

COMPLEMENTARITIES OF EDUCATION AND SOCIOECONOMIC DEVELOPMENT IN NEPAL

**A Summary of a Doctoral Dissertation Submitted by
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Complementarities of education and socioeconomic development in Nepal

1. Purpose and Justification of the Dissertation

Education is the most crucial factor for socioeconomic change especially in developing countries like Nepal. These countries are running under not only a vicious circle of poverty but also multidimensional poverty as well. There is not only poverty in economic sector but also social and overall human development perspective. Only one solution and starting point to tackle these problems are making people more aware, educated and more skillful by offering the best quality education and some vocational and skill oriented training. Many research outcomes have proven that there are serious problems in educational policy of the country and educational inputs. Some studies have shown inter-relationship between education and socioeconomic development parameters. There are various theoretical and empirical arguments of the education and its complementarities to different development parameters. There are two-way impacts or interdependencies between the development parameters and education.

Among a few crucial factors education is the most influential factor for the development of a country. Basically, short run educational policy tries to address the short term social and economic goals of the country through awareness programs on safety, health, environment, food security, women empowerment. But in the long run, it is directly related to human capital development, factor productivity, poverty reduction and ultimately economic growth and socio-economic development of the country. In this study, I focus on the instrumental role of education in poverty reduction, women empowerment, environmental protection, health promotion, human capital development, and economic growth.

Political instability, high international migration and possibility of brain drain, less industrial development, low quality of life, lack of opportunities in the labor market, high poverty, unmanaged and irresponsible public sector, coordination failure (lack of coordination), lack of common ground for political parties, high child and maternal mortality rate, high public debt, vicious circle of poverty, fragmented land system, lack of good governance, traditional farming system, low productivity in various sectors are some common features of developing and least developed and third world countries. Basically, all these above problems are interrelated with education, education attainment, and research and innovation.

To address all the above issues a well-educated and skilled human resources are essentials. The main aim of the research is in policy implications in education and socio-economic sectors of the developing countries like Nepal. This research outcomes will be equally applicable in developing countries of Asia, Sub-Saharan Africa and some of the latin American countries as well. All the above explanations justified the complementarities of education in socioeconomic development in Nepal and education can plays a pivotal role in socioeconomic sector of Nepal.

2. Research Questions

To deal with complementarities of education in socioeconomic development in Nepal the following research questions should be addressed.

- i. What is the impact of periodic development planning on educational attainment and its quality in Nepal?
- ii. What is the impact of education on women empowerment?
- iii. What is the impact of education on HRD and employment, and economic growth?
- iv. What are the linkages between education, health, and economic growth?
- v. What are the linkages between education, poverty, and economic growth?
- vi. What are the effects of education on environment?
- vii. What is the overall role of education in socio-economic transformation in Nepal?
- viii. What are the policy implications for education and socio-economic development?

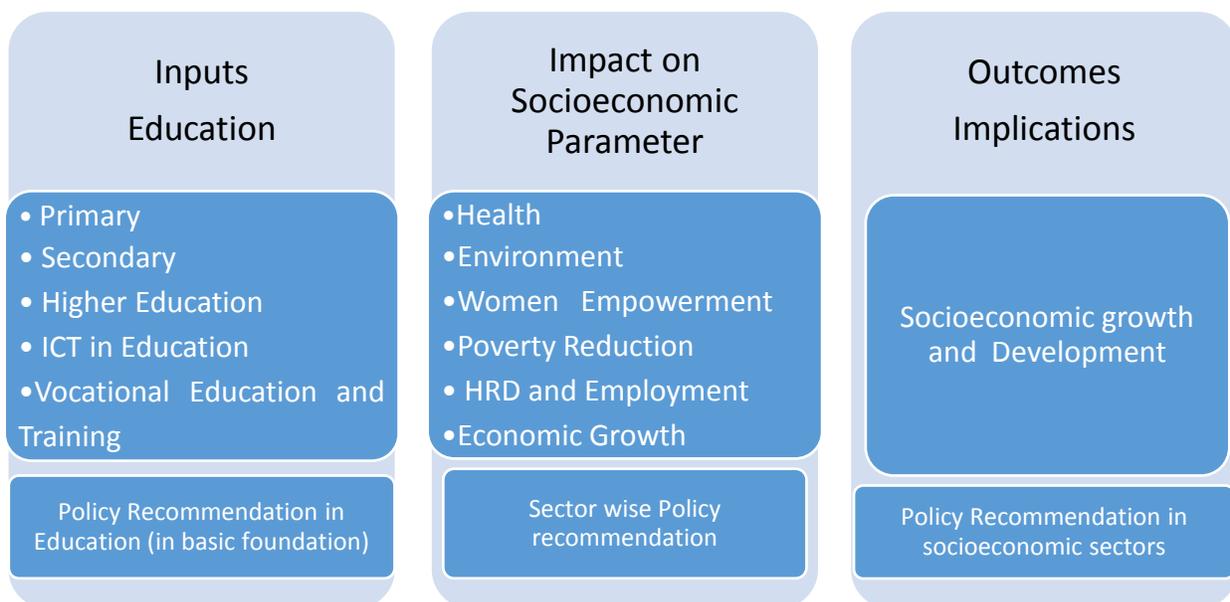
3. Research Objectives

The main objective of this study is to analyze complementarities of education and socio-economic development in Nepal. The specific objectives in compliance to the main objective are as follows:

- i. To review development plans and analyze education policies and progress in Nepal.
- ii. To conduct empirical study and analyze the complementarities of education with health, women empowerment, HRD and employment, environment, poverty conditions, and economic growth
- iii. To establish the relationship between education attainment, HRD and employment, and economic growth.
- iv. To establish the relationship between education, health, and economic growth and to analyze long run relation between them.
- v. To draw implications for education and socio-economic development policies of Nepal.

4. General conceptual framework

To make the study more systematic and organized the following conceptual framework is applied.



Source: Authors' Ph.D. model

In this conceptual framework education is taken as input factor and it includes primary education, secondary education, higher education, information communication and technology, vocational education and short term training. Similarly, the impact of inputs that is educational sector is studied in various sectors basically on health, environment, women empowerment, poverty reduction, employment and economic growth. Ultimately outcomes can be measured through the level of socioeconomic development, human development index and sustainable economic growth. All these are treated as outcomes and play a crucial role in policy in national policy formulation in socioeconomic and individual sectors. To complete the desired goals of study following hypothesis are formulated.

