RMSA TECHNICAL COOPERATION AGENCY

SECONDARY EDUCATION IN INDIA?

IDENTIFYING CHALLENGES AND ASSESSING FEASIBLE GROWTH RATES

JANUARY, 2015

The RMSA Technical Cooperation Agency is funded by the UK Department of International Development (DFID)

UKaid
from the British people

Report Distribution and Revision Sheet

Project Name: RMSA Technical Cooperation Agency
Report Number: RMSATCA
Report Title: Are RMSA targets realistic? Identifying challenges and assessing feasible growth rates

Revision	Date	Originators	Checker	Approver
0.1	January 2015	Gaurav Siddhu Shashiranjan Jha	Dr. Keith Lewin	Dr. Jayshree Oza

Note on Documentary Series

A series of documents has been produced by RMSA Technical Cooperation Agency for the Government of India's programme to make good quality secondary education available, accessible and affordable to all young persons in the age group of 14-18 years.

The documentary series is arranged as follows:

RMSATCA 0	Programme Management Reports and Documents
RMSATCA 1	National Achievement Survey (Reports and Documents for Thematic Area 1)
RMSATCA 2	Teacher Management and Development (Reports and Documents for Thematic Area 2)
RMSATCA 3	School Standards, Evaluation and Development (Reports and Documents for Thematic Area 3)
RMSATCA 4	Data Management and Use (Reports and Documents for Thematic Area 4)
RMSATCA 5	Results Focused Planning (Reports and Documents for Thematic Area 5)
RMSATCA 6	Communications and Knowledge Management (Reports and Documents for Thematic Area 6)

Disclaimer

List of Acronyms

Acronym	Details
BRIC	Brazil, Russia, India, China
EPSM	Enhanced Projection and Simulation Model
GDP	Gross Domestic Product
GER	Gross Enrolment Rate
GMR	Global Monitoring Reporting
M1	Projection Model 1- Baseline Model
M2	Projection Model 2- RMSA Target Feasibility Model
M3	Projection Mode 3- Feasible Growth Model
NER	Net Enrolment Rate
NSS	National Sample Survey
OBC	Other Backward Caste
OECD	Organization for Economic Cooperation and Development
PCR	Pupil Classroom Ratio
PTR	Pupil Teacher Ratio
RMSA	Rashtriya Madhyamik Shiksha Abhiyan
SC	Scheduled Caste
SGDP	State Gross Domestic Product
ST	Scheduled Tribe
TCA	Technical Cooperation Agency
UDISE	Unified District Information System for Education

Table of Contents

Tables and Figures

Executive Summary

Rashtriya Madhyamik Shiksha Abhiyan (RMSA) is a programme of the Government of India to universalise access to secondary education and ensure that all children complete grade 10. The target for universal access to grade 9 is 2017, while the target for universal completion of grade 10 is 2020. These dates are fast approaching, with most states currently off track to achieve the goals. This analytic report asks three questions:

- Can the enrolment target be achieved in the time available?
- If not, what are the constraints on growth?
- How can growth be accelerated in ways that are equitable, demographically possible, administratively feasible, and financially sustainable?

A simulation model has been developed to project enrolments and costs into the future using an enhanced version of software originally developed during the planning phase of RMSA. This has been populated with the most recent possible data from three states, Assam, Bihar and Odisha, to generate insights into the three research questions above.

The results are specific to each state, taking into account the different contexts, and are reported as individual case studies below. However the analysis does provide some insights that have general application to several states. For example:

1. The flow of students to grade 8 acts as a constraint on the expansion of secondary schooling, as large proportions of students drop out of school before competing elementary or even primary school. Grade 9 participation cannot expand faster than the number of grade 8 completers allows. Therefore a GER of 100% will not be achieved in those states which do not have near-universal levels of grade 8 completion.
2. Demographic transition means that the number of six-year-olds is already declining in all case study states and the number of 14-year-olds will therefore start to decline before 2020 almost everywhere. This will make it easier to achieve high enrolment rates in the medium term. However there is a risk that planning to meet peak demand (before the number of 14-year-olds starts to fall) will result in overcapacity in the long run.
3. If the current norms and standards for school establishment and location are followed they are likely to result in an increase in the number of small schools with enrolments of less than 160 in grade 9 and 1O. These schools will be expensive to operate and may not be effective in enhancing school achievement. It is already the case that 50% of all secondary schools in some states have fewer than 100 students. Their cost per student in these schools may be as much as four times greater than for schools with more than 300 students. School mapping is essential to identify the inter-relationships between school size, operating costs, transport costs, safety and security, and access to schools excluded groups.
4. Many schools currently do not have a full complement of trained teachers in all of the four main subject areas of the curriculum. Pupil-teacher ratios are unacceptably high and can be double the current RMSA norm of 40:1 in some states, while in others pupil teacher ratios are so low and may fall below 10:1 in some schools representing a great inefficiency in the use of resources. The number of contract teachers has been increased in some states to meet shortages and some temporary recruitment can help meet peak demand without creating excess capacity once the numbers of school-aged children falls. However, contract teachers with little or no training and no career pathway which provides incentives for increased professional

capability is not a long-term solution to the need for qualified teachers. All high performing countries in international assessments have graduate level qualified teachers at secondary level in all core subjects.

5. A larger number of classrooms and other facilities are needed in existing secondary schools to increase capacity, and new schools need to be strategically located and built in under-served areas. A substantial amount or rehabilitation is also needed of existing facilities that fall short of RMSA standards. Planning improved and expanded infrastructure must take account of demographic transition towards a period of falling numbers of school age children in the population, and patterns of urban migration which are rapidly increasing the numbers of school age children in urban and peri-urban areas. Double shifting schools and the use of temporary structures may be considered to accommodate temporary increases to demand along with investment in durable infrastructure to meet long term demand at both secondary and higher secondary school.
6. The enrolment challenge is concentrated on needs to include those children who are currently excluded from secondary school who can be more than half of all children in low enrolment districts. Scheduled Tribe and Scheduled Caste children enrol in secondary school at half (or less) of the rate of their more privileged peers. Poverty is a major factor, with fewer than 15% of the poorest children being enrolled in secondary school. In some states girls are particularly disadvantaged in terms of access to secondary school whereas in others the participation rates are similar for boys and girls. In some states this conceals the fact that there may be 20% fewer girls in the school age population as a result as a result of selective abortion and infanticide. Higher participation rates can only be achieved with an understanding that the distance to travel to reach universal access and completion is much greater for SCs and STs and, in some states but not others, for girls than simple average enrolment rates may suggest. For the most excluded groups enrolment rates in secondary will have to triple of more to reach these levels.
7. Successful measures to extend secondary school enrolment to groups currently out of school will mean including children with different needs and capabilities than those currently proceeding through secondary education. Children from lower socio-economic backgrounds may benefit from different options in terms of curriculum. If levels of achievement are not to fall and relevance is to be maintained then curriculum reform and better quality pedagogy will be needed in order to ensure that new groups of students are able to learn well and, progress normally and pass summative of examinations with appropriate national standards. Otherwise expanded access will be reflected in rapidly deteriorating performance in Board examinations in grade 10 designed for academically selected children.
8. The costs to households of secondary schooling remain substantial. Without pro-poor subsidies that make expenditure on schooling close to zero for the poorest children from the lowest quintiles of household income, many will remain excluded from secondary education. Pro-poor bursaries, fee waivers, and cash transfers must be considered and costed into plans for sustainable financing and should be directed towards improvements in the fee free public system rather than as subsidies for private for profit providers. No children from households at or below the poverty line should have to pay direct and indirect costs for access secondary school. Nor should they have to borrow at high interest rates to support costs associated with secondary schooling.
9. Universal participation in grades 9 and 10 have to be financed for not much more than 1.25% of State gross domestic product. This is more than current levels of allocation in many low

enrolment states and less than that in some states with very low pupil teacher ratios that spend unusually large proportions of their SGDP on education. Estimates suggest that overall India invests about 4% of national GDP in public education and this creates upper limits for the sustainable financing of secondary that are unlikely to be much more than 1% of GDP.

10. The rates of growth needed in enrolments and finance to meeting current timelines for enrolment targets for RMSA requires rapid growth in grade 9 enrolments, classroom capacity and teacher employment. Where this rate of increase is in excess of 10% annually it is unlikely to be possible to sustain this for more than two or three years. Sustainable growth will require cost saving reforms the nature of which will depend on the current levels of internal efficiency and effectiveness within particular states. Effective secondary schools will need to be organised at costs of less than twice as much as those at elementary level to sustain universal enrolment.

1. Introduction

India's progress in improving access to secondary education has fallen behind the expectations of the 11th Five Year Plan, which launched Rashtriya Madhyamik Shiksha Abhiyan (RMSA). Gross enrolment rates in India have only reached around 71% and have remained substantially lower than in East Asia (90%) and Latin America (103%), (Global Monitoring Report 2012)[1]. China in particular has near universal levels of enrolment in lower secondary schools and a majority completing upper secondary in all but the least developed parts of the country. Most OECD countries have had universal access to secondary schooling for over 50 years but India is only now making the transition towards mass access to education through grade 10.

Currently no more than 60% of all Indian children complete secondary school and net enrolment rates are little more than 40% suggesting that a large proportion of children of secondary school age are not enrolled at this level or at the appropriate age as they should be. Around half of those completing secondary school fail to acquire Board qualifications, indicating failure to achieve the required learning outcomes as defined by the national curriculum. In the Northern states, which have high populations and low enrolment and completion rates in elementary school, less than half of all children transition to secondary school. Those from scheduled tribes and castes and from other educationally marginalised groups are especially disadvantaged. Girls' enrolments lag behind those of boys in some states, but not in others.

RMSA is an initiative of the Government of India which seeks to partner with States to increase capacity in grades 9 and 10 through shared financing of new school construction, upgradation of existing schools, and contributions to recurrent costs. Secondary schooling remains a State responsibility and the bulk of secondary school costs continue to be paid from state budgets. RMSA should catalyse the provision of more capacity, the development of model secondary schools and address key issues related to school size location and performance. Thus RMSA seeks to expand opportunities to those currently excluded and support quality improvement so that all young people in the age group 14-16 years (grades 9 and 10) are enrolled. The target is to universalise entry into secondary school by the end of 2017 and achieve universal completion by 20202. Achievement of this goal would increase international competitiveness and lessen the gap between India and other BRIC countries in which universal access has already been a reality for around two decades. It would also contribute to social justice and the extension of the Right to Education to the age of 16 in line with almost all middle income countries. The challenge for RMSA is to identify ways to accelerate progress that are financially sustainable, demographically realistic, democratically accessible, and which lead to expanded capabilities through higher educational attainment.

This report uses an enrolment-driven projection, Enhanced Projection and Simulation Model (EPSM), model built from 25 interlinked spreadsheets which simulate key system parameters to profile enrolments, participation, teacher demand, school construction and costs over a ten year period for three states: Assam, Bihar and Odisha. The model is iterated to reflect different possible patterns of educational reform and to assess the feasibility and implications of the RMSA goals. The analysis reveals that for the three states chosen for illustrative case studies enrolment rate targets are unachievable within the anticipated time frame of the 12th Plan and that demographic and cost

[1] Some increase will have taken place since 2012 but further growth is increasingly constrained by dropout before grade 8. The secondary completion rate cannot be higher than the grade 8 completion rate.

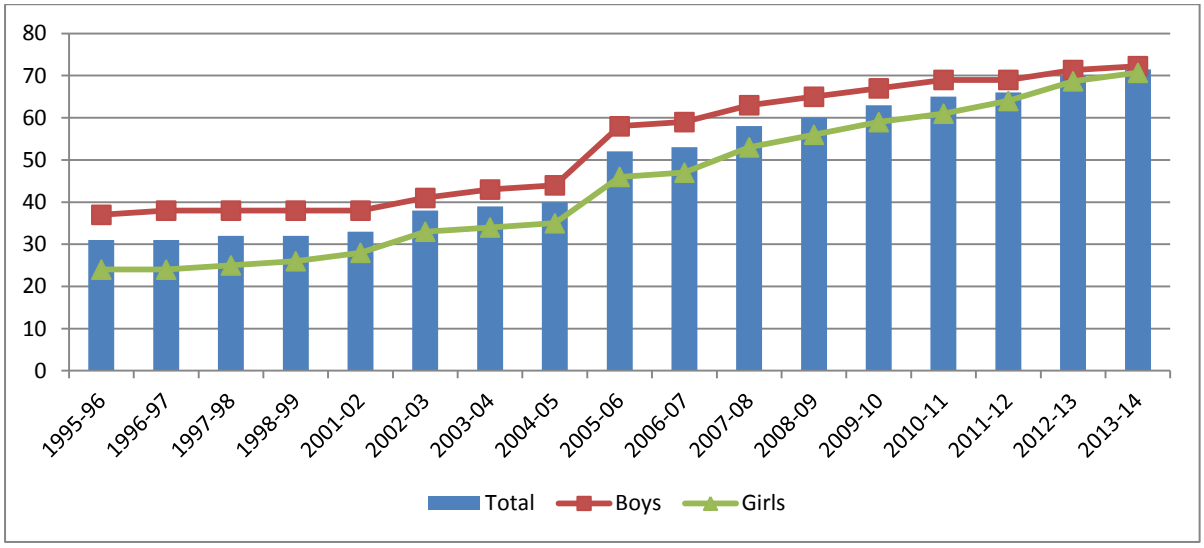
[2] http://mhrd.gov.in/rmsa

factors will constrain growth. Indications are provided of options to maximise progress towards higher participation rates with gains in efficiency, effectiveness and equity.

1.1. Context

India's progress in expanding access to secondary schooling has been substantial. Figure 1**Error! Reference source not found.** shows the increasing gross enrolment ratio (GER) over time for boys and girls. Despite progress in participation of girls in secondary education their participation remains marginally lower than that of boys in most states, although the gap in GER between boys and girls has declined. The GER for boys has increased from 37% in 1995-96 to 72% in 2013-14. In the same period the gross enrolment rate of girls increased from 24% to around 70%, increasing gender parity from 0.7 in 1995-96 to 0.9 in 2013-14. Further progress towards gender parity is constrained by imbalances in the sex ratio in the population of children; in some states there are as many as 20% more boys than girls in the relevant age group. This is concealed by gross enrolment rates which measure participation within each group.

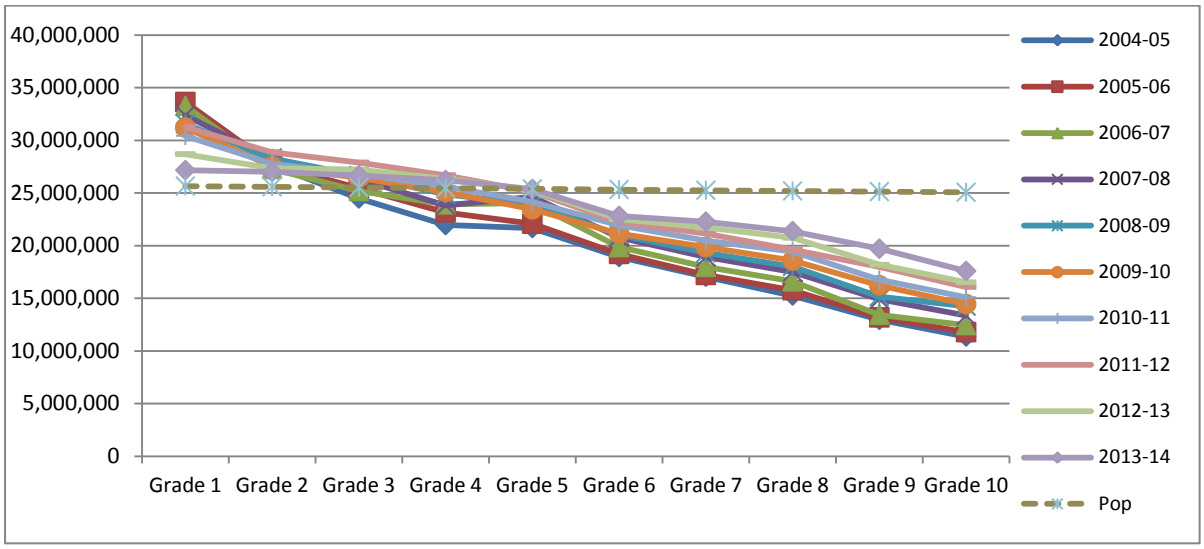
Figure 1: Growth in secondary gross enrolment ratio by gender



Source: Selected Education Statistics various years

Patterns of enrolment over time across India from primary grade 1 are shown in Figure 2. As many as 27 million children are enrolled in grade 1, including many over-aged and some under-aged children. By grade 5 the total number enrolled is similar to the number of 10 years olds in the population (indicated by the green dotted line). From grade 6 upwards, there are fewer children enrolled than there are in the relevant age group, and by grade 9, after the transition to secondary school, enrolments have fallen to about 21 million. Over the period from 1995 to 2013 enrolments have grown at every grade level. However, the rate of dropout, which is related to the slope of the graph, has fallen, but not enough.

Figure 2: Enrolment by grade 2004-2013- All India



Note: 'Pop' is age-grade specific population for the year 2011

Figure 1 and figure 2 are highly aggregated and patterns differ greatly between states, districts and blocks and social groups (i.e. Scheduled Castes (SC), Scheduled Tribes (ST), Other Backward Castes (OBC), those with disability, etc.). They are also blind to important sources of inequality. Thus only 11% of children in the lowest quintile of household expenditure are likely to reach secondary school whilst almost all of those in the richest quintile complete grade 10. The average number of years of schooling received by all children varies by more than 2:1 between states. Children who are two or more years over-age make up more than 20% of all poor children and over 30% of children enrolled in grade 5, and across India only 28% of 14 year old children are in the correct grade for their age. Being over age greatly affects access to secondary school. Boys entering school at the age of 10 had one eighth of the chance of attending secondary schools of those entering at the age of 6, and over age girls only one sixteenth the chance (*Source: TCA Analysis using NSS 64th round*).

2. Projection and Modelling Methods

The next section outlines the projection methods and the data used to populate the model to test the feasibility of different scenarios for growth. The set of assumptions made to profile student flows, participation rates and key cost parameters are illustrated over the projection period.

2.1 An Overview of the Projection Model

Projections of different pathways to meet national and state targets for expanded access to secondary education (grades 9 and 10) have been developed. The state education system has been modelled from national school and population census data to generate enrolment projections through to 2025 from which key dates for targets can be extracted (2017, 2020 and 2022). Secondary education expansion is linked to progress made in increasing completion rates at the elementary school level. However, all-India data shows clearly that working within this limitation states vary widely in their level of participation in secondary schooling and there is no simple correlation between primary and secondary enrolment rates. For this reason the expansion of secondary enrolments is treated as a policy variable.

The changing output of the primary school system is therefore taken into account but is complemented by other policy-driven changes in internal efficiency and admission. Growth in secondary places will not simply expand to absorb a particular proportion of those who complete grade 8 since entry into grade 9 is a function of many things including secondary school admissions policies, availability of local secondary schools of suitable quality, the affordability of participation, especially for low wealth quintile households, and willingness to attend secondary school.

A range of parameters are used to populate the model. They include demographic data on single age cohorts, intake rates to grade 1, promotion, repetition and dropout rates by grade, pupil-teacher ratios, pupil-classroom ratios, and teacher-classroom ratios, data from reconstructed cohorts, completion rates, and transition rates. Costs are estimated using illustrative data for classrooms and schools, specialised facilities, teachers' salaries, non-teaching staff costs, learning materials, maintenance, and other costs. State allocations to education are compared to the amounts needed to support various possible patterns of enrolment growth.

The approach adopted in the modelling identifies different possible rates of growth for secondary schooling and links these to the demand for additional teachers, extra classroom provision and many other incremental demands. Special programmes to support enhanced enrolment can be included in the modelling e.g. pro-poor bursaries, fee waivers, subsidies for girls' accommodation, free uniforms and books. The modelling can be used to track growing recurrent and development costs if the unit costs of all the different inputs to the school system can be established.

2.2 Projection Technique

Step 1: Single age population data was obtained for each of the study states from the 2011 national census. A forward shifting method was then applied to project the population for the projection period for each year in the future. Age specific death rates were applied before using the estimated population of 6-year-olds to project new entrants into the schooling system. Age specific death rates were assumed to remain constant during the projection period.

Step 2: UDISE data for 2012 and 2013 for elementary and secondary levels were used to calculate internal efficiency measures (promotion, repetition, dropout and survival rates) for the case study states. These internal efficiency measures were then introduced into the model and, along with the

projected population, to project enrolment at the secondary level. GERs for the secondary level were calculated using projected enrolment and projected population numbers for 14 and 15 year-olds.

Step 3: For projection models 2 and 3 (discussed in the next sub-section) internal efficiency measures are manipulated at 5 year intervals to achieve the desired result for each model (Annex 1, 2 and 3). In some low enrolment states transition rates to secondary level remain low. In these cases there may be scope for secondary expansion in advance of removing any constraint arising from the numbers of children graduating from grade 8. In others the survival rate to grade 8 will have to increase before ambitious targets to universalise access to secondary education can be achieved.

Step 4: In the case of projection model 3, the number of successful grade 8 graduates places an upper limit on the numbers that can be admitted into secondary schooling. It would be contradictory to try to expand grade 9 places faster than the numbers of those able and willing to attend secondary and in any case, it would not be sustainable. .

Step 5: In order to estimate requirements for teachers and classrooms, pupil-teacher ratios (PTRs) and pupil-classroom ratios (PCRs) were calculated for the reference year. These were then converged to the RMSA norm standards of 30:1 for PTR and 40:1 for PCR using two different pathways. Pathway 1 required an immediate convergence to norms and pathway 2 required a gradual convergence. Resource implications of the two pathways are then compared to assess the feasibility of each approach.

Step 6: Cost parameters such as salaries of teaching and non-teaching staff, construction, maintenance, training and other relevant costs were then applied to estimate budgetary implications of expansion. Additional cost measures, such as scholarship for children from marginalised groups, were introduced in cases where resource rationalisation brought down the necessary share for secondary education in the state gross domestic product (SGDP).

Step 7: The final step involved analysing implications of current secondary education expansion policies by projecting teaching and classroom capacity utilisation. In order to do this, all government schools were grouped into 11 different enrolment categories and an average enrolment for each category was calculated. It was assumed that, unless the expansion policies changed, the distribution of schools by size and their average enrolment would remain constant during the projection period. This was used to estimate the number of schools in each enrolment category during the projection period. In order to study the implications of resourcing norms, each school was then equipped with teachers and classrooms in compliance with RMSA norms. Total teachers and classrooms were multiplied by 30 and 40, respectively, to estimate maximum capacity of the government schooling system. This was then plotted against demand for government schooling and the population of secondary school-aged children.

2.3 Description of Models

The Technical Cooperation Agency (TCA) EPSM uses data from UDISE, from reconstructed cohorts and from state-level statistics to generate a baseline model populated with the most recent data on enrolments, teachers, schools, classrooms and costs. The baseline model (M1) is validated using various tests of internal consistency and external validity with key parameters derived from other sources. It represents what will happen if the education system continues to evolve with the same flow characteristics of intakes rates, repetition, promotion and dropout rates as is currently the case.

The second model (M2) raises the participation rates in grades 9 and 10 to the target levels set by RMSA. This is achieved by increasing internal efficiency parameters and increasing the entry rate to grade 9 to whatever value is necessary to achieve the enrolment goals of GER 100% by 2020. This can result in the numbers needed in grade 9 growing faster than those completing grade 8. Where this is the case the target is beyond reach within the planned timeframe.

The third model (M3) is generated by modifying M2 to provide enhanced access and increased completion rates within boundaries that do not transgress any fundamental constraints on the rate of growth. These constraints include the numbers of grade 8 graduates, likely rates of procurement of new capacity and appointment of additional teachers, and plausible state budget allocations to secondary schools. Variant M3 can therefore indicate how long it will take to achieve the goals of RMSA and what resources are likely to be necessary.

The development of the projection models is driven by three key policy questions:

- Can the target levels of enrolment for RMSA be achieved in particular states in the time available?
- If not, what are the constraints on growth?
- How can growth be accelerated in ways that that are demographically possible, administratively feasible, and financially sustainable?

The analysis in the remainder of this paper presents the results of the enrolment projection models for three different case study states, Assam, Bihar and Odisha. It illustrates the likely evolution of state education systems as they attempt to meet enrolment targets, expand secondary schools at rates that do not exceed the numbers graduating from grade 8, and put in place sustainable financing.

The illustrative state case studies are presented below.

