

ECONOMIC ANALYSIS

A. Introduction

1. In a concerted effort to build on the progress made under the country's Education for All program, FY2004–FY2009, and School Sector Reform Program (SSRP), FY2010–FY2016, to attain middle-income country status by 2022 and to meet the sustainable development goal targets for education by the year 2030, the Government of Nepal has prepared a School Sector Development Plan (SSDP), FY2017–FY2023 and a 5-year program in close consultation with stakeholders including development partners. Whereas the Government's SSDP vision extends to 2022 and even beyond, the Government of Nepal and development partners have jointly agreed to appraise a five-year implementation program, FY2017–FY2021. The economic analysis presented in this document will focus on this intermediate 5-year program.

2. The issue of equity and equality in educational opportunity for all has been a major policy debate in developing countries. At policy level, it is well accepted that the strong and skill based education for all is a major pillar for sound and sustainable economic growth. Education system which is designed to groom skills based on individual capacity and focusing on the current need of the labor market will not only reduce poverty and unemployment but also increase the income and livelihood of people by increasing individual productivity. In return it reinforces economic growth by generating demand in the economy. If we reflect on economic history of successful economies, initial investment in education intended to stimulate innovation was instrumental in laying strong foundation for sustainable growth and equitable distribution of the resource.

3. Learning the lesson from the earlier experience of few Asian countries in escaping “middle income trap”, the Government of Nepal has acknowledge that: (a) higher productivity and structural changes can be achieved through investment in education that promotes innovation; (b) skilled worker is required to introduce new and advanced technology in manufacturing sector to add value in the product; and, (c) last but not least, country can achieve smooth structural transformation with the rapid expansion of secondary and tertiary education like in Korea. Therefore, substantial investment in the human capital formation is needed in Nepal especially by increasing the provision of quality education for all in the country to accelerate growth, reduce unemployment rates, in-cash the advantage of the demographic dividend, and transform the country into a knowledge economy. Manpower with specific skill set and training is needed to achieve national and international demand for skilled human resources. To meet stated national goal, country needs to invest heavily in the education sector and initiate school reform program where one can learn the skill set demanded in the labor market. Benefit of investment in education sector will reflect in the long run. Government initial investment, therefore, is needed in the school subsector where one can avail free compulsory education until grade 12.

4. **GDP Growth.** If we look into Nepalese economy in last few years, the growth rate has been inconsistent. Gross domestic product (GDP) has grown at around 4.5% from 2009 to 2015;¹ it has reached highest 5.7% in 2014 and touched lowest of 2.32% in 2015. Because of quake-related damages the revised growth rate for 2014/2015 was 2.32%. The country's economy is projected to grow at a sluggish pace of 0.77% in FY2016. This estimated growth is the lowest since 2001–2002, when GDP increased by 0.16% (Table 1).

¹ Trading Economics. <http://www.tradingeconomics.com/nepal/gdp-growth-annual> (accessed 10 July 2016).

Table 1: Annual GDP Growth Rate at constant price (%)

| FY | FY | FY | FY | FY | FY | FY | FY | FY | FY | FY |
|------|------|------|------|------|------|------|------|------|------|------|
| 2002 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| 0.16 | 2.75 | 5.8 | 3.9 | 4.26 | 3.85 | 4.61 | 3.76 | 5.72 | 2.32 | 0.77 |

Source: Government of Nepal, Central Bureau of Statistics. Kathmandu.

5. **Incidence of Poverty.** Nepal Living Standards Survey (NLSS, 2010/2011) report highlighted that one-fourth of households are living below poverty line, and this result has improved over 1996 and 2004. The incidence of absolute poverty has fallen to 31% in 2003 from the pick of 42% in 1991. After the political transition period from 2006 to 2010, it has stabilized at 25.2% (Table 2). From the periods 2006 to 2013, unemployment rate was averaging at 7.3% and the underemployment rate at 9.8%. Despite reasonable performance of remittance led Nepal's economy, its impact on education, employment and redistribution is remains low and unequal. Therefore, considering earlier failure of development plans and the effort in tickling down the fruit of economic growth, the Nepal Development Plan 2011–2016 has adopted a framework of inclusive growth. This framework is expected to distribute the benefit of sustainable economic growth equally and generate mass employment as well as reduce absolute poverty.

Table 2: Incidence of Poverty and Unemployment Rate (%)

	1991	2003	2006	2010	2011	2013
% of population below poverty line	42	31	...	25.2	...	...
Unemployment rate %	...	...	...	7.3	...	...
Underemployment rate%	...	...	...	9.8	...	...

... = not available.

Source: Government of Nepal, Central Bureau of Statistics.

6. Education and poverty are causally interrelated as indicated by empirical study on poverty and education or literacy which has established strong correlation between the increase in level of education or literacy and fall in income poverty. At the same time, the effect of education on poverty reduction can also be traced to remittance transfer and migration. Since Nepal is one of the major labor exporting country, skilled based education will increase the likelihood of getting better employment opportunity internationally and the remittance transfer. Studies have already established the positive effect of remittance on poverty reduction in migrant sending country.