5. Hypothesis:

Hypothesis I: There is significant effects of education on socioeconomic development parameters such as improvement in health, women empowerment, environment protection, HRD and employment, poverty reduction, and economic growth.

Hypothesis II: There is significant long run relationship between educational attainment, HRD and employment, and economic growth in Nepal.

Hypothesis III: There is triangular casualty between education, health and economic growth.

6. Literature review

Socioeconomic development is a complex phenomena. It inculcates economic development model to socioeconomic transformation. In this regards the first generation of economic development model was formulated in the early years after the World War II. These early models focused on the utility of massive injections of capital to achieve rapid GDP growth rates. The two famous models are Rostow's stages growth model and the Harrod-Domar model (Todaro & Smith 2009). New growth theorists (Romer, 1986; Lucas, 1988; Aghion & Howitt, 1992) link with the technological change to the enhancement of knowledge and economic growth as well.

A large body of recent research suggests that educational attainment is a key driver of the acquisition of skills, better employment outcomes, individuals and country's well-being, and therefore economic growth according to Romer (1990), Barro (1991), Barro & Lee (1993), Benhabib & Spiegel (1994), Islam (1995), Barro & Sala-i-Martin (1995), Gemmell (1996), Sala-i-Martin (1997), Temple (1999), Hanushek & Kimko (2000), Bils & Klenow (2000), Kruger & Lindahl (2001), Sianesi & Reenen (2003). On the other hand, as Bloom et al. (2004), Sala-i-Martin et al. (2004), Gyimah-Brempong & Wilson (2004), Jamison et al. (2005), and Weil (2007) remind us; good health improves human welfare as well as labor productivity, and positively affects economic growth in both developing and industrial countries.

Todaro & Smith (2015) highlighted the economics for developing countries (development economics), to deal with the economic, social, political, and institutional mechanisms, both public and private, necessary to bring about rapid and large-scale improvements in levels of living for the peoples of Africa, Asia, Latin America, and the formerly socialist transition economies. According to them these countries presently characterized by low levels of living and other development deficits are in the development literature as synonyms of less developed countries. These countries are in the serious stage of poverty trap such as low investment

produces low quality goods with low market value, creates low income, and results into low quality life which in turn keeps moving into the same cycle. As a conclusion Todaro & Smith (2015) believe that development must be conceived of as a multidimensional process involving major changes in social structures, popular attitudes, and national institutions, as well as the acceleration of economic growth, the reduction of inequality, social justice, and the eradication of poverty toward a condition of life regarded as materially and spiritually better.

In the process of reviewing the empirical literature, to a large extent, the research has, however, tended to focus on one-way causality between either education or health and economic growth. For instance, Barro & Lee (1993) have employed a set of panel data to estimate the determinants of economic growth, physical investment, and human capital accumulation as well as fertility for 129 countries over twenty five-year periods from 1960-1985. Based on the findings of their study, education is positively correlated with economic growth. In the same vein, Benhabib & Spiegel (1994) have used Cobb-Douglas aggregate production function with physical and human capital stocks and estimated cross-country growth-accounting regressions using OLS with Heteroscedasticity-consistent covariance method for the period 1965-1985. Unlike the findings of Barro & Lee (1993), they have concluded that human capital is insignificantly correlated with per capita growth rates.

In the similar vein, Tsamadias & Prontzas (2012) followed the model by Mankiw et al. (1992) to analyze the effect of education on economic growth in Greece during the period 1960-2000 and showed a significant and positive effect on economic growth during the period for which the study was carried out.

A recent study by Boccanfuso et al. (2013) used the analytical model developed by Islam (1995) who considered a panel data approach to study cross-country growth. Another recent study by Uneze (2013) implemented panel cointegration and causality testing approaches for 13 Sub-Saharan Africa countries during the period 1985-2007 and found a bidirectional causality between capital formation and economic growth.

Similarly, OECD (2010) Singapore is an example of Asia's great success stories, transforming itself from a developing country to a today's modern industrial economy just in one generation due to offering best educational system. This discussion examines how this "tiny red dot" on the map has achieved and sustained highly developed stage achieving most of the socioeconomic parameters.

Recently, Dahal, G. & Nowak, A.Z. (2016) studied education and its contribution to socioeconomic development of Nepal with reference to some selected Asian countries by using time series data with OLS and they found there is positive and significant impact of education in socioeconomic status of developing countries. They also proved that there is triangular casualty among education, health and economic growth, so these factors are equally important in socioeconomic development. In the same vein A.Z ,Nowak et al.(2016) analyzed time series data with OLS to establish the relationship between Women Education and Empowerment and its Impacts on Socioeconomic Development in Bangladesh and Nepal and they found women education has significant and very positive impact in socioeconomic development.

7. Methodology

According to Kothari (2004) and Robson (1993), there are two basic approaches to research; (1) Quantitative approach, also known as the Positivistic, natural science based, or Hypothetic-deductive approach, and (2) Qualitative approach, also known as the Interpretivistic or ethnographic approach. This research has followed quantitative (Hypothetico-deductive) approaches and in some cases the mixed methods of both qualitative and quantitative. To analyse the secondary data OLS Diagnostic approach is used. The main reason of selecting OLS approach is to know and understand the interdependency between the macroeconomic variables. For that many econometric analytical tools and testing tools are applied.

7.1. Source of Data:

In this research paper, the sources of information (data) are taken as various published sources like World Bank, International Monetary Fund (IMF), Human Development Reports (HDRs), CIA World Fact-Book (2015), Central Bureau of Statistics (CBS, Nepal), National planning commission of Nepal (NPC, Nepal) Ministry of Education (MOE, Nepal), and various other development and gender reports.

7.2. Methodology for analysis

For the data analysis and testing the reliability of data and model both, the technique of Ordinary Least Square (OLS diagnostic), Unit Root Test, Error Correction Model (ECM), Unrestricted VAR Model, Granger Causality Test, Augmented Dickey-Fuller (ADF) test, ARDL Approach for Co-integration, Autoregressive Distributed Lag (ARDL) Wald testing approach are used to show the long run relationship between the variables. The study period of this research is 1994/95 to 2014/15 on the basis of availability of data.