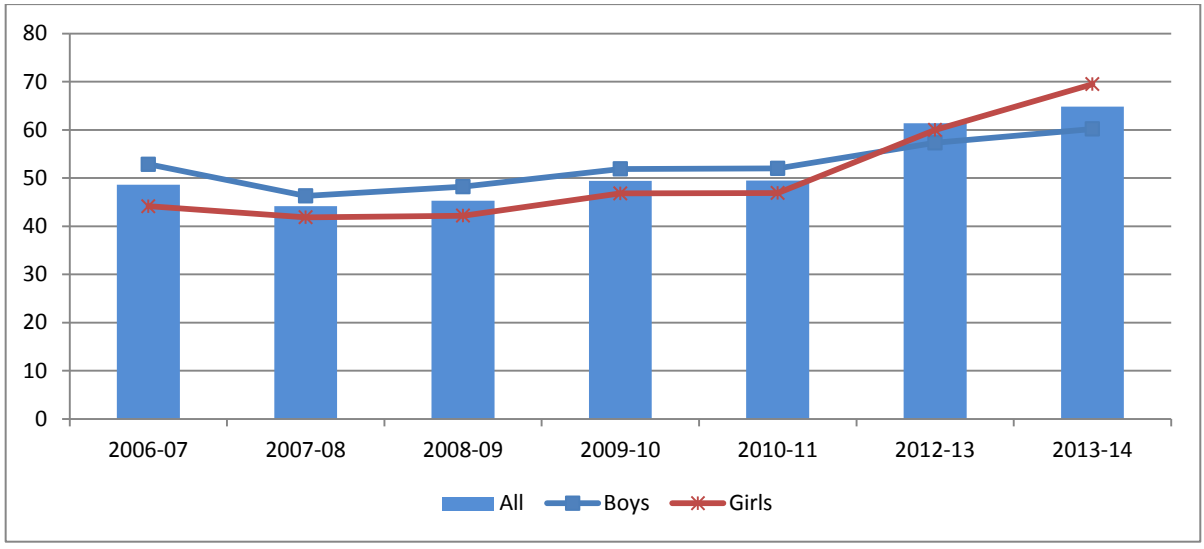
3. Case Study- Assam

3.1 Background

Over the last decade, there has been a consistent increase in participation in secondary education in Assam (Figure 3). Between 2006-07 and 2013-14 GER increased by 16 percentage points, however this growth rate is significantly below that needed to achieve the RMSA target of 100% completion by 2020. In 2013-14, the secondary level GER was 64% and NER was 31%, with girls having a higher GER than that of boys. The GER for girls and boys were 69% and 60% respectively. However GERs for SCs were 76% and 19% at lower and higher secondary levels with large differences in rates in favour of boys. For STs the GERs were around 51% and 15% at the different levels[3].

In Assam total enrolment at secondary level increased from 864,030 in 2012-13 to 911,780 in 2013-14, of which 517,500 were in grade 9 and 393,200 in grade 10. There were about 40 lakh children who were in grades 1-5 and 17 lakh in grades 6-7 in 2013-14. Of these about 587,900 were enrolled in grade 8. There were therefore about 70,000 (11%) more children enrolled in grade 8 than in grade 9; this margin represents the extent to which it is currently possible to expand participation in grade 9. In addition, grade 10 enrolments are about 24% less than grade 9, indicating considerable drop out. Measures to increase transition to grade 9 are necessary, but must also be accompanied by measures to reduce dropout before grade 10 in order to increase participation in secondary schooling in a sustainable way. Girls now out enrol boys by a significant margin in secondary schools in Assam and future interventions will have to address reasons why boys drop out.

Figure 3: Growth in Gross enrolment ratio by Gender



Source: Selected Education Statistics various years

In terms of the coverage of the system, there has also been an improvement in the number of secondary schools. In 2013-14 there were 7,120 schools offering secondary education, of which 57% were government schools. However, most government schools were relatively small with 62 percent having enrolments below 150. These small schools enrolled about 36% of students (Table 1). Non-government schools in Assam are also small or very small.

[3] Statistics for school education, 2010-11, MHRD

The allocation of resources to public secondary schools remains uneven and costs per student are high. The main reason is that, in 2013-14, the PTR in government schools stood at 18:1. This is much lower than the national RMSA norms of 30:1. Despite this low ratio only 9.2% of government schools had qualified teachers for all core subjects. Classroom provisioning is less generous, with 67:1 PCR in government schools (this ratio rises to 70:1 when non-functional classrooms are excluded). It is thus the case that there are about four teachers for every functional classroom suggesting that teaching groups are being combined together and teacher workloads correspondingly reduced.

Table 1: Distribution of government secondary schools by enrolment

	Up to 50	**51-100**	**101-150**	**151-200**	**201-250**	**251-300**	**301-350**	**351-400**	**401-450**	**451-500**	**>500**
Percentage of schools	11.3	30.3	20.7	14.9	10.0	5.8	3.5	1.4	1.0	0.4	0.7
Average enrolment	32.9	72.6	124.1	174.3	222.9	272.1	323.6	372.0	421.5	472.3	573.7
Share of enrolment	2.6	15.5	18.1	18.2	15.6	11.0	8.1	3.6	3.1	1.4	2.8

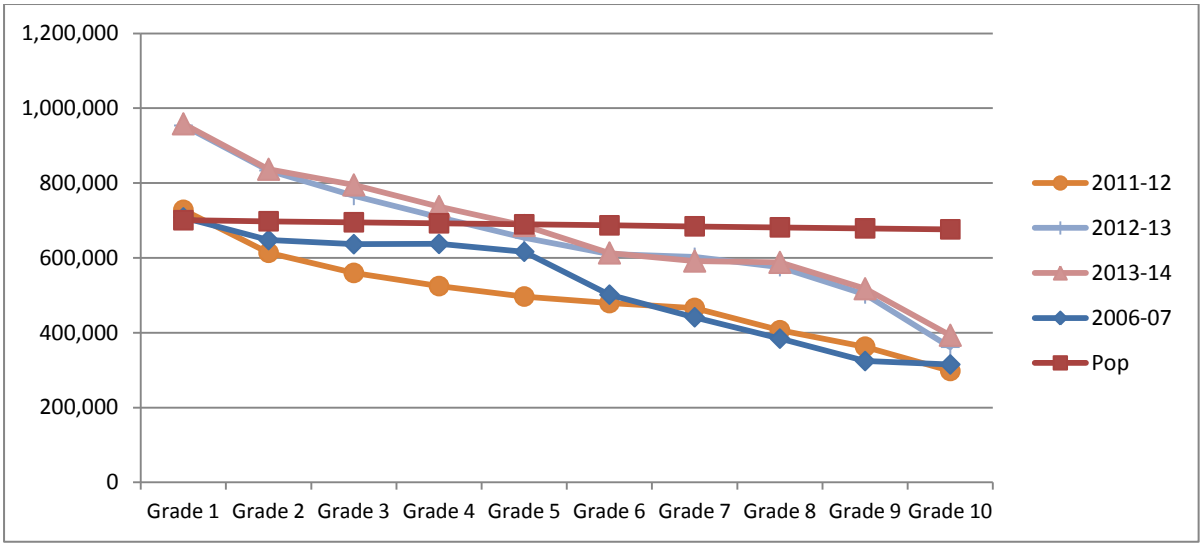
3.1.1 Efficiency

Achievement of GER targets depends on internal efficiency at the elementary as well as the secondary levels. A reconstructed cohort model was setup to calculate internal efficiency indicators using UDISE data on grade specific enrolment for two consecutive years (2012-13 & 2013-14) along with information on repeaters in 2013-14. These internal efficiency measures were then fed into the projection models.

In Assam repetition rates appear low in all except grades 9 and 10. Promotion and dropout rates are such that less than 70% reach grade 8 and less than 50% reach grade 10. There are high rates of drop out in grade 1 and grade 9 and a bottleneck in transition from grade 8 to grade 9. To achieve GERs in line with RMSA targets the flow of students will have to improve considerably and substantial efforts will be needed to enhance internal efficiency rates to increase the number of grade 8 leavers.

More specifically, dropout amongst boys is higher than that of girls during the elementary cycle and the trend continues to the secondary cycle. Around 12% of pupils dropped out after grade 1 and by grade 5 around 22.5% boys and 20.8% of girls appear to have left the system. The dropout rate is highest around key transition points: grade 5, grade 8 and grade 9. The dropout rate in grade 5 was 6.5%, increasing to 16.5% in grade 8 and to 17.8% in grade 9. The transition rate to grade 6 was 93.2% and to grade 9 it was 82.8% with girls transitioning in larger number than boys. The promotion rate from grade 9 to grade 10 was lower still at 74%.

Figure 4: Enrolment by grade: Assam



Note: 'Pop' is age-grade specific population for the year 2011

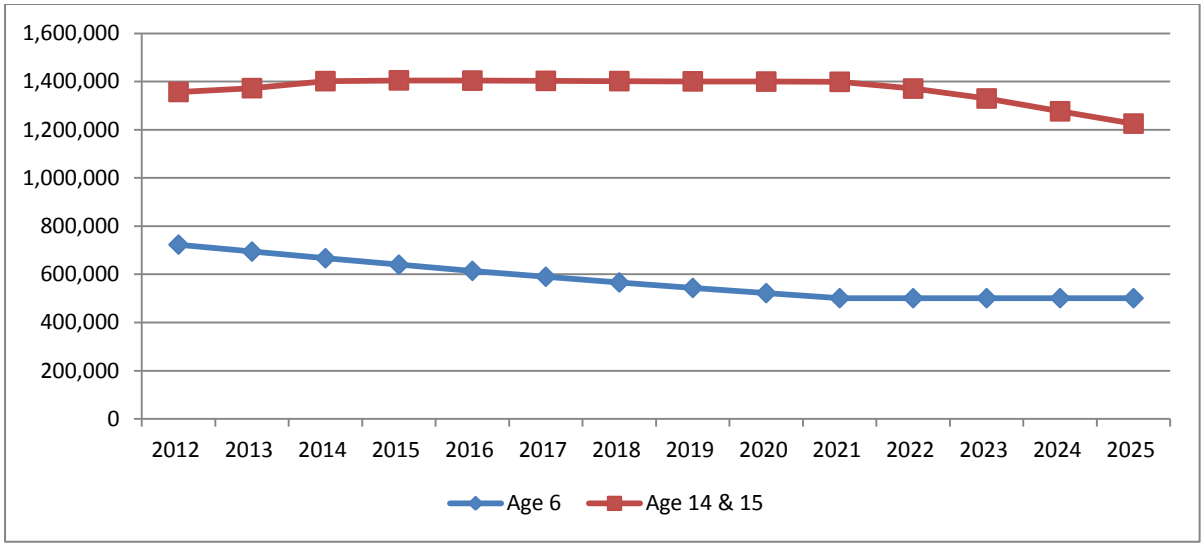
Repetition is also an issue despite a policy of automatic promotion, increasing from below 1% at elementary level to 8.2% by grade 9 and 5.9% by grade 10. This translates to a survival rate of 78% to grade 5 and 73% to grade 6 meaning that if 100 students enrol in grade 1 then 78 students reach 5 and 73 students reach grade 6. The survival rate drops further to 69% to grade 8, 57% to grade 9, and 46.5% to grade 10, however this latter figure is only 43.7% for boys. Achieving RMSA targets depends on greatly increasing these survival rates.

3.1.2 Demography

In order to project secondary enrolment and the related gross enrolment rates, the population of the relevant age groups must also be projected. Figure 5 presents the projected population of children in the secondary age group (ages 14 and 15 years) and new entrants (aged 6). The population for age 6 is projected up to 2017 applying the *moving age forward* method and adjusting for age specific death rates obtained from the census in 2011. In the absence of reliable projection parameters beyond 2017, the age 6 population was assumed to plateau from 2021 onwards. Similar methods were used to project the secondary age population up to 2025 which sets the limit to this projection model.

The age 6 population in Assam is expected to decline consistently until 2017, from 723,266 in 2012 to 589,731 by 2017 and is assumed to plateau at that level until 2025. In contrast the population of children aged 14 and 15 is likely to increase from 1,356,791 to 1,404,872 between 2012 and 2015 and plateau thereafter, before declining from 2020 onwards to 1,225,487 in 2025. This demographic transition from growth to contraction in the size of the age group has substantial medium term implications for planning the secondary education sector as there will be many fewer 14-15 year olds in 2025 than in 2013-14. This, and some growth in the interim period, must be anticipated in expansion plans for secondary education in order to avoid investment in capacity that will not be needed in the long run. The falling enrolments that will be experienced at the secondary level after 2020 could persist for two decades if the birth rate continues to fall as development takes place, as has been the case in most parts of China.

Figure 5: Age 6, 14 and 15 population



3.1.3 Education financing

Total plan and non-plan budgeted expenditure on secondary education (including secondary and higher secondary) in Assam increased to 2,413 Crores in the year 2012-13 from 1,681 Crores in 2011-12. Secondary education expenditure in Assam as a share of total educational expenditure observed marginal decline from 28.5% in 2011-12 to 28.2% in 2012-13. In terms of share of SGDP, secondary education (including higher secondary) expenditure in Assam accounted for 2.1% in 2012-13. This is amongst the highest levels across Indian states and reflects the high costs arising from low PTR and small schools. Even these high levels are not sufficient to universalise access and completion. Cost saving reforms will be needed.

3.2 Outputs from the Projection on Assam

3.2.1 Baseline Model

The baseline model (M1) is configured to show how participation will grow if the current system remains as in 2013-14. If internal efficiency measures remain unchanged, enrolment in grade 9 is likely to increase from 534,325 in 2015 to 535,933 in 2020 as shown in Figure 6. After 2020 the number of grade 9 entrants will decline to 443,733 by 2025 and is likely to stabilise thereafter. This increase in secondary enrolment combined with the projected secondary school age population means that the GER for secondary school will remain about the same between 2015 and 2025 (**Error! Reference source not found.**) if the promotion and transition rates remain unchanged. Under this scenario the number of grade 8 students remains substantially more than those enrolled in grade 9. However the GER at secondary level remains stable at about 68%.

Figure 6: Enrolment in grade 8, 9 & 10 (lags introduced to reflect transitions)

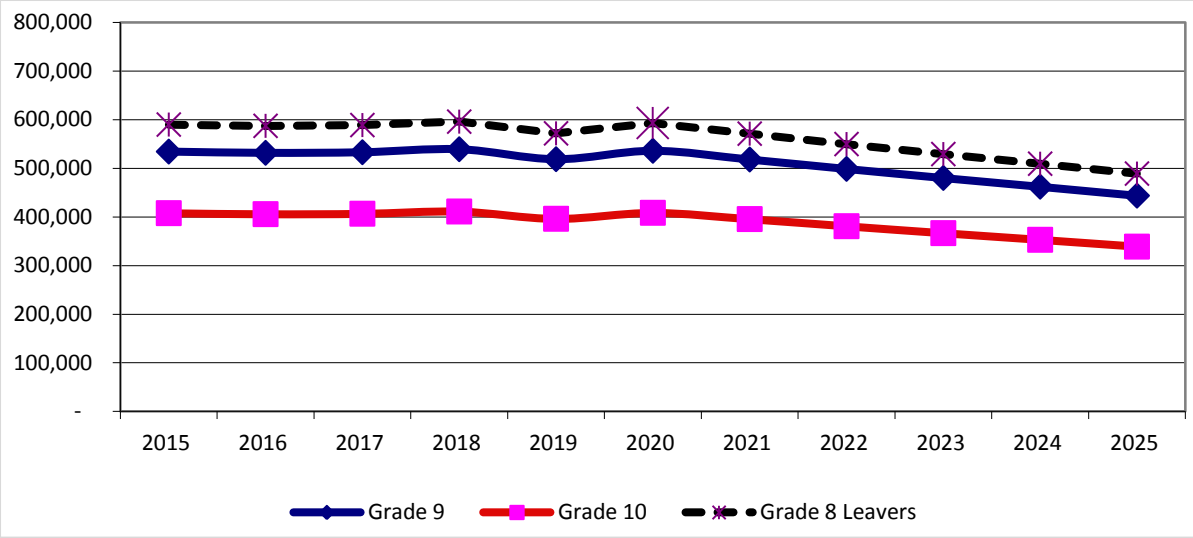
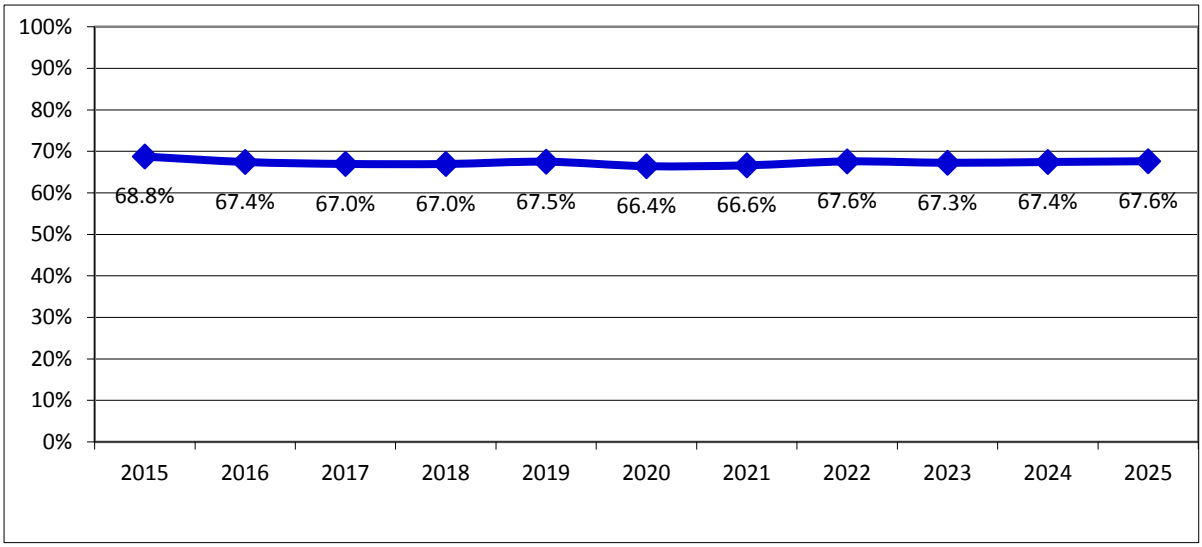


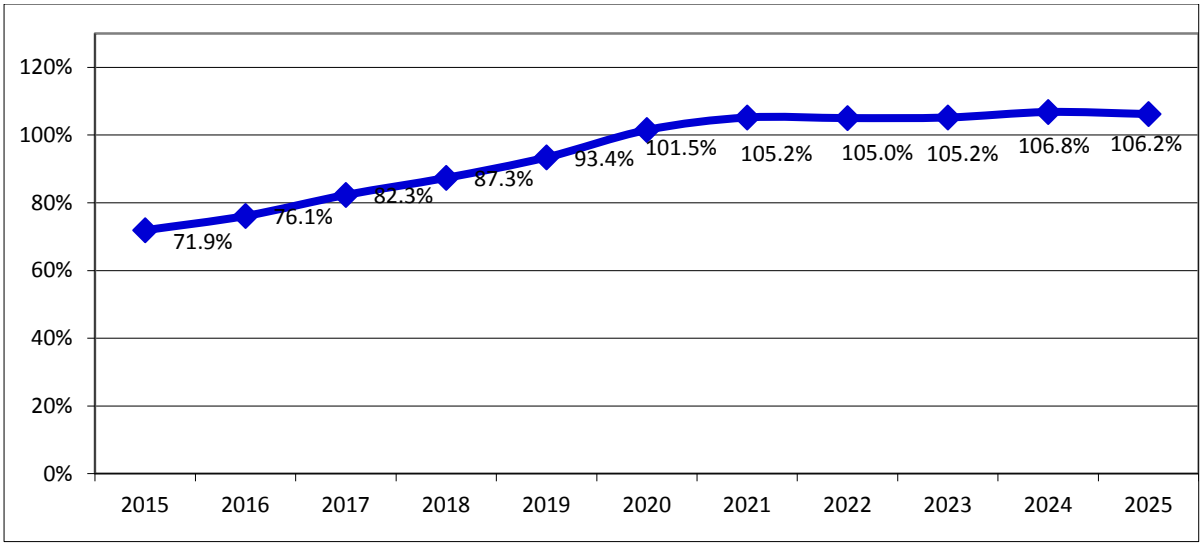
Figure 7: GER secondary- Model 1



3.2.2 RMSA Target Feasibility (Model 2)

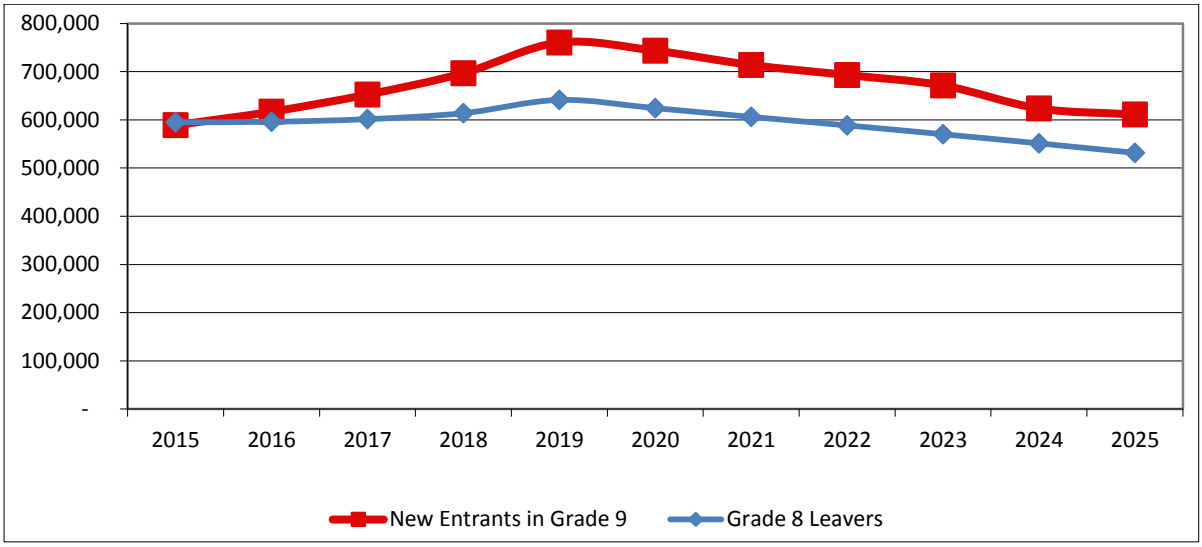
A large increase in the number of grade 8 leavers will be required in 6 years' time to achieve the target of universal retention in secondary by 2020. Dropout rates will have to be reduced in elementary school and transition rates from grade 8 to 9 and 9 to 10 greatly improved. For GER target to be realised an additional 30% of students would be needed in grade 9 between 2015 and 2019. As shown in Figure 7, applying these measure will push the gross enrolment rate at the secondary level to 100.5% in 2020. However this is not possible because by 2018 total enrolment needed in grade 9 will become more than the grade 8 enrolment in the previous year (Figure 8). Even assuming 100% transition from grade 8 to grade 9 and grade 9 to grade 10, the system will run out of feeder students needed to achieve the necessary target. This means that the RMSA target in the case of Assam is over ambitious and does not take into account the limitations imposed by the attrition that takes place through grades 1 to 8. Nor does it recognise the longer term consequences of the decline in the number in the age group.

Figure 8: GER secondary- Model 2



The problem is predominantly structural and about managing the flow of students, more than it is about the need for additional financing. Educational reforms can increase internal efficiency in ways that release resources to cover the costs of the additional enrolment needed. But this has to occur at a rate of enrolment growth that does not cause the numbers in grade 9 to exceed those in grade 8 as is the case in Model 2.

Figure 9: Grade 8 Leavers and New Entrants- Model 2



3.2.3 Feasible GER Growth (Model 3)

A more realistic profile of GER growth is needed than that shown in Model 2. This is obtained through making changes in the internal efficiency rates at the elementary and secondary levels, and keeping the number of new entrants in grade 9 below the number of grade 8 graduates (Figure 10). In this Model total grade 8 leavers in 2015 are expected to be around 611,255 which will increase to 650,708 by 2020 before declining to 551,394 by 2025. This decline in grade 8 leavers reflects

changes in the demographic profile. As shown in figure 7, these improvements in the efficiency rates will push the GER to 73.3% in 2015, 75.4% in 2017 and 83.5% in 2020 (Figure 11).