B. Challenges and Rationale

7. Although it is well accepted that education is central to achieve inclusive growth, the school education system in Nepal is still facing number of challenges. It is characterized by wide disparities and inequities in the educational outcome among the diverse population coming from different geography, caste, and ethnicity. These disparities get worse upwardly, until grade ten, when they begin to taper off. Increasing enrollment share in private schools, continuous low performance of rural community schools, inequitable distribution of qualified and experienced teachers particularly in remotest region, parents inability in meeting different forms of fees including private tuition, and high associated opportunity costs for children from poor families, particularly for boys, are some of the strong signal of persistent inequitable education system in Nepal.

8. **Distributional Effects.** If we look into the distributional impact on education at all the levels, it appears that Nepal has made impressive progress towards enhancing access to basic and secondary education, during the past decade (primary net enrollment ratio [NER] is 96.2%,

and basic NER 87.6% in FY2015). Some progress has also been made towards increasing enrollment rates at the post-school level. However considerable regional and socio-economic disparities continue to exist in poverty rate, gender equality, geographical region, and different social groups in the distribution of resources, schools, infrastructure, facilities, teachers, and education outcomes while comparing with national average data. There is also disparity among districts in terms of girls' enrollment. Analogy is supported by the recent study conducted by National Assessment of Student Achievement (NASA) (2011) which showed noticeable variation in student achievement across genders, region, ethnicity, and school (Table 3).

Table 3: Disparity in Grade 8 NASA in 2011 across Different Groups
(Average student score [%] in Grade 8 NASA)

Groups	Nepali	Mathematics	Social studies
Male	48	45	50
Female	49	41	49
Urban	55	48	52
Rural	46	41	48
Mountain	49	41	48
Hill	50	38	47
Kathmandu Valley	64	55	59
Terai	42	44	48
Brahmin-Chhetri	52	45	52
Janajati	50	41	48
Dalit	45	37	46
Madheshi	48	49	47
Community schools	46	39	46
Private schools	62	63	63
Nepal	49	43	49

Source: Metsamuuronen J. and Kafle B. 2013. *Where Are We Now? Student Achievement in Mathematics, Nepali and Social Studies in 2011*. Ministry of Education. Kathmandu. Nepal.

9. **Government Education Spending.** Government education spending is a major factor to achieve quality education. Government's budget allocation annually in terms of monetary value and the share for education sector and its subsector is a major lookout to spot its priority. The 2010 education budget reveals that the allocated budget is skewed and favoring the poorest quintiles of the population, mainly coming from the remotest area of the country. Over 60% of the total school budget is allocated for the primary education, where most students at primary level in community schools originate from poor households. The poor section of the society is benefiting mainly from allocated budget at primary level (35% share of the poorest quintile), whereas the richest quintile are benefiting from tertiary education (56.8% share of the richest quintile) (Table 4).

Table 4: Share of Educational Budget by Consumption Quintiles

	Primary	Secondary	Higher Secondary	Tertiary	Total
Quintile 1	34.0	16.6	6.0	1.1	27.1
Quintile 2	26.7	22.1	10.1	4.0	23.3
Quintile 3	20.1	23.9	17.9	14.5	20.3
Quintile 4	13.9	23.5	30.2	23.6	17.0
Quintile 5	5.3	14.0	35.8	56.8	12.2

Source: The World Bank. 2013. *Nepal Report on Human Development - Access, Equity, and Quality in the Education, Health and Social Protection Sectors*. Washington, DC.

10. There is progressive decline in the share for higher income groups in primary level budget. In 2010, the richest quintile was receiving only 6% of the school level budget. In contrary, at higher level of education, the pattern of benefit for higher income group is reversed. The richest quintile is receiving the largest budget share of 35% at higher secondary level, while

poorest quintile budget share is limited to 6%. The secondary education budget allocation appeared to be progressive but not absolutely pro-poor. While, the budgets share for the higher secondary and tertiary levels are yet to be poor focused.

11. Especially for secondary education, gross enrollment rate (GER) for the poorest families (first quintile) is lower than national average. For primary education, first quintile and national average GER is 112% and 124.9% respectively. Similarly, first quintile and national average GER for lower secondary is 77.8% and 97.4%, and for secondary education is 46.6% and 81.7%, respectively.² The children enrollment from poorest households in secondary education is still low, which is merely 46.6% in FY2014. At primary level, the NER from poor households³ is standing at 75% as compared to 80% for non-poor households (NLSS, 2010/2011). This ratio gets worse with the increase in the education level. For instant, at secondary level poorest quintile has as low as 7.6% of NER, while richest has 56.5% (NLSS, 2010/2011). There is no improvement in NER in the period from 2003 to 2010; the NER for these children is more or less the same for all the level of schooling (NLSS, 2010/2011). This result is an indication of children out of school in 2010. NER figure of 24% at lower secondary level for poor as compared 50% and above (NLSS, 2010/2011) for non-poor is a strong indication of 70% or more of the secondary school going age population from poor household is not attending school or out of school. The poorest two quintiles have the lowest net attendance rates and the highest percentages of out-of-school children.⁴ Geographical wise, performance of Teria region in education sector is poor. The Terai has lowest net attendance rate, the highest percentage of out-of-school children and student-teacher ratio at all level of schooling.