Variables Used in the Study

Definition of the terms and variables which are used in the study

LN_Y = natural log of nominal GDP

LN_{X1} = natural log of gross enrollment in primary level of education

LN_{X2} = natural log of gross enrollment in secondary level

LN_{X3} = natural log of gross enrollment in tertiary and higher level

LN_{RGDP} = natural log of real GDP

LN_{IE} = natural log of Investment in education

LN_{GERPE} = natural log of gross enrollment ratio in primary education

LN_{GERSE} = natural log of gross enrollment ratio in secondary education

LN_{GERTE} = natural log of gross enrollment ratio in tertiary education

LN_{FLFP} = natural log of female labor force participation

LN_{MLFP} = natural log of male labor force participation

LN_{GDP} = natural log of nominal GDP

LN_I = natural log of investment in education % share of GDP

LN_{FE} = Share of educated female

LN_{ME} = Share of educated male

LN_{LFP} = natural log of labor force participation both sexes

LN_{RGDPPP} = natural log of real GDP per capita

LN_{EPP} = natural log of educational expenditure per capita

LN_{HEPP} = natural log of health expenditure per capita

7.3. Methods of referencing and tools of analysis

The study has used the American Psychology Association (APA) method for citation of mentioned literature and referencing in the bibliography. The bibliography has been classified into books, journal articles and reports. For data analysis Eviews-8, SPSS-20 and Microfit 5.0 are used.

8. Descriptive Analysis and cross country comparison

8.1. Trend of Economic Growth in Nepal

Economic growth rate seems not consistent in Nepal from 1996 to 2015. The highest growth rate in the study period was 6 percent in 2000 and 2008 and lowest growth was 0.20 percent in 2002. This trend of GDP rate shows that there is slow economic growth rate of developing country, means country is inside vicious circle of poverty and multidimensional poverty as well.

Figure 1. Annual GDP fluctuating rate since 1994 to 2015

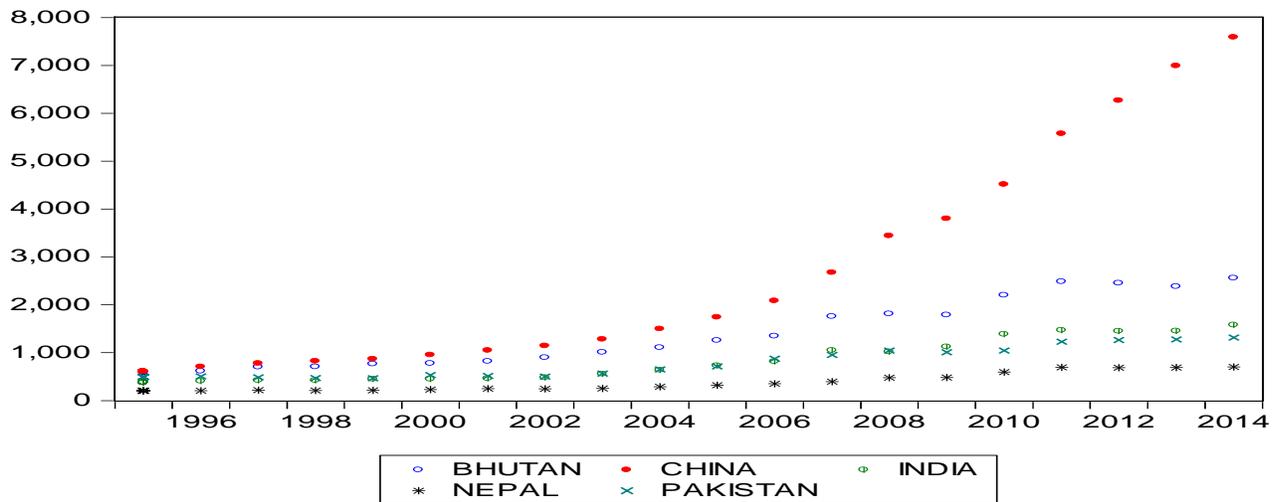


Source: CBS Nepal 2015

8.2. GDP increasing trend of some selected Asian countries

Figure 2 shows trend of GDP increasing rate of the study region. As a comparative study of five Asian countries, China is doing tremendous progress and is the highest GDP increasing rate and followed by Bhutan, India and so on. The performance of Nepal is in a much vulnerable situation in this region.

Figure 2. GDP Increasing Trend 1995 -2014

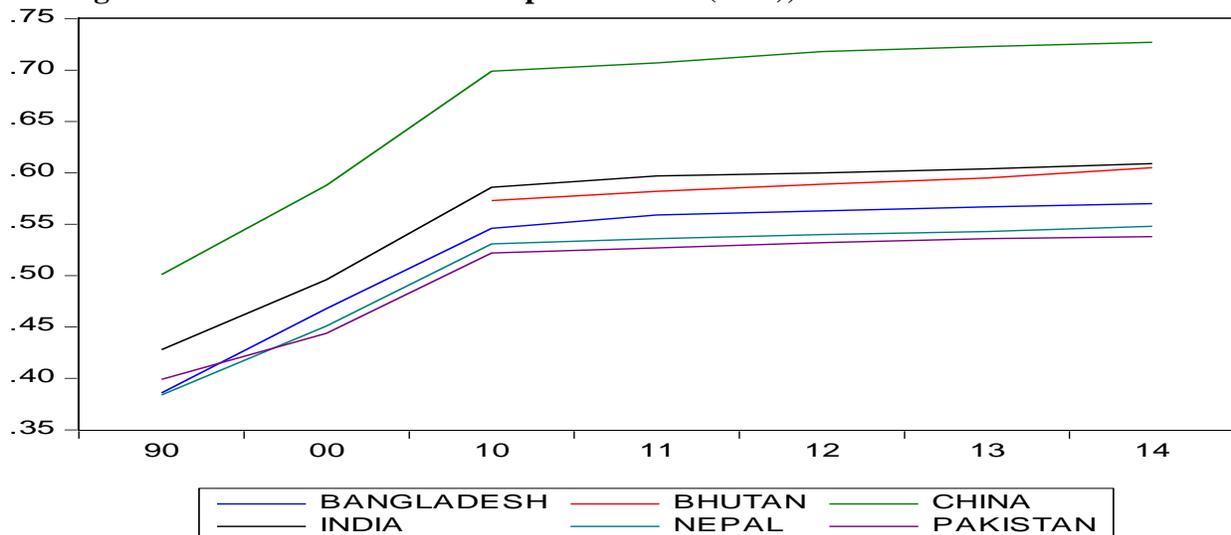


Source: Human Development Report 2014, World Bank data (2015)

