	0.242715	0.8163
R-squared	0.225343	Mean dependent var	-0.047129	
Adjusted R-squared	-0.420204	S.D. dependent var	0.049494	
S.E. of regression	0.058984	Akaike info criterion	-2.516262	
Sum squared resid	0.020874	Schwarz criterion	-2.273809	
Log likelihood	21.09757	F-statistic	0.349074	
Durbin-Watson stat	2.130182	Prob(F-statistic)	0.865925	

Dependent Variable: DLER

Method: Least Squares

Date: 07/13/03 Time: 11:17

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.014217	0.008379	1.696778	0.1407
DLGDPN	-0.175175	0.250816	-0.698421	0.5111
DLHGDP	-0.003285	0.013108	-0.250587	0.8105
DLEPHCH	0.029039	0.052844	0.549523	0.6025
DLALR	0.000526	0.061999	0.008486	0.9935
DLIAI	-0.030835	0.075864	-0.406455	0.6985
R-squared	0.208559	Mean dependent var	0.009138	
Adjusted R-squared	-0.450976	S.D. dependent var	0.009971	
S.E. of regression	0.012011	Akaike info criterion	-5.699085	
Sum squared resid	0.000866	Schwarz criterion	-5.456631	
Log likelihood	40.19451	F-statistic	0.316221	
Durbin-Watson stat	1.066297	Prob(F-statistic)	0.886397	

Dependent Variable: DIMR

Method: Least Squares

Date: 07/12/03 Time: 08:40

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.047960	2.012584	1.017577	0.3556
DLGDPN	0.485592	2.095355	0.231747	0.8259
DLHGDP	0.086869	0.110379	0.787011	0.4669
DLEPHCH	-0.197240	0.446369	-0.441877	0.6770
DLALR	-0.557017	0.553533	-1.006294	0.3605
DLIAI	-0.014479	0.666925	-0.021710	0.9835
LAGRI	-0.562871	0.540390	-1.041602	0.3453
R-squared	0.297567	Mean dependent var		-0.057502
Adjusted R-squared	-0.545352	S.D. dependent var		0.080237
S.E. of regression	0.099745	Akaike info criterion		-1.481305
Sum squared resid	0.005533	Schwarz criterion		-1.198343
Log likelihood	15.88723	F-statistic		0.353020
Durbin-Watson stat	2.261479	Prob(F-statistic)		0.881369

Dependent Variable: DCMR

Method: Least Squares

Date: 07/12/03 Time: 08:50

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.632752	2.355267	0.268654	0.7989
DLGDPN	2.330931	2.452132	0.950574	0.3855
DLHGDP	0.087508	0.129173	0.677446	0.5282
DLEPHCH	-0.145239	0.522372	-0.278037	0.7921
DLALR	-1.030616	0.647784	-1.590989	0.1725
DLIAI	0.106194	0.780483	0.136063	0.8971
LAGRI	-0.189248	0.632402	-0.299253	0.7768
R-squared	0.434520	Mean dependent var		-0.064362
Adjusted R-squared	-0.244056	S.D. dependent var		0.104654
S.E. of regression	0.116728	Akaike info criterion		-1.166736
Sum squared resid	0.068128	Schwarz criterion		-0.883874
Log likelihood	14.00041	F-statistic		0.640341
Durbin-Watson stat	2.859865	Prob(F-statistic)		0.700300

Dependent Variable: DCBR

Method: Least Squares

Date: 07/12/03 Time: 08:57

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.078469	0.798582	-0.098261	0.9255
DLGDPN	1.025947	0.831425	1.233963	0.2721

DLHGDP	-0.051464	0.043798	-1.175045	0.2929
DLEPHCH	0.062487	0.177116	0.352799	0.7386
DLALR	0.080264	0.219639	0.365438	0.7297
DLIAI	0.066015	0.264632	0.249458	0.8129
LAGRI	0.007830	0.214424	0.036515	0.9723
R-squared	0.421311	Mean dependent var	-0.019299	
Adjusted R-squared	-0.273116	S.D. dependent var	0.035077	
S.E. of regression	0.039578	Akaike info criterion	-3.329881	
Sum squared resid	0.007832	Schwarz criterion	-3.047018	
Log likelihood	26.97928	F-statistic	0.606703	
Durbin-Watson stat	2.174373	Prob(F-statistic)	0.720904	