12. **Household Education Spending.** Household educational spending is only 5% of the total consumption and 3.5% of the remittance (NLSS, 2010/2011). In presence of wide disparity, in addition to the opportunity cost, direct cost of sending children to the school is a major factor determining the education level of children coming from poor households. Per student out-of-pocket spending on education is high for secondary level and above. Average annual cost of school education from grade one to eight is NRs1,332 followed by secondary level NRs5,386 and higher secondary level education NRs10,398 (Table 5). It should be noted that out-of-pocket expenditure in real terms has declined for all levels of education in 2010 compared to 2003.

Table 5: Average Annual Out-of-Pocket Spending in Community Schools/Colleges

Year	Primary	Lower Secondary	Secondary	Higher	Tertiary	National
Nominal out-of-pocket expenditure (NRs)						
2003	1,319	2,568	5,047	8,913	11,395	2,509
2010	1,332	2,504	5,386	10,398	13,914	3,329
Real out-of-pocket expenditure (2003 NRs)						
2003	1,319	2,568	5,047	8,913	11,395	2,509
2010	7,40	1,392	2,993	5,777	7,730	1,394

Source: The World Bank. 2013. *Nepal Report on Human Development - Access, Equity, and Quality in the Education, Health and Social Protection Sectors*. Washington, DC.

13. **Absence of Pro-poor Targeting of Scholarships.** NLSS 2010/2011 data shows that the poorest 20% households spent NRs3,246 for school education compared to NRs30,762 for

² Government of Nepal, Central Bureau of Statistics. 2015. *Nepal Annual Household Survey, 2013–2014*. Kathmandu.

³ 'Poor' denotes households of the lowest 30% in per capita consumption distribution.

⁴ The World Bank. 2013. *Nepal Report on Human Development - Access, Equity, and Quality in the Education, Health and Social Protection Sectors*. Washington, DC.

the richest 20% households in 2010 and the poorest 10% households spent NRs2,463 for school education compared to NRs41,306 for the richest 10% households in 2010 (Table 6). Low education related spending could be explained by the low household income, and the major expenditure on food and other very basic needs. Considering the low education related spending and objective of enhancing access and improving equity in education sector, government has designed as many as sixteen different types of scholarships targeting the population and groups such a disabled, poor but talented, conflict affected, girls, and Dalits. However, these scholarships have failed to target financially weak students. In contrary to its objectives, many of these benefits are favoring the students coming from the richest consumption quintile.⁵ Also, the ethnic groups in Terai are not much benefiting from such initiatives.

Table 6: Household Education Spending in NRs (current prices)

	With weights	Without weights
Bottom 20%	3,246	3,307
Top 20%	30,762	36,669
Bottom 10%	2,463	2,488
Top 10%	41,306	47,537

Source: Government of Nepal, Central Bureau of Statistics. 2012. *National Living Standards Survey (NLSS) 2010/2011, NLSS Third*. Kathmandu.

14. **Share of Private Schools.** The share of private school enrollment was 15.4% for primary and increases with the increased education levels. This ratio was 30% for higher secondary schools. This indicates that a sizable portion of the families incurs significant expenses sending their children to private schools (Table 7).

Table 7: Share of Private Schools and Students (%)

	Schools	Students
Early childhood development	14.5	...
Primary	15.6	15.4
Lower Secondary	25.7	15.9
Secondary	31.9	19.1
Higher secondary schools	26.3	29.6
Tertiary	61.3	...

Source: Government of Nepal, Department of Education. *Flash Report I, 2014/2015*. Kathmandu

15. **Effects of Earthquake.** Even recent natural disaster (earthquake) has further affected the vulnerable school going children origin from poor households. An assessment study in earthquake-affected area conducted by Ministry of Education (MOE) has found that there is a presence of lower risk at primary level and higher risk at the secondary school level in the most affected districts.⁶ While, reversed pattern is observed in the affected districts. High dropout and repetition rates at secondary level compared to primary are strong indicator to suggest that there is a need to divert special attention and investment in this area to minimize girls and minority group's dropout at the secondary level.

16. **Presence of Out-of-School Children.** The immediate effect of the disparity in access and **participation** can be seen in the number of out-of-school children. Nearly 8.1% children aged 5 to 12 were out of school in 2010 (NLSS, 2010/2011), although significant decline from

⁵ The World Bank. 2013. *Nepal Report on Human Development - Access, Equity, and Quality in the Education, Health and Social Protection Sectors*. Washington, DC.

⁶ Government of Nepal, MOE. 2015. *Post-Disaster Needs Assessment*. Kathmandu.

21% in 2003 (NLSS, 2004). Most commonly children belongs to extreme poor family, woman-headed household, child laborer, street children, children with disability, ethnic group and from remote areas are structurally barred from attending school. Using NLSS 2010/2011 data, a comparison across income groups shows a negative correlation between household economic status and child not being in the school. In particular, the poorest quintile has 14% of children out of school which is seven times higher than the richest. Minor communities are still lagging behind with 26% of Terai Dalits followed by Muslim 19% of children are out of the school. Surprising, male and female share in total out of school children is closely the same.

