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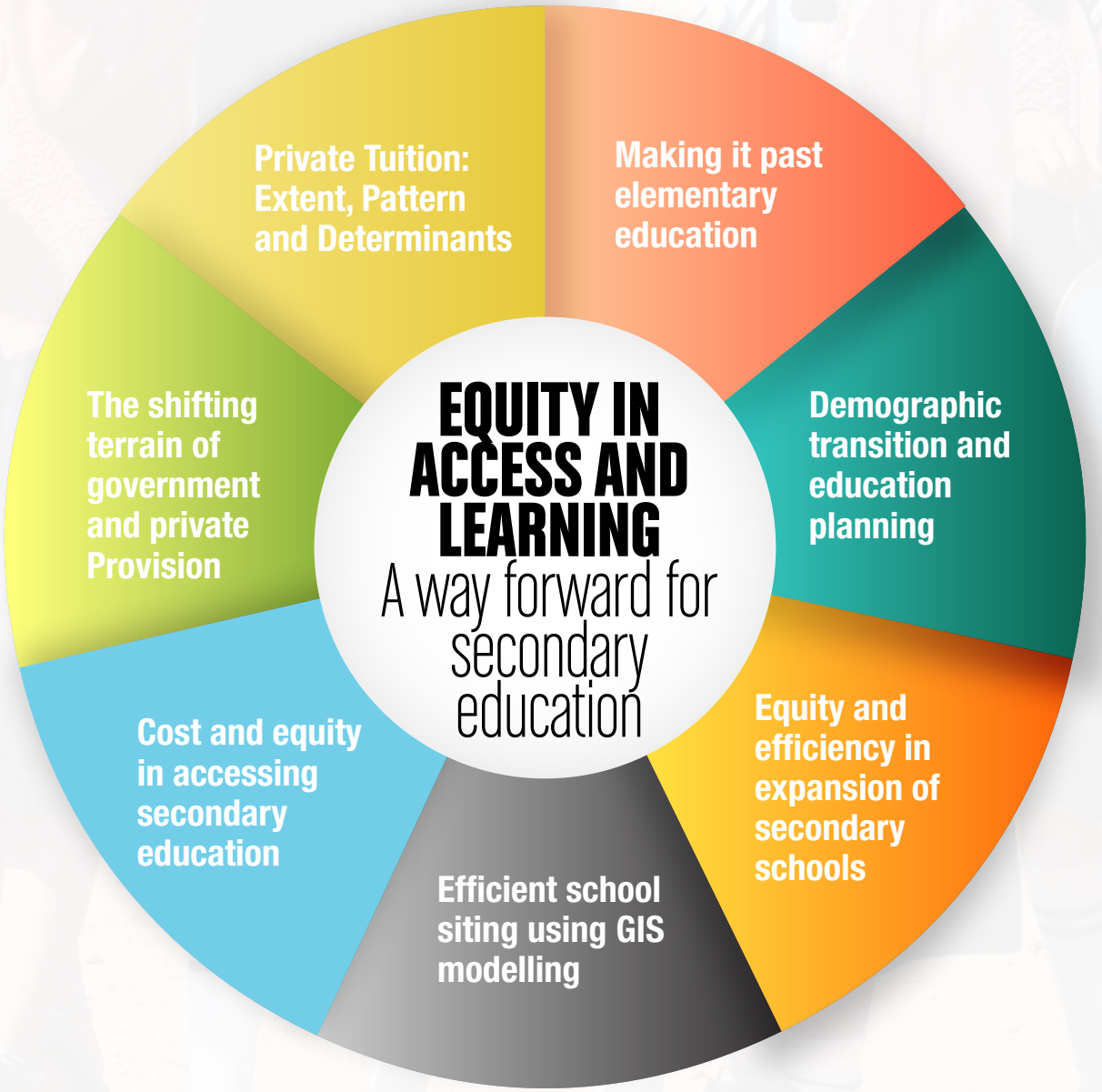
Ministry of Human Resource Development

RESEARCH REPORT
0

Equity in Access and Learning: A Way Forward for Secondary Education



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RMSA-TCA
Rashtriya Madhyamik Shiksha Abhiyan
Technical Cooperation Agency

Preface

This synthesises report *Equity in Access and Learning: A Way Forward for Secondary Education in India* presents findings from a programme of research developed by the Rashtriya Madhyamik Shiksha Abhiyan-Technical Cooperation Agency (RMSA-TCA) in discussion with National University of Educational Planning and Administration and the Ministry of Human Resource Development (MHRD).

The research was developed to respond to concerns expressed in the Joint Review Missions (JRM) to strengthen the evidence base for diagnosis of issues arising during the implementation of RMSA, and to inform policy dialogues on options that could increase access, efficiency, effectiveness, and equity.