8.3. Trend of Human Development Index (HDI), 1990-2014

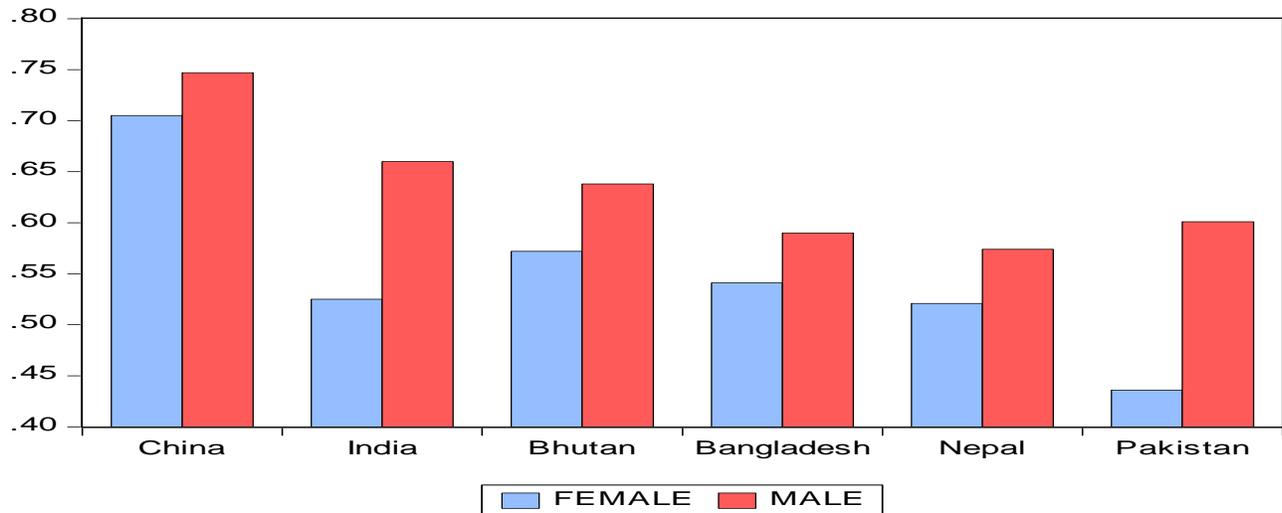
Human development index is the important parameter to measure overall progress of the country. Figure 3 shows that the trend of human development index of selected Asian countries in the period between 1990 to 2014. From very beginning the track record of China is leading position having significant improvement and very high speed but after 2010 this growth trend shows diminishing increment. There is significant increment but rate of increment is little slower. Then after this tract is following by India and Bhutan but remaining countries Bangladesh, Nepal and Pakistan are following India and Bhutan. The HDI performance of Pakistan is in the lower level.

Figure 3. Trend of Human Development Index (HDI), 1990-2014



Source: Human Development Report 2014, World Bank data (2015)

Figure 4: Human Development Index (HDI), Gender Perspective (2014)



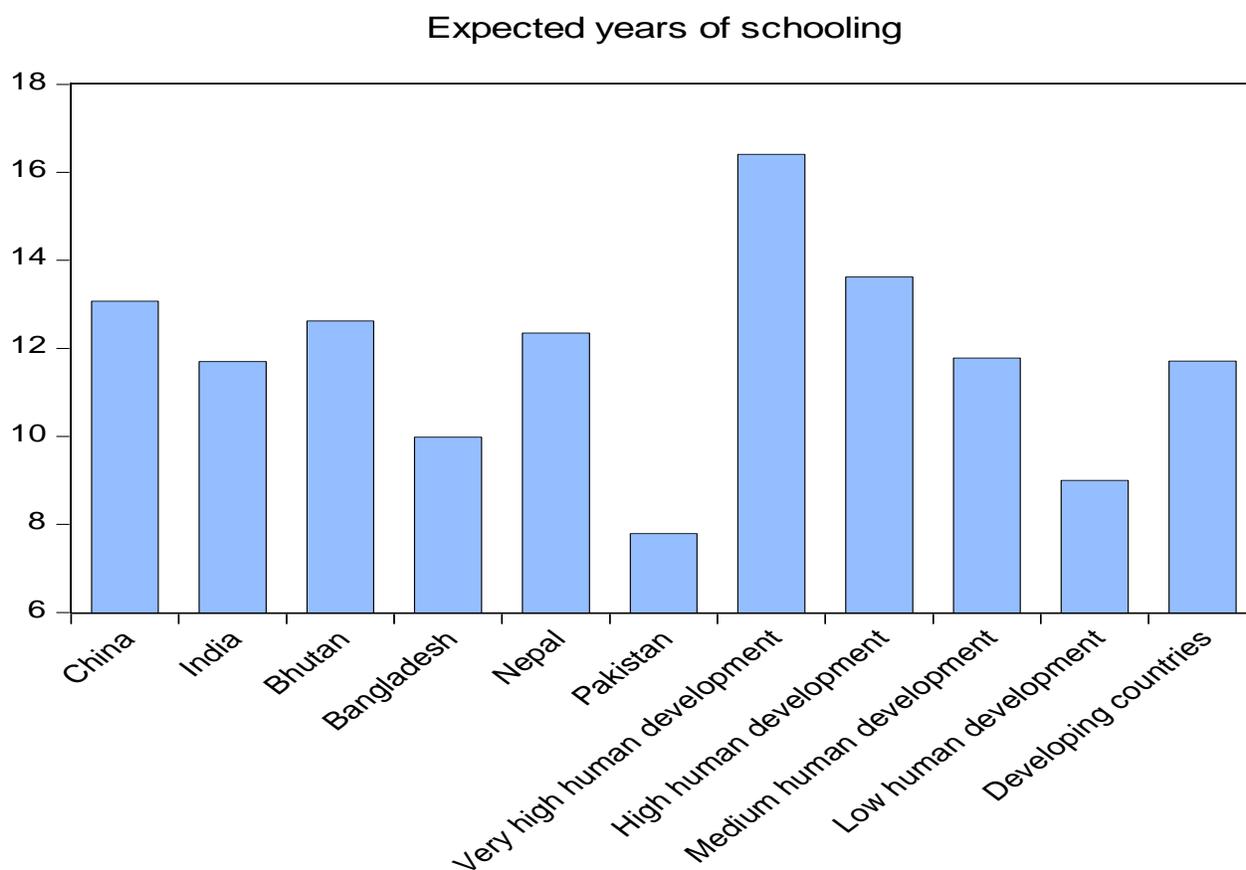
Source: Human Development Report, 2014

In figure 4, human development index from gender perspective is given and it shows that China is doing better and balancing the gender gap also. But in the remaining countries, on the one hand there is low gender development index and on the other hand there is high variation between the male and female population. The status of Nepal is also very low situation but Pakistan is in the very low performance in gender perspective. Female are quite low HDI situation in most of the Asian countries in comparison to male.