C. Justification for SSDP Program

17. To tackle the interrelated problems of education, inequality and poverty, and existing challenges in quality and governance, investment in SSDP school reform and development program is needed. The underlying rationale of the SSDP is that its reform provision will develop a sustainable, efficient and equitable education system in Nepal which will cater quality education to larger population irrespective of the race, caste, income, region, religion and ethnicity. SSDP is expected to implement a wide range of demand and supply side interventions to improve access, equity and efficiency while at the same time enhancing quality of schooling through improved student, school and teacher-level sub-programs as well some overriding policy/institutional reforms.

18. The concept and motivation of SSDP program is prominent in discussions of sustainable development. For young students in a country like Nepal, where inequality and poverty in persistent, these are of particular importance: they help to give them certain skills as an entry points into the labor market, which was not accessible to them before, as well as open up various career opportunities. SSDP program focusing primarily on poor population will generate range of benefit for the participant and the economy in the long run.

19. **Focus on Secondary Education.** Improving the quality of education by focusing on secondary education via investment in SSDP is essential for higher education. It will enable them to participate in the labor market where work opportunities are available. In fact the main focus of SSDP program is to generate pool of skilled human resource in the country. This SSDP program focus on secondary education is guided by the fact that (i) recently the demand for secondary education has increased substantially due to the growth in basic education but government's investment in this subsector is very limited to meet the current demand, (ii) pressure to ensure that the larger pool of students, mainly from rural and isolated region of Nepal, will meet the entry requirements of higher education system, and (iii) rise in the awareness among the people and growing acceptance among policy makers vis-a-vis investment in secondary education which has greater return in the long run and the only mantra for social and economic development.

20. **Program Beneficiaries.** The primary beneficiaries of the SSDP program will be the SSDP students completing school education. They will be better prepared for employment or further education and skill development training. In numbers, the primary beneficiaries of the SSDP will be around 6 million students. The SSDP teacher management program will be designed to ensure that all upper basic and secondary schools will have subject teachers especially in mathematics, science and English. In return, it will enhance the quality of education, and students from rural areas choosing technical subject like science will increase and get benefitted. Employers and tertiary education institutions will also get benefitted from this program by finding prepared and skilled fresh graduates for the work and postsecondary

education and training. Through training, information and communication technology and equipment, MOE core functions will get benefited from capacity building. Better prepared and skilled graduate will enter into higher education institutions and will be able to cope with tertiary level study materials. In the longer run, the SSDP program will make the Nepal's school education cycle more comparable and competitive internationally and will ensure that skilled and competitive Nepalese workers are entering into the global labor market. Moreover, these benefits are contingent upon MOE providing increased quality and access to all.

21. **Increasing Employability.** SSDP program strives to provide quality education to all young students as they enter into the higher education. Education increases employability of individual and the future income by enhancing productive capacity. According to NLSS 2010/2011, the average annual wage income of wage earners with higher education is higher than those of lower education levels (Table 8). The average incomes of school, secondary and higher secondary educated people are NRs24,528, NRs44,220, and NRs67,481 respectively. Compared to lower secondary level, average annual wage increase by NRs23, 621 (NRs67,841) if a person has completed secondary education. However, compared to 2003, in 2011 average annual wages of employees has increased at all the levels except for the individual with tertiary education.

Table 8: Average Annual Real Wage for All Employed Workers
(in 2003 NRs)

Education Completed	FY2011	2003
No education	12,839	8,520
Primary level completed	24,528	17,651
Lower secondary level completed	44,220	33,681
Secondary level completed	67,841	58,981
Tertiary level (bachelors and higher) completed	99,695	172,436
Average for Nepal	29,282	24,776

Source: Government of Nepal, Central Bureau of Statistics, National Planning Commission. 2011.

22. It also expected to strengthen the access to education for the poor, and the impact of poverty reduction intervention and its sustainability through developing productive human resource for the labor market. Through SSDP if we ensure education for all by increasing access and participation in education from every community, it will lead to increase in the size of skilled labor force in the future. These labor force entrants will have at least eight and twelve years of schooling, and likely to earn high income relative to other non-finishers.

23. **Reducing Disparities.** SSDP's emphasis on equity to reduce disparities in participation and learning across districts by supporting the existing secondary schools to achieve minimum enabling conditions mainly related to physical facilities and subject teachers, providing pro-poor scholarship to students especially girls in districts with low girls' enrollment, and implementing out of school children program in target districts will help reduce poverty and socio-economic inequalities. The emphasis on quality to strengthen teaching of mathematics, science and English will improve the likelihood of students gaining skills that will lead to productive employment.