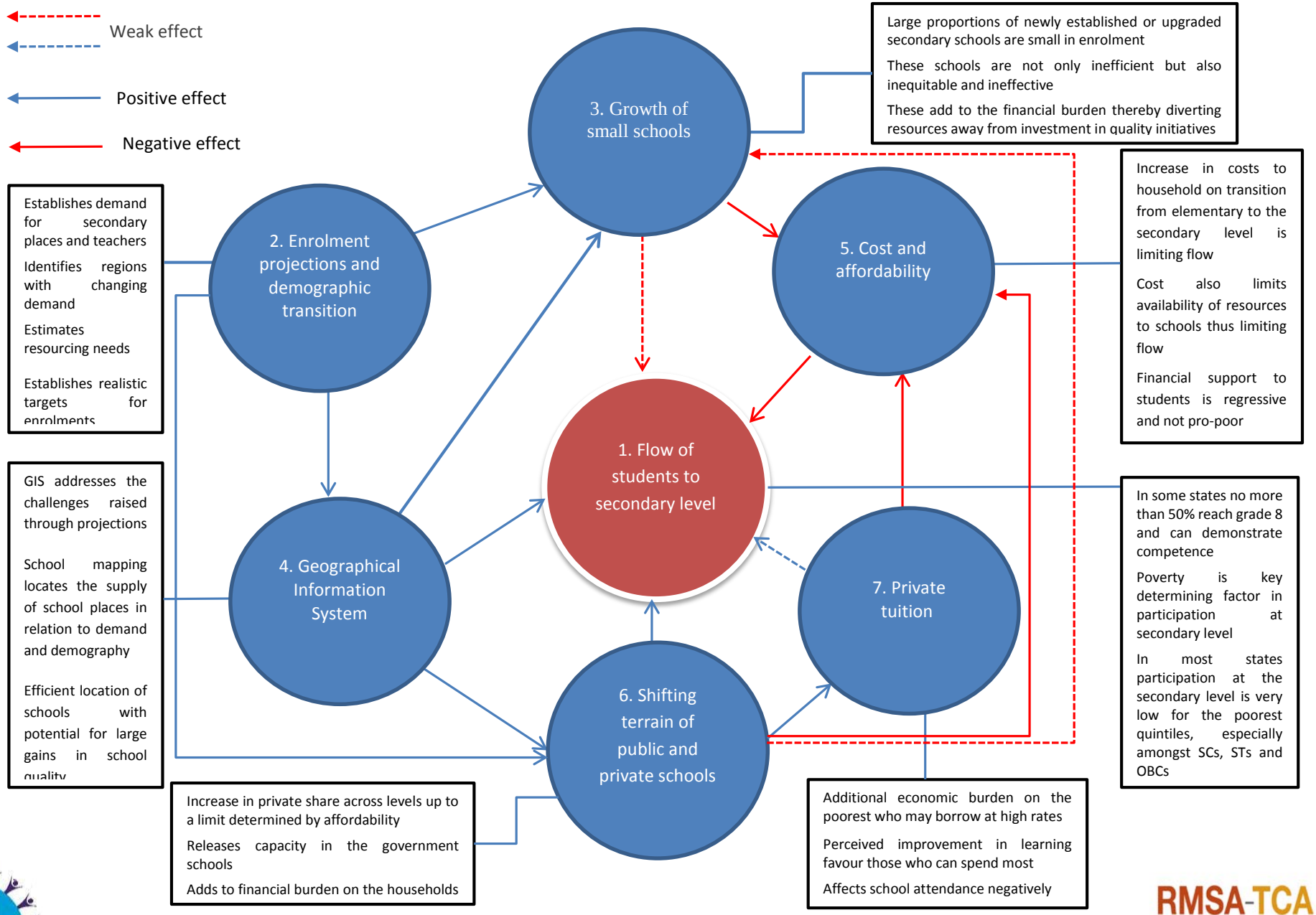
The research reports prepared as part of this research initiative are intended to be of interest to planners, managers and policy makers, as well as to academics involved in development of policies and plans for secondary education. In addition to these reports, a research priority framework and research quality assessment framework has also been developed to take this research agenda forward.

The analysis in this consolidated report identifies key areas of concerns that will shape secondary school development in India over the next decade. It also presents a matrix of policy options that can be explored to address some of these challenges.

The eight research reports in this series are as follow:

Research Report 0: ***(Consolidation)***	**Equity in Access and Learning: A Way Forward for Secondary Education**
Research Report 1:	**Making it Past Elementary Education**
Research Report 2:	**Demographic Transition and Education Planning**
Research Report 3:	**Equity and Efficiency in Expansion of Secondary Schools**
Research Report 4:	**Efficient School Siting using GIS Modelling**
Research Report 5:	**Cost and Equity in Accessing Secondary Education**
Research Report 6 :	**The Shifting Terrain of Government and Private Provision**
Research Report 7:	**Private Tuition: Extent, Pattern and Determinants**

CONCEPTUAL MAP OUTLINING INTERLINKAGES BETWEEN THE RESEARCH STUDIES



RMSA-TCA
Rashtriya Madhyamik Shiksha Abhiyan Technical Cooperation Agency

RMSA TECHNICAL COOPERATION AGENCY

EQUITY IN ACCESS AND LEARNING:

A WAY FORWARD FOR SECONDARY EDUCATION IN INDIA

March 2016

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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)
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	Research (Reports and Documents for Thematic Area 6)
RMSATCA 7	Communication and Knowledge Management (Reports and Documents for Thematic Area 7)

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Executive Summary

Rashtriya Madhyamik Shiksha Abhiyan (RMSA) is an initiative of the Government of India in partnership with State governments which seeks to universalise enrolment in grades 9 and 10 across India. It supports the upgradation of existing schools, the building of new schools to reach under-served areas, investments in quality improvement, and contributions to recurrent and capital costs. The goal is to universalise entry into secondary school by the end of 2017 and achieve universal completion of grade 10 by 2020[1].

This report synthesises findings from a programme of research developed by the RMSA-Technical Cooperation Agency (TCA) in discussion with National University of Educational Planning and Administration (NUEPA) and the Ministry of Human Resource Development (MHRD). The research was developed to respond to concerns expressed in the Joint Review Missions (JRM) to strengthen the evidence base for diagnosis of issues arising during the implementation of RMSA, and to inform policy dialogues on options that could increase access, efficiency, effectiveness, and equity.

The main research questions were:

- How has participation grown under RMSA in terms of distribution of schools by type, size, distance to school, performance, social group participation, and costs per student and what does this indicate about changing patterns of access, equity, efficiency and effectiveness and transitions into secondary education?
- How are patterns of participation likely to change over the next ten years as a result of changing demography, higher participation rates, and changing costs and what will be the constraints on achieving RMSA goals?
- What are the main constraints on growth in participation at secondary level including demographic transition, affordability, the characteristics of new learners from more disadvantaged social groups, levels of achievement, the growth of fee paying private schools and the development of private tuition?
- To what extent is the growth of participation equitable for different social groups and how could future growth promote a better distribution of opportunities to learn?
- How efficient are current secondary education expansion models? And, what efficiency gains can be achieved through application of GIS for school location planning?