8.4. Expected Years of Schooling

Expected years of schooling means average years of school attending people. Similarly, figure 5 below shows that China's performance in education has excellent track recording and is doing much better in this region even if China has a higher population size. Bhutan and Nepal are also doing better but these are the countries having comparatively low population size. India's performance is also in the right path but Bangladesh and Pakistan should do much more in this sector..

Figure 5. Expected Years of Schooling



Source: Human Development Report, 2014

Result show that average years of schooling in the countries of very high HDI is approximately 17 years and high HDI is 14 years, Similarly China has 13 years but other countries should do more in this sector. In Nepal there is only 12 years of schooling.

9. Empirical Results and Interpretations

The study has analyzed the time series data from 1994/95 to 2014/15 and estimated various possible models. The major empirical results are presented in this section.

9.1. Unit Root Test Results

Augmented Dickey-Fuller (ADF) test is employed to test the unit root. The results of ADF-test are presented in table 2 The lag length is automatically selected upto maximum 4 by using Eviews-8 software.

Table 2. Unit root test

Table : ADF-Test Results for Unit Root Test				
Variables	Levels		First Difference	
	t-Statistics	p-Value	t-Statistics	p-Value
Education and economic growth and socioeconomic development				
LN _Y	0.111052	0.9579	-4.125321*	0.0058
LN _{X1}	-1.010030	0.7276	-4.824276*	0.0014
LN _{X2}	0.190291	0.9643	-2.986539**	0.0485
LN _{X3}	-2.192605	0.2158	-2.987024**	0.0170
Education and Human resource development (HRD) and its impact on economic growth and socioeconomic development				
LN _{RGDP}	0.341090	0.9727	-5.249167*	0.0008
LN _{IE}	0.396111	0.9767	-3.189915**	0.0387
LN _{GERPE}	-1.413621	0.5524	-5.528387*	0.0004
LN _{GERSE}	0.131972	0.9591	-3.949826*	0.0329
LN _{GERTE}	0.861719	0.9922	-6.661600*	0.0001
LN _{FLFP}	0.482755	0.9805	-3.274264**	0.0354
LN _{MFLFP}	-0.052771	0.9394	-3.205648**	0.0400
Women education and empowerment and economic growth/ socioeconomic development				
LN _{GDP}	0.341226	0.9728	-5.249503*	0.0008
LN _I	0.396115	0.9767	-3.189883**	0.0387
LN _{FE}	0.479574	0.9807	-3.386969**	0.0266
LN _{ME}	-0.550593	0.8589	-3.068159**	0.0404
LN _{LFP}	2.108828	0.9997	-2.976431**	0.0110
Long run causality between Health, education and economic growth				
LN _{RGDPPP}	1.781588	0.9993	-3.349153**	0.0276
LN _{EEPP}	-1.015345	0.7256	-4.535287*	0.0025
LN _{HEPP}	-0.249783	0.9158	-4.353530*	0.0036
ADF Test Critical Values				
Sign. Level	Levels		First Difference	
1% level	-3.626784		-3.632900	
5% level	-2.945842		-2.948404	
10% level	-2.611531		-2.612874	

*Significant at 1% level

**Significant at 5% level

In this table Augmented all the macroeconomic variables are significant either at 1% level level of significance or 5% level of significance. * denotes the variable at 1% level of significance and ** denotes the variable significant at 5% level of t-statistics.

9.2. Education and economic growth and socioeconomic development

To establish the relation between various level of education and economic growth of the country the following regression model is developed. Where X₁, X₂, and X₃ denotes the gross enrolment ratio of primary, secondary and tertiary education and Y denotes nominal GDP. where E_t is the error term and C₁, C₂, C₃ are coefficient and C₀ is constant.

$$\text{LNY} = C_0 + C_1 * \text{LNX1} + C_2 * \text{LNX2} + C_3 * \text{LNX3} + \text{Et} \dots \dots \dots (1)$$

Table 3. OLS Diagnostic between LNY, LNX1, LNX2 and LNX3

OLS Diagnostic, Dependent Variable: LNY				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.84562	0.974942	18.30429	0.0000
LNX1	0.391742	0.345754	1.133005	0.2647
LNX2	0.713667	0.261425	2.729910	0.0097
LNX3	0.114332	0.115384	0.990889	0.3284
R-squared	0.897987	Mean dependent var		22.37402
Adjusted R-squared	0.889486	S.D. dependent var		0.502055
F-statistic	105.6325	Durbin-Watson stat		0.257880
Prob(F-statistic)	0.000000			
Test statistics	Coefficient	Probability	P-values	Decision/ Significance
Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	4.666243	Prob. F(3,36)	0.0074	Obs*R-squared>0.05, of P-value No serial correlation
Obs*R-squared	11.19927	Prob. Chi-Square(3)	0.10107	
Heteroskedasticity Test: Breusch-Pagan-Godfrey				
F-statistic	1.553134	Prob. F(2,33)	0.2267	Obs*R-squared> 0.05 of P-value , so there is no Heteroskedasticity
Obs*R-squared	3.355219	Prob. Chi-Square(2)	0.1868	
Normality LM Test- Jarque- Bera Jaque-Bera: 2.061972 Probability: : 0.3566 > 0.05, Residual is normally distributed			Stability Test of dependent variable (CUSUM Test) : dependent variable is stable at 5% level of significance	

The coefficient of determination i.e. R-squared is 0.8979 which shows that 89.79 percent of variation due to explanatory variables is explained by the regression equation which is satisfactory. The overall significance of the model tested by F-test is statistically significant at 1 percent level. The diagnostic tests for serial correlation, functional form, normality test and heteroscedasticity show that there is no evidence of autocorrelation, residuals are normally distributed, the variance of the residuals are homoscedastic and functional form Chi-square value indicates the model is correctly specified. Result shows that there is high contribution of primary and secondary education to GDP in comparison to tertiary education which is 11.43%.