24. **Targeted Interventions.** The SSDP program is trying to address the equity and disparity issues by focusing on most important segment of the education. First, designing the disbursement-linked indicators on equity to support the 200 model schools to be selected from the decentralized units of the country and monitoring the subject teachers' deployment to these schools. To develop student capacity in the area of mathematics, science and technology, the

investment in science, information technology, science laboratories, equipment and professional development, and rational deployment of teachers will be initiated. To target the poor's, scholarship program will be redesigned by increasing scholarship amount and implemented to increase the no of student from the poor household. Out-of-school programs will be implemented based on the equity index and use of voucher program in urban areas for poor students graduating grade 10 from community schools to prepare them to enroll in grade 11 and 12 in private schools. And, monitoring student participation and the allocation of vouchers scheme under SSDP to currently underserved groups, like disabled and poor children, minority, girls and children from remote areas, will enable to bring them under the umbrella of education. Other than these, SSDP intervention that is expected to support education of poor children includes need based construction of classrooms, and the promotion of information and communication technology in education.

25. The SSDP program is expected to have positive distributional effect for the following reason. First, the SSDP program will bring more children (especially girls) from the poor households in the education system after the introduction of pro-poor targeting scheme under the free school education system. Second, subject specific teachers recruitment to support free higher secondary education in rural schools will motivate and incentivize grade 10 graduates to enroll into higher level. Third, the design and motivation of the SSDP scholarship program is objectively pro-poor than the currently available scholarship scheme. The proposed increase in the base subsidy level scheme will allow students from the poorest income deciles to attend private SSDP, at least by providing tuition waiver.

26. **Efficiency and Economy.** SSDP interventions will improve the institutional capacity of the government by creating pool of productive human resources. The absorptive capacity of MOE is still not up to the mark to use allocated budget in timely and efficient manner to manage in the number of community schools. The SSDP's disbursement-linked indicators expected to achieve minimum enabling conditions in community schools by rationalizing and recruiting qualified subject teachers, maintaining moderate student–classroom ratios, implementing SSDP model school program, and the strengthening of MOE's financial management and procurement monitoring. Use of government system under results-based lending modality will enable MOE to achieve greater efficiency by reducing transaction costs. The establishment of model school meeting all minimum enabling condition will also promote rationalization of schools as nonviable schools will be either closed or improve the conditions required to provide quality education. Implementation of teacher rationalization plan will be the most important reform in school education which is expected to save scarce resources and divert in quality enhancement activities.

27. **Sustainability.** Moreover, sustainability of a pro-poor program in developing countries has been in question. Often such intervention loses its way, in the long run, when inefficient governance mechanism is designed, project is not integrated into the legal provision and funds start drying up. Therefore, sustainability of the SSDP programs will be strengthened by including SSDP into the country's school education system supported by the Education Act Eighth Amendment 2016. Furthermore, the sustainability of SSDP program in medium-term will be enhanced by the results-based lending modality, which links the disbursements with the results and encourage the achievement of disbursement-linked indicator targets. The SSDP also strengthens the MOE's ability by securing necessary budgetary support for the SSDP program. In addition, reform in nationwide fiduciary and safeguard mechanism will help, in medium term, to sustain progress in financial management, procurement, anti-corruption efforts, and

environmental and social safeguards. This will also help in strengthening the link between government spending and its intended outcome.

D. Economic Analysis of SSDP Program

28. This economic analysis appraises the economic viability of the proposed SSDP program in accordance with ADB's Guidelines for the Economic Analysis of Projects. The cost-benefit analysis for the SSDP, 2016–2021 presents an assessment of benefits and costs associated with the proposed program using a “with- and without-program” approach whereby SSDP “investment” is the estimated additional cost over and above the currently run SSDP spending. Table 9 presets key assumptions to estimate additional benefits and additional investment. Economic internal rate of return (EIRR) has then been calculated by solving for the discount rate that equates the net present value of the benefit stream arising from additional investment in schooling with the same net present value of the cost stream.

29. **Benefits.** The benefits are taken to be those changes in the quantity, quality and reduction in internal inefficiency of education produced over the period as a result of SSDP. Benefits come from three sources: (i) increased number of basic and secondary education completers who earn higher wages (relative to non-completers),⁷ (ii) increased quality of education resulting in higher wage-premium for all basic education completers; and, (iii) decreased wastage of public and private resources as a result of reduced dropouts and repetitions. SSDP will enhance internal efficiency that will result into low “wastage,” i.e., fewer school dropouts and repeaters, and lower unit costs. Recently, internal efficiency has been improved by lowering repetition rates, and improved survival rates and completion rates, and SSDP intervention is expected to contribute further in this area.

Table 9: Underlying Assumptions to Estimate Additional Benefits and Additional Costs

Area	Approach	With SSDP	Without SSDP
A. Physical Projection			
1. Total enrollment projection	Projected based on assumed Grade 1 enrollment and promotion (p), repetition (r) and dropout rate (d) for all grades.	Improvement in promotion (p), repetition (r) and dropout rate (d) rates assumed. With the introduction of letter grades, the promotion rate at grade 10 is expected to increase substantially.	No change in rates from 2015/2016 level.
2. Additional public enrollment	Share of community school enrollment used to estimate public enrollment.	Improvement in quality due to SSDP will contribute to maintain current public enrollment share.	Public share decreases by 1% annually.
3. Additional completers	Completers estimated based on constructed cohort prepared using the projected promotion, repetition and dropout rates.	Increased number of completers because of improved promotion (p), repetition (r), and dropout (d) rates.	Increased number of completers with existing promotion (p), repetition (r), and dropout (d) rates.
4. Efficiency gains	Internal efficiency estimated using constructed cohort method.		No improvement in internal efficiency.
B. Benefits			
5. Quantity benefits for additional completers	2015/2016 wage rate estimated based on 2010/2011 wage taking account of actual inflation	Additional completers multiplied by wage level.	Additional completers multiplied by wage level.