These main questions have been explored through a series of research studies focussed on:

i) Changing patterns of access, participation and equity in secondary schools
ii) Projections of enrolments and demographic shifts to predict future demand for schools, classrooms, teachers and the necessary financing levels
iii) School size analysis to map problems arising from excessive numbers of small schools
iv) School location analysis using Geographic Information Systems
v) Affordability analysis to establish costs to household and the extent to which this will limit effective demand for secondary school for the poor
vi) Private school growth and the extent to which this can contribute constructively to RMSA's goals
vii) Private tuition and its costs to households

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

The research has used several different methods of data collection and analysis. These include desk, literature and interview based reflective analysis and reviews of recent research relevant to RMSA and resource allocation and participation; secondary data analysis of Unified District Information System for Education (U-DISE) and National Sample Survey (NSS) data and other data sets including National Achievement Survey as appropriate; cross sectional modelling based on normative data; and longitudinal projection using software designed to simulate system growth and generate scenarios in relation to school location, size, achievement, costs per child and affordability. GIS methods were used to demonstrate the power of the techniques through its application in a single district. The research also draws on RMSA-TCA's own unique survey data, collected during fieldwork carried out in selected districts in Assam, Odisha, and Bihar.

This portfolio programme of research for RMSA-TCA highlights the fact that no more than 60% of all Indian children complete secondary school and net enrolment rates are little more than 40% suggesting that many are over age for their grade. Around half of those completing secondary school fail to acquire qualifications and demonstrate mastery of the national curriculum. In the Northern states less than half of all children make the transition to secondary school. Those from Scheduled Tribes (ST) and Scheduled Castes (SC), Other Backward Castes (OBC) 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. The poorest 20% of children are eight times less likely to complete secondary school than the richest 20% in some 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

This analysis identifies twelve concerns that will shape secondary school development in India over the next decade. These are evidenced in the RMSA-TCA research reports.

First, most states will find it difficult to achieve secondary level Gross Enrolment Rates (GERs) greater than 100% by 2020 and will not succeed by the target date of 2017[2]. This has several causes. These include insufficient numbers of students reaching and graduating from grade 8 since more than 40% of children who start grade 1 do not reach the secondary level; inadequate levels of achievement of grade 9 entrants who may then fail to complete grade 10 successfully; insufficient access to secondary school places in some areas and oversupply in other areas; poor attendance of students and absenteeism by teachers; wide variations between schools in staffing, class size and availability of learning materials; diversion of resources from free public provision to subsidies for private schools

[2] 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%.

which do not enrol children from poor households; and failure to ensure adequate financing at State level to universalise access.

Rates of growth needed in some States and Districts may need to exceed plausible rates at which new capacity can be procured and sustained. RMSA need to 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 make the transition to grade 9. Expansion should also be managed at rates that allow adequate numbers of teachers to be employed to achieve pupil teacher ratios of 30:1 and class sizes to be limited to 40 students to maintain quality.

Second, 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 before 2020 after which the number of secondary age children will fall by 20% or more over a decade. The pattern of demand for school places will be determined by demography, topography and the current stock of schools and classrooms. The temptation to build and provide staff and facilities to meet peak demand needs to 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.

Third, additional demand for secondary education will come mostly 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 support, will need curricula adjusted to their capabilities, pedagogies adapted to less capable learners, and curricula 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 pupil teacher ratios (PTR) and therefore high recurrent costs in some States[3] (e.g.

[3] 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

Assam). In these States more than 50% of secondary schools have enrolments below 100 in grades 9 and 10. In other States 'mega schools' have developed with PTRs 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.

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. It is also the case that 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.

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. Geographic information systems (GIS) can provide detailed insight into current patterns of school location in relation to habitations. This can lead to the development of plans to increase locational efficiency that are both technically effective and educationally and politically feasible. The goal should be to have fewer schools of much greater quality.

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 disadvantaged children will follow curriculum and learning material originally intended for a select group of children who have attained a certain level of academic achievement. 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 schooling requires many more teachers qualified in all major subjects, especially where current PTRs 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 achieve and maintain a PTRs of 30:1. Where PTRs are well below the norm more teachers are not needed but the mix of those with qualifications in core subjects may need improving. It may be possible to increase PTRs 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

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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.

groups likely to be poorer rather than richer. Cost is a major factor in decision making on attendance at secondary school for poor households. 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 indirect costs of secondary school attendance and to avoid contracting debt at high interest rates to pay school costs. No child should be excluded from secondary school by the costs of attendance. This means that secondary school should be fee free and supported by scholarships or cash transfers for all for all those in the lowest two quintiles of household expenditure.

Ninth, private schools now enrol as many as 30% of those in secondary schools or about 15% of all secondary age children. Most of those participating in private schools are from the richest households. Most private schools are in areas of high population density and relative wealth. This will place a constraint on the extent to which private for-profit providers can contribute to expanded access to secondary schooling since most households in the poorer half of the population will find private schools unaffordable, even where there are lower price schools available. Private schools generally do not increase access but attract students who would otherwise be in government schools. There is yet to be any systematic evidence that private schools raise standards in government institutions as a result of competition; rather, it can be detrimental where most or all of the more advantaged and motivated families abandon government provision in favour of private options. Public subsidy of private provision always has an opportunity cost that could have been invested in improved access and quality in public systems.

Tenth, private tuition has grown rapidly and is very common at secondary level. It can cost households as much as all the other costs of secondary school attendance. There is some evidence that those with scholarships are more likely to pay for private tuition. Surprisingly large numbers of those in private schools also buy private tuition. It is not clear what are the net effects of the investment. It may encourage or facilitate student's absenteeism. It may favour the rich who can afford to buy more private tuition and it is therefore socially regressive. It may simply be raising the price of selection by high stakes examinations without much impact on who gets selected. The probability is that private tuition and its cost will continue to grow and affect more and more households. The poorest will contract debt to pay the costs thus making themselves even poorer.