Long Run Association by Johansson Co-integration among LNY, LNX1, LNX2 and LNX3

Series: LNY LNX1 LNX2 LNX3

Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized	Trace	0.05		
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.552198	49.94236	47.85613	0.0314
At most 1	0.329060	19.41297	29.79707	0.4635
At most 2	0.103125	4.248092	15.49471	0.8825

At most 3 0.002949 0.112229 3.841466 0.7376

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.552198	30.52939	27.58434	0.0203
At most 1	0.329060	15.16487	21.13162	0.2775
At most 2	0.103125	4.135863	14.26460	0.8447
At most 3	0.002949	0.112229	3.841466	0.7376

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

In both test of Trace Statistics and Maximum Eigenvalue P-value shows that there is long r run associationship in primary, secondary and tertiary level of education and GDP.

9.3. Education and Human resource development (HRD) and its impact on economic growth and socioeconomic development

To analyse the relationship between GDP, Education expenditure, gross enrolment ratio in various level of education (primary, secondary, territory and higher level education) and labor force participation for both sexes male and female the following model is established.

$$\text{LNGDP} = C (1) * \text{LNIE} + C (2) * \text{LNGERPE} + C (3) * \text{LNGERSE} + C (4) * \text{LNGERTE} + C (5) * \text{LNFLFP} + C (6) * \text{LNMLFP} + C (7) + ut \dots \dots \dots (2)$$

Table 4. Result of OLS Dignostic among LNGDP, LNIE, LNGERPE, LNGERSE, LNGERTE, LNFLFP, LNMLFP

OLS Dignostic, Dependent Variable: LNGDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNIE	0.049375	0.051543	0.957946	0.0357
LNGERPE	0.171052	0.214495	-0.797463	0.0440
LNGERSE	0.033783	0.093241	-0.362318	0.7234
LNGERTE	0.134153	0.082669	1.622764	0.0306
LNFLFP	1.793419	0.691215	2.594590	0.0235
LNMLFP	0.378514	1.218873	0.310544	0.7615
C	-9.952752	9.266056	-1.074109	0.3039
R-squared	0.917229	Mean dependent var		24.31776
Adjusted R-squared	0.905843	S.D. dependent var		0.340182
F-statistic	719.7599	Durbin-Watson stat		0.951289
Prob(F-statistic)	0.000000			
Test statistics	Coefficient	Probability	P-values	Decision about significance
Breusch-Godfrey Serial Correlation LM Test:				

F-statistic Obs*R-squared	2.113897 5.645858	Prob. F(2,10) Prob. Chi-Square(2)	0.1715 0.0594	Obs*R-squared > 0.05, of P-value No serial correlation
Heteroskedasticity Test: Breusch-Pagan-Godfrey				
F-statistic Obs*R-squared	0.697622 4.913519	Prob. F(6,12) Prob. Chi-Square(6)	0.6570 0.5550	Obs*R-squared > 0.05, of P-value, so there is no Heteroskedasticity
Normality LM Test- Jarque- Bera Jaque-Bera: 0.839379 Probability: : 0.6572 > 0.05, Residual is normally distributed			Stability Test of dependent variable (CUSUM Test) : dependent variable is stable at 5% level of significance	

P-values of more than 50 % independent variables are less than 5% and P-value of F-statistics is also less than 5%. So combined effect of all independent variables to the dependent variable i.e. LNGDP is significant. The diagnostic tests for serial correlation, functional form, normality test and heteroscedasticity show that there is no evidence of autocorrelation, residuals are normally distributed, the variance of the residuals are homoscedastic and functional form Chi-square value indicates the model is correctly specified. In this analysis p-value of t-statistics of LNIE, LINGERPE, LNGERTE and LNLFPP are highly significant which indicates that there is high influence of these variable to LNGDP.

9.4. Women education and empowerment and economic growth/ socioeconomic development

To establish the relationship between GDP, investment in education, education level in gender prospective male and female and their involvement in labor force is shown in the following model

$$LN(GDP) = C_0 + C_1 * LN(I) + C_2 * LN(ME) + C_3 * LN(FE) + C_4 * LN(LFP) + U_n \dots \dots (3)$$

Table 5. OLS Diagnostic among LNGDP, LNI, LNFE, LNME, LNLFP

OLS Diagnostic, Dependent Variable: LNGDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-17.73849	4.326127	-4.100315	0.0011
LNI	0.079959	0.033847	2.362381	0.0332
LNFE	0.191902	0.207599	0.924388	0.3709
LNME	-0.233683	0.223897	-1.043706	0.3143
LNLFP	2.488750	0.246283	10.10525	0.0000
R-squared	0.996698	Mean dependent var		24.31776
Adjusted-Rsquared	0.995755	S.D. dependent var		0.340182
F-statistic	1056.481	Durbin-Watson stat		0.583744
Prob(F-statistic)	0.000000			
Test statistics	Coefficient	Probability	P-values	Decision / Significance
Breusch-Godfrey Serial Correlation LM Test:				
F-statistic Obs*R-squared	2.322922 14.36272	Prob. F(8,6) Prob. Chi-Square(8)	0.1602 0.0728	Obs*R-squared > 0.05, of P-value, No serial correlation
Heteroskedasticity Test: Breusch-Pagan-Godfrey				
F-statistic Obs*R-squared	0.879022 3.813961	Prob. F(4,14) Prob. Chi-Square(4)	0.5012 0.4318	Obs*R-squared > 0.05, of P-value, so there is no Heteroskedasticity
Normality LM Test- Jarque- Bera			Stability Test of dependent variable	

Jaque-Bera: 0.559530 Probability: : 0.7559 > 0.05, Residual is normally distributed	(CUSUM Test) : dependent variable is stable at 5% level of significance
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In this Table 5, P-values of more than 50 % independent variables are less than 5% and P-value of F-statistics is also less than 5%. So combined impact of all independent variables to the dependent variable i.e.LNGDP is significant. The p-values of t-statistics of independent variable LNI, LNFE, and LNLFP are significant and these variables highly contribute to the LNGDP. The diagnostic tests for serial correlation, functional form, normality test and heteroscedasticity show that there is no evidence of autocorrelation, residuals are normally distributed, the variance of the residuals are homoscedastic and functional form Chi-square value indicates the model is correctly specified.