Figure 10: Grade 8 Leavers and New Entrants- Model 3

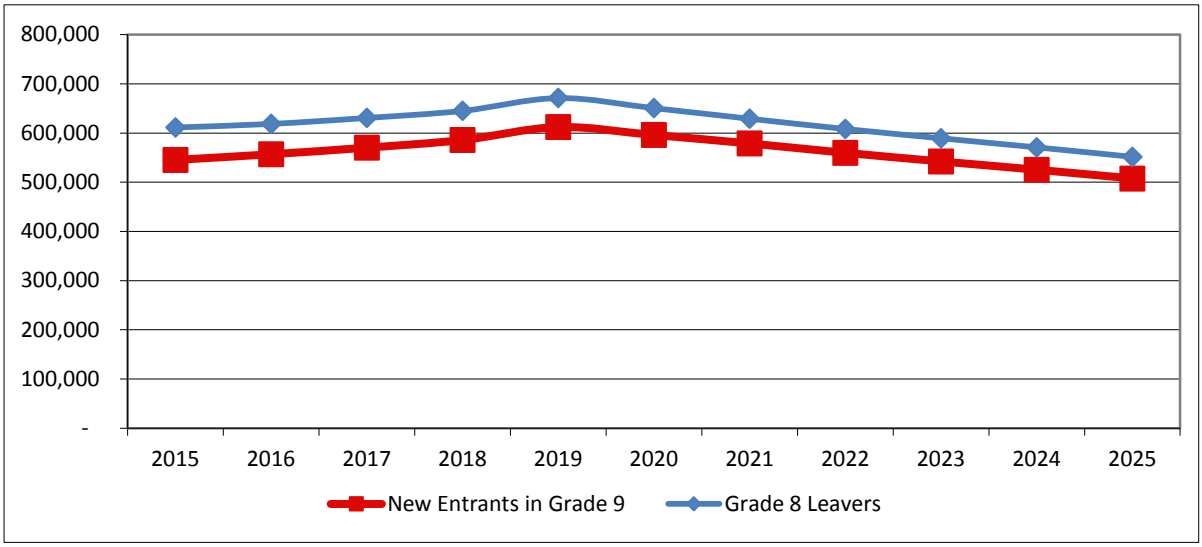
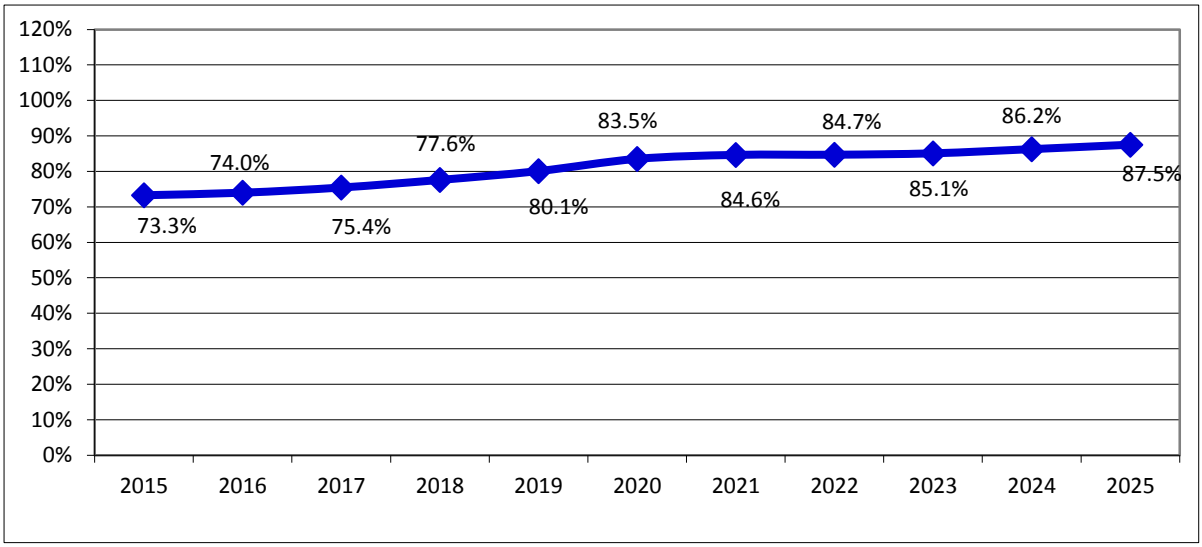


Figure 11: GER secondary- Model 3



In order to absorb these additional students up to 2020 the capacity of the secondary education system will have to be increased while controlling costs to ensure financial feasibility. After 2020 the number of secondary school-aged children, and therefore enrolments, will start to fall. The resource implication of this projected pattern is discussed in the next sub-section.

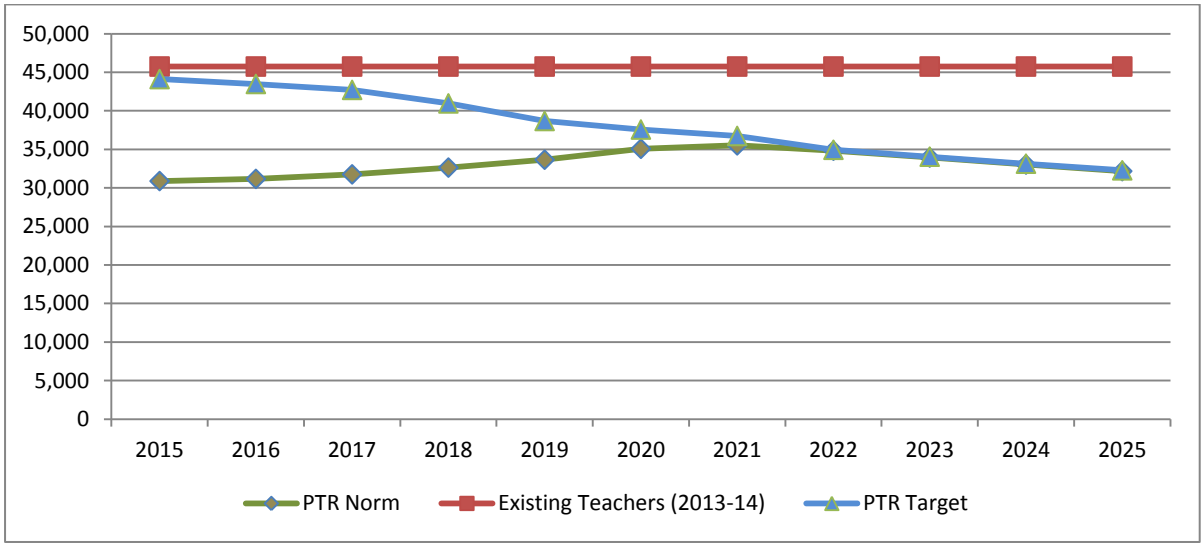
3.3 Projection of Teacher and Classrooms Needs

The implications of model 3 need to be considered. In Assam a move from the current PTR to the norms- specified level would release a large number of teachers. The gap between projected future teacher requirements and the existing teacher supply is shown in Figure 12. Two different pathways for converging to the norms level are shown in Figure 12. Pathway 1 shows gradual changes in the PTR level and pathway 2 shows the number of teachers needed when the norms-specified PTR is applied from 2015 onwards. Gradual change via pathway 1 seems more realistic, as pathway 2

would result in immediate release of a very large number of teachers. These teachers would need to be redeployed elsewhere until demand for teachers rises again in future years. If Assam had followed the PTR norm the total demand for teacher would have been 30,880 in 2015, significantly below the current number of teachers: 44,110 in 2015.

Assuming the proportion of permanent and contract teachers remain constant and following pathway 1 for convergence to norms, demand for regular government teacher will be 39,706 in 2015 which will drop to 33,817 in 2020 and 29,050 in 2025 (Figure 13). The result would be a more cost effective system with unit costs closer to national averages. Achieving this would require political will to allow natural wastage to shrink the cadre of teachers in the expectation of fewer children in school in the long run. It would also allow the phasing out of contract teachers. Some teachers might also be re-trained and redeployed to meet growing demand at the higher secondary level. Such reforms will be challenging but will certainly prove worthwhile in the long term and more efficient than expanding higher secondary schools with a new cadre of teachers.

Figure 12: Demand for Teachers



The total number of classrooms needed to accommodate growing secondary school enrolments and to achieve convergence to classroom norms is calculated using two different scenarios. Scenario 1 entails a gradual convergence to norms level, whereas scenario 2 depicts immediate convergence. Figure 14 shows, over time, the total number of classrooms needed under the two scenarios and the currently existing number. Scenario 2 entails a jump in classroom stock that is not feasible, from 11,109 in 2013-14 to 23,160 in 2015. Scenario 2 entails a more gradual increase, starting with construction of 4,100 additional classrooms immediately to arrive at 15,188 in 2015, increasing to 22,385 in 2020 and then to 24,128 in 2025. These additional classrooms could be built in existing schools or in new schools, decisions which should ideally be taken based on detailed mapping of current and projected future demand projections which should take into account demographic transition and urban migration.

Figure 13: Regular and contract teachers

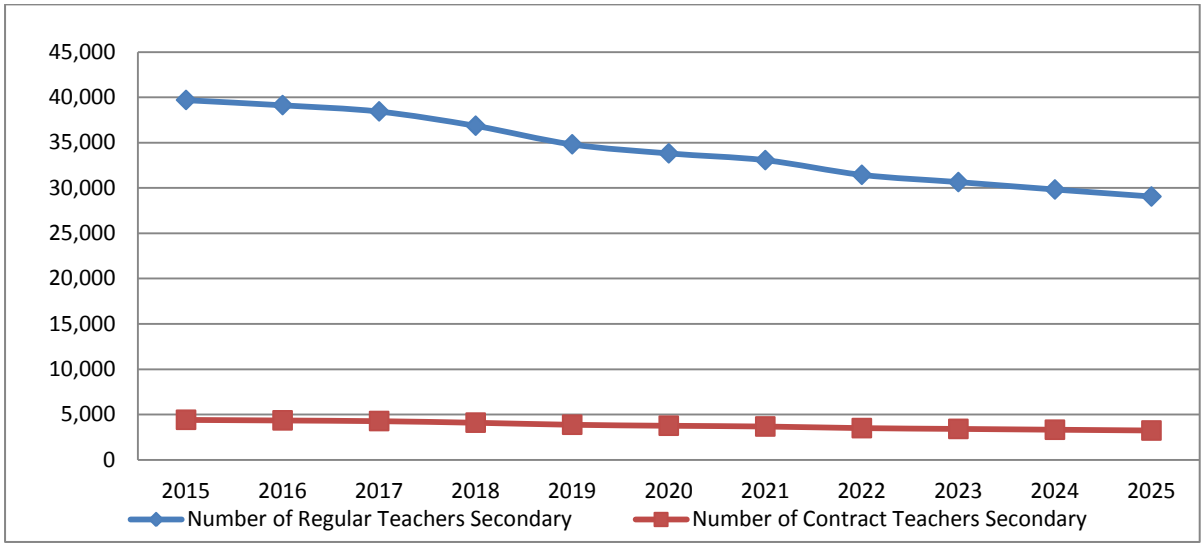
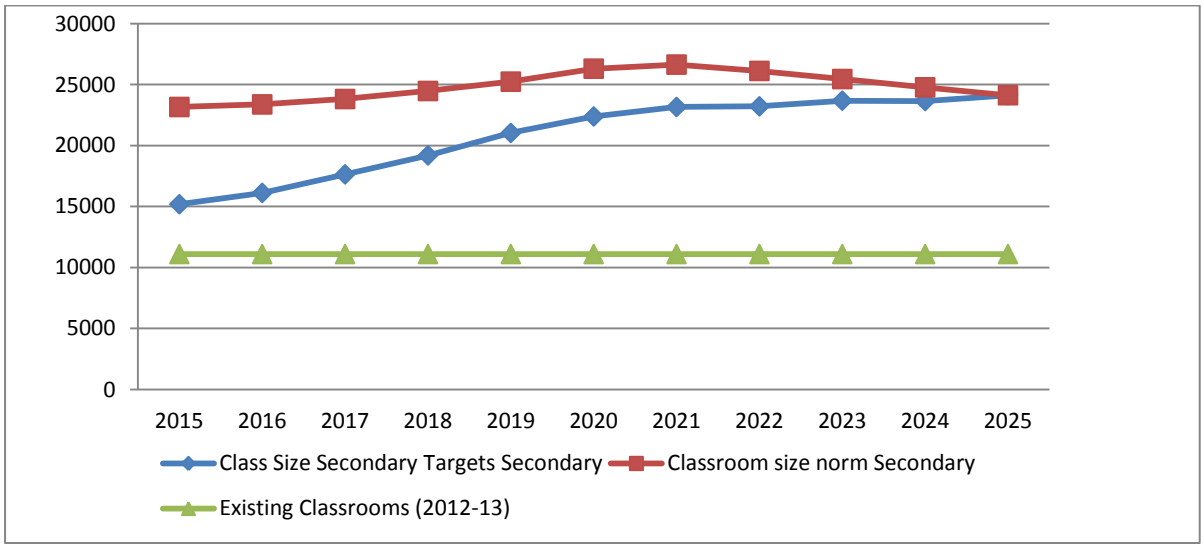


Figure 14: Demand for Classrooms

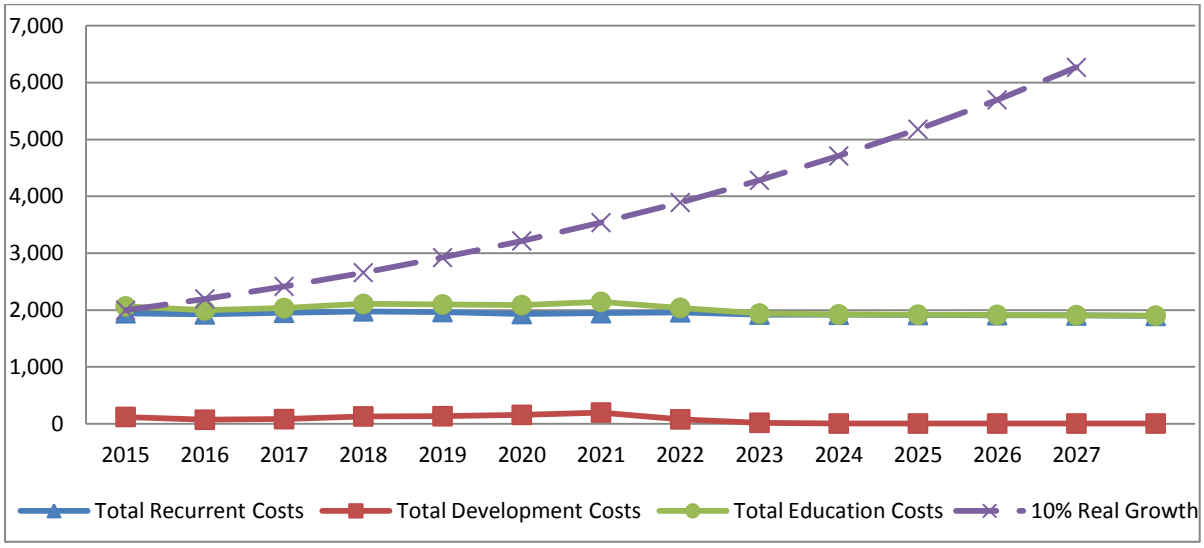


3.4 Projected Expenditure and Financial Feasibility

The total projected cost for the secondary education system can be estimated using gradual convergence of PTR and PCR to the national norms levels and the costing norms relating to classroom construction. Teachers' salaries are assumed to average Rs 25,000 per month for regular teachers and Rs 10,000 for contract teachers. The number of non-teaching staff was assumed to be around 10% of the number of teaching staff and their salaries Rs 7,000 per month. Additionally, non-salary costs are assumed to be 10% of teachers' salary costs based on current expenditure trends, and management and research costs are assumed to be 1% of teachers' salary costs. Provision has been made for 3% growth in salaries over time. Subsidies for marginalised groups have also been included at the rate of Rs 15,000 per child for 20% of enrolled children (this could be reconfigured to

Rs 7,500 for 40% of enrolments at the same cost). This is a necessary provision because many new entrants to secondary school will not be able to afford the costs of schooling without assistance.

Figure 15: Recurrent and development cost

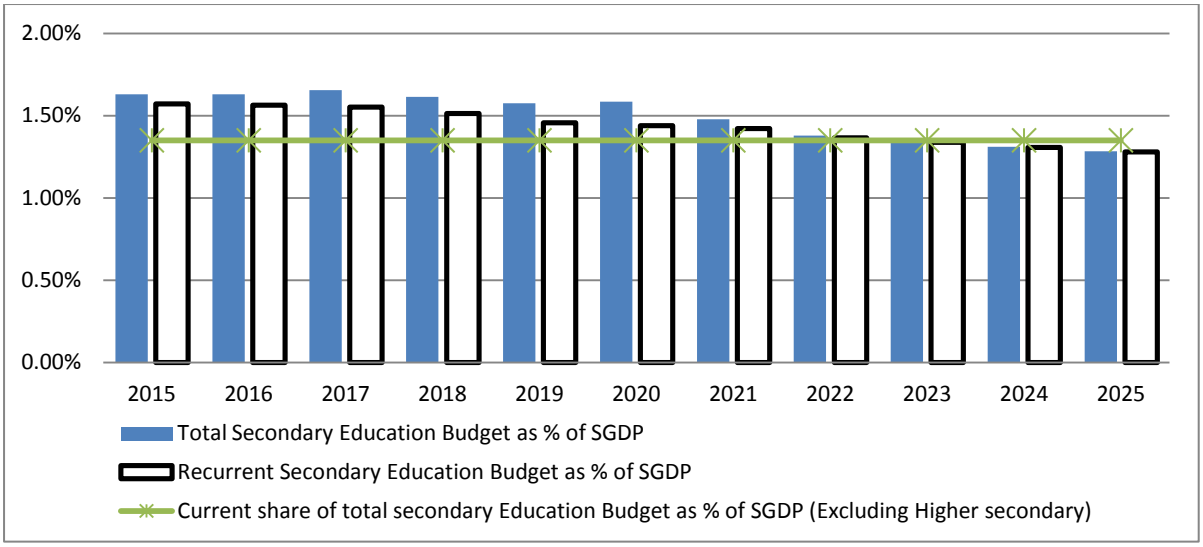


The financial implications of expansion under model 3 are shown inFigure 15. Recurrent expenditure will be about 1,945 crores in 2015 increasing to 1,953 crores in 2017 and will then decline to 1,898 crores by 2025. This drop in recurrent expenditure is due to the falling teacher requirement resulting from norm compliance. The development cost[4] in 2015 is projected to be 121 crores in 2015, and expected to increase to 157 crores in 2020. The total education cost will decrease from 2,065 crores in 2015 to 1,903 crores in 2025.

Recurrent and total expenditures as a percentage of SGDP are shown in Figure 16. In Assam, total secondary expenditure as a share of SGDP will be around 1.6% in 2015 dropping to 1.5% in 2020 and 1.28% in 2025. Recurrent expenditures, which form the bulk of education expenditure, will comprise around 1.5% of SGDP in 2015 and 1.4% in 2020.

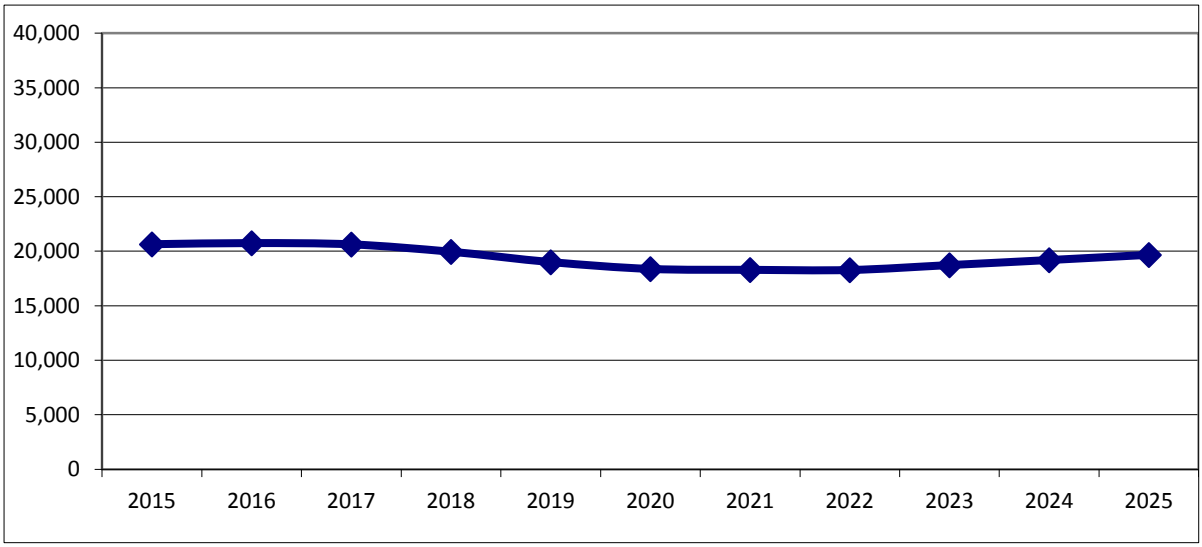
Figure 16: Secondary education expenditure as % of SGDP

[4] Construction and maintenance cost



Total annual government expenditure per secondary student will be around Rs 20,360 in 2015 which will drop to Rs 18,370 by 2020 (Figure 17). The decline in the unit cost in the first period is caused by the PTR at the secondary level rising from 17:1 in the baseline year to 30:1 in 2022 following the RMSA norm. When this has been achieved the assumption of 3% real growth in teachers' salaries acts to increase unit costs. It is assumed that the state would react and adjust in real time to these changing resourcing needs, however this may not be the case if the objective of continually responding to changes in resourcing needs is not factored into reform plans.

Figure 17: Unit cost



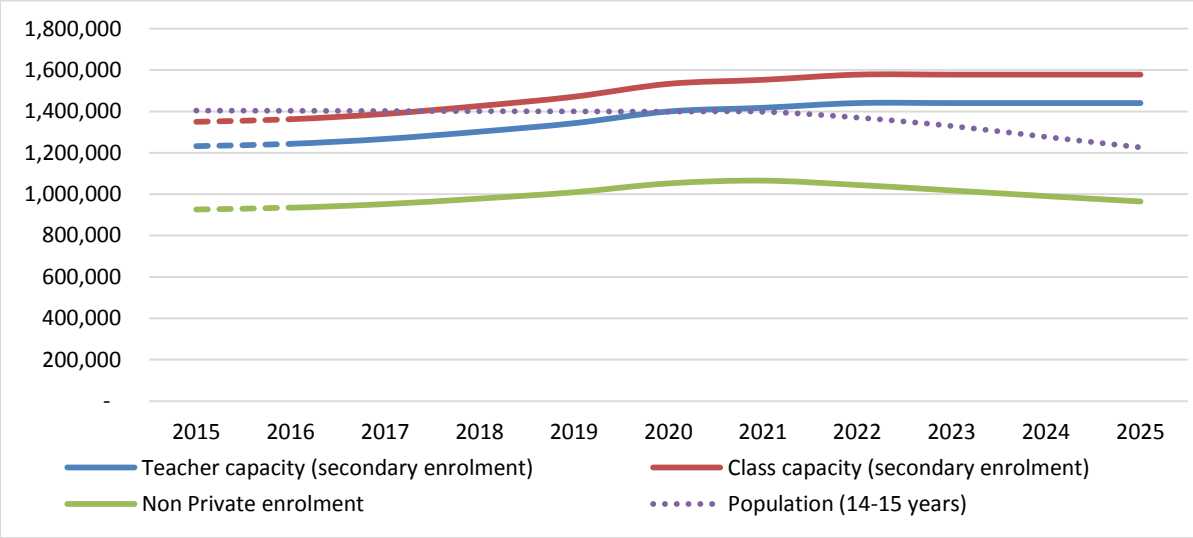
A key finding for this state is that there is no significant growth needed in total expenditure, meaning that financing should prove relatively unproblematic. However, this depends on efficiency gains being made. If the system is not reformed to make more efficient use of teachers then substantially increased costs will result.

3.5 Norms and Surplus Capacity

The total projected cost of the Assam education system in the previous section assumed full capacity utilisation, however this is not the case in Assam. Currently there are a large number of

schools that are operating below capacity if RMSA norms were to be followed. This is due to staffing allocations and inefficient school siting policies which result in many small schools. This section discusses the financial implications of secondary education expansion, incorporating the existing distribution of schools by size.

Figure 18: School capacity- Availability and need



Note: Utilisation rates are obtained using demand for non-private (government and aided) enrolment

If the current pattern of distribution of schools by existing size continues, with RMSA norms applied, the system is likely to generate surplus teacher and classroom capacity. Figure 18 presents projected teaching and classroom capacity in government schools incorporating distribution of schools by their size. Teacher/Classroom capacity in any given schools is estimated by multiplying the total number of teachers/classrooms by the maximum permissible number of students under RMSA norms. The gap between teacher/classroom capacity and demand for government school places comprises the surplus capacity. The maximum capacity needed can be assumed to be fixed by the population of secondary school age children.

By 2015, if all schools are resourced according to RMSA norms, the system will operate at 75% capacity in the case of teachers and 69% in the case of classrooms. On current trends, these utilisation rates will decline to under 67% and 61% respectively by 2025. Even if all secondary school-aged children attend government schooling, the system will start to generate excess capacity from 2022 onwards. This illustration draws attention to the need to anticipate future demand and not over-recruit teachers and build eventually excess classrooms. It provides an upper limit of what

could be achieved in a perfectly efficient system, however assuming 100% occupancy of schools with no drop out is unrealistic. The invitation is to compare existing levels of utilisation with the upper limit and determine whether the system is becoming more or less efficient as a result of planned interventions. Greater efficiency will reduce costs per child and should increase effectiveness and the rate of progress towards enrolment targets.

3.6 Summary Conclusion - Assam Case Study

Assam has already achieved relatively high enrolment rates with a GER approaching 70%. Further progress towards the RMSA targets depends on increasing the numbers successfully graduating and transitioning from grade 8 and ensuring capacity in grade 9 to meet realistically projected numbers of future grade 8 graduates. This requires action to improve internal efficiency in grades 1-8 and improve the transition rates from grade 8 to grade 9, as well as retention of students in grades 9 and 10. There are also likely to be needs to improve quality and measured performance of students and this will be the subject of a separate analysis.

In Assam demographic transition is already a reality and the population of 6 year olds is now shrinking. This will affect the secondary school age group from 2020, after which there will be a steady decline in the number of 14 year old children. It will be important to factor this into planning expansion of capacity so that a surplus is not produced. GERs can increase to as much as 84% by 2020. Progress beyond this level depends on more children graduating from grade 8. If the growth is accompanied by increased PTR it can probably be financed within the current level of allocation to secondary schools.