⁷ Para. 30.

Area	Approach	With SSDP	Without SSDP
	and 2% wage premium every year.		
6. Quality benefits for all completers	Increased wage by certain percentage because of improved quality of education among completers.	It is assumed that to have full increase in wage rate due increase in quality it takes 8 years for basic education and 4 years for secondary education.	Quality premium not available.
7. Efficiency benefits for all completers	Saving of public resources	It takes 5 years to have full efficiency gains for basic and 4 years for secondary education.	Resources not saved to each completers.
C. Costs			
8. Increased public investment	Both SSDP and SSRP costs are estimated in constant price.	SSDP costs are the program costs. Only recurrent costs are used from 2020/2021.	SSRP trend cost is based on 2015/2016 estimated school sector budget.
9. Private investment for additional enrollment	Household costs for the increased enrollment. Per capita household expenditure is calculated using NLSS 2010/2011 figures.		
10. Opportunity costs for additional enrolled	Household wage lost due to attendance in school. Per capita opportunity cost for attending school is assumed to be half the wages of what people with less than basic and secondary education have been receiving based on NLSS 2010/2011 data.		

NLSS = Nepal Living Standards Survey, SSDP = School Sector Development Plan, SSRP = School Sector Reform Program.

30. **Projection of public enrollment and completers.** Underlying the analysis is the projection of 5-year olds cohort population, gross-intake ratio into grade 1 and repetition and dropout rates (and thus promotion/completion) for each of basic education (grades 1–8) and secondary education (grades 9–12). Under SSDP, dropout and repetition rates are estimated to decline faster than if there was no SSDP. This allows calculation of student-flow numbers with SSDP and without SSDP, and thus the difference between two cases is the impact of the new program on the completers, repeaters and dropouts.⁸

31. **Estimation of Quantity Benefits.** The additional number of basic education and secondary completers will earn the wage-premium (wage levels for completers and non-completers is estimated for FY2016 from NLSS 2010/2011 and then assumed constant for future years). Wages include (i) both agricultural and non-agricultural wages based on NLSS 2010/2011, and (ii) wage rate (including in-kind) received on daily, long term and contract/piece rate. Incomes from the enterprises are not included.

32. **Estimation of Quality Benefits.** Quality premium (due to increase skills and relevance through SSDP), however, applies to all basic education and secondary education completers—we assume a conservative 5.5% of the wage level of the basic education and 5.5% of wage

⁸ The projected public school enrollments and completers (Table 15).

level for secondary completer for this.⁹ The benefit stream accruing from life-time earnings for the five-cohorts is assumed to continue for 20 years (even though typical basic education completer will earn beyond 20 years, “discounting” will make the values insignificant beyond this time). The estimated quality premium obtained by comparing the increased wage of graduates from urban public schools compared to wage earned by graduates from rural public schools was 44% for basic and 34% for secondary in 2010/2011. This provides basis for carrying out sensitive analysis.

33. **Estimation of Benefits from Internal Efficiency Gains.** And finally, the impact of improved internal efficiency will reduce the “number of student years” to complete the basic and secondary education cycle per each completer. Student-cohort analysis indicates that SSDP will save 0.65 student-years per completer for basic and 1.34 student-years per completer for secondary education and savings apply to both program/public unit costs as well as private household expenditure and opportunity costs. It is assumed that it takes 5 years to have full efficiency gain for basic education and 4 years for secondary education. Information on public unit cost, number of completers and number of years saved to complete the level was used to obtain this figure.

34. **Non-quantifiable benefits.** Other non-quantifiable expected positive externalities includes greater social cohesion by increase in civic awareness/consciousness among the population, rise in the size of a skilled/highly educated labor force and better health status of children from an educated mother.

35. **SSDP Costs.** Costs include additional program costs (from the Government of Nepal and Development Partners sources) and private costs that comprise of direct household outlays as well as opportunity costs. Additional program investment is derived from the difference between the ongoing program spending and the proposed SSDP estimates.

36. **Increased public investment.** Both SSDP and SSRP costs are estimated in constant price. SSDP costs are the program costs and only recurrent costs are used from 2020/2021. SSRP trend cost is based on 2015/2016 estimated school sector budget. The incremental recurrent costs incurred by the proposed SSDP after the completion of the FY2016–FY2021 program are planned to be absorbed by the public expenditure.

37. **Private investment for additional enrollment.** Household costs for the increased enrollment is considered. The per capita household expenditure in education (spent on tuition and related fees, uniform, textbook, transportation and private tuition for currently enrolled student) is calculated using NLSS 2010/2011 figures.