9.5. Health, education and economic growth

To develop the inter linkages between health, education and economic growth the following triangular casualty between these three variables are established.

Model specification (The technique of Ordinary Least Square)

$$\text{LNRGDPPp} = C_0 + C_1 * \text{LNEEpp} + C_2 * \text{LNHEpp} + u_t \dots\dots\dots (4)$$

Table 6. OLS Dignostic, Johansen Cointegration Test Results among LNRGDPPP, LNEEPP, LNHEPP

OLS Dignostic, Dependent Variable: LNRGDPPP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.477254	0.404561	16.01058	0.0000
LNEEPP	0.162061	0.108615	1.492065	0.1540
LNHEPP	0.348543	0.063609	5.479505	0.0000
R-squared	0.957849	Mean dependent var		9.903300
Adjusted R squared	0.952890	S.D. dependent var		0.145653
F-statistic	193.1571	Durbin-Watson stat		1.089797
Prob(F-statistic)	0.000000			
Test statistics	Coefficient	Probability	P-values	Decision/ significance
Breusch-Godfrey Serial Correlation LM Test:				
F-statistic	3.641072	Prob. F(2,15)	0.5012	Obs*R-squared> 0.05, of P-value No serial correlation
Obs*R-squared	6.536305	Prob. Chi-Square(2)	0.4318	
Heteroskedasticity Test: Breusch-Pagan-Godfrey				
F-statistic	5.535364	Prob. F(2,17)	0.1141	Obs*R-squared>0.05, of P-value , so there is no Heteroskedasticity
Obs*R-squared	7.887738	Prob. Chi-Square(2)	0.1914	
Normality LM Test- Jarque- Bera Jaque-Bera: 0.581142 Probability: : 0.7473 >0.05 so Residual is normally distributed			Stability Test of dependent variable (CUSUM Test) : dependent variable is stable at 5% level of significance	
Johansen cointegration test result: Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.656814	31.50789	29.79707	0.0315
At most 1	0.465850	12.25720	15.49471	0.1450

At most 2	0.052451	0.969787	3.841466	0.3247
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.656814	19.25069	21.13162	0.0898
At most 1	0.465850	11.28742	14.26460	0.1404
At most 2	0.052451	0.969787	3.841466	0.3247

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

In Table 6. P-values of more than 50 % independent variables are less than 5% and P-value of F-statistics is also less than 5%. So combined effect of all independent variables to the dependent variable i.e.LNRGDPPP. Johansen cointegration test results indicate there is short run relationship between LNRGDPPP, LNEEPP and LNHEPP because of both Trace Statistics and Maximum Eigenvalue test show the similar results that is P-values > .05. Per Johansen Cointegration, VECM and P-values of coefficient clearly shows that there is short run and long run associations between the variables and there is triangular causality between GDPpp, EEpp and HEpp that is Real GDP per capita, per capita education expenditure and per capita health expenditure.

The value of Akaike info criterion (AIC) is -5.724021 and Schwarz criterion (SC) is -5.233895 at lag 2 which are minimum in comparison to lag 4 and lag 6.

Table 7. ADRL model (Wald test)

Test Statistic	Value	df	Probability
F-statistic	3.325833	(3, 7)	0.0862
Chi-square	9.977498	3	0.0188

Null Hypothesis: C(8)=C(9)=C(10)=0

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(8)	0.338642	0.203166
C(9)	-0.182834	0.081647
C(10)	0.129664	0.100961

Restrictions are linear in coefficients.

In Table 7 the P-value of F-statistics is >5% so null hypothesis C(8)=C(9)=C(10)=0 is rejected and alternative hypothesis is accepted that means C(8)=C(9)=C(10) not equal to zero. It indicates there is long run association between the variables LNRGDPPP, LNEEPP, LNHEPP. So, there is short run as well as long run association between Real GDP per capita, per capita education expenditure and per capita health expenditure.

9.6. Education, Poverty and Economic Growth:

The rigorous study of archives and literatures clearly shows there is high correlation between education rate, level of poverty and economic growth. On the time basis education empowerment and literacy rate is increasing in one hand but on the other hand rate of poverty is diminishing so

there is high link between education enhancement and poverty reduction. Poverty in Nepal is related with consequent factors of socioeconomic, cultural, political and geo-political environments. Nepal is in reverse socioeconomic and vicious cycle of poverty trap. Therefore, holistic-synergistic approach is critically important to overcome the trap of unemployment, poverty, hunger, illiteracy, ill-health, exclusion and environmental degradation issues in Nepal. A visionary leadership (it can be a person, an institution or a system), who is proficient in political economy diplomacy and passionate to national entrepreneurship, is the first and foremost step to be established in Nepal for her rapid socio-economic development.

9.7. Environmental Protection and sustainability:

Various literature and archives are used to analyse environmental sustainability. Deforestation has been increasing in Nepal and this will bring a vast deterioration in the biological balance and environmental sustainability for future generations. Therefore, development planning in Nepal needs to give particular attention to forest conservation strategies and programs. Community forestry policy and commercial forestry policy, both, should be promoted for environmental protection, fulfilling household needs and rural people 's income generation simultaneously. The value of sustainable environment should be included in all levels of education and community trainings with the center of attention. Sufficient supply of electricity to households will substantially reduce deforestation replacing wood fuel. Bio-diversity preservation plans and the bioresearches should be strategically designed to multiply it with the environmental sustainability, employment generation and economic growth.

10. Major Findings, Conclusions and Policy Implications

10.1. Findings and conclusions :

The developing countries like Nepal where resources are underutilized and surrounded by multidimensional poverty with very low status of socioeconomic parameters, the starting point is providing best quality and skilled based education. From descriptive and quantitative analysis there is significant impact of education and in socioeconomic development parameters. Education plays a pivotal role for improvement of health, women empowerment, environmental protection, HRD and employment, poverty reduction and economic growth and overall impact is education plays crucial role in socioeconomic development. This research also shows that well educated and skilled human resources more contribute to the economy. Gender unbiased education is another key factor for empowering women and increasing productivity. Study also reflects that there is short run and long run association between education, health, HRD and economic growth. In the same vein training and vocational education has crucial role in labor market participation and increasing family income. Study also replicates that education also plays key role in environmental sustainability and poverty reduction either relative or absolute. The findings are summarized in the following points.