Key conclusions are:

- The numbers completing grade 8 will be a constraint to achieving a GER greater than 84%
- The internal efficiency of the elementary school system will need to improve
- Demographic transition means that in the long term fewer secondary places will be needed
- A large proportion of the schools in Assam are small and 43% enrol less than 100 and 76% less than 200 students. To the extent possible secondary schools need to be of larger size and expansion should first be through upgradation unless there are compelling geographic reasons for building new schools.
- Moving towards the RMSA norm for the PTR to reach 30:1 from the current level of less than 20:1 will take political will and would involve a moratorium on new recruitments, some redeployment to high schools, and the phasing out of contract teachers who would no longer be needed.
- Class sizes are large in Assam and the PCR is currently about 70:1. This means many more classrooms will need to be constructed in the short term to assure a level of no more than 40:1. It will be important to account for the projected future fall in demand for space beginning from 2020 so that too much space is not built.
- New curricula and better management of learning may be needed if new students are to be retained in secondary school and make the transition from grade 9 to grade 10.
- Additional financing may not be needed if reforms are put in place; however if this is not the case, expanding capacity will require considerable additional resourcing from state budgets.

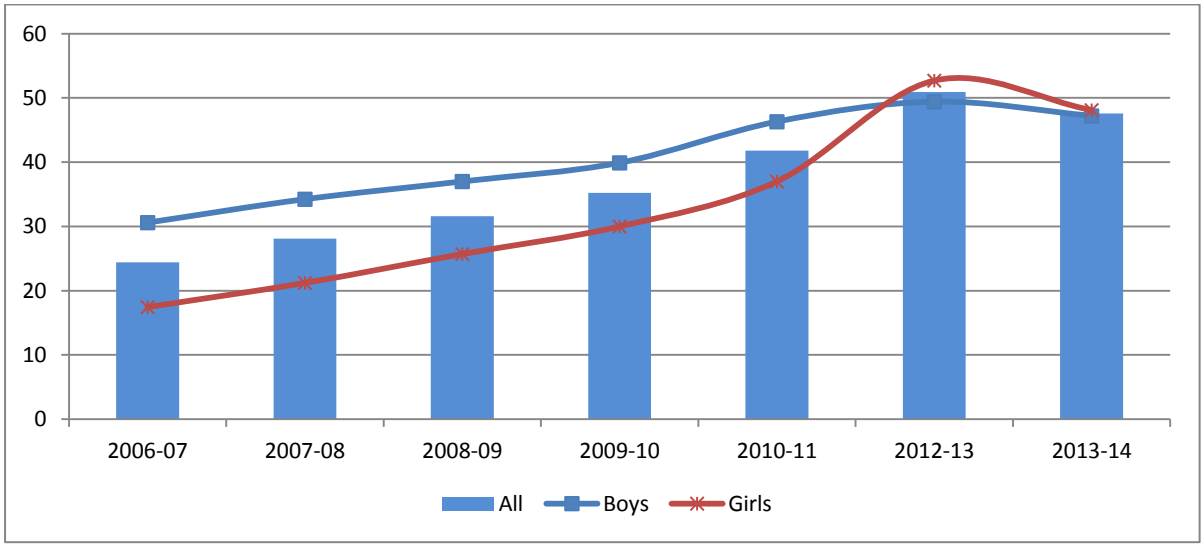
4. Case Study- Bihar

4.1 Background

The secondary gross enrolment ratio in Bihar has doubled from 24% in 2006-07 to 48.1% in 2013-14 (Figure 19), while the net enrolment ratio is 36%. Bihar witnessed an increase in enrolment at the secondary level from 3,031,000 in 2012-13 to 3,460,900 in 2013-14. The crude transition rate is considerably better in Bihar where the transition rate to secondary for girls is 87.9% and for boys 92.8%. The GER is 47% for boys in 2013-14, but is higher for girls at 48%. However this represents a steep drop off from a GER of 107% in primary grade 1, falling to 56% by grade 8.

There are about 90 girls enrolled for every 100 boys in secondary schools, while this ratio is 84:100 in the secondary school age population. Thus, though secondary enrolment rates of boys and girls are similar, the actual numbers enrolled differ due to the much smaller number of girls in the population. This is the result of fewer girls being born and fewer surviving to school age and this is therefore .The survival rate for girls to grade 9 is 66.4% and 71.9% for boys, indicating greater dropout amongst girls. Caste-based differences in secondary participation in Bihar are pronounced. GERs for SCs were 31.1% and 15.8% at secondary and higher secondary levels with a large gender imbalance in favour of boys. For STs the GERs were around 33.9% and 26.6% respectively5. A low GER at present as well as these group-specific survival rate challenges makes it highly unlikely that Bihar will be able to achieve RMSA targets.

Figure 19: Growth in Gross enrolment ratio by Gender



Source: Selected Educational Statistics

In Bihar there are 5,750 schools offering secondary education in 2013-14. Government schools account for 66% of the total, government aided schools 5%, private unaided schools 13%, and other categories 16%. The distribution of enrolments between different school types was 82%, 5%, 10%, 3%, respectively, indicating that secondary schooling is overwhelmingly in public schools.

Bihar has both very large and very small schools. Around 38% of government and government aided schools have an average enrolment of above 500 in grade 9 and 10 (Table 6). The average enrolment

[5] Statistics for school education, 2010-11, MHRD

in these schools is around 960[6]. In contrast, about 27% of government and government aided schools have an average enrolment less than 150. These small schools account for less than 5% of total enrolment, while in comparison, large schools account for 74%. These vastly differing school sizes may be the result of unavoidable contextual factors, but are also a source of inefficiency. Currently Bihar has an average PTR of 56:1 and PCR of around 81:1. In very small schools with less than 50 students the PTR averages 5:1, in schools with 200 students 43:1, and where there are more than 500 students the PTR averages 150:1. It appears there may be over expanded and very large secondary schools with inadequate provision of teachers. But this finding must be treated with considerable caution. Many secondary schools appear to have very low attendance rates so effective PTRs may be very different to nominal PTRs.

Table 2: Distribution of government secondary schools by enrolment size

	Up to 50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	401-450	451-500	>500
Percentage of schools	9.8	9.3	7.9	6.5	5.4	6.2	5.0	4.1	4.1	3.7	37.8
Average enrolment	17.1	76.0	124.8	174.3	225.6	275.1	324.4	374.3	424.9	477.0	963.6
Share of enrolment	0.3	1.4	2.0	2.3	2.5	3.5	3.3	3.2	3.5	3.6	74.2

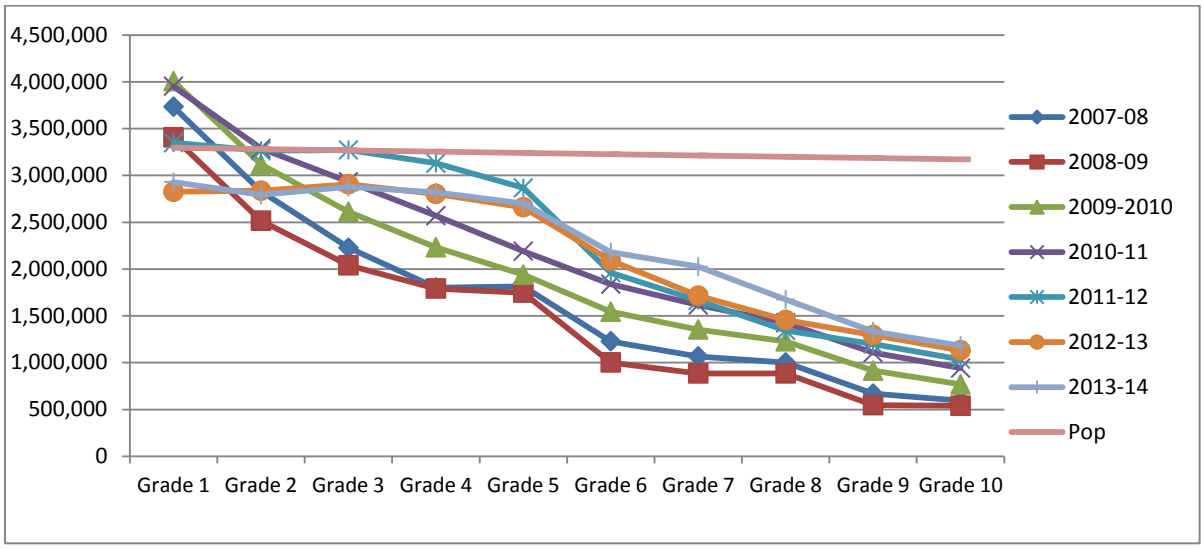
4.1.1 Efficiency

The achievement of the RMSA enrolment targets for secondary education in Bihar requires a rapid improvement in the internal efficiency of the elementary school system. Currently, less than two thirds of those who enrol in grade 1 reach grade 8. Though the gross enrolment rate at primary is 140%, that at upper primary is only 60%, indicating large-scale dropout. It is impossible to universalise secondary schooling until almost all children complete upper primary and transit to secondary. In Bihar currently there are about 1.2 million students enrolled in grade 9, compared to 1.4 million enrolled in grade 8 in 2013-14; these grade 8 students represent little more than half of the 14 year old age group. Disadvantaged groups have even lower participation rates with girls surviving less than boys. For the SCs the survival rate was as low as 37% to grade 9.

Figure 20 shows the steep drop-off in survival rate after grade 5. There is over-age enrolment in the lower grades such that there are more children in grades 1-4 than there are children in the age-specific population, shown by the dotted green line. Most children do survive to grade 5, with a rate is as high as 96%. From grade 6 onwards, there is a decline to about 70% by grade 8 and 62% by grade 10. The transition rate from grade 5 to grade 6 is around 81% and from grade 8 to grade 9 around 90%. Repetition is low (below 2% in most grades, except grade 1). The dropout rate is greatest in grades 5 (17%), 8 (8%) and 9 (8%). Annex 2 provides more details. The achievement of RMSA targets depends on improving internal efficiency rates. There is evidence that retention is improving in (Figure 20) but not at a rate fast enough to reach RMSA targets.

[6] A recent field visit suggested that in at least some of these mega secondary schools average daily attendance is much less than enrolment – one school visited had nominal enrolments of over 1000 and less than 200 present on the day of the visit.

Figure 20: Enrolment by Grade Bihar



Note: 'Pop' is age-grade specific population for the year 2011

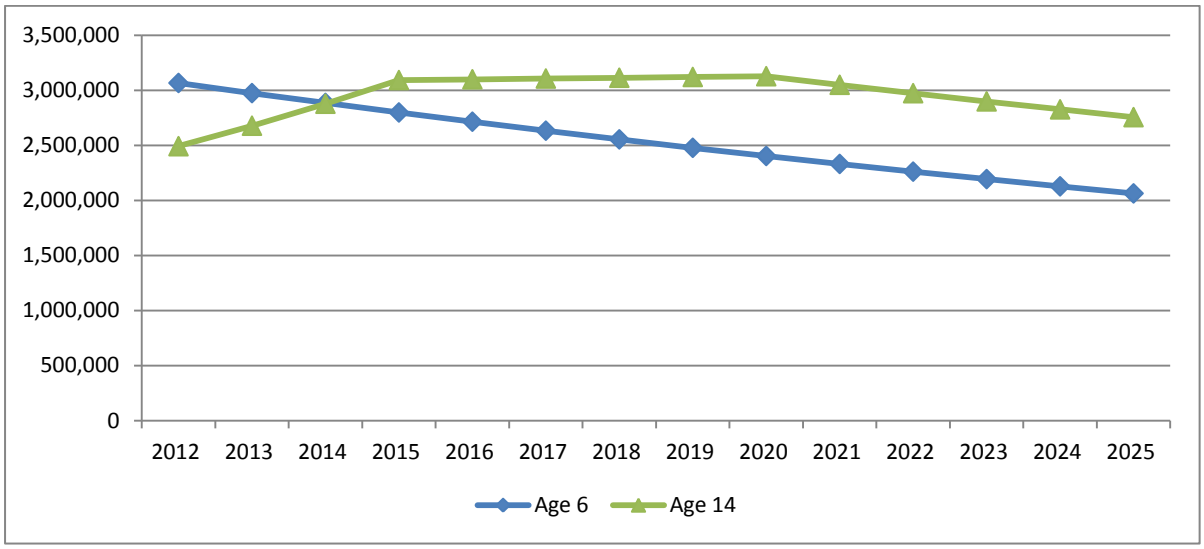
4.1.2 Demography

Demographic changes are taking place in the population of children in Bihar. Projecting forward from the 2011 census, the population of 6 year olds in Bihar is expected to decline from about 3 million in 2012 to 2.6 million in 2017, and 2.4 million in 2020. The population of children age 14 is likely to first increase, from 2.5 million in 2012 to 3.1 million in 2017 as a result of the historic birth rate, and then stabilise at this level until 2020 at which point it will start to fall. (Figure 21). The implication is that in the short term the demand for places in secondary schools will increase, before eventually declining along with the numbers of children in the age group. Changes in population structure need to be considered to avoid surplus capacity that may evolve with the application of norms under RMSA. Peak demand for secondary places will last for about 5 years, after which the number of places needed will decline.

4.1.3 Education Financing

Total plan and non-plan budgeted expenditure on secondary education (including secondary and higher secondary) increased from 2,187 Crores in 2011-12 to 2,195 Crores in 2012-13 in Bihar. Secondary education expenditure as a percentage of total educational expenditure declined from 21.8% in 2011-12 to 17.7% 2012-13. Secondary education (including secondary and higher secondary) expenditure in Bihar accounted for 0.8% of SGDP. The estimated share of secondary education (excluding higher secondary) was around about 0.56% of SGDP in the base year of projection model.

Figure 21: Age 6 and 14 population



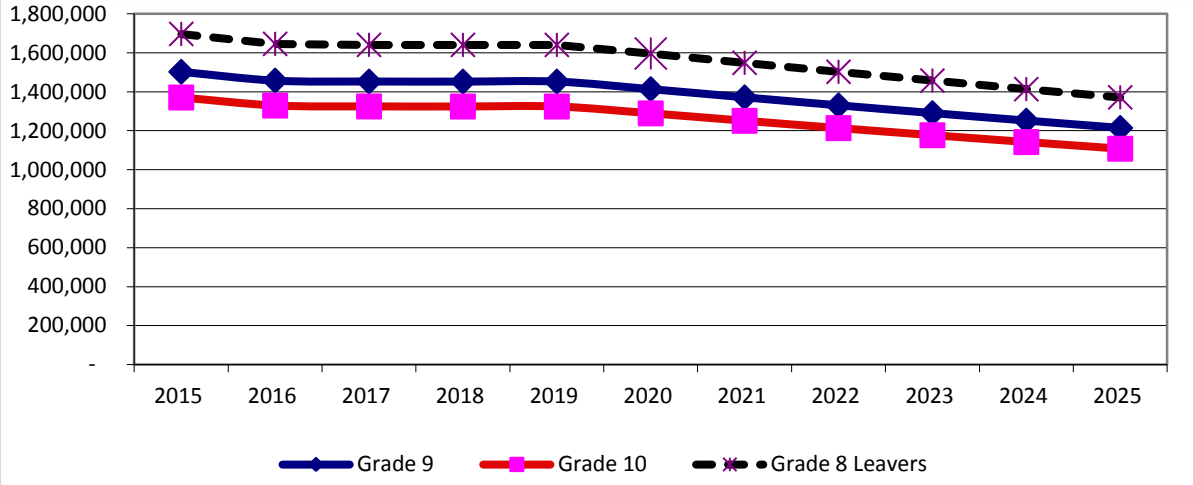
4.2 Outputs from the Projections on Bihar

4.2.1 Base Line Model

The baseline model (M1) is configured to show how participation will grow if the current system remains as it was in 2012-13. Annex 2 provides more detail. Enrolments in primary will track the population growth of children and completion and transition rates will remain the same. As shown in Figure 21 the population of age 6 and age 14 is likely to fall during the projection period. Decline in the population of the relevant age group will have important implications for growth of grade 9 entrants and the secondary level GER.

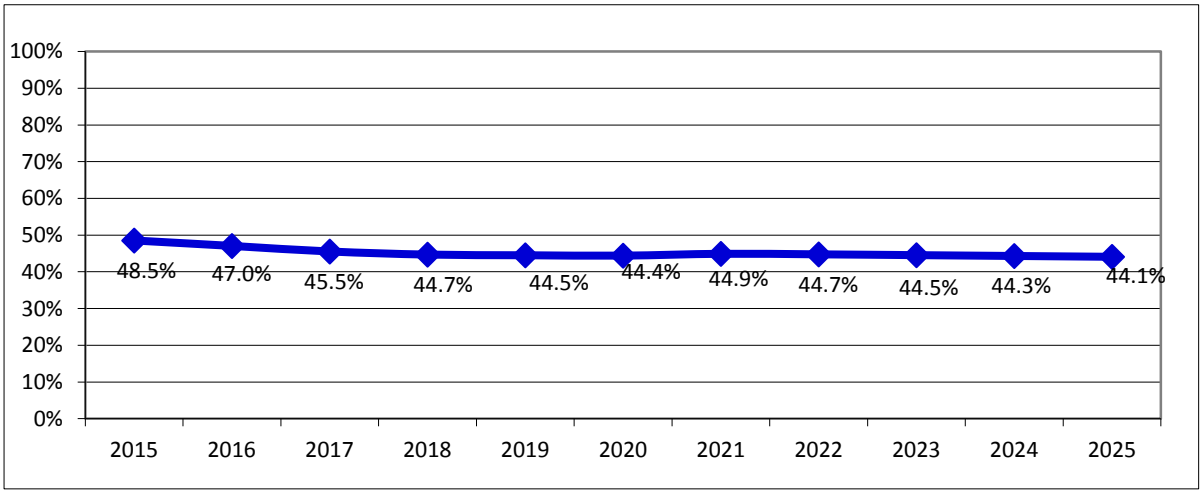
Projected trends in grade 8 leavers, grade 9 and grade 10 entrants are shown in Figure 22. The number of grade 9 entrants will change according to the changes in the population of age 6 and will decline. With the fall in population of age 6, and subsequently of age 14 due to demographic changes, enrolment in grade 9 will fall from 1,502,337 in 2015 to 1,214,258 in 2025. Since the numbers in grades 8 and 9 are well below the number in the age group the GER at secondary will at best be about 48% as shown in Figure 23. The population of 14 year olds is falling faster than the projected enrolments so the GER slowly decreases. In addition the numbers of grade 8 graduates stay above those entering grade 9 and there is a transition rate of about 90%.

Figure 22: Enrolments in grade 8, 9 & 10 (Lags introduced to reflect transition)



Achieving a higher GER would require a large increase in the number of grade 8 completers. The highest rates of growth necessary to attain universal retention by 2020 are unlikely. The results of the baseline model suggest, with existing rates of internal efficiency remaining constant, Bihar is at best likely to achieve 44% GER by 2020. Significant improvement in internal efficiency will be needed to reach higher levels. To model what would be necessary to achieve the RMSA target GER in 2020 of 100% we have assumed improved internal efficiency at all levels and have increased the entry rate to grade 9 to the values necessary to achieve GER 100%.

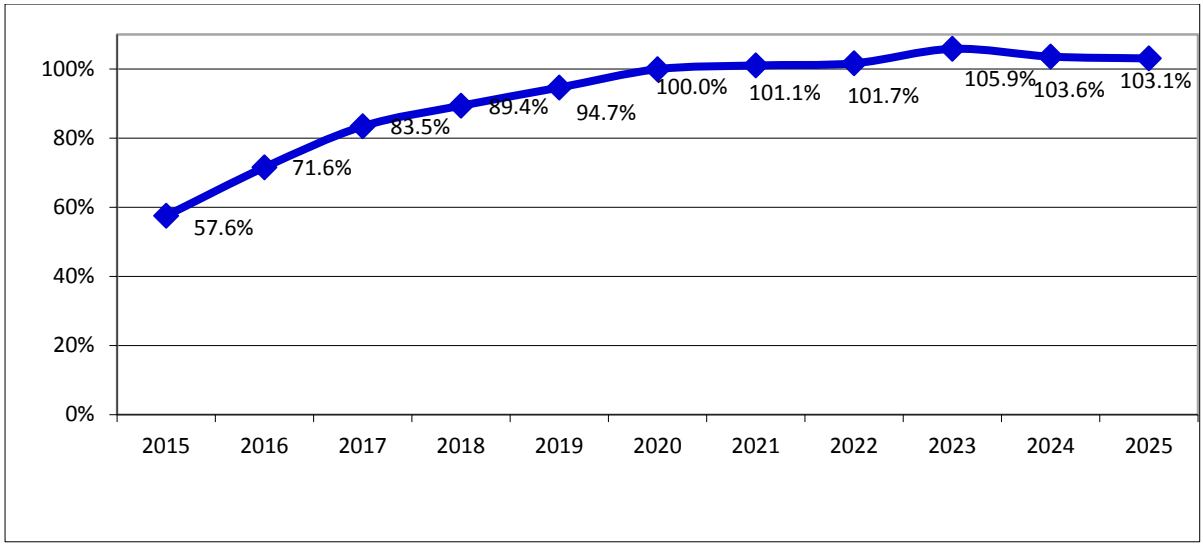
Figure 23: GER secondary (M1)



4.2.2 RMSA Target Feasibility (Model 2)

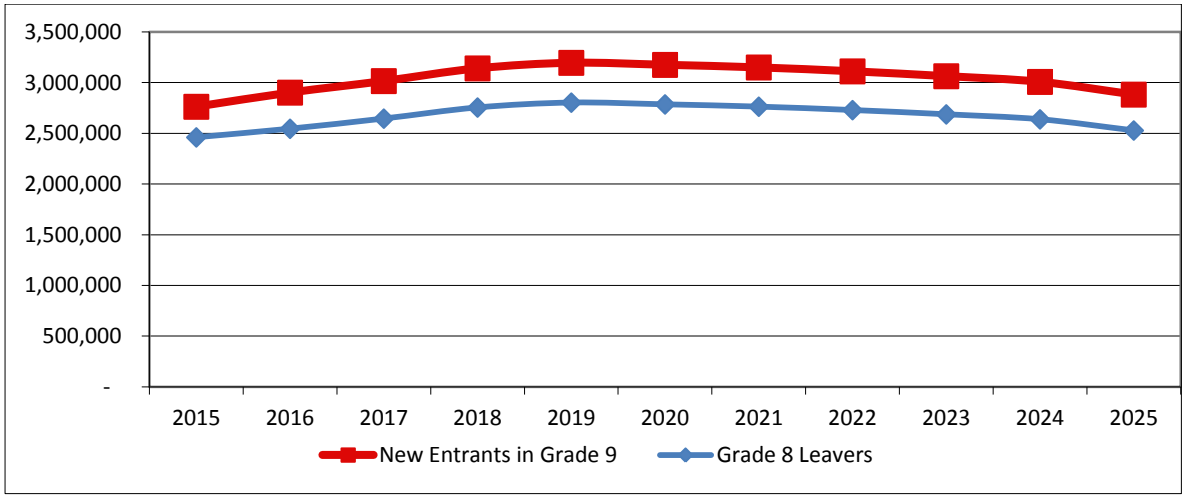
Figure 24 shows how the GER would have to rise to 58% by 2015 and to 100% by 2020. The rate of increase needed is rapid and implies the numbers in grade 9 would have to increase from 2.7 million to 3.2 million (20%) by 2020.

Figure 24: GER secondary (M2)



The immediate consequence of introducing these high growth rates into the model is that there would need to be around 400,000 more enrolled in grade 9 than there were children in grade 8 (Figure 25), an outcome that is not possible. A slower rate of progress towards the goal is inevitable.

Figure 25: Grade 8 Leavers and New Entrants (M2)



4.2.3 Feasible Targets: Model 3

Model 3 assumes that internal efficiency is greatly improved with reductions in repetition and drop out such that the survival rate to grade 8 improves from 75% to over 90%; a sizeable challenge but necessary to approach universal access to secondary school. It would allow higher rates of growth in secondary enrolment before the number of grade 8 children became a constraint.

Improvement in the internal efficiency rates at the elementary level in this model variant produces a sufficient number of grade 8 graduates to support a sustainable level of expansion (Figure 26). However the maximum level of GER that can be achieved by 2020 is now 60.4% (Figure 27). The number of grade 8 completers will increase from 1.8 million in 2015 to 2.1 million by 2020. Model 3 represents the fastest sustainable rate of growth in participation at secondary. It would require immediate action to increase enrolments in secondary by making significant improvement in internal efficiency rates at the upper primary level and increasing the transition rate to secondary.

The steps necessary to do this will need systematic phasing to match increases in grade 8 with additional capacity at secondary level under RMSA.