Eleventh, financing universal secondary education with current cost structures in some States could require more than 2% of State Gross Domestic Product (SGDP). This level is financially unsustainable without a disproportionate allocation of the State budget to the education sector. Planning should allocate about 1% of SGDP to secondary school. This should fall 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.

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.

Navigating the ocean of possibilities for RMSA to develop requires not one road map but a series of State and District level medium term perspective plans sensitive to local opportunities and priorities that roll over from year to year and have the benefit of projection modelling and GIS. There are many detailed policy options suggested by the research of RMSA-TCA. These are contained in the thematic reports and in the matrix of policy options.

The research identifies twelve major reforms that can be a basis for dialogue and which would be transformational and would constitute innovations that would transform the landscape of secondary education in India.

i. Implement a district level medium term planning process using District Five-Year Rolling Plans. These would use school mapping, GIS and demographic projection to analyse supply and demand for school places, teachers, learning materials and infrastructure, school size and distance travelled to existing and new schools, and identify needs for elementary school upgradation and the establishment of new schools.
ii. Promote equity explicitly and monitor indicators of inequality and place data and results in the public domain. Reduce variation in key indicators of participation, achievement and attainment between States and within States of participation. This would require a radical departure from using averages, to using range and variation in key measures to of progress. All main indicators that have distributional characteristics should be reported in terms of average, range and standard deviation.
iii. Abolish fees for children from wealth quintile 1 and quintile 2 and provide scholarships for all boys and girls Below the Poverty Line (BPL). Offer free secondary schooling to all those who cannot afford the direct and indirect costs. Replace income from fees with capitation grants to schools.
iv. Develop a new secondary school curriculum to recognise the broader range of capabilities, aspirations and preferences of grade 9 students. Embed the systematic management and tracking of learning in the curriculum with learning outcome levels and regular school based formative assessments.
v. Develop curriculum teachable in small secondary schools with staffing and other costs no more than 50% more than average costs per student in schools with 500 students.

vi. Develop a diagnostic entry test to be used in schools for grade 9 to provide baseline data for teachers to use to target pedagogic support to new and old students who may need this. Require National Achievement Survey (NAS) to produce detailed pedagogic guides and systematic intervention programmes to identify learning difficulties for grade 8 and grade 10 students.
vii. Reform Board examinations to increase their predictive validity and reliability, offer different pathways for different students, improve their relevance to life futures, and reduce the incentives for private tuition to obtain marginal gains in marks.
viii. Commit States to ensure every child in secondary school is taught by qualified teachers possessing the necessary subject content and pedagogical knowledge, and manage teacher education and the appointment of teachers to achieve this goal.
ix. Extend the Right to Education (RTE) requirement for 25% of enrolment to be of Economically Weaker Section (EWS) students to include private secondary schools. The rationale is similar to RTE 6-14 years. If the cycle of universal participation is extended to grade 10 it is logical to extend RTE.
x. Regulate and facilitate the growth of the private schools so that they are complementary to public schools rather than in direct competition for students and locations. Test any Public Private Partnership (PPP) propositions against their opportunity costs and value for money.
xi. Develop and agree a secure and predictable system of funding of public secondary schools that guarantees adequate resources for learning and a qualified teacher in all core subjects. This is likely to need the allocation of between 0.7% and 1% of SGDP to secondary schools and cost effective delivery methods which provide school places at a cost of no more than about 30% of SGDP per capita.
xii. Provide all core learning material free on line and copyright free through a national portal. Include core texts, pod casts, video clips et al and develop on-line enrichment and examination preparation material to give access to additional tuition to all students independent of household wealth.

Policy dialogue can be structured around access, equity, efficiency and effectiveness since these are the key aspects of development that will shape RMSA over the next decade.

Intervention Area	Policy Option
Improving access to secondary education	• Strategically invest in standalone/composite schools/upgraded schools with specific criteria that take into account considerations of cost effectiveness. • Pilot modalities for new school and upgradation procurement using decentralised norms and standards suit local circumstances. • Review the selection and transition issues surrounding entry into secondary schools to increase the efficiency of the flow of students into grade 9 and 10 and through from grade 1 to grade 8 in elementary school. • Develop a basket of subsidies and supports for poor households that can meet the direct and indirect costs of secondary schooling. • Determine goals in terms of attendance and retention of all children to grade 10 at affordable costs.
Improving equity in participation and resourcing	• Review patterns of participation and identify evidence of inequality in access, progression and completion and ascertain the causes for SCs STs, etc. • Develop pro-poor funding of schools and households to ensure that no child is excluded from secondary school as a result of inability to pay. • Make secondary school fee-free for all those classed as Below the Poverty Line (BPL). Allocate scholarships to all in quintiles 1 and 2.

Intervention Area	Policy Option
	• Invest in girls' schools where this is culturally appropriate, and in support programs for SCs, STs and OBCs, and in secure transportation. • Balance investment in girls with investment programmes for disadvantaged boys. • Track all children through elementary school and into secondary and identify those from marginalised and reserved groups so that their participation can be monitored and enhanced to reduce gaps arising from different forms of discrimination and disadvantage.
Improving efficiency in human and physical resource utilisation	• Develop school and district planning and management systems designed to improve the cost efficiency of teacher deployment and reduce inefficiencies created by uneven distribution of teachers and excessive numbers of small schools. • Use GIS and other EMIS to rationalise small schools where this is feasible and to identify sites for new schools and upgradations that contribute to efficiency. • Review practice on teacher qualifications and appointments to phase-in norms which require qualified teachers to teach at least two specialist subjects. • Develop context-specific strategies related to private provision and its interaction with government schools and teachers to ensure constructive and complementary development rather than overlap and unproductive competition leading to inefficiencies. • Reduce variation between schools and between districts and between states in key indicators associated with quality.
Improving effectiveness and levels of achievement	• Review curriculum in relation to the needs and capabilities of new entrants with lower academic ability and different levels of social capital. • Develop options for different pathways through secondary schooling which would make core curricula accessible to all new students and offer appropriate tracks towards qualifications with value in the labour market. • Develop curricula and learning materials that can be used effectively in schools at affordable levels of cost, using innovative approaches. • Devise methods for learning material production and distribution that are affordable to poor households. • Invest in the development of formative assessment systems which are designed to assist in managing learning which can diagnose difficulties and link these to intervention strategies to reduce the probability of low achievement and subsequent dropout. • Reform Board examinations to improve assessment of higher cognitive level skills and develop methods of reducing practice effects; undertake predictive validity analysis for high stakes assessments.