38. **Opportunity costs for additional enrolled.** This denotes household wage lost due to attendance in school. The opportunity cost for attending school is assumed to be half the wages

⁹ The quality premium measures the contribution of improvement in education quality to the increase in wage rates among the people with the same level (but different quality) of education. Note that wage premium is attributed partly to quality premium. We assume that controlling for student's individual and household characteristics, the premium for having attended urban public school in comparison with rural public school, provides us with a measure of quality premium. The co-efficient in the regression was 34% for secondary and 44% for basic. But 5.5% (around 14.0% of the premium) can be attributed to increased quality when all else is held constant. This scale of quality premium is comparable with that used in the World Bank (2009) economic analysis for Nepal's School Sector Reform Program, in which 5% of the average annual earnings of those with basic education was taken to be a measure of the “education quality premium”.

of what people with less than basic education have been receiving based on NLSS 2010/2011 data.¹⁰

39. **Cost and Benefit Analysis.** Both costs and benefits are valued in domestic price numeracies and in 2015/16 constant prices. Economic prices of investment costs and recurrent costs are estimated by converting the financial prices with a shadow exchange rate factor of 1.07 for traded goods and 1.0 for non-traded goods, as well as a shadow wage rate factor of 1.0 for skilled labor and 0.65 for unskilled labor.¹¹ Based on a discount rate of 12% for the benefit and cost streams described above, the present discounted value of benefits for the base-case scenario is estimated to be \$2,830 million while the present discounted value of costs is estimated to be \$2,447 million, and therefore the net present value of program benefits is \$383 million (Table 10). The economic analysis resulted in a sound EIRR of 15.85% for the program (12.63% for basic education and 23.91% for secondary education).

Table 10: Internal Rate of Return Estimates (NRs million)

Year	Costs			Benefits			Net benefit	PV at 12%	
	Additional public investment	Private and opportunity costs	Total	Quantity	Quality	Internal efficiency			
1	14,086	4,742	18,828	0	0	1,445	1,445	(17,383)	(17,383)
2	29,841	7,654	37,495	782	735	3,892	5,410	(32,085)	(28,647)
3	34,025	9,875	43,900	2,918	3,083	6,434	12,436	(31,464)	(25,083)
4	39,029	13,766	52,795	5,913	7,202	9,414	22,528	(30,267)	(21,543)
5	51,796	18,494	70,290	9,963	13,208	11,184	34,355	(35,936)	(22,838)
6	18,404	0	18,404	15,284	19,292	11,184	45,760	27,355	15,522
7	18,404	0	18,404	15,284	21,630	11,184	48,098	29,693	15,043
8	18,404	0	18,404	15,284	23,968	11,184	50,435	32,031	14,489
9	18,404	0	18,404	15,284	26,306	11,184	52,773	34,369	13,881
10	18,404	0	18,404	15,284	26,306	11,184	52,773	34,369	12,394
11–25	276,067	0	276,067	229,257	394,583	167,756	791,595	515,528	84,411
						NPV =	40246	EIRR =	15.85%

EIRR = economic internal rate of return, NPV = net present value, PV = present value.

Source: ADB staff estimates.

40. The key source for school sector education benefits was earnings improved education quality (59% for basic and 48% for secondary education). A sensitivity analysis revealed that on the benefit side, except for the wage level effect, wage premium resulting from quality of education affects the return on investment more than other variables (Table 11), implying that elevating the overall education quality of the workforce would bring a higher return on investment.

Table 11: Sensitivity Analysis

Scenario	Sensitivity Parameter	Variation	EIRR	NPV (NRs million)	Switching value
1	Base case		15.85%	40246	
2	Additional completers	-15%	14.64%	27329	-46.70%
3	Quality premium (external efficiency)	-15%	13.98%	20131	-30.00%
4	Internal efficiency	-15%	14.73%	28704	-52.30%
5	Wage level	-15%	12.98%	9700	-19.75%

¹⁰ Not all out-of-school children would be working and earning the wages. Estimates suggest only 25% of 10–16 year old out of school children would be working for wages. Thus 50% is a reasonable conservative estimate.

¹¹ Conversion factors for the shadow exchange rate factor and shadow wage rate factor are based on recently approved ADB-financed project in Nepal: ADB. 2015. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to Nepal for Additional Financing of Kathmandu Valley Water Supply Improvement Project*. Manila.

Scenario	Sensitivity Parameter	Variation	EIRR	NPV (NRs million)	Switching value
6	Public investment	+15%	12.70%	7859	+18.65%
7	Both external and internal efficiency	-15%	12.84%	8589	-19.05%
8	Both efficiencies and additional completers reduced	-15%	11.57%	(4328)	-13.53%
9	Both efficiencies and wage level reduced	-15%	10.03%	(18939)	-10.04%
10	Both efficiencies reduced and public investment increased	-15% +15%	9.83%	(23798)	-9.43% +9.43%

EIRR = economic internal rate of return, NPV = net present value.

Source: ADB staff estimates.