Figure 26: Grade 8 Leavers and New Entrants (M3)

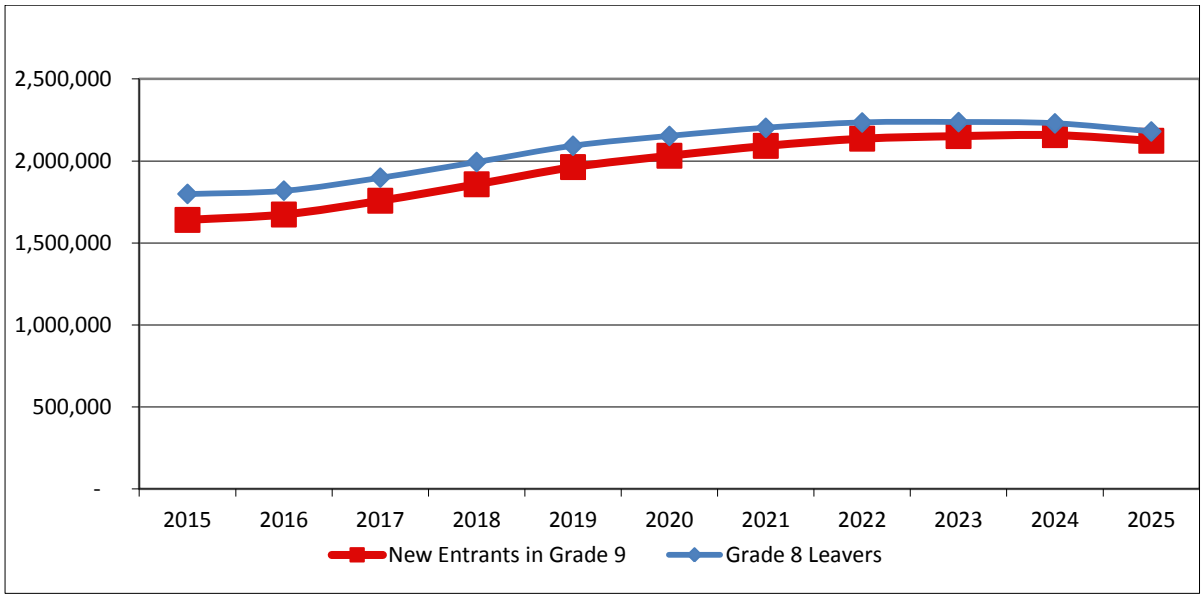
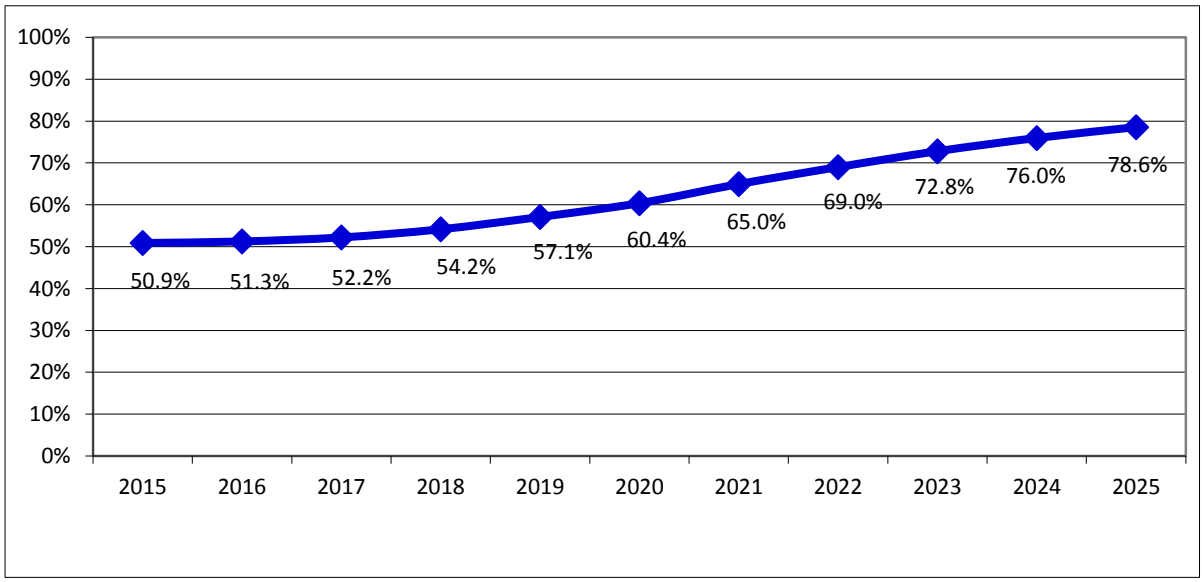


Figure 27: GER secondary (M3)

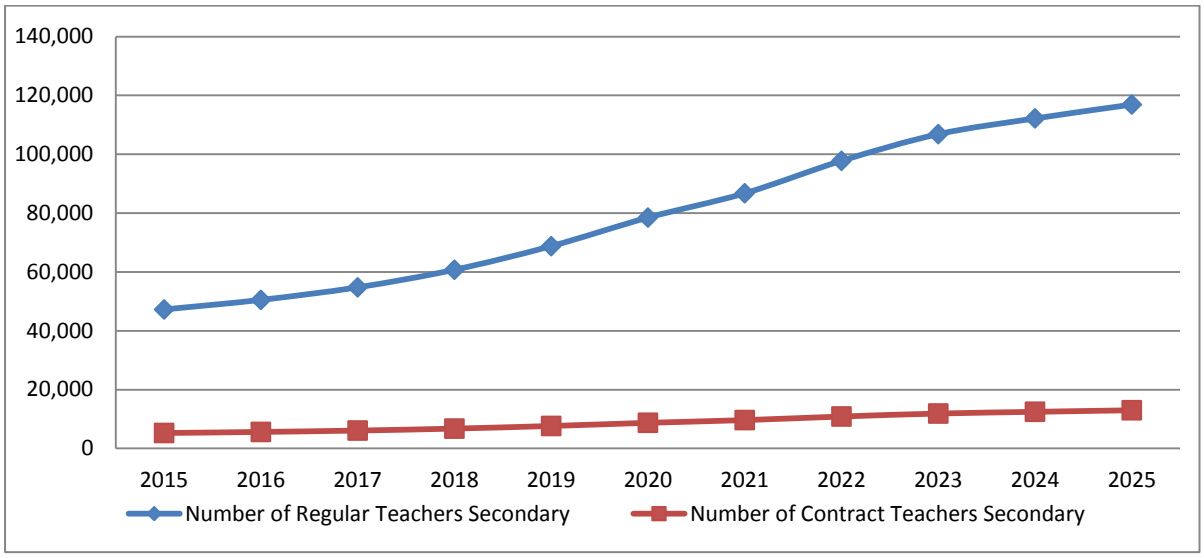


4.3 Projection of Teacher and Classroom needs

The implications of the sustainable growth model for training and appointing teachers and building new schools and classrooms need to be considered. Figure 28 and Figure 29 show how the number of teachers needed will have to grow if PTR are to fall from their current value of 56:1 to 30:1. Following the RMSA norms the demand for teachers at the secondary level are substantial.

Assuming the proportion of permanent and contract teachers remains constant the number of regular government teachers needed will increase from about 47,200 in 2015 to about 78,500 by 2020. The number of contract teachers would have to increase from about 5,200 to 8,700. After 2020 as enrolments fall in line with decline population, fewer teachers will be needed.

Figure 28: Regular and contract teachers



The proposed pathway to reach the norm of 1 teacher per 30 children is shown in Figure 29. About two thirds of the demand for new teachers is driven by reductions in PTR. It can be seen that if the RMSA norms are applied immediately (blue line), the total demand for teacher would be 94,448, much higher than the existing number of 39,600 in 2013-14. It is not realistic to recruit, train and deploy teachers so rapidly. A better strategy would be to recruit new teachers in phases over the next 10 years bearing in mind that at the end of the period the demand for teachers will be falling. If a higher norm above 30:1 was chosen this would also slow demand, but entail larger class sizes.

The demand for new classrooms depends on the growth in enrolments, the class size norm which is currently 40:1, and the need to reduce the current average class size of 80:1. Figure 30 shows the total number of classrooms needed to achieve this. Following the RMSA norm the total demand for classrooms needed increases from 35,100 in 2015 to 52,300 in 2020 implying 3,500 classrooms a year would have to be built. The pathway to reach the norm of 40 children per classroom is also shown in Figure 30. If the norms were applied immediately an additional 35,000 classrooms would be needed by 2015, meaning an immediate doubling of currently available classrooms. A more feasible way forward would be to phase the programme of the classroom building over 15 years to moderate swings in the pattern of procurement and avoid surplus capacity.

Figure 29: Demand for Teachers

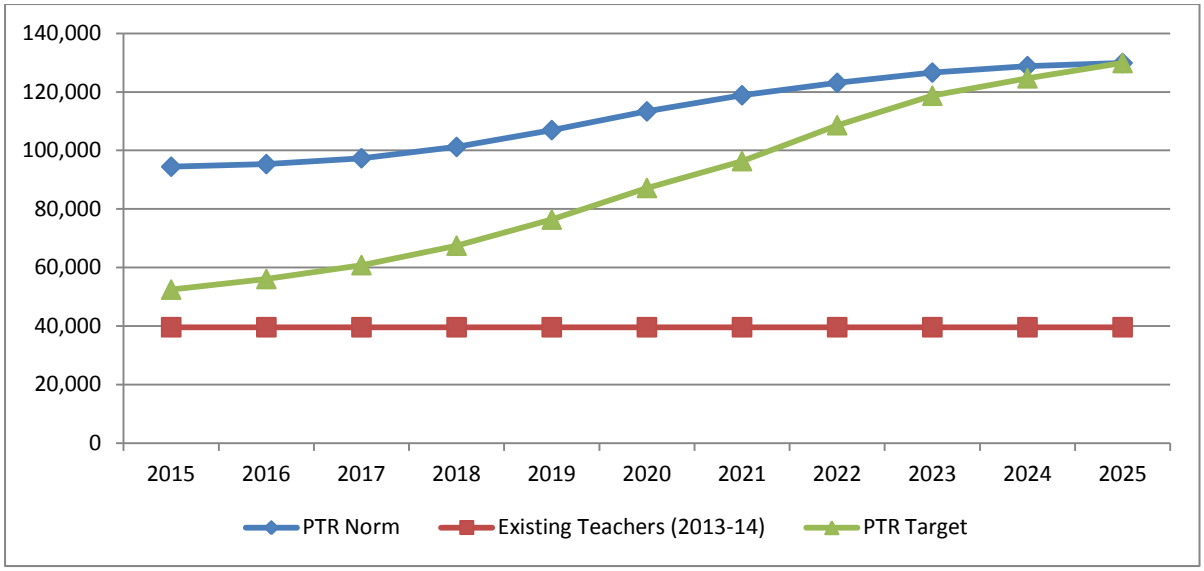
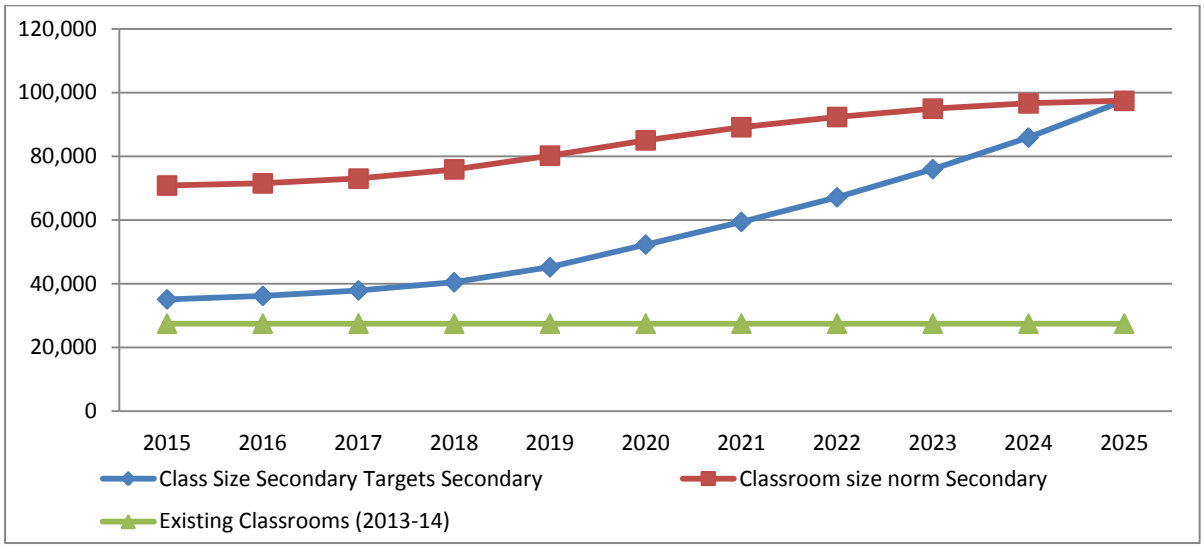


Figure 30: Demand for Classrooms



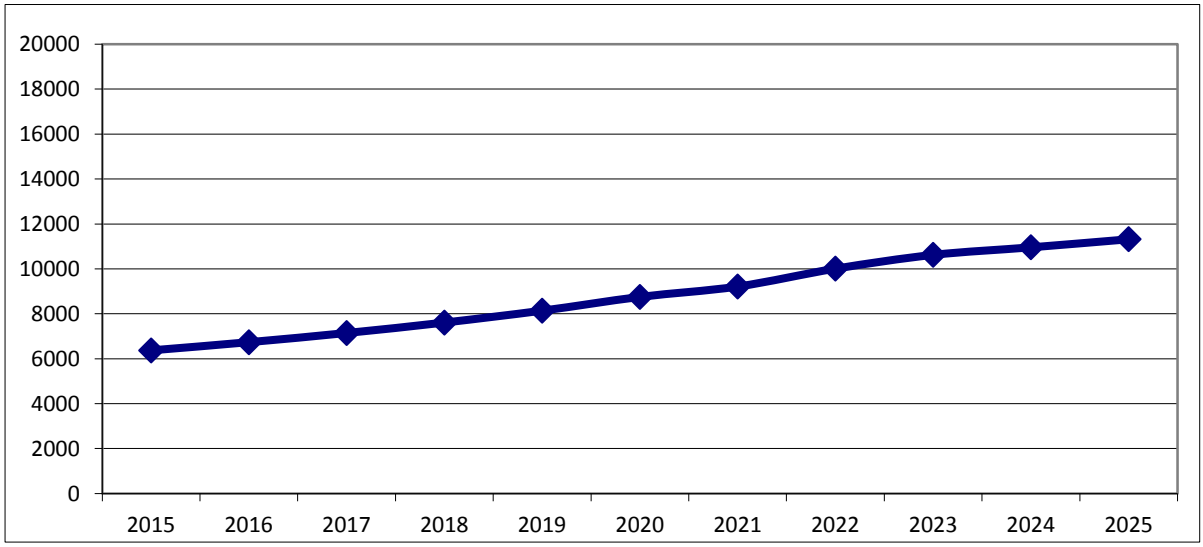
4.4 Projected Expenditure and Financial Feasibility

Projection of secondary education expenditure is driven by the changes in the PTR, teacher salaries, PCR, the cost of construction of new classrooms and schools and other development investments. In Model 3, the PTR was reduced to 30:1 from the existing 56:1, and PCRs were reduced from 1:80 to 1:40. Teachers' salaries were assumed to average Rs 25,000. The cost of constructing new classrooms was fixed at Rs 500,000. The SGDP was assumed to grow at 2% annually.

The unit cost at secondary level in Bihar is shown in Figure 31. With the gradual implementation of RMSA norms of PTR from 56:1 in the baseline year to 30:1 in 2025, unit costs will increase from under Rs 6,368 in 2015 to Rs 8,751 by 2020 and then stabilise around Rs 11,323 from 2025. Unit costs are low relative to other states because of the high PTR in Bihar.

The financial implications of sustainable growth presented in model 3 are considerable (Figure 32). The gradual implementation of RMSA PTR norms push recurrent expenditure up. The increase for secondary grades 9 and 10 alone would be from about Rs 1,600 crores in 2012 to Rs 2,000 crores by 2015 and to just over Rs 3,000 crores in 2020. Development expenditure[7] would also grow over this period in order to support the construction of new classrooms, schools, toilets, and development grants. This would account for about 15% of total expenditure.

Figure 31: Average annual unit cost (in Rs)



The main difficulty will be concentrated on financing growth in the budget for recurrent expenditures. Overall a consistent real growth rate of about 10% would be needed to ensure that Model 3 reforms could be implemented.

To achieve the participation rates needed to implement Model 3 would take an increasing share of the State budget and SGDP (Figure 33). The total secondary budget as share of SGDP needs to increase from a projected 0.76% in 2015 to 1.25% in 2020. Similarly the recurrent expenditure as a share of SGDP would require an increase from 0.67% in 2015 to 1% in 2020. This will be difficult, but not impossible to achieve if there is political will to move to these levels of investment. Cost saving reforms will be needed to make the expansion more financially sustainable beyond 2020 since allocations to secondary that exceed 1.25% may put pressure on other parts of the state education budget.

[7] Construction and maintenance cost

Figure 32: Recurrent and development

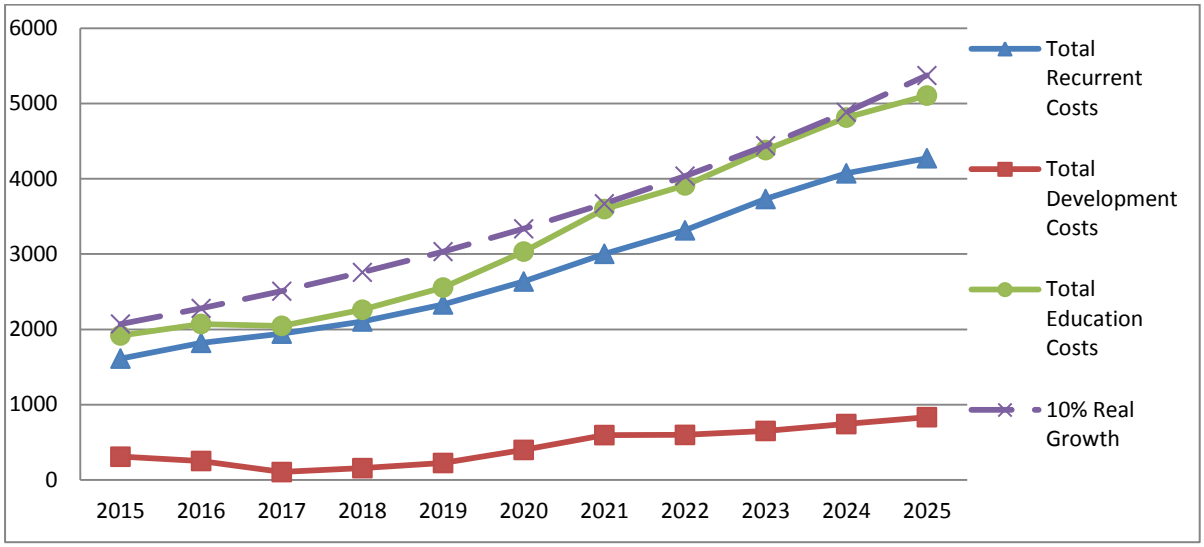
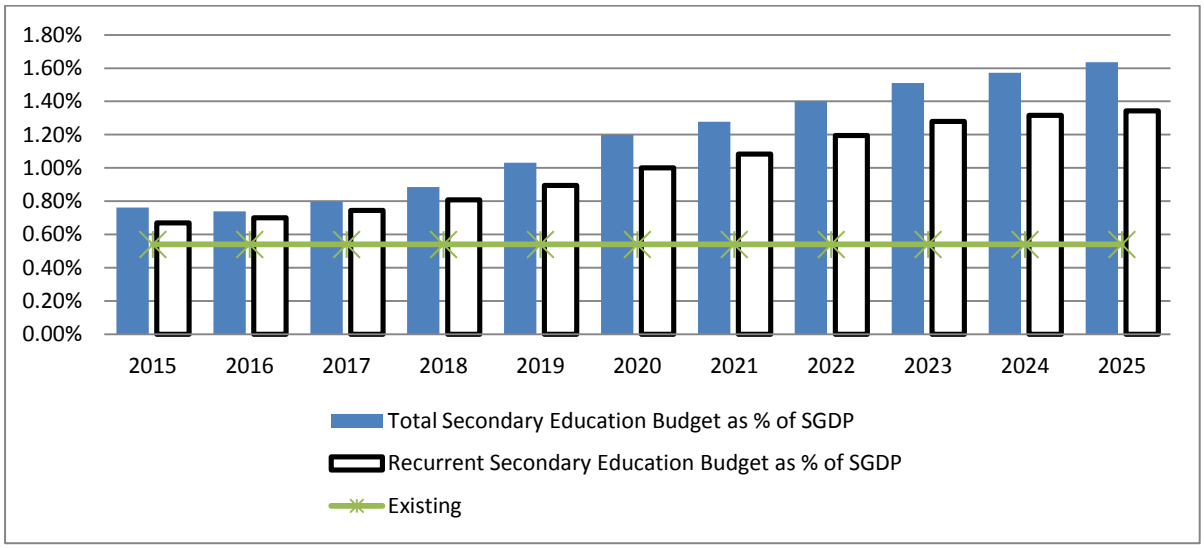


Figure 33: Secondary education expenditure as % of SGDP



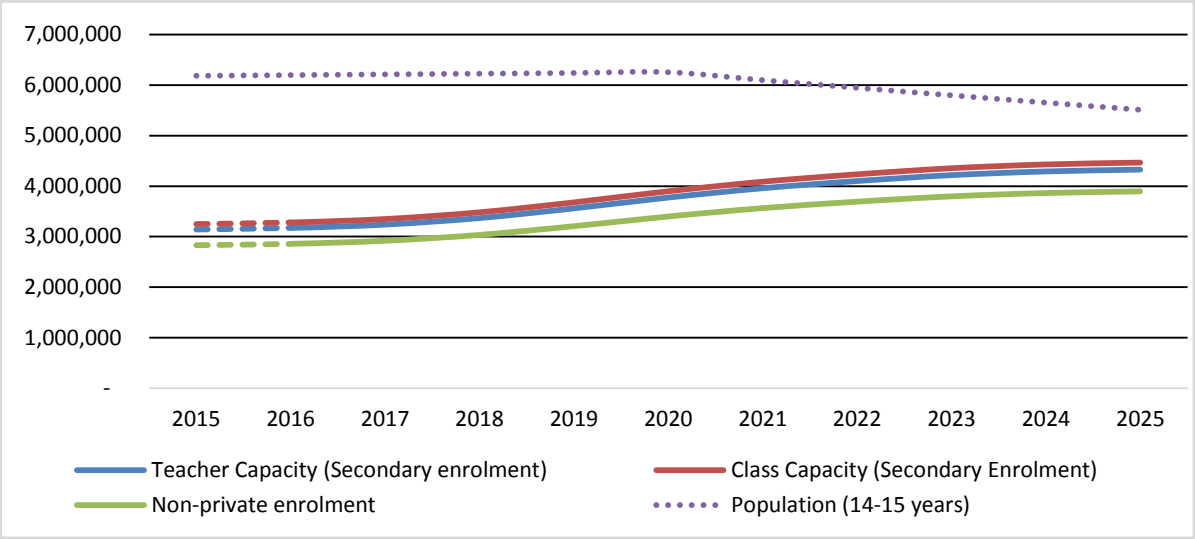
4.5 Norms and Surplus Capacity

While the RMSA norms make it appear simple to approve or reject plans for new schools and expansion of places in existing schools, they generate risks for efficient resource allocation and for educational and financial sustainability. The norms for establishing a new school, staffing and space under RMSA can result in surplus capacity and inefficient allocation of resources (Figure 34).

Under-utilisation of classroom capacity generated through the application of RMSA norms could be significant. If the current pattern of distribution of schools by size continues in Bihar (Table 2), the application of RMSA norms would create surplus teacher and classroom capacity (Figure 34). This is represented by the distance between the capacity and enrolment lines in the figure 34. If all small schools operated at a PTR of 30:1 then the gain in efficiency would be equivalent to capacity for approximately 125,000 students. It is not realistic to expect the eradication of small schools, but a

proportion of the maximum possible gains could be achieved by more efficient school location, thereby helping to reduce the cost of maintaining higher enrolment rates. Though not evident from the simulation it is clear that problems of high nominal enrolment and low actual attendance are endemic in Bihar. Before embarking on the recruitment of more teachers it is important to establish how efficiently the existing cadre are being utilised.

Figure 34: School Capacity



Note: Utilisation rates are obtained using demand for non-private (government and aided) enrolment

4.6 Summary Conclusion - Bihar Case Study

Bihar has an opportunity under RMSA to progress towards universalizing access to and participation in secondary school. The target of a GER of 100% cannot be achieved within the timeframe indicated in the 12th Plan. This is because the elementary school system is not graduating sufficient numbers of children to support universal entry to grade 9. It is also because there are outstanding problems related to high PTR, very large class sizes, large numbers of small schools and overly large schools, and concerns over the quality and relevance of learning. It is of concern that enrolments may not reflect actual attendance patterns. Schools may appear over enrolled but actually be operating below capacity and this critical issue needs further exploration.

Substantial progress can be made. Demographic transition means that the numbers of school-aged children are already falling at primary level and this will affect demand for secondary schooling in the medium term. Falling rolls will make it easier to achieve high enrolment rates.

GERs at secondary can increase from their current level of 48% to well over 60% by 2020 and over 70% by 2022 if:

- Internal efficiency in primary and upper primary is rapidly increased so that dropout is minimised especially after grade 5
- Transition rates from grade 8 to grade 9 are increased to over 95% through automatic transition coupled with support for learning achievement
- Grade 9 and 10 curricula and pedagogies are adapted to manage the learning of all secondary children in ways which lead to positive achievements and low rates of underachievement, failure and dropout
- New teachers are recruited, trained and deployed on a large scale to meet norms for the PTR of 40:1 and remunerated appropriately with real growth in salaries linked to productivity gains

- Classrooms and schools are built and located according to medium term needs, taking into account the short term need to increase capacity and the medium term need to adjust to falling rolls.
- Adequate budgetary provision to meet projected recurrent and development costs within a sustainable financial framework that provides up to 1.25% of SGDP for secondary education
- Cost saving reforms to ensure that budget allocations are sustainable beyond 2020
- Attendance is improved to ensure those enrolled attend at least 90% of the time.