1. Introduction

Rashtriya Madhyamik Shiksha Abhiyan (RMSA) is an initiative of the Government of India in partnership with State governments which seeks to universalise enrolment in grades 9 and 10 across India. It supports the upgradation of existing schools, the building of new schools to reach under-served areas, investments in quality improvement, and contributions to recurrent costs. The goal is to universalise entry into secondary school by the end of 2017 and achieve universal completion of grade 10 by 2020[4]. Achievement of this goal would lessen the gap between India and other BRICS[5] countries where universal access to secondary school has already been a reality for two decades. It should increase international competitiveness as a result of investment in human capital. It should 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 indicated by higher educational achievement and attainment.

1.1 The Research

This report synthesises findings from a programme of research developed by the RMSA-TCA in discussion with National University for Educational Planning and Administration (NUEPA) and Ministry of Human Resource Development (MHRD)[6]. The research was developed to respond to concerns expressed in the Joint Review Missions (JRM) to strengthen the evidence base for diagnosis of issues arising during the implementation of RMSA, and to inform policy dialogues on options that could increase access, efficiency, effectiveness, and equity.

This research strand of the RMSA-TCA project seeks to respond to these concerns, and is focused on developing a portfolio of research reports on key issues that will shape RMSA to 2020 and beyond. The main research questions were:

- How has participation grown under RMSA in terms of distribution of schools by type, size, distance to households, performance, social group participation, and costs per student and what does this indicate about changing patterns of access, equity, efficiency and effectiveness and transition to secondary education?
- How are patterns of participation likely to change over the next ten years as a result of changing demography, higher participation rates, and changing costs and what will be the constraints on achieving RMSA goals?
- What are the main constraints on growth in participation at secondary level including demographic transition, affordability, the characteristics of new learners from more disadvantaged social groups, levels of achievement, the growth of fee paying private schools and the development of private tuition?
- To what extent is the growth of participation equitable for different social groups and how could future growth promote a better distribution of opportunities to learn?

[4] http://mhrd.gov.in/rmsa- New target is revised to GER of 75% by 2017

[5] Brazil, Russia, India, China and South Africa

[6] This report has been written by Keith Lewin, Gaurav Siddhu and Shashiranjan Jha

- How efficient are current secondary education expansion models? And, what efficiency gains can be achieved through application of GIS for school location planning?

In the process of exploring these main questions a series of studies have been developed around particular themes. These are:

i) Changing patterns of access, participation and equity in secondary schools
ii) Projections of enrolments and demographic shifts to predict future demand for schools, classrooms, teachers and the necessary financing levels
iii) School size analysis to map problems arising from excessive numbers of small schools
iv) School location analysis using Geographic Information Systems
v) Affordability analysis to establish costs to household and the extent to which this will limit effective demand for secondary school for the poor
vi) Private school growth and the extent to which this can contribute constructively to RMSA's goals
vii) Private tuition analysis to determine its costs to households

Each of these themes has one or more substantial research reports based on extensive analysis of household survey data (NSS and the RMSA-TCA survey), and administrative data (predominantly U-DISE). Literature reviews have been undertaken and incorporated into the relevant texts. The reports are listed in Annex 1.

The research has used several different methods of data collection and analysis. These include desk, literature and interview-based reflective analysis and reviews of recent research relevant to RMSA and resource allocation and participation; secondary data analysis of U-DISE and NSS data and other data sets including the National Achievement Survey as appropriate; cross sectional modelling based on normative data; and longitudinal projection using software designed to simulate system growth and generate scenarios in relation to school location, size, achievement, costs per child and affordability. GIS methods were used to demonstrate the power of the techniques through its application in a single district.

Analysis of secondary data at the national level was complemented by the data from field research conducted in three case study states, Assam, Bihar and Odisha. Results from the research also informed various State-level RMSA-TCA reports. The research activities in these three states included analysis of patterns of participation and recent development of the State secondary school system; field studies in at least one district in each State to identify and document patterns of school and classroom capacity utilisation; empirical data collection in a sample of households and schools in the same districts selected to generate robust insights into efficiency, effectiveness and equity.

The portfolio of research is designed to lead to identification of strategies to improve performance and make better use of the resources available, and generate estimates of the possible benefits using modelling, scenario planning, and school mapping linked to GIS where this is feasible.

1.2 Status

India's progress in improving access to secondary education has been considerable since RMSA was launched in 2009. However it has been uneven and has fallen behind the expectations of the 11th and 12th Five Year Plans that envisioned the achievement of equitable and universal access. The intention that no child would be excluded from grades 9 and 10 because of their social group affiliation or the wealth of their households is far from being achieved. Though gross enrolment rates (GERs) in states

at the secondary level have reached 70% or more, average net enrolment rates (NERs) still linger at not much more than 45%, indicating that many of those who reach grade 9 are over age. NAS data shows that at least half of all children are performing poorly, confirming that many secondary school students would fail to reach the PISA minimum score levels in core subjects. Thus, as a result of drop out and under-achievement no more than 60% of all Indian children complete secondary school successfully and net enrolment rates are little more than 45%, and can be much lower. Examination Board qualifications vary widely between schools at a level that indicates mastery of the national curriculum. Those from scheduled tribes and castes, and from other educationally marginalised groups, are especially disadvantaged. Girls' enrolments and achievement lags behind those of boys in low enrolment states, but is often higher than boys where enrolment rates are high.