- Research also indicates that the countries having more gender imbalance education they are far behind in terms of human development index in comparison to the countries having gender balance education.

- Study prevails that in most developed countries like OECDs public educational system is far better but in the developing countries where the government is weak and educational policies are frequently changing, private and community based educational institutions are doing better than public.
- Review of literature and achieves shows that there are certain forces behind gender inequality in education in Nepal and other Asian developing countries which are: (i) male dominated society tradition or culture (ii) religious prospective (iii) poverty.
- This study also indicates that there is crucial role of education in basic socioeconomic issues such as environmental protection, poverty reduction and managing household income and family size and providing awareness to the people about health and sustainability.
- Analysis of data also reflects that investment in education and labour force participation have positive and highly significant impact on GDP.
- OLS result shows that there is significant and crucial role of primary, secondary and tertiary education in economic growth (RGDP) of the country. There is significant long run relationship between educational attainment, HRD and employment, and economic growth in Nepal and developing countries.
- There is triangular casualty between education, health and economic growth. Per Johanssen Cointegration and VECM show that there is short run and long run associations between the variables and there is triangular causality between GDPpp, EEpp and HEpp that is Real GDP per capita, per capita education expenditure and per capita health expenditure.
- ADRL model of Wald testing indicates that there is long run, short run and both relationships between the macroeconomic variables like education, health and economic growth and socioeconomic development of the nation in the model.
- According to Johansson Co-integration there is existence of short run and long run relationship between education, health and economic growth of Nepal
- There is significant long run relationship between educational attainment, HRD and employment, and economic growth in Nepal.
- This research clearly shows that there is significant role of education in various development paradigms i.e. Improvement of health, women empowerment, environmental protection, HRD and employment, Poverty reduction, economic growth, and socioeconomic development.

10.2. Policy Implications

In the light of the current study, there are some recommendations and developing countries should realize and implement these guidelines for the future betterment.

- Study shows that education plays the important contribution to the national economy. So, government of developing countries like Nepal should creat environment of compulsory education for all and equal opportunities for all group of people in the society by keeping education on top priority in public policies.
- Research demonstrate that every government of developing countries should put vocational education in high priority and time and need based training and other HRD and skilled development program should be launched because vocational education and trainings have crucial role in labour force participation.

- School dropout rates in Primary, secondary and tertiary level in developing countries is the chronic problem so government, political parties, civil society and social workers should think what procedure can be used to stop dropout rates.
- The contribution of health to the long run economic growth is equally important. So, the developing countries like Nepal should invest more in the health sector and health related awareness programs and campaign should be launched. Public health facilities must be easy and affordable to all income level of groups in the society.
- Gender friendly education policy should be initiated by the developing countries like Nepal to empower women and women's capabilities to bring more than 50% of population in national development stream.
- More budget should be allocated to education and training programs and budget should be properly utilized. Many developing countries are not facing budget problem but implementation of the budget is equally important.
- Developing countries should revise their policies regarding education especially in the public sector but in private sectors performance is little better.
- Research (Various literature reviews) also shows that Vocational education and skill based training have more impact on labor force participation and overall family income these programs should keep in top priority in public policy and planning commission of Nepal should formulate short term and long term policies and should be implemented in given structure and time framework.
- Nowadays environmental sustainability is critical issue for long run economic goals. So, authorities should launch national awareness program through education, public campaign and provide feeling of ownership to all towards environment.
- Many poverty reduction planning and policies should be launched and implemented by national planning commission and authorities of the government. Many developing countries are facing deep rooted vicious circle of poverty.

11. Constraints of the results (limitations)

In this study mostly secondary data and other sources of information are used that's why any limitation in secondary data may lead biased results as well. The research is heavily on the time frame 1994/95 to 2014/15, so data before 1994 are normally not included in the research. In this study there are seven impact sectors including education such as women empowerment, health, HRD and employment, poverty, environment and economic growth. Two impact sectors environment and poverty are not inculcating in the model due to lack of required information and some data are periodic and do not match with time series data. But these are individually analyzed with data table, graph and archives.

This study includes various macroeconomic parameters of development basically socio-economic variables such as education, health, women empowerment, environment, poverty, HRD and employment and economic growth. Besides these variable there are so many other variables related to socioeconomic but these other variables are excluded from this study. The research is basically focused on the case study of Nepal and some other developing countries normally south Asian countries to make contrast and comparative analyses. The scope of this

study is limited to exploring the role of education in socio-economic development and planning in Nepal.

Normally all information are taken as secondary or published sources and the role of primary data and qualitative could not be included in this research. In some of the cases the analysis is more technical one. In socioeconomic transformation there is crucial role of qualitative research in some dimensions. In other hand in socioeconomic development there are three dimensions such as political willpower, social transformation and development. But here research is more concentrated on socioeconomic transformation and development.

12. Further Scope of the Research

This research is normally focused on linking education as an instrumental tool in the socioeconomic development of Nepal focusing on the parameters such as Women Empowerment, Environmental Sustainability, Improvement in Health, Poverty Reduction, HRD and Employment, and economic growth. If we considered the further scope of this research there are two distinct scopes one is further deepened on each parameter of socioeconomic development individually and research becomes more rigorous. So in coming days the researcher can address the all these parameters in terms of federal structure of Nepal. So, individual parameters can be studied in terms of federal structure. Here is big scope of research.

Second scope is this is the period sustainable development after completing the giant goals of Millennium development. The sustainable development goals are established to complete the incomplete goals of millennium development. Coming researcher can explore the main limitation of millennium development goals and how these can be addressed in sustainable development goals is major area of research.

This research is limited to the data of up to 2014/15 but coming researcher can upgrade the data and analyse the socioeconomic status with assuming education as an intervening variable will be more comprehensive one. So, for the new researcher there is wide space of further research in the context of federalism. Nepal just promulgated the new constitution in federal structure and federal model of education is also important research area for coming researchers. What would be the role of federal states in the education is more researchable area which directly connect the coming trend of educational system in federal structure.