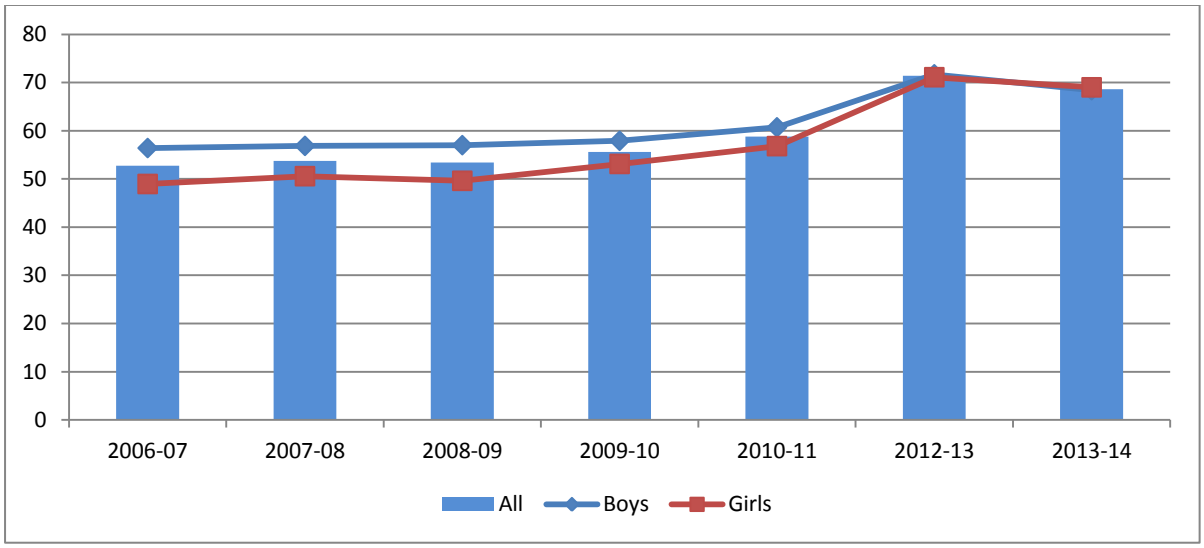
5. Case Study- Odisha

5.1 Background

In Odisha, there has been significant improvement in participation at secondary level. Figure 35 shows that the secondary GER in Odisha has increased from 53% in 2006-07 to 69% in 2013-14 with an NER of 64%. The GER for girls was similar to that for boys (69% and 68% respectively). There are 99 girls for every 100 boys in secondary schools. GERs for SCs are 59.8% and 19.1% at secondary and higher secondary levels with large differences in rates in favour of boys. For STs the GERs are around 42.1% and 17.2% respectively[8]. The transition rate to secondary school in Odisha was high at 94.3% and for boys 93%. The dropout rate of boys in grade 8 is marginally higher than that of girls and the survival rate to grade 9 was higher for girls, 76.7% compared to the survival rate of boys, 74.9%.

Enrolment rates at secondary level in Odisha increased between 2009 and 2013 but appear to have plateaued in 2014. At the same time enrolment has become more urban with over 4% growth in the last year compared to almost no growth in rural enrolments. There were 4.2 million children in grades 1-5, and 2.1 million in grades 6-7. Of these about 0.6 million were in grade 8. The grade 9 enrolment in Odisha was 0.62 million in the year 2013-14 indicating that almost all of those who reached grade 8 transited to grade 9, and that there were overaged children in grade 9.

Figure 35: Growth in Gross enrolment ratio by Gender-Odisha



In 2013-14 there are 9,423 schools offering secondary education in Odisha of which 54% are government schools, and 31% grant aided schools. Fifty-nine percent of all children are enrolled in government schools most of which are small schools with average enrolments of less than 150. These small schools with enrolments less than 150 constitute 67% of the total number of schools in the government system, and enrol 44% of all children in secondary school. A skewed distribution of schools by size with implications for efficiency and effectiveness is apparent in Odisha (Table 3). In 2013-14, while the average PTR in government school is 20:1, only 6.1% of government schools have all core subject teachers. Despite the low PTR, the PCR in government school was 68:1, suggesting that for every teacher teaching, two other teachers may be engaged in other activities.

[8] Statistics for school education, 2010-11, MHRD

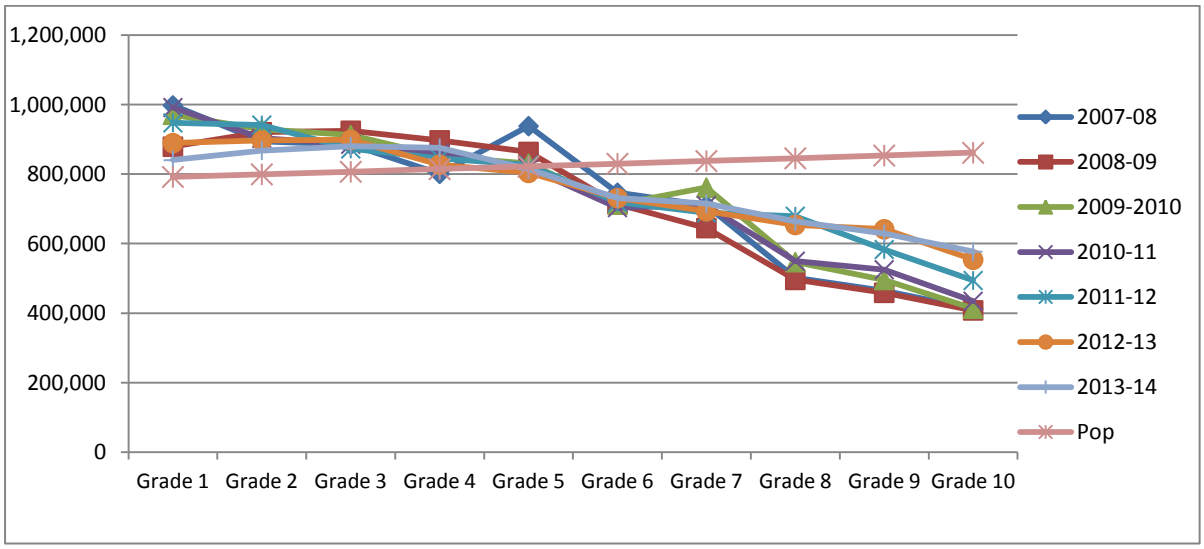
Table 3: Distribution of government secondary schools by secondary enrolment categories-

	Up to 50	51-100	101-150	151-200	201-250	251-300	301-350	351-400	401-450	451-500	>500
Percentage of schools	11.4	29.4	26.2	16.1	8.8	4.0	1.9	1.1	0.5	0.2	0.4
Average enrolment	29.6	76.7	124.4	172.7	222.9	272.8	324.5	371.9	425.0	477.1	601.9
Share of enrolment	2.5	17.0	24.6	21.0	14.7	8.3	4.5	3.0	1.5	0.8	1.9

5.1.1 Efficiency

In Odisha moderate efforts are required to advance the internal efficiency rates to increase the number of grade 8 leavers so that the system has enough grade 8 leavers to support expanded access and achievement of GER targets. Figure 36 shows recent trends in enrolment by grade in Odisha.

Figure 36: Enrolment by Grade-Odisha



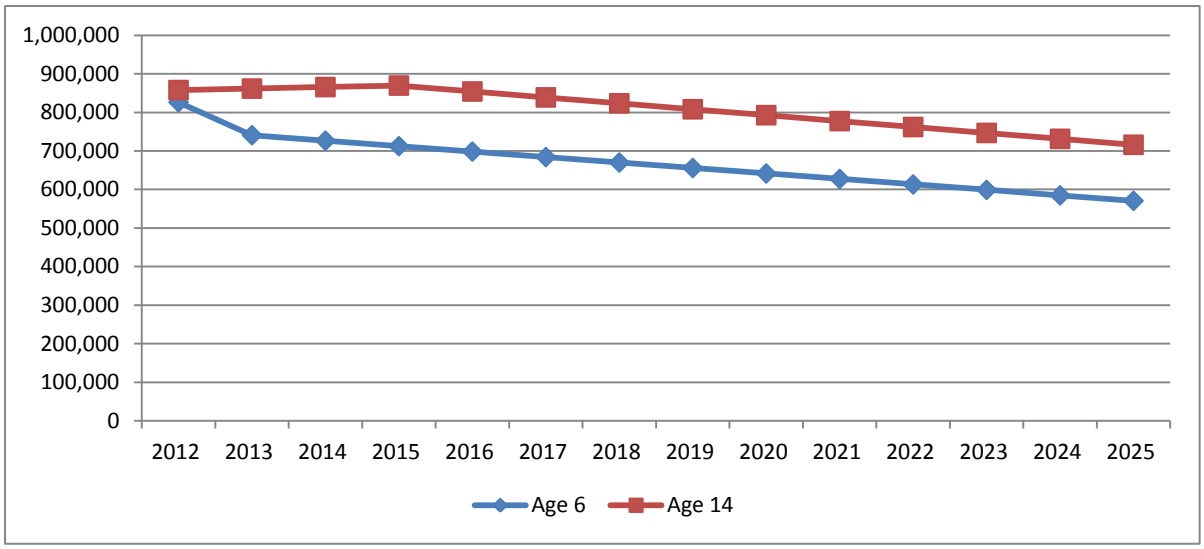
Note: 'Pop' is age-grade specific population for the year 2011

The dropout rate peaks in grades 5, 8 and 9. Until progression improves, full enrolment at secondary level will remain impossible. Only 84% of children reach grade 6. By grade 8 survival is less than 80%, and by grade 9 only 75%. Girls tend to have slightly higher enrolment rates than boys and repetition rates appear to be low. Participation rates at the secondary level are dependent on the numbers of pupils completing grade 8. In addition, the dropout rate of 9% in grade 9 further lowers secondary level participation, possibly due to poor quality teaching and/or the inability to pay the necessary costs.

5.1.2 Demography

A time lagged projection was used to estimate the population of 6, 14 and 15 year olds to 2025 using 2011 census data. Demographic transition has already occurred for 6 year olds, decreasing the population of secondary school-aged children by 2016.

Figure 37: Age 6 and 14 population



Figire 37 shows how the population of 6 year olds in Odisha will decline from 823,455 in 2012 to 712,620 in 2015 and then to 570,730 by 2025. The population of children aged 14 is likely to increase from 858,068 in 2012 to 869,776 in 2015 and then will start to decline. When projecting the school enrolment and GER targets, demographic changes in the population structure need to be considered. With the fall in population the GER in secondary will gradually increase if enrolments remain the same or increase. However, the current pattern of enrolments is concentrated in small schools and may not reflect changing patterns of urbanisation so adjustments are likely to be necessary with implications for the efficiency of resource allocation.

5.1.3 Education Financing

In Odisha total plan and non-plan budgeted expenditure on secondary education (including lower and higher secondary) increased from Rs 1,783 crores in 2011-12 to Rs 2,101 crores in 2012-13. Secondary education expenditure in Odisha as a share of total educational expenditure experienced a marginal decline from 27.7% in 2011-12 to 27.2% in 2012-13. In terms of share of SGDP, the secondary education expenditure in Odisha accounted for 0.8%.

5.2 Outputs from the Projections on Odisha

5.2.1 Baseline Model

The baseline model (M1) is configured to show how participation will grow if the current system remains as in 2012-13 and 2013-14. Enrolments in primary school will track population growth of children and completion and transition rates will remain the same. As shown in figure 35 population growth of age 6 and age 14 is likely to fall during the projection period. As a result enrolment in grade 9 will decline from 636,950 in 2015 to 610,280 in 2017 (Figure 38). The number in grade 8 will remain slightly more than those enrolled in grade 9. GER at secondary in will increase slowly from 70% in 2015 to 72% by 2020 (Figure 39).

Figure 38: Enrolment in grade 8, 9 & 10 (lags introduced to reflect transitions)

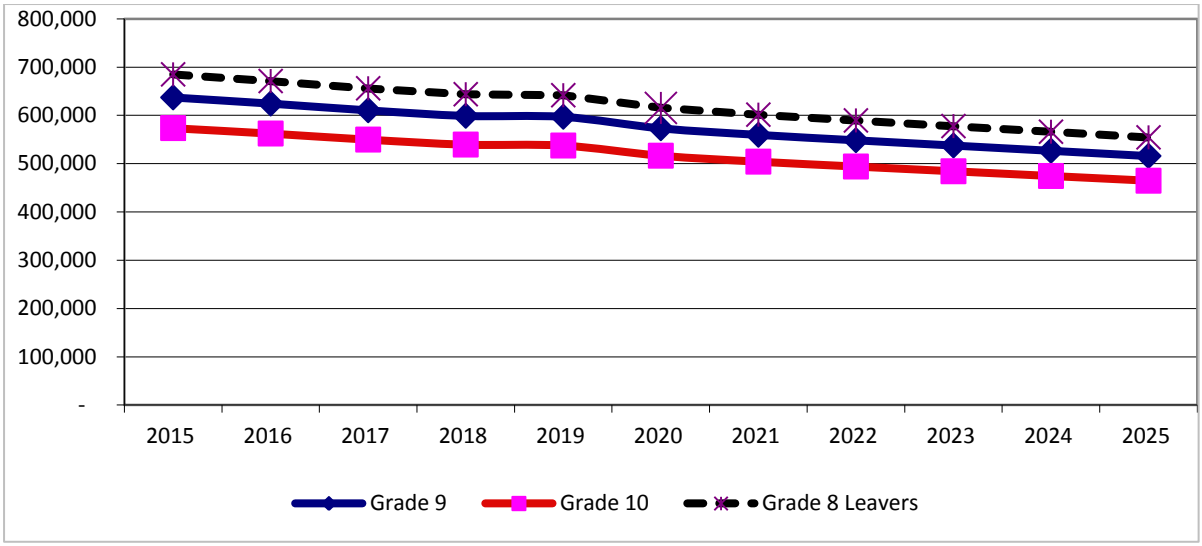
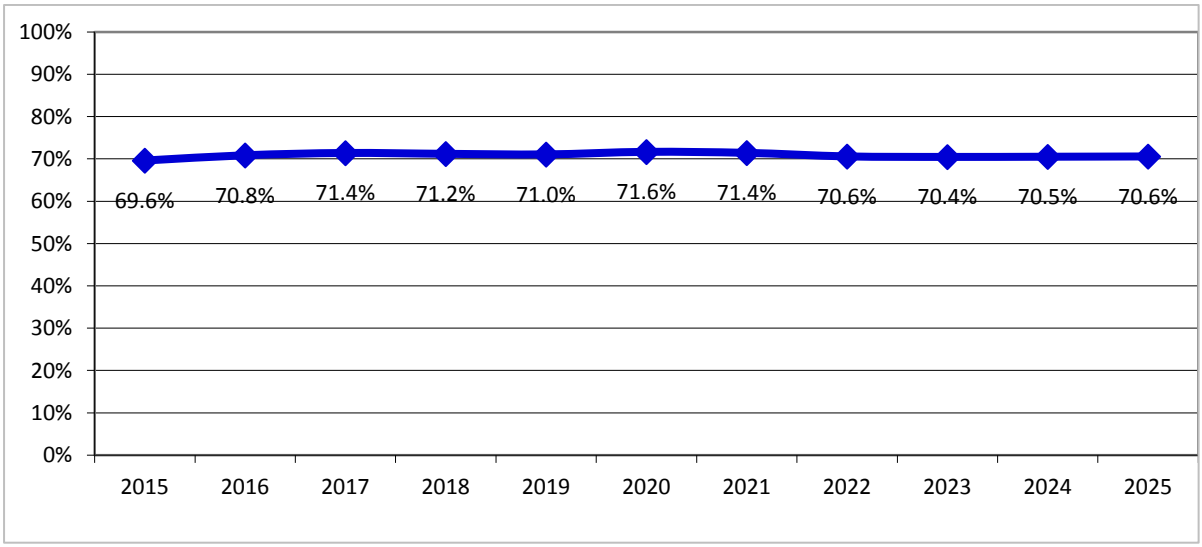


Figure 39: GER secondary



5.2.2 RMSA Target Feasibility (Model 2)

Achieving higher GERs in secondary requires a significant increase in the number of grade 8 leavers. This is necessary to increase progress towards universal retention in secondary by 2020. The survival rate through to grade 8 must therefore be improved with consistent action to reduce drop out. Figure 40 shows the pattern of growth needed to reach GER 100% by 2020.

Figure 40: GER Secondary M2

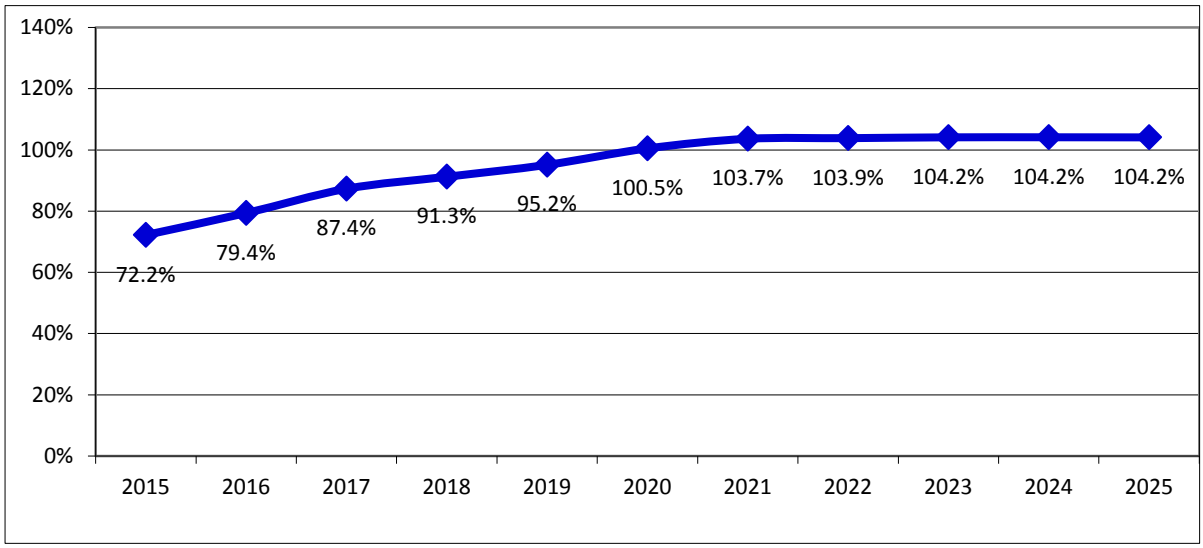
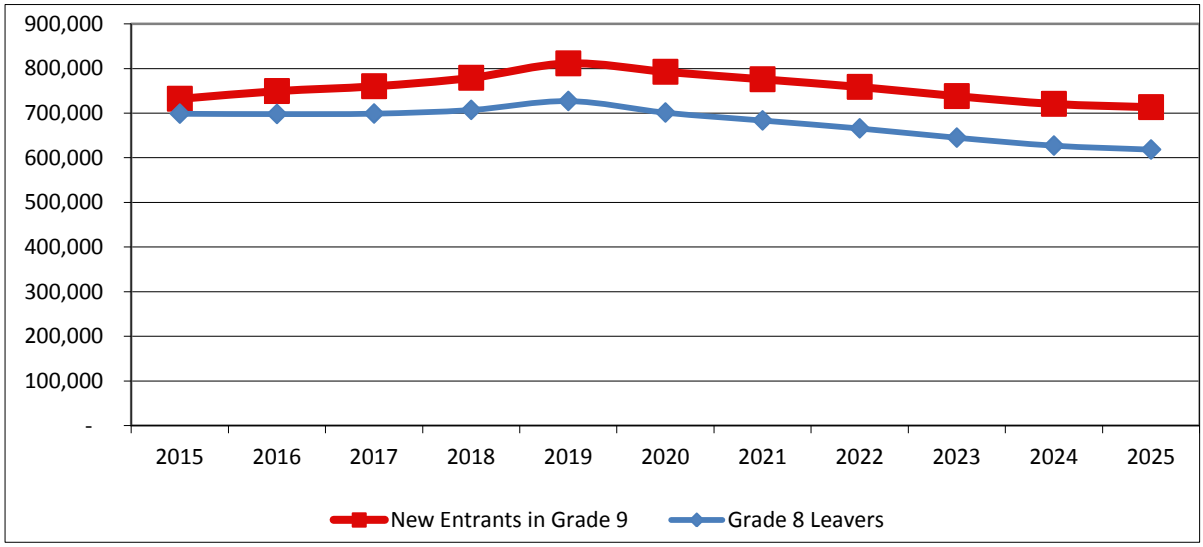


Figure 41: Grade 8 Leavers and New Entrants



To achieve the target GER of 100%, enrolment in grade 9 would have to increase by 14% per year from 2015 and will have to increase up to 17% through to 2022 to reach 100% by 2020 (Figure 41). However it is clear that Odisha will not be able to produce enough grade 8 completers to support these annual increases in grade 9 entrants.

5.2.3 Feasible Targets: Model 3

Given that the GER target for 2020 is impossible to achieve in Odisha (Model 2), a more realistic profile of growth is shown in Model 3 through making changes in internal efficiency. This is done to ensure that the new entrants in grade 9 are below the number of grade 8 leavers. Model 3 projects what levels of GER are possible to achieve over time (Figure 42). Improvements in internal efficiency at the elementary and secondary levels can allow for sufficient numbers of grade 8 leavers to support a feasible level of expansion (Figure 43) which allows GER to rise to 85.2% by 2020, but no higher.

Figure 42: GER secondary

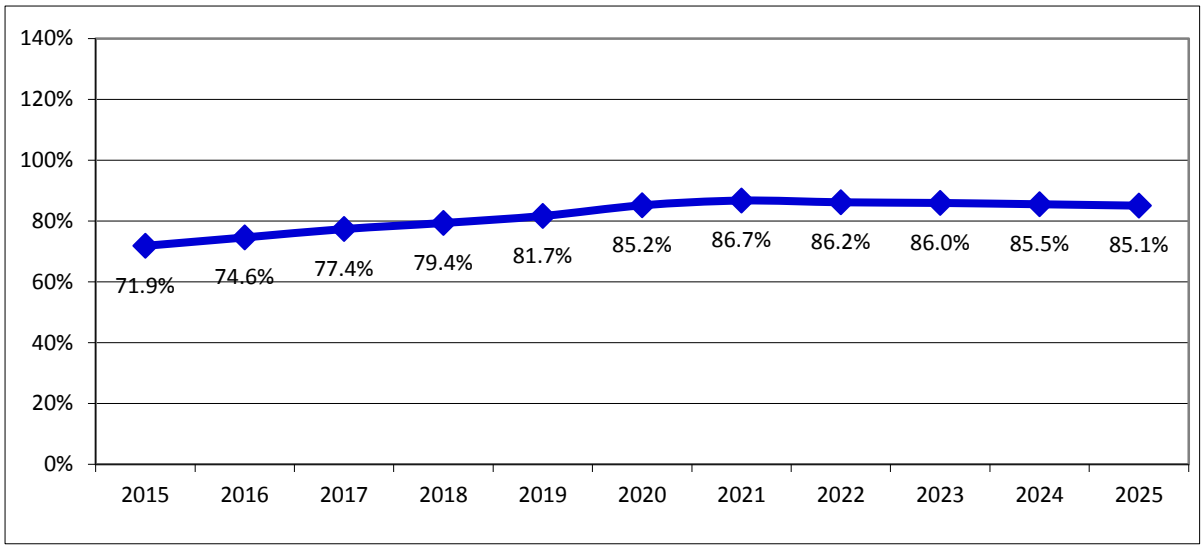
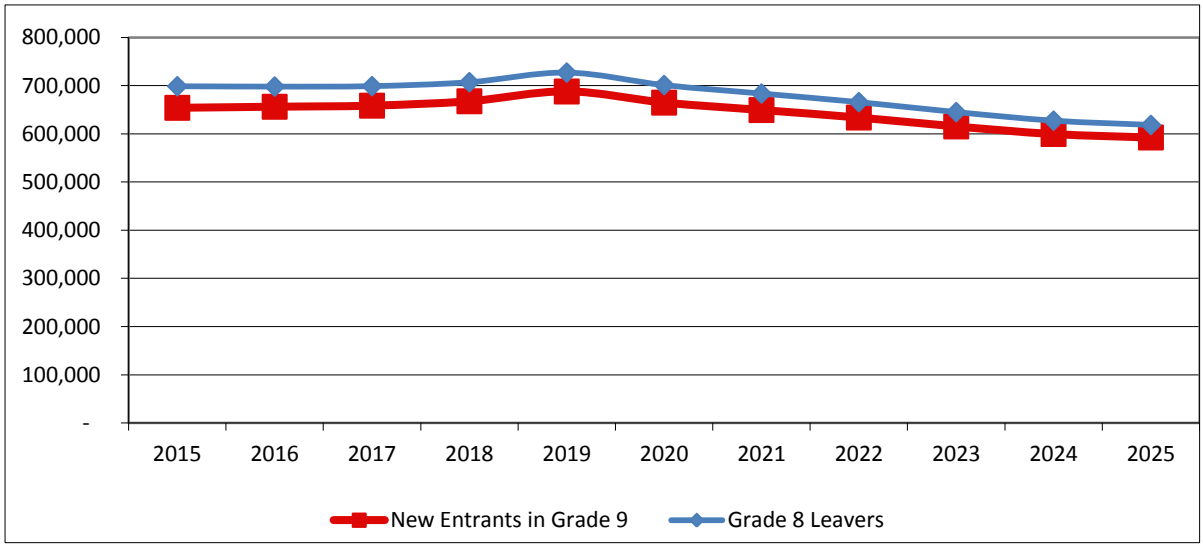


Figure 43: Grade 8 Leavers and New Entrants



In this Model the total grade 8 leavers in 2015 are expected to be around 698,690 in 2015 and will increase to 698,946 by 2017. The numbers will then decline to 701,194 by 2020 as the population of secondary school-aged children begins to decline. In Odisha improving internal efficiency rates at the elementary and secondary level would lead to GERs of 77.4% in 2017; 85.2% in 2020 and 86.2% by 2022.