Levels of participation in secondary school in India are substantially lower than in East Asia (90%) and Latin America (103%), and in the BRICS countries with which India is sometimes compared (Global Monitoring Report 2012)[7]. China in particular has had near universal levels of enrolment in lower secondary schools since 2000 and a majority completing upper secondary in all but the least developed parts of the country[8]. Most OECD countries have had universal access to secondary schooling for over 50 years.

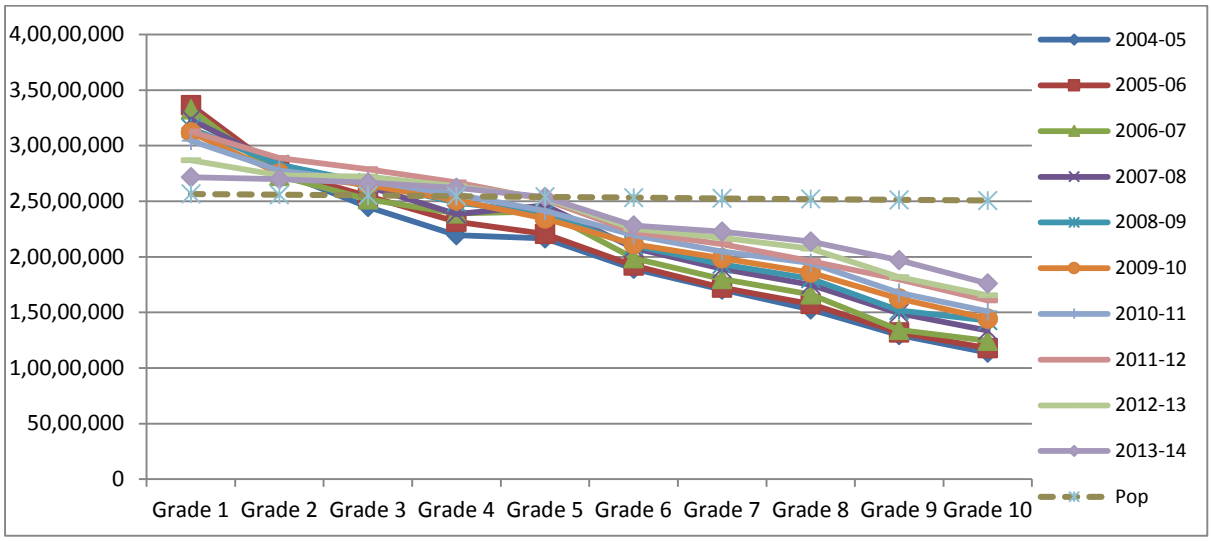
About 27 million children are enrolled in grade 1 across India as shown by Figure 1. This total includes many over-aged and some under-aged children. By grade 5 the total number enrolled is similar to the number of 10 years olds in the population (indicated by the dotted line). From grade 6 upwards, 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 19.7 million. Over the last ten years enrolments have grown at every grade level. However, drop out has not fallen rapidly and the numbers surviving to grade 8 are becoming a constraint on growth.

Figure 1 shows enrolments by grade over time for All India. It is highly aggregated and patterns differ greatly between States, districts and even blocks. There are also large differences between the social groups (i.e. Scheduled Castes (SC), Scheduled Tribes (ST), Other Backward Castes (OBC), those with disability, etc.). Around grade 5 there is a tipping point where there are fewer children enrolled than there are in the relevant age cohort. Below grade five more are in school then there are in the relevant age population indicating high levels of over age and some under age enrolment.