Dependent Variable: DCDR

Method: Least Squares

Date: 07/12/03 Time: 09:01

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.861233	1.242377	0.693214	0.5191
DLGDPN	-0.694457	1.293472	-0.536894	0.6144
DLHGDP	-0.002328	0.068137	-0.034171	0.9741
DLEPHCH	-0.191957	0.275545	-0.696643	0.5171
DLALR	-0.206619	0.341699	-0.604683	0.5718
DLIAI	-0.005682	0.411696	-0.013802	0.9895
LAGRI	-0.237285	0.333585	-0.711318	0.5087
R-squared	0.296531	Mean dependent var	-0.047129	
Adjusted R-squared	-0.547632	S.D. dependent var	0.049494	
S.E. of regression	0.061573	Akaike info criterion	-2.445991	
Sum squared resid	0.018956	Schwarz criterion	-2.163129	
Log likelihood	21.67595	F-statistic	0.351272	
Durbin-Watson stat	2.183022	Prob(F-statistic)	0.882431	

Dependent Variable: DLER

Method: Least Squares

Date: 07/12/03 Time: 09:05

Sample(adjusted): 1990 2001

Included observations: 12 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.401370	0.201172	1.995155	0.1026
DLGDPN	-0.131160	0.209446	-0.626224	0.5586
DLHGDP	0.000235	0.011033	0.021272	0.9839
DLEPHCH	0.013317	0.044618	0.298466	0.7774
DLALR	-0.038603	0.055330	-0.697683	0.5165
DLIAI	-0.072962	0.066664	-1.094480	0.3236
LAGRI	-0.104015	0.054016	-1.925634	0.1121
R-squared	0.545570	Mean dependent var	0.009138	
Adjusted R-squared	0.000254	S.D. dependent var	0.009971	
S.E. of regression	0.009970	Akaike info criterion	-6.087230	
Sum squared resid	0.000497	Schwarz criterion	-5.804368	
Log likelihood	43.52338	F-statistic	1.000466	
Durbin-Watson stat	1.223467	Prob(F-statistic)	0.510358	

PRIORITY ONE PROGRAMS (P1)

Child health
EPI (Regular, Hepatitis B, MNT, NID)
ARI/CDD
Nutrition(PEM, Vitamin A & Micro-nutrient supplement
Family health
Family Planning
Safe Motherhood /Reproductive health
Adolescent Reproductive health
FCHVs
Epidemiology & disease control
Communicable disease (kala-azar, malaria)
Vector borne disease (research & training)
Emergency Preparedness and disaster mgt.
TB Control Program
Leprosy Program
HIV/AIDS/STD
District level health institutions
District Hospitals
Primary health care center/health center
District Public Health Office, HPs, SHPs
Information Education Communication
Health Training
Logistics Management including medicine, medical equipment & commodity supply
Integrated Supervision/ M & E
Health science research
Community Drug & Health Insurance
HMIS/FMIS/LMIS/HURDIS/ & planning
Health PAF (safety net)

PRIORITY TWO PROGRAMS (P2)

Hospitals
Kanti Children's Hospital
Maternity Hospital
Ayurveda Chikitsala (dispensary)
E ye Hospital
Ministry of Health
Departments
Department of Drug Administration
Department of Health Services /regional directorates
Department of Ayurved
National Health Laboratory
Development of health facilities including renovation and maintenance
Non-communicable Disease Control
Environmental & Occupational Health

Hospital Waste Disposal
Environmental Sanitation
Occupational Health Hazard
Oral Health
Accident Prevention

PRIORITY THREE PROGRAMS (P3)

Hospitals
Teku tropical hospital
Bir hospital
Shahid Gangalal heart center
Patan hospital
Western Regional Hospital
Zonal Hospitals
BPKIHS Cancer Hospital Bharatpur
BPKIHS Dharan
Netra Jyoti Sangh (Eye Care Organization)/BP eye hospital
Mental hospital
BPK Ophthalmic Centre
Ayurved and traditional medicine
Naradevi Hospital
Singha Durbar Vaidhya Khana
Homeopathy
Unani
Urban Health
PGMEC/health institute grant
Substance Abuse

Source: His Majesty's Government of Nepal, Ministry of Health. "Medium Term Expenditure Program (MTEF) to Operationalize 1st Three Years of 10th Five Year Plan's Health Programmes" (28 January 2002).