5.3 Projection of Teacher and Classroom Needs

The implications of model 3 need to be considered in regard to teacher and classroom needs. Currently Odisha has surplus teacher capacity as the PTR is 20:1. If Odisha followed the RMSA norm of 30:1 this would result in a reduction in demand for teachers at this level (as illustrated in Model 3) and the need to redeploy these teachers. Figures 44 and 45 show the demand for teachers at secondary level in Odisha if RMSA norms were to be met.

Figure 44: Regular and contract teachers

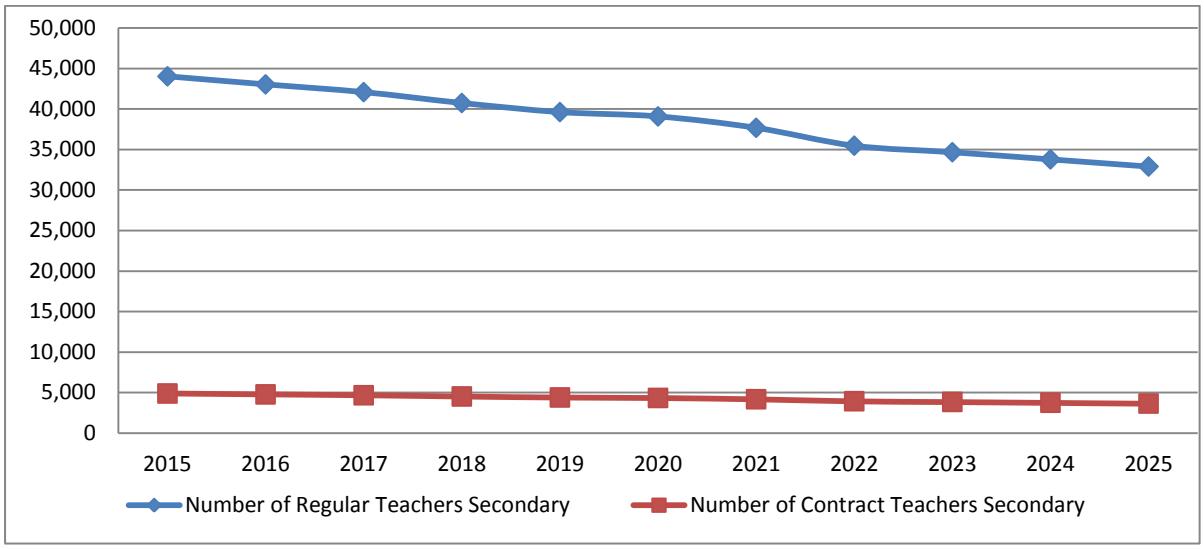
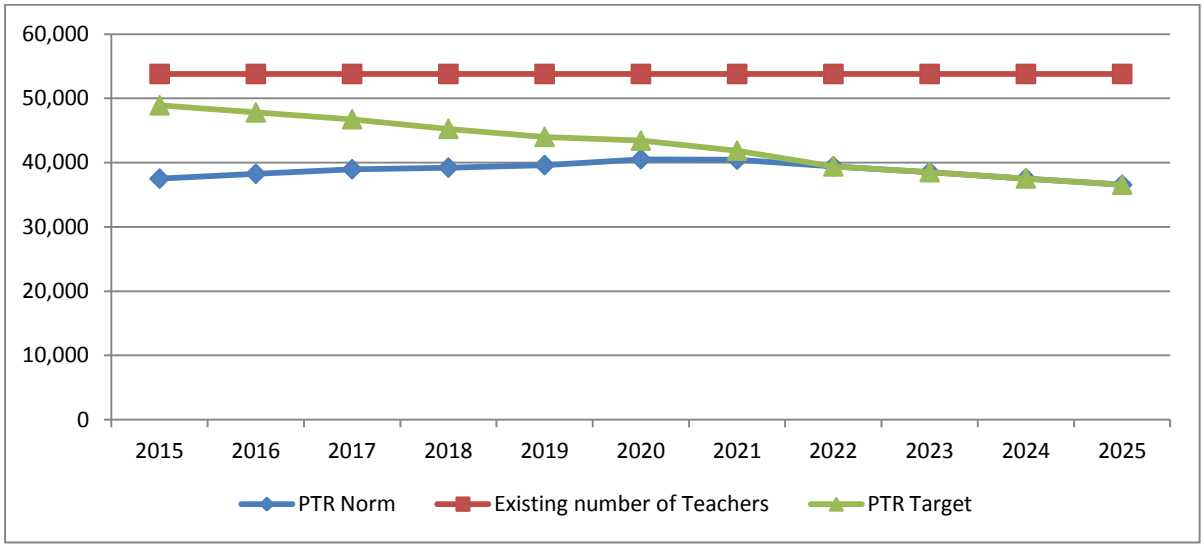
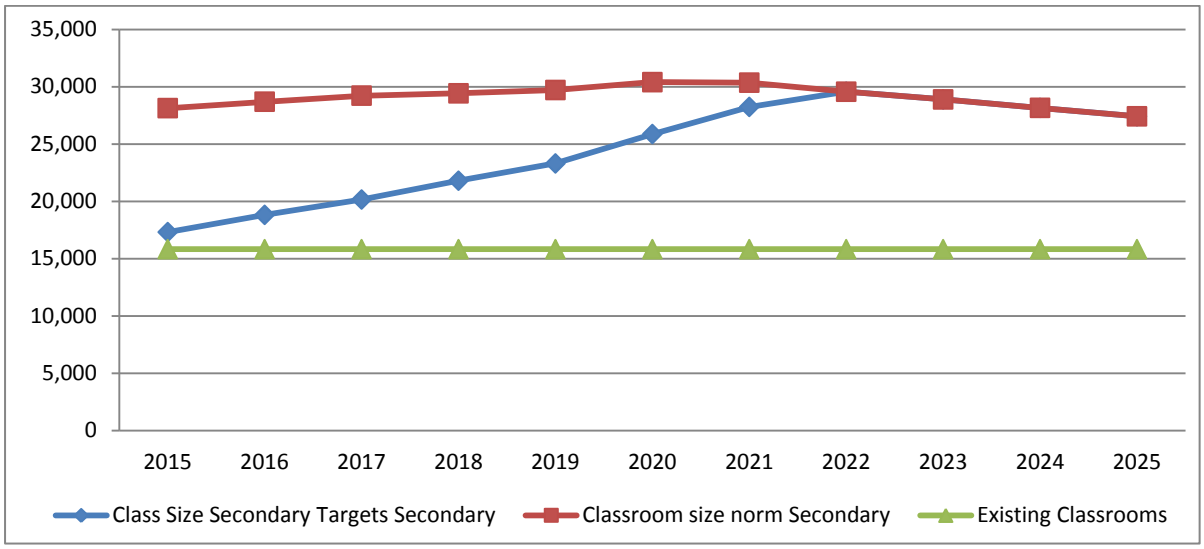


Figure 45: Demand for New Teachers



Assuming the proportion of permanent and contract teachers remains constant the number of government teachers needed is 44,025 in 2015 and 39,078 in 2020. The numbers for contract teachers are 4,892 and 4,342 in respective years (Figure 44). One strategy to manage the shrinking of the teacher cadre would be to phase out contract teachers. The pathway to reach the norm of 1 teacher per 30 children is shown in Figure 45 whereby natural wastage and carefully managed recruitment result in convergence to a PTR of 30:1 by 2022.

Figure 46: Demand for Classrooms



Currently Odisha has about 15,821 classrooms and following the RMSA norm of 40:1 total demand for classrooms is currently around double this number. PCRs can exceed 100:1 for functional classrooms. The pathway to reach the norm of 40 children per classroom is shown in Figure 46. If the norms were applied immediately a total of around 12,300 additional classrooms would be needed in 2015 in addition to the existing 15,821 classrooms. One way forward would be to phase the programme of classroom building to meet the norm by 2022 to create a more practicable pattern of procurement.

5.4 Projected Expenditure and Financial Feasibility

Projection of secondary education expenditure is based on changes in the PTR, teacher salaries, PCR and cost of construction of new classrooms. Teachers' salaries were assumed to average Rs 25,000 and grow at 3% per annum on average. The cost of constructing a new classroom was fixed at Rs 500,000. The SGDP was assumed to grow at 2% annually. The projection of secondary education expenditure is shown in Figure 47, 48 and 49 below.

The unit cost of secondary education is shown in Figure 47. If the RMSA norms are followed the unit cost of secondary education is likely to reach Rs 15,632 by 2022. Figure 48 and**Error! Reference source not found.** 49 shows the financial implications of Model 3. Recurrent expenditure would decline driven by an increase in the PTR and a falling number of children in the age group. The recurrent cost in Odisha would be about Rs 1,897 crores in 2015 and will increase to Rs 1,906 crores by 2020. Development expenditure[9] would grow over this period because of the need for new classrooms. The development expenditure in 2015 will be approximately Rs 19 crores and will increase to Rs 122 crores by 2020. The total education cost would increase during the same period from Rs 1,916 crores in 2015 to Rs 2,029 crores in 2020.

[9] Construction and maintenance cost

Figure 47: Unit cost

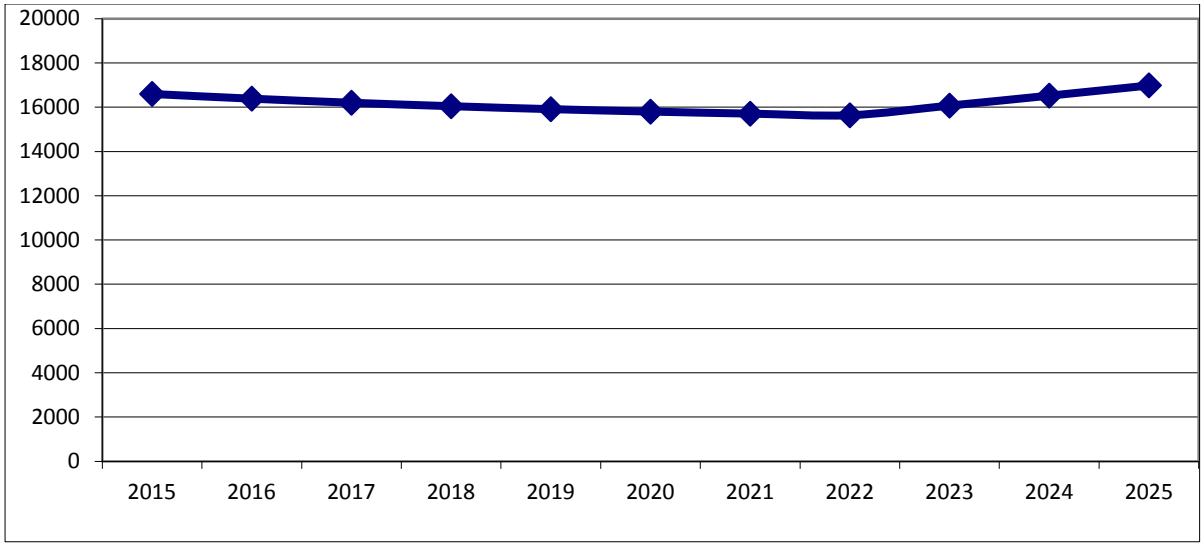
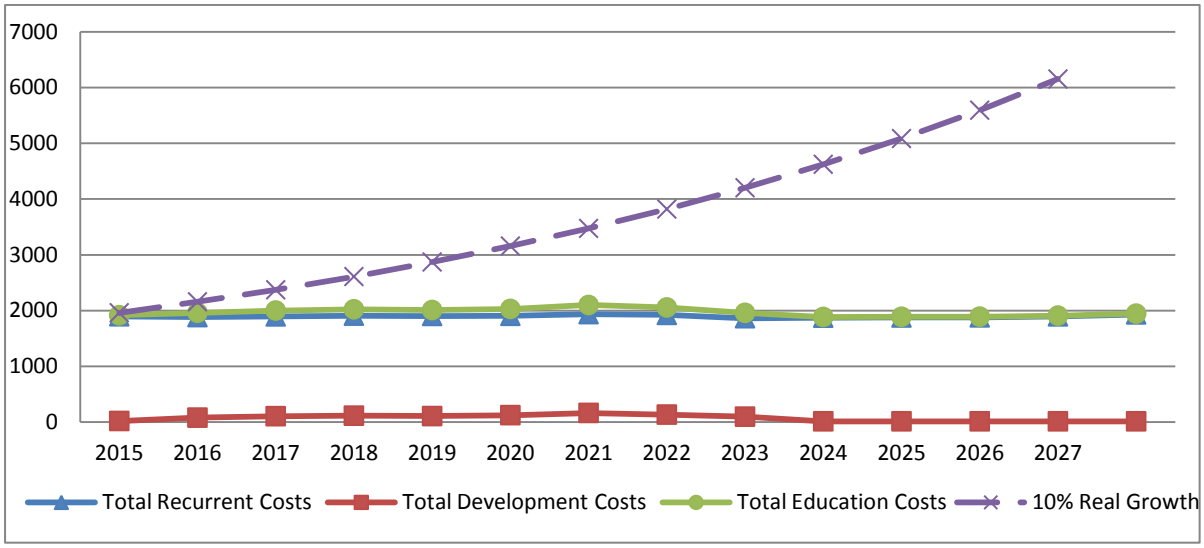
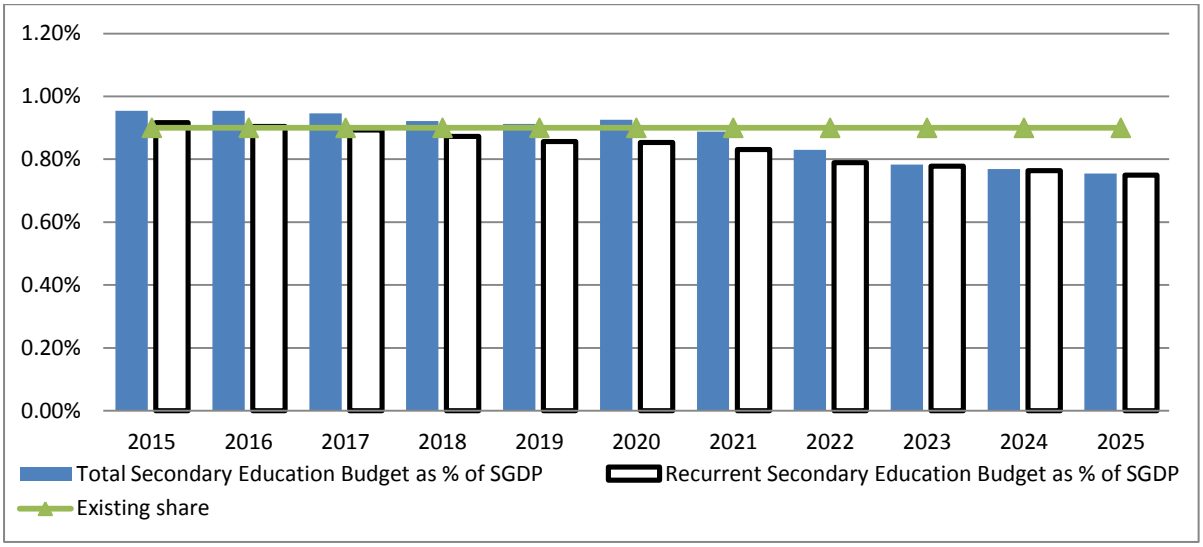


Figure 48: Recurrent and development cost



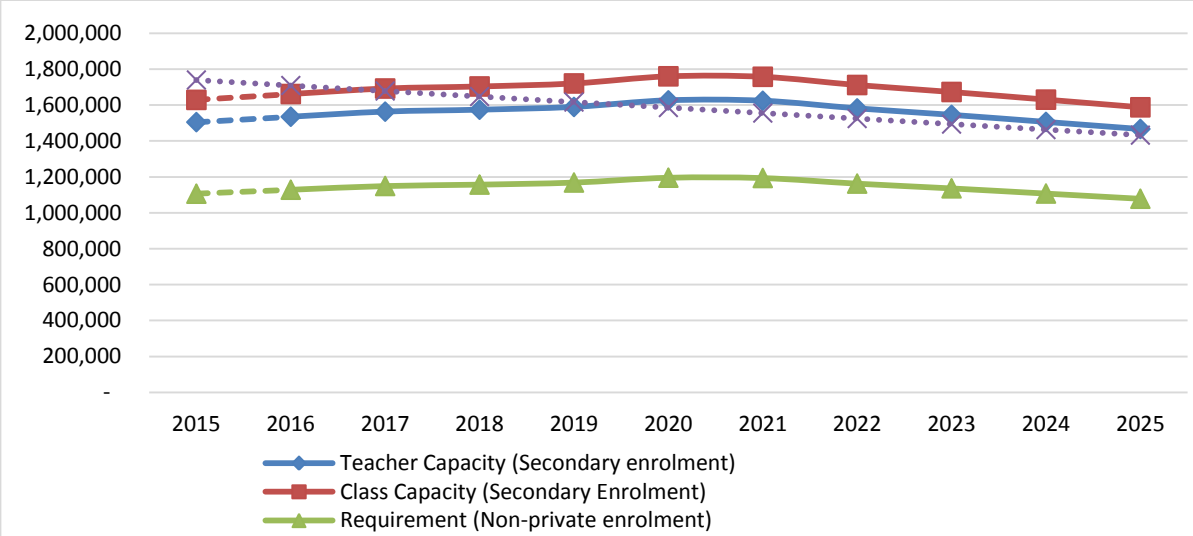
Attainment of the participation rates presented in Model 3 would take a smaller share of the State budget and SGDP. In Odisha the total secondary budget as share of SGDP will be around 0.95% in 2015 and will decline to 0.90% in 2020. Similarly the recurrent expenditure as a share of SGDP will be 0.92% in 2015, falling to 0.85% in 2020. The pattern of expanded access is therefore affordable, and creates opportunities to invest in improved quality while maintaining the current level of expenditure.

Figure 49: Secondary education expenditure as % of SGDP



5.5 Norms and Surplus Capacity

Figure 50: School Capacity



Note: Utilisation rates are obtained using demand for non-private (government and aided) enrolment

If the RMSA norms were applied such that the PTR and class size averaged 30:1 and 40:1 respectively it is clear that there will be over capacity in the sense that all projected students could be accommodated in fewer schools with fewer teachers. This simple observation ignores the specificity of terrain and community location that may make it necessary to accept some level of technical inefficiency. Figure 50 shows the notional surplus teachers and classroom capacity if the norms could be applied.

Currently Odisha is theoretically operating at 73% of its teacher capacity, with a similar pattern for classroom capacity, meaning that the government system in Odisha is operating at around 67% of its

capacity. It is important to note that even if all grade 8 leavers transition to government schools, the system will still face this surplus capacity under RMSA norms.

5.6 Summary Conclusion – Odisha Case Study

Odisha has achieved a relatively high enrolment rate at secondary level, approaching 70% GER. As in the case of Assam further progress towards RMSA targets depend on increasing the numbers successfully graduating from Grade 8 and matching expanded capacity in grade 9 with a realistic projection of future grade 8 graduates. Improved internal efficiency in grades 1-8 is essential and the transition rates from grade 8 to grade 9, while already relatively high, could be further increased. There is significant dropout from grade 9 and this may increase unless steps are taken to identify the causes and provide the additional support needed.

Demographic transition to low population growth has already occurred in Odisha according to the 2011 census data. The population of 6 year olds is shrinking. This will affect the secondary school age group from 2017 after which there will be a steady decline in the number of 14 year old children. It will be important to recognise this when planning expansion of capacity so that a surplus is not created. GERs can increase to as much as 85% by 2020. Progress beyond this level depends on more children graduating from grade 8. If the growth is accompanied by increased PTR it can be financed within the current level of allocation to secondary schooling. Eventually falling enrolments will create opportunities to invest in quality improvement.

Key conclusions for Odisha are:

- The numbers reaching grade 8 will be a constraint on secondary school participation above GER 85%
- The internal efficiency of the primary school system will need to improve
- Demographic transition means that in the long term fewer secondary places will be needed
- A large proportion of the schools in Odisha are small, with 67% of schools enrolling less than 150 students and most do not have teachers in all core subjects despite the low average PTR of 20:1. The development of the school system should consider how to increase efficiency by increasing average school size and making better use of qualified teachers
- Evolution towards the PTR norm of 30:1 will take time and must be managed to make best use of the human resources available. This may involve a moratorium on the new recruitment of teachers, some redeployment to high schools, and the phasing out of contract teachers who would no longer be needed after 2020
- Class sizes are high in Odisha and the average PCR is currently approaching 70:1. 2.3 teachers are available for every classroom. This means many more classrooms will need to be constructed in the short term to assure a level of no more than 40 pupils per class. It also means teachers could be deployed more effectively. Forward projections suggest that demand will fall after 2020 so that the demand for new space will diminish
- High dropout rates in grade 9 are a concern that must be addressed. New curricular options and improvements to pedagogy and teaching may be needed to ensure higher levels of learning
- Additional financing may not be needed if the reforms identified are put in place. Without the reforms the amounts needed may be affordable but would not represent value for money.

6. Summary of Findings and Policy Implications

RMSA is a Government of India initiative which seeks to partner with states in the development of capacity in grades 9 and 10 with the aim of universalising secondary education (i.e. achieving a GER of 100%) by 2017 and achieving universal graduation by 2020. A projection model has been developed for three RMSA-TCA states (namely, Assam, Bihar and Odisha) to assess whether RMSA enrolment targets are achievable, what are the constraints to expansion, and what realistic levels of growth can be expected. The models integrate patterns of demographic changes and the existing internal efficiency parameters to project secondary level enrolment and gross enrolment rates to 2025. Additionally, costing parameters such as PTR, PCR, specialised facilities, teachers' salaries, non-teaching staff costs, learning materials, maintenance, and other costs, were also integrated in the model of feasible growth to project demand for additional resources and emerging constraints. Ten issues stand out from the analysis of the challenges states face in achieving RMSA.

First, demographic transition is a reality in most states and will lead to declining numbers of secondary school-aged children. In low enrolment states demand for secondary school places is likely to peak around 2020 after which this demand will fall back. The pattern of demand will be determined by demography, topography and the current stock of schools and classrooms. The temptation to build and staff facilities to meet peak demand should be managed to avoid creating excess capacity that will become redundant as numbers fall. Options to meet peak demand and "tunnel through" the peak need to be considered. These might include more flexible teacher deployment and temporary double shifting. It will also be important to monitor utilisation rates of school infrastructure so that nominal enrolments are matched by actual attendance rates.

Secondly, most states will not achieve secondary level GERs greater than 100% by 2025 let alone by the target date of 201710. This is due to insufficient numbers of students reaching and graduating from grade 8. More than 50% of children who start grade 1 do not reach secondary grades. Rates of growth needed may exceed plausible ceilings on the speed at which new capacity can be procured and sustained. RMSA should only support the expansion of enrolments at rates that do not result in providing more places than the number of grade 8 students willing and able to transition to grade 9. Expansion should also be managed at rates which allow adequate numbers of teachers to be employed and class sizes to be limited to 40 students to maintain quality.

Third, additional demand for secondary education will come from marginalised groups not previously able to enrol in and complete elementary education. These groups disproportionately include children from rural areas and from urban and peri-urban informal settlements and slums, children from low income households, those from scheduled tribes and castes and other backward castes, and, in some states, girls. These different constituencies have systematically different characteristics to those children who currently attend secondary school, especially in the low enrolment states. These differences will require analysis with regard to the needs and capabilities of specific groups to establish how their needs can be addressed through changes in pedagogy and curriculum. If this is not undertaken expanded enrolment is likely to result in higher levels of drop out and failure to complete grades 9 and 10, and falling school effectiveness in achieving passes in Board examinations. In short, new students from backgrounds with less cultural capital and parental

[10] Universal access and completion would result in GERs over 100% as a result of repetition and overage enrolment. If an education system is efficient the GER would not normally be more than GER = 105%.

support, will need curricula adjusted to their capabilities, pedagogies adapted to less capable learners, and option choices relevant to their likely life futures.

Fourth, increased participation to meet RMSA targets will come from areas located at a distance from existing secondary schools. This may increase average distances to travel to secondary and result in additional costs to poor households. Safety and security issues are also associated with distance and are problematic in some states especially for adolescent girls. School type and location and working practices (including hours of operation and security arrangements) need to address these concerns. Research is needed to establish how distance to school may be changing and what the consequences are likely to be for access and equity for students who are currently unenrolled.