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

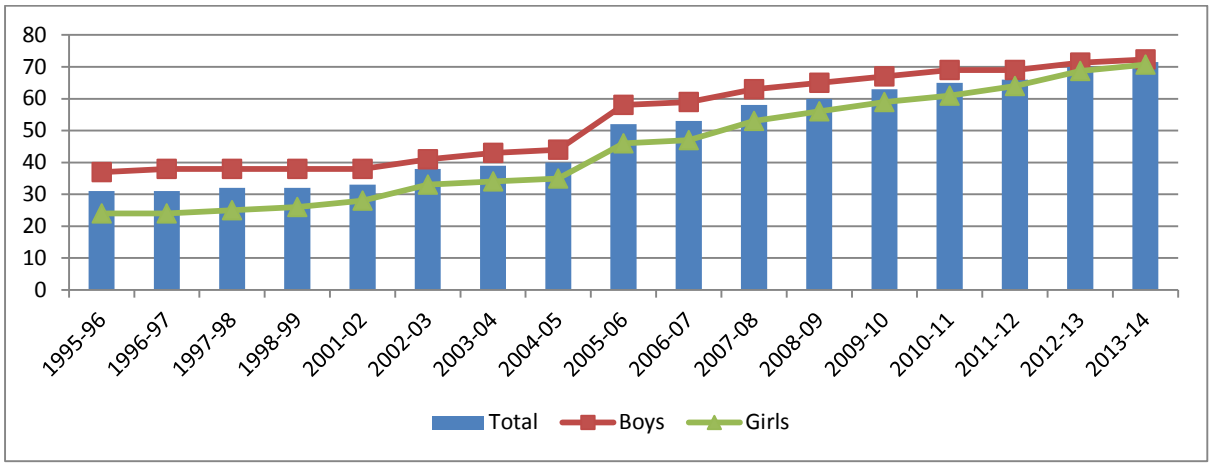
[8] Lewin 2011

Figure 1: Enrolment by grade, 2004-2013, All India



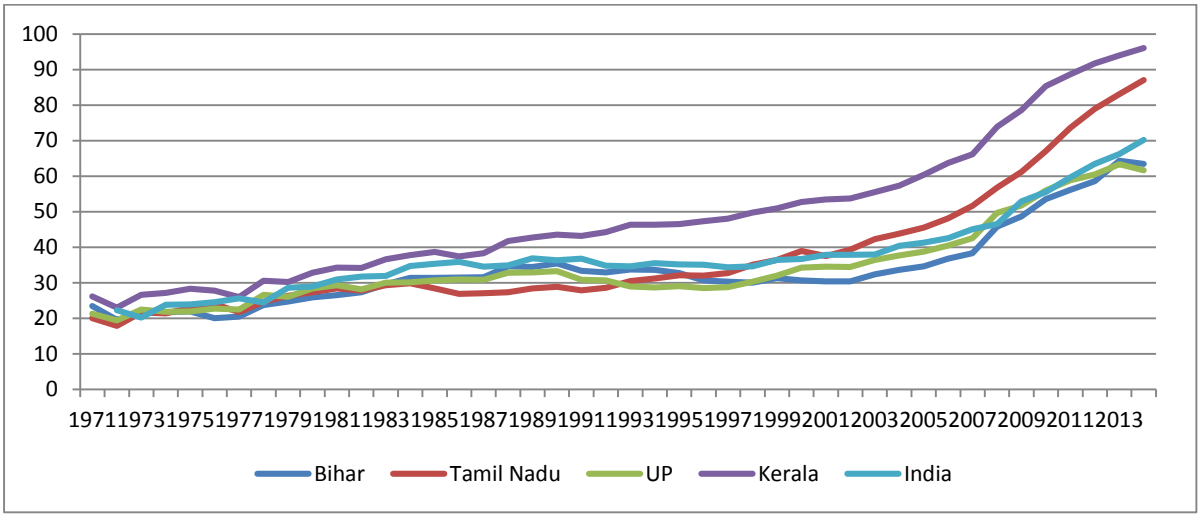
Participation in secondary school is highly unequal. Only 11% of children in the lowest quintile of household expenditure are likely to reach secondary school whilst almost all of those in the richest quintile complete grade 10. The average number of years of schooling received by all children varies by more than 2:1 between States. Children who are two or more years over-age make up more than 30% of children enrolled in grade 5, and only 30% of 14 year old children are in the correct grade for their age. Boys entering school at age of 10 have one-eighth of the chance of attending secondary schools of those entering at the age of 6, and over-aged girls only one-sixteenth the chance.

Figure 2: Gross enrolment and age-specific (16-17 years) enrolment sates, 2014



Gross enrolment rates have increased consistently over the last twenty years and now average a little more than 70%, as shown in figure 2. Differences between girls and boys have diminished to the point where in most States there is not much variation. The growth in participation partly reflects the success of SSA in increasing the flow of students into grade 8. Future growth will be concentrated in low enrolment States and districts, and will need to be much higher amongst SCs, STs and OBCs than other caste groups.

Figure 3: Percentage completing secondary in five year cohorts from 17-22 years old



Completion rates for secondary schooling have followed a trajectory of slow growth accelerating since 2007. There was a steady increase from the 1970s when about 20% completed secondary school, until 2006 when the average across India was around 45%. After this time, participation accelerated rapidly in most States. The most important reason was the increasing demand arising from the success of SSA in increasing the numbers reaching grade 8in the higher enrolment States. There is evidence that gaps between the more and less developed States began to widen as growth accelerated, as is made clear in Figure 3.

RMSA has had many effects on the secondary school system in India and is entering its third phase as the 13th Plan period (from 2017) approaches. It is a good time to take stock of what has been achieved and consider how it should evolve in the light of the evidence from research on its achievements and challenges. This is explored in the next sections.

2. Key Issues

The next sections discuss research findings in relation to the seven thematic areas identified in RMSA-TCA policy dialogue. These are concerned with changing patterns of access, participation and equity; projections of enrolments and demographic shifts; school size analysis; school location mapping using Geographic Information Systems; affordability analysis to establish costs to household; private school growth; and private tuition and its costs to households

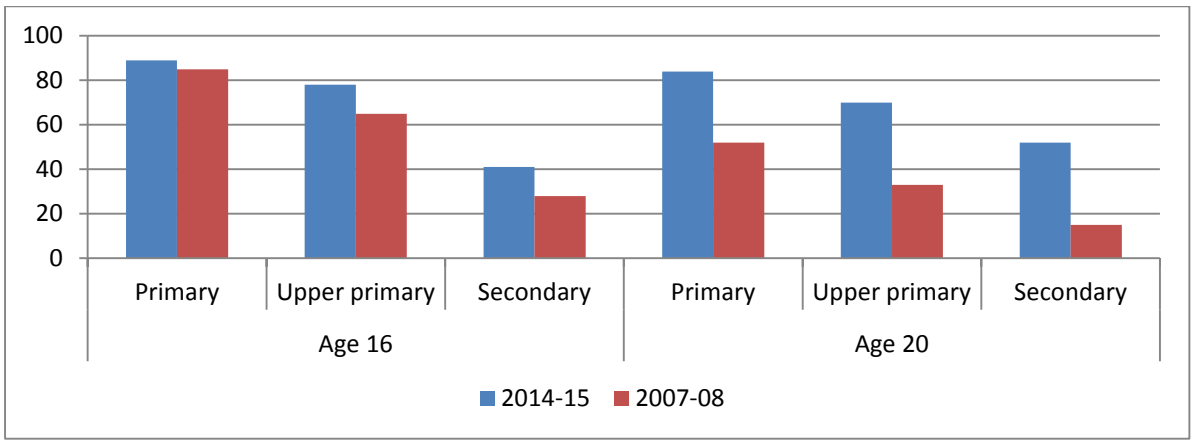
2.1 Changing patterns of participation

Participation in secondary school has evolved under RMSA. The RMSA-TCA research report on '*Making it Past Elementary Education'* contains detailed analysis of flows and who is going to secondary school.