41. **Sensitivity Analysis.** In sensitivity analysis, we consider other scenarios by taking into account mainly the downside risks, including the decrease in market-determined wage rate, the decrease in the quantity of additional completers, the decrease in internal efficiency and the increase in public investment costs. Hereby we exclude the consideration on the scenario of delay in program implementation, given that the Supporting School Sector Development Plan (SSSDP) is a result-based lending program and part of the SSDP framework, which relies on the government's budget allocation and execution process that are pre-determined for the program implementation. We attach the combination of these downside risks to the change of efficiency factors to examine their joint effects. The results suggest that SSDP program is expected to be a sound "investment" in the majority of scenarios (Table 11). The results also show that the most sensitive factors are the public investment costs, as well as the combination of quality premium and internal efficiency. These in turn demonstrate the importance of SSSDP interventions to improve governance and budget planning, allocation and execution efficiency, as well as to enhance quality and improve the transition rate from lower graders to higher graders and from basic level to secondary level education. In addition, the results are conservative lower-bound estimates, given that we have not yet accounted for the externality benefits arising from healthier, more educated citizens and more equitable/inclusive society that may result from the interventions.

Table 12: Recent trends in GDP Growth and Parameters Used in Resource Envelope

	2009/ 2010	2010/ 2011	2011/ 2012	2012/ 2013	2013/ 2014	2014/ 2015 ^r	2015/ 2016 ^e
1. GDP growth in constant prices (%)	...	3.8	4.6	3.8	5.1	2.32	0.77
2. Inflation (%)	...	9.6	8.3	9.9	9.1	7.2	9.7
3. GDP growth in current prices (%)	...	13.4	12.9	13.7	14.2	9.52	10.5
4. Share of Government Education Expenditure in GDP (%)	3.87	4.02	4.06	3.69	4.02	3.8	3.9
5. Share of school sector in GDP (%)	80.4	80.4	80.3

... = not available, GDP = gross domestic product.

Note: r=revised estimate, e=estimate.

Source: MOE estimates.

Table 13: Government Allocation to Education

NRs billion	2013/2014 actual	2013/2014 actual	2014/2015 actual	2015/2016 revised	2016/2017 estimate
1	National budget	439	531	701	1,049
2	Education budget	77.8	79.8	88.0	116.4
	Percentage in national budget	17.7	15.0	12.5	11.1

Note: Actual means based on Ministry of Finance final figures (not audited), revised means (nearly final figures based on 9 months of actual expenditures) and estimate means announced figures.

Source: Government of Nepal, Ministry of Finance. *Estimates of Expenditure: Redbook 2016/2017*. Kathmandu.

Table 14: School Sector Estimates

NRs billion	2013/2014 actual	2014/2015 actual	2015/2016 revised	2016/2017 estimate
Education budget (billion)	77.8	79.8	88.0	116.4
SSDP budget (excluding pension)	62.6	64.2	70.7	93.0
Percentage of education budget	80.4	80.4	80.3	80.0
Teachers salary (excluding pension)	39.2	43.7	43.7	59.6
Share of teacher salary	62.6	68.0	61.8	64.0

SSDP = School Sector Development Plan.

Source: Government of Nepal, Ministry of Finance. *Estimates of Expenditure: Redbook 2016/2017*. Kathmandu.

Table 15: Projected Public School Enrollments and Completers

	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021
Public Enrollment Share without SSDP						
<i>Basic (1–8)</i>	84%	84%	83%	82%	81%	80%
<i>Secondary (9–12)</i>	78%	77%	76%	75%	75%	74%
All Public Enrollment without SSDP						
<i>Basic (1–8)</i>	5,173,054	5,217,510	5,281,190	5,340,390	5,354,276	5,377,625
<i>Secondary (9–12)</i>	1,077,891	1,274,052	1,306,883	1,308,178	1,374,323	1,432,274
Additional Public Enrollment with SSDP						
<i>Basic (1–8)</i>	...	51,845	104,363	160,951	220,150	286,465
<i>Secondary (9–12)</i>	...	36,972	49,411	50,699	72,770	102,374
Additional Public Completers with SSDP						
<i>Basic (1–8)</i>	...	7,063	14,807	27,041	37,280	50,102
<i>Secondary (9–12)</i>	...	7,819	29,848	29,958	39,161	49,305
<i>Basic (cumulative)</i>	...	7,063	21,870	48,911	86,191	136,293
<i>Secondary (cumulative)</i>	...	7,819	37,667	67,625	106,786	156,091
All Public Completers with SSDP						
<i>Basic (1–8)</i>	463,041	445,841	455,064	508,124	511,647	523,895
<i>Secondary (9–12)</i>	53,975	127,639	153,461	154,111	170,288	180,077
<i>Basic (cumulative)</i>	...	445,841	900,905	1,409,029	1,920,676	2,444,571
<i>Secondary (cumulative)</i>	...	127,639	281,099	435,211	605,498	785,575

... = not available, SSDP = School Sector Development Plan.

Sources: Government of Nepal, Department of Education. *Flash Report I, 2014/2015*. Kathmandu; ADB staff estimates.