Fifth, current national/state secondary education expansion policies have resulted in a surfeit of small schools with low PTR and therefore high recurrent costs in some States11 (e.g. Assam). In these States more than 50% of secondary schools have enrolments below 50 in grades 9 and 10. In other States 'mega schools' have developed with PTR over 150 and enrolments in grade 9 and 10 of over 600 (e.g. Bihar). Universalisation of secondary education will depend on providing extra capacity in school places within existing schools and in new schools. Provisioning schools (teachers, classrooms, laboratories etc.) in-line with RMSA norms in States with many small schools will result in creating large under-utilised capacities when the relevant resources could be more strategically utilised to generate more capacity at the same costs. Rationalisation of resourcing through the merging of small schools and creating composite schools can release resources which can then be utilised for financing schemes needed to improve system efficiency and quality. It will remain the case that in some situations small schools are unavoidable/. In such cases new models are needed for staffing and pedagogy which are affordable and which do not compromise quality. Mega schools are likely to be unwieldy institutions which may suffer diseconomies of scale and difficulties in ensuring no children are left behind. There is evidence that some such schools have very low attendance rates (less than 20%) and are thus very ineffective. Mega schools are not necessarily cheaper to run and may increase travel distances and costs for the poorest. Policy should be developed to establish the value added by mega schools and alternative pathways to increased capacity.

Sixth, less than half of all grade 10-aged children take Board examinations in grade 10 with even lower percentages graduating successfully with grades rewarded by places in higher education and by job opportunities. As enrolments expand greater numbers of less capable and disadvantaged children will be taking summative examinations originally intended for a select group of children who have attained a certain level of academic attainment. New qualifications and courses suited to those who will leave school and seek employment after grade 10 will be needed to reduce the chances of a decline in pass rates and standards of achievement, and ensure higher relevance of secondary schooling for those who do not intend to pursue further academic study.

Seventh, the distribution of teachers is very uneven with PTRs within the same district varying from below 10 to above 100. The problem is further exacerbated by staff recruitment policies. In some states less than 14% of schools have teachers qualified in all four of the main subject areas (as in Assam and Odisha) despite very low PTRs and high teacher per class ratios. Expanded secondary

[11] Definitions of small and large schools are essentially arbitrary. Below an enrolment of 200 the cost per child rises rapidly so this paper defines a small secondary school as having enrolments below 200. Schools below 100 can be described as very small. In contrast economies of scale diminish above an enrolment of 500 so this level can be defined as a large school.

schooling requires many additional teachers covering all major subjects and electives, especially where current PTR are over the RMSA norm of 30 (as in Bihar). New teachers are needed to meet new demand and reduce the backlog of deployment needed to maintain PTR 30:1. Where PTRs are low it may be possible to increase them through strategies to merge small schools, and by making use of multi-subject and multi-grade teachers within a planned system of reforms to improve the effectiveness and reduce the costs of small schools.

Eighth, secondary education expansion will be constrained by the additional financial burden that this will place on poor households which will provide the bulk of new students. Much of the new demand will come from children from lower quintiles of household income and from otherwise marginalised groups likely to be poorer rather than richer. Cost is a major factor in decision making on attendance at secondary school for poor households and secondary school costs to household may be more than four times those for attendance at local primary schools depending on location and school type. For this reason attendance must be fee-free and direct costs to households must be minimised for households with the lowest range of income. Those at or below the poverty line are likely to need cash transfers to support the direct and opportunity costs of secondary school attendance and should not contract debt at high interest rates to pay school costs. This will pace a constraint on the extent to which private for profit providers can contribute to expanded access to secondary schooling since most households below the second quintile will find private schools unaffordable.

Ninth, financing universal secondary education with current cost structures in some States could require more than 2% of SGDP. This level is financially sustainable without a disproportionate allocation of the State budget to the education sector. Planning should profile investment to lead to systems that allocate about 1%-1.25% of SGDP to secondary schooling and less as demographic transition takes place and allows more to be invested per child within the same total allocation. In states with higher current per-student expenditure the additional costs of universal participation require cost saving reforms which increase efficiency and effectiveness (e.g. in Assam and Odisha). In States with low per pupil expenditure (such as Bihar) there is likely to be a need to increase expenditure per student linked to reforms designed to improve quality and achievement towards national averages. This would make provision between States more equitable. It would require States to increase the allocation of resources to secondary education from levels that are low relative to national averages.

Finally, growth in participation may be inequitable. It is likely that the relatively advantaged within excluded groups will benefit more than the most excluded as expanded access becomes a reality. Thus children from richer SC and ST and OBC households may increase their chances of completing secondary school at the expense of those in the same groups from lower income levels. RMSA should monitor who benefits from expanded access and develop strategies to ensure that the most marginalised are also reached. If academic achievement alone is used to filter and select children into different secondary schools this may replicate and reproduce inequality in ways that are not transparent. Local solutions are needed to ensure equality of opportunity in secondary education is a reality and that changing patterns of provision and access are publicly monitored to limit the effects of elite capture of public subsidies.

In conclusion it is important to remember that no more than 60% of all Indian children complete secondary school and net enrolment rates are little more than 40%. Around half of those completing secondary school fail to acquire high level Board qualifications and demonstrate mastery of the national curriculum. In the Northern states less than half of all children transition to secondary

school. Those from scheduled tribes and castes, OBCs and others from other educationally marginalised groups are especially disadvantaged. Girls' enrolments lag behind those of boys in some states, but not in others. There are many fewer girls in the child population than boys in some states but not in others. Only 11% of children in the lowest quintile of household expenditure are likely to reach secondary school whilst almost all of those in the richest quintile complete grade 10. The average number of years of schooling received by all children varies by more than 2:1 between states. Children who are two or more years over-age make up more than 20% of all poor children and over 30% of children enrolled in grade 5, and across India only 28% of 14 year old children are in the correct grade for their age greatly affecting access to secondary school. Boys entering school at the age of 10 had one eighth of the chance of attending secondary schools of those entering at the age of 6, and over age girls only one sixteenth the chance (Source: TCA Analysis using NSS 64th round).

For all the reasons listed above it is essential that planning of RMSA for education infrastructure, staffing and financing should pay full attention to the issues that link access, equity, efficiency and effectiveness to the flow of children through the school system. Planning must reconcile high aspirations with realistic goals and allocate resources in ways which reflect demography, constraints on growth arising from the flow of children through to grade 8, efficient teacher deployment, curricula and pedagogies relevant to new learners, and needs to tailor expansion of opportunity under RMSA to promote pro-poor and more equitable access to quality secondary schooling.

Annex 1: Assam modelling assumptions and model parameters

Table 4 presents internal efficiency measures for Assam for the year 2012-2013. Throughout the modelling exercise these measure are manipulated to assess the potential growth in the enrolment at the secondary levels.

Table 4: Student Flow Assam

	Promotion rate	Repetition rate	Dropout rate	Survival rate
Grade 1	87.4%	0.7%	11.9%	
Grade 2	95.0%	0.4%	4.5%	88.0%
Grade 3	95.9%	0.4%	3.7%	84.0%
Grade 4	96.6%	0.3%	3.1%	80.9%
Grade 5	93.1%	0.3%	6.5%	78.4%
Grade 6	96.3%	0.7%	3.1%	73.2%
Grade 7	97.0%	0.6%	2.5%	71.0%
Grade 8	82.8%	0.7%	16.5%	69.2%
Grade 9	74.0%	8.2%	17.8%	57.7%
Grade 10		5.9%		46.5%

As shown in table 5, in the baseline model the efficiency rates have been kept constant. Transition from grade 5 to 6 is 93.1% and transition from grade 8 to 9 is 82.8%. The dropout rate at grade level is 16.5%. The PCR and PTR in Assam is 70 and 17 respectively and remain content throughout the duration of the projection.

Table 5: Assumptions of Projection: Base Line Model

	2012	2017	2022
Admission Rate in Grade 1	130.9 %	130.9 %	130.9 %
Transition rate from primary to upper primary	93.1%	93.1%	93.1%
Transition rate from Grade 8 to Grade 9	82.8%	82.8%	82.8%
Promotion rate (Grade 9 to 10)	74.0%	74.0%	74.0%
Dropout rate at Grade 8	16.5%	16.5%	16.5%
PCR Secondary	70	70	70
PTR Secondary	17	17	17

Table 6: Assumptions of Projection: Model 2

	2012	2017	2022
Admission Rate in Grade 1	130.9 %	120%	120%
Transition rate from Grade 5 to Grade 6	93.1%	95%	95%
Transition rate from Grade 8 to Grade 9	82.8%	90%	92%
Promotion rate (Grade 9 to 10)	74.0%	80%	85%
Dropout rate at Grade 8	16.5%	9.3%	7.3%
PCR	70	54	43
PTR	17	22	30
Growth rate required in grade 9 entrants to achieve GER targets		20%	28%

In model 2 iteration on the efficiency rates were introduced in order to reach the values necessary to achieve the GER targets (table 6). Growth rate required in the grade 9 entrants are also introduced to find out the number of additional grade 9 entrants required for achieving the GER targets in Assam. Transition rate from grade 5 to 6 has been increased up to 95%. Similarly an increase has been made in the transition rate to grade 9. Besides these internal improvement an external growth in grade 9 enrolment will be needed to achieve GER targets. The growth rate required will be between 20% to 30%.

Table 7: Assumptions of Projection: Model 3

	2012	2017	2022
Admission Rate in Grade 1	130.9 %	120%	120%
Transition rate from Grade 5 to Grade 6	93.1%	95%	95%
Transition rate from Grade 8 to Grade 9	82.8%	90%	92%
Promotion rate (Grade 9 to 10)	74.0%	80%	85%
Dropout rate at Grade 8	16.5%	9.3%	7.3%
PCR	70	54	43
PTR	17	22	30
Growth rate required in grade 9 entrants to achieve GER targets	Projected growth		

Introduction of growth rate in required number of grade 9 entrants in model 2 implied more number of grade 9 entrants than there were grade 8 leavers. This proposition is impossible and therefore model 3 projects feasible enrolment flows by using the iterations in the internal efficiency rates.

Table 8: Summary of indicators: Assam														
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Enrolments														
Enrolment Grade 9	502468	575820	571139	572997	573800	585440	599456	615747	642951	628173	610209	590086	571584	553661
Enrolment Grade 10	361562	388516	451260	456420	464999	472990	488255	505984	526025	555703	550618	541160	529408	518680
Secondary Enrolment	864030	964336	1022399	1029418	1038799	1058431	1087711	1121731	1168976	1183876	1160828	1131246	1100992	1072341
GER Secondary	63.7%	70.3%	72.9%	73.3%	74.0%	75.4%	77.6%	80.1%	83.5%	84.6%	84.7%	85.1%	86.2%	87.5%
Transition Rate Grade 8-9	86.0%	86.8%	87.6%	88.4%	89.2%	90.0%	90.4%	90.8%	91.2%	91.6%	92.0%	92.0%	92.0%	92.0%
Teachers														
Pupil Teacher Ratio	17	20	20	21	22	22	24	26	28	29	30	30	30	30
Total Number of Secondary Teachers	45743	43395	46008	44118	43485	42717	40960	38680	37574	36741	34941	34051	33140	32278
Pupil Classroom ratio	70	67	64	61	58	54	51	48	45	44	43	41	41	40
Number of Classrooms Needed Secondary	11109	12954	14377	15188	16119	17641	19195	21032	23380	24216	24296	24832	24832	24832
Costs														
Unit Cost per Annum	22903	20455	20972	20635	20741	20620	19944	18995	18366	18283	18268	18718	19183	19661
Total Recurrent Costs Crore	17941	17875	19446	19251	19530	19782	19659	19306	19456	19615	19214	19190	19140	19108
Total Development Costs Crore	54	1537	1207	721	822	1301	1335	1570	1989	785	182	52	52	52
Total Education Costs Crore	1800	1941	2065	1997	2035	2108	2099	2088	2144	2040	1940	1924	1919	1916
Development as % of Total	0.3%	7.9%	5.8%	3.6%	4.0%	6.2%	6.4%	7.5%	9.3%	3.8%	0.9%	0.3%	0.3%	0.3%
Recurrent Secondary Education expenditure as % of SGDP	1.56%	1.65%	1.72%	1.63%	1.63%	1.65%	1.61%	1.57%	1.59%	1.48%	1.38%	1.34%	1.31%	1.28%
Total Secondary Education expenditure as % of SGDP	1.55%	1.52%	1.62%	1.57%	1.56%	1.55%	1.51%	1.46%	1.44%	1.42%	1.37%	1.34%	1.31%	1.28%

Annex 2: Bihar Modelling Assumptions and Model Parameters

Three projection models were set up keeping the status of internal efficiencies, demographic changes and secondary education financing into consideration. Projections of different pathways to meet RMSA targets for expanded access to secondary schools (Grades 9&10) have been developed. The State education system has been modelled from national school and population census data to generate enrolment projections through to 2025.

Table 9: Student flow - Bihar

	Promotion rate	Repetition rate	Dropout rate	Survival rate
Grade 1	97.4%	3.4%	-0.8%	
Grade 2	100.3%	1.4%	-1.7%	100.8%
Grade 3	96.0%	1.2%	2.8%	102.6%
Grade 4	95.4%	1.1%	3.5%	99.6%
Grade 5	81.4%	1.0%	17.5%	96.1%
Grade 6	96.3%	0.7%	3.0%	79.1%
Grade 7	97.0%	0.7%	2.3%	76.7%
Grade 8	90.4%	0.7%	8.9%	75.0%
Grade 9	89.9%	1.4%	8.7%	68.2%
Grade 10	-	1.5%	-	62.2%

In the base line model admission rate at grade one is calculated using the actual enrolment in grade 1 in 2012-13 and the population figure of age six children obtained from 2011 census. The base year of projection model uses the existing state of enrolment, population, PTR, PCR and unit cost. The figure for PCR and PTR are obtained from secondary flash Statistics 2012-13. Transition rate at primary to upper primary (Grade 5 to Grade 6) and transition from upper primary to secondary (from grade 8 to grade 9), promotion rate are estimated using reconstructed cohort model based on the UDISE data of 2012-13 and 2013-14.

Table 10: Assumptions of Projection: Base Line Model Bihar

	2012	2017	2022
Admission Rate in Grade 1	89 %	89 %	89 %
Transition rate from primary to upper primary	81.4%	81.4%	81.4%
Transition rate from Grade 8 to Grade 9	90.4%	90.4%	90.4%
Promotion rate (Grade 9 to 10)	89.9%	89.9%	89.9%
Dropout rate at Grade 8	8.9%	8.9%	8.9%
PCR Secondary	81	81	81
PTR Secondary	56	56	56

In model 2 improvement in the internal efficiency rates were introduced. Further, growth rates required in the number of entrants at grade nine to achieve the targets of GER at secondary level are introduced. Projection model 2 suggests that Bihar requires a high growth rate in the number of entrants to grade 9 to achieve the GER target.

Table 11: Assumptions of Projection: Model 2 Bihar

	2012	2017	2022
Admission Rate in Grade 1	89 %	95%	95%
Transition rate from Grade 5 to Grade 6	81.4%	85%	90%
Transition rate from Grade 8 to Grade 9	90.4%	90.4%	90.4%
Promotion rate (Grade 9 to 10)	89.8%	95%	95%
Dropout rate at Grade 8	8.9%	4.3	4.3
PCR	81	66	43
PTR	56	44	30
Growth rate required in grade 9 entrants to achieve GER targets		32%	20%

The third model relies upon realistic changes in the internal efficiency rates to increase the flow of students. Iterations are made to improve internal efficiency rates. Secondary grade 9 places grow at a rate determined by the goal of achieving GER 100% moderated by the need to ensure grade 9 entrants are always less than or equal to grade 8 leavers the previous year. Teacher demand is projected on the basis of achieving PTR of 30:1 at secondary level. The number of class rooms are projected on the basis of achieving PCR of 40:1.

Table 12: Assumptions of Projection: Model 3 Bihar

	2013	2017	2022
Admission Rate in Grade 1	89 %	95%	95%
Transition rate from Grade 5 to Grade 6	81.4%	85%	90%
Transition rate from Grade 8 to Grade 9	90.4%	91%	92%
Promotion rate (Grade 9 to 10)	89.8%	95%	95%
Dropout rate at Grade 8	8.9%	4.3	4.3
PCR	81	66	43
PTR	56	44	30
Growth rate required in grade 9 entrants to achieve GER targets	Projected growth		

Table 13: Summary of indicators: Bihar														
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Enrolments														
Enrolment Grade 9	1354282	1640834	1635150	1659740	1696539	1781136	1882654	1988904	2059413	2120720	2165533	2181823	2187991	2153562
Enrolment Grade 10	1245668	1513128	1518590	1548221	1592540	1682109	1789261	1902421	1983076	2055013	2111771	2141325	2160918	2140744
Secondary Enrolment	2599950	3153962	3153740	3207960	3289079	3463245	3671915	3891325	4042490	4175733	4277305	4323149	4348909	4294306
GER Secondary	49.5%	47.8%	50.2%	50.9%	51.3%	52.2%	54.2%	57.1%	60.4%	65.0%	69.0%	72.8%	76.0%	78.6%
Transition Rate Grade 8-9	88.0%	71.6%	89.6%	90.4%	91.2%	92.0%	92.6%	93.2%	93.8%	94.4%	95.0%	95.6%	96.2%	96.8%
Teachers														
Pupil Teacher Ratio	56	56	56	54	51	48	45	42	39	37	34	32	31	30
Total Number of Secondary Teachers	39614	41133	46390	52471	56088	60839	67474	76388	87188	96369	108630	118703	124653	129879
Pupil Classroom ratio	81	81	81	81	79	77	75	71	65	60	55	50	45	40
Number of Classrooms Needed Secondary	27507	28561	32211	35133	36209	37926	40484	45187	52313	59428	67153	75970	85872	97410
Costs														
Unit Cost per Annum	6145	6146	6146	6368	6733	7143	7608	8139	8751	9214	10012	10626	10963	11323
Total Recurrent Costs Crore	13746	14279	16116	18212	19431	21049	23314	26357	30039	33160	37326	40735	42740	44506
Total Development Costs Crore	133	981	3073	2504	1035	1555	2240	3977	5948	5973	6499	7413	8328	9691
Total Education Costs Crore	1388	1526	1919	2072	2047	2260	2555	3033	3599	3913	4382	4815	5107	5420
Development cost as % of Total	1.0%	6.4%	16.0%	12.1%	5.1%	6.9%	8.8%	13.1%	16.5%	15.3%	14.8%	15.4%	16.3%	17.9%
Total Secondary Education expenditure as % of SGDP	0.54%	0.58%	0.72%	0.76%	0.74%	0.80%	0.89%	1.03%	1.20%	1.28%	1.40%	1.51%	1.57%	1.64%
Recurrent Secondary Education expenditure as % of SGDP	0.54%	0.55%	0.60%	0.67%	0.70%	0.74%	0.81%	0.90%	1.00%	1.08%	1.20%	1.28%	1.32%	1.34%

Annex 3: Odisha Modelling Assumptions and Model Parameters

Table 14 presents internal efficiency measures for Odisha for the year 2012-2013. These are calculated using UDISE data applying reconstructed cohort method.

Table 14: Student flow at elementary level

	Promotion rate	Repetition rate	Dropout rate	Survival rate
Grade 1	95.0%	3.2%	1.7%	
Grade 2	95.7%	2.5%	1.7%	98.2%
Grade 3	95.1%	2.3%	2.4%	96.4%
Grade 4	96.1%	2.4%	1.4%	94.0%
Grade 5	89.1%	2.3%	8.5%	92.7%
Grade 6	95.9%	1.9%	2.0%	84.6%
Grade 7	94.2%	1.9%	3.7%	82.8%
Grade 8	93.6%	1.5%	4.7%	79.6%
Grade 9	88.5%	2.5%	8.8%	75.8%
Grade 10		1.6%		68.8%

Table 15: Key parameter model-1

	2012	2017	2022
Admission Rate in Grade 1	104.1 %	104.1 %	104.1 %
Transition rate from Grade 5 to Grade 6	89.1%	89.1%	89.1%
Transition rate from Grade 8 to Grade 9	93.6%	93.6%	93.6%
Promotion rate (Grade 9 to 10)	88.5%	88.5%	88.5%
Dropout rate at Grade 8	4.8%	4.8%	4.8%
PCR Secondary	68	68	68
PTR Secondary	20	20	20

In the baseline model existing rates of internal efficiency remain constant. The admission rate in Grade 1 was around 104%. The transition rate from grade 5 to 6 was 89.1% in Odisha in 2012-13. The transition rate from grade 8 to grade 9 was 93.6%. PTR in Odisha was 20 and PCR was 68. These rates remain constant for model 1.

Table 16: Key parameters- Model 2

	2012	2017	2022
Admission Rate in Grade 1	104.1 %	100%	100%
Transition rate from Grade 5 to Grade 6	89.1%	95%	97%
Transition rate from Grade 8 to Grade 9	93.6%	95%	95%
Promotion rate (Grade 9 to 10)	88.5%	92%	95%
Dropout rate at Grade 8	4.8%	3.4%	1%

PCR	68	58	40
PTR	20	28	30
Growth rate required in grade 9 entrants to achieve GER targets		14%	17%

Iterations in internal efficiency rates were introduced in model 2. Further, growth rates required in the number of entrants at grade 9 to achieve the targets of GER at secondary level were also introduced. Projection model 2 suggests that Odisha will have to make significant efforts towards improving the transition rate from grade 5 to grade 6 from existing 89.1 to 99% in 2022. Similarly the transition rate from grade 8 to grade 9 will have to be moderately improved from 93.6% in 2012 to 95% in 2022. Besides increase in grade 8 graduate through improvement in internal efficiency additional grade 9 enrolment will be needed to achieve GER target. The projection model suggests that Odisha will require between 14%-17% additional students during the projection period.

Table 17: Key parameters- Model 3

	2012	**2017**	**2022**
Admission Rate in Grade 1	104.1 %	100%	100%
Transition rate from Grade 5 to Grade 6	89.1%	95%	97%
Transition rate from Grade 8 to Grade 9	93.6%	94%	95%
Promotion rate (Grade 9 to 10)	88.5%	92%	93%
Dropout rate at Grade 8	4.8%	4.4%	3.4%
PCR	68	66	43
PTR	20	24	30
Growth rate required in grade 9 entrants to achieve GER targets	Projected growth		

The third model relies upon realistic changes in the internal efficiency rates. Secondary Grade 9 places are allowed to grow at a rate determined by the main targets for the participation rate (GER) moderated by the need to ensure grade 9 entrants are always less than or equal to grade 8 leavers the previous year. Private non-aided schools will remain similar in number. The assumption is that new entrants to grade 9 will be from low income households that cannot afford significant direct and indirect costs. Teacher demand is projected on the basis of achieving PTR of 30:1 at secondary level and the number of class rooms are projected on the basis of achieving PCR of 40:1.

Table 18: Summary of Indicators: Odisha														
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Enrolments														
Enrolment Grade 9	649888	647356	653587	668262	673511	675913	685111	705641	683073	667106	651116	632281	616062	608390
Enrolment Grade 10	594028	596497	606794	625117	631598	635272	645203	665798	646576	632729	618890	602328	588100	581884
Secondary Enrolment	1243916	1243853	1260382	1293379	1305109	1311184	1330314	1371439	1329649	1299835	1270006	1234610	1204162	1190274
GER Secondary	69.7%	71.4%	71.7%	71.9%	74.6%	77.4%	79.4%	81.7%	85.2%	86.7%	86.2%	86.0%	85.5%	85.1%
Transition Rate Grade 8-9	92.0%	92.4%	92.8%	93.2%	93.6%	94.0%	94.2%	94.4%	94.6%	94.8%	95.0%	95.2%	95.4%	95.6%
Teachers														
Pupil Teacher Ratio	20	21	22	23	24	25	26	27	28	29	30	30	30	30
Total Number of Secondary Teachers	53792	52773	50784	48916	47815	46751	45260	44013	43420	41862	39410	38515	37535	36552
Pupil Classroom ratio	68	68	68	65	62	59	56	53	50	47	44	41	40	40
Number of Classrooms Needed Secondary	15821	16297	16430	17309	18509	19810	21014	22422	24315	25829	26871	26871	26871	26871
Costs														
Unit Cost per Annum	17463	17134	16847	16599	16384	16200	16042	15908	15796	15705	15632	16070	16521	16985
Total Recurrent Costs Crore	18942	19141	18971	18823	18953	19086	19028	19056	19360	19217	18626	18718	18753	18776
Total Development Costs Crore	76	459	185	786	1048	1135	1064	1234	1631	1335	962	130	130	130
Total Education Costs Crore	1902	1960	1916	1961	2000	2022	2009	2029	2099	2055	1959	1885	1888	1891
Development cost as % of Total	0.4%	2.3%	1.0%	4.0%	5.2%	5.6%	5.3%	6.1%	7.8%	6.5%	4.9%	0.7%	0.7%	0.7%
Secondary Education expenditure as % of GDP	0.98%	0.99%	0.95%	0.95%	0.95%	0.95%	0.92%	0.91%	0.93%	0.89%	0.83%	0.78%	0.77%	0.75%
Recurrent Secondary Education Expenditure as % of SGDP	0.98%	0.97%	0.94%	0.92%	0.90%	0.89%	0.87%	0.86%	0.85%	0.83%	0.79%	0.78%	0.76%	0.75%