The first critical issue for RMSA that the research identifies is managing the flow of new students into the expanded secondary school system. This has many dimensions that require strategic planning at State level. The issues include the volume and location of recent growth in government and private schools; the likely numbers graduating successfully from grade 8 willing and able to enter secondary school; the success schools have in retaining children through grade 9 to the end of grade 10; and the proportion who then pass Board examinations.

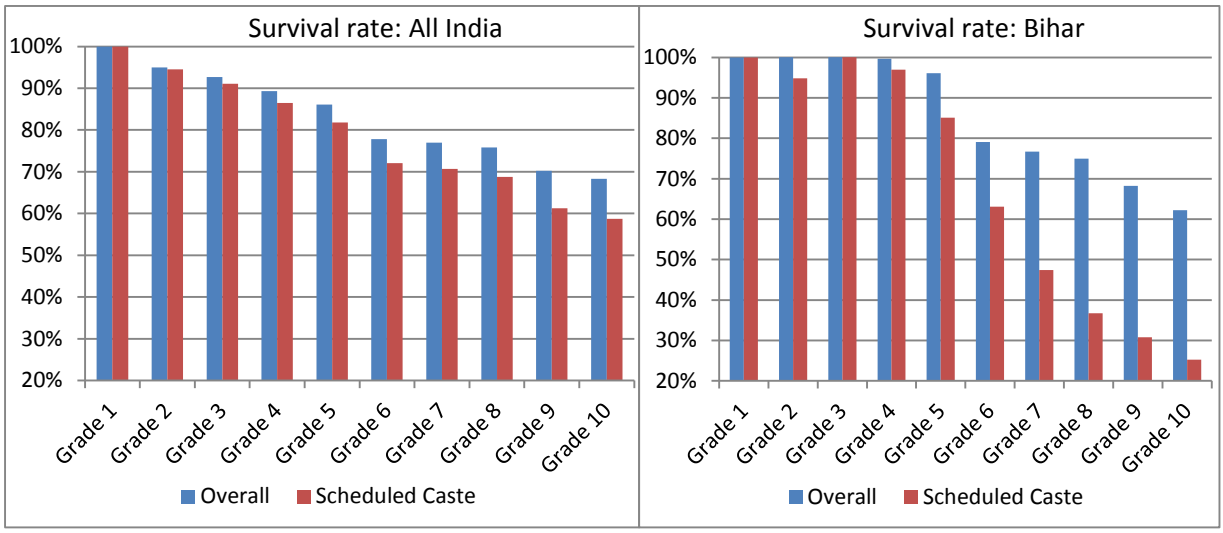
Much greater proportions of the population are now reaching and completing secondary school as shown in figure 4. The figure presents two important messages firstly, it shows that overage enrolment is a continuing issue as illustrated by the much larger percentage of those completing secondary school in 2014-15 by age 20 as opposed to age 16. Secondly, the percentage of individuals aged 16 years who have completed the primary and upper primary cycle is greater than that for the population aged 20 years thus reflecting greater efficiency in the education system experienced by the younger cohorts.

Figure 4: Percentages of the population aged 16 and 20 completing different educational levels



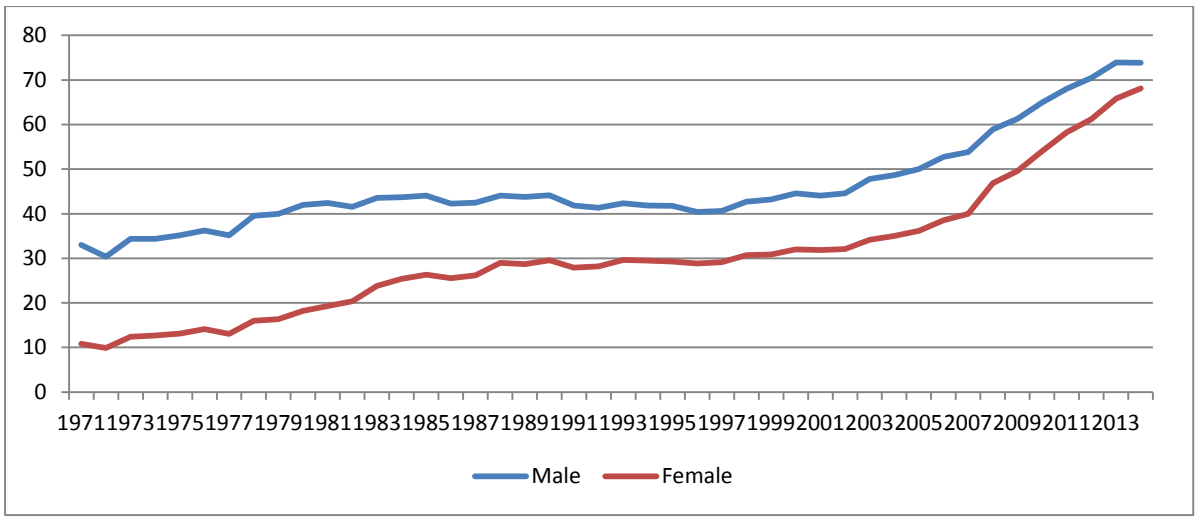
In some States the number of children reaching and successfully graduating from grade 8 is insufficient to support universal access to grade 9. Repetition is still common and transition rates from grade 5 to 6 and from grade 8 to 9 remain substantially below 100% in low enrolment States. Survival rates to grade 8 with appropriate levels of academic achievement are still not much more than 50%, with much lower levels in pockets of under enrolment and high attrition. Figure 5 illustrates this.

Figure 5: Survival rates to grade 10, All India and Bihar



Survival rates vary widely and are especially low for SCs and STs. This is very clear for example in Bihar where above grade 5 there is a sharp drop out to the extent that not much more than 37% of scheduled caste students in the age group reach grade 8 and qualify for entrance to secondary school. RMSA target enrolment rates depend on this group, and SCs and OBCs, having much higher retention rates through the primary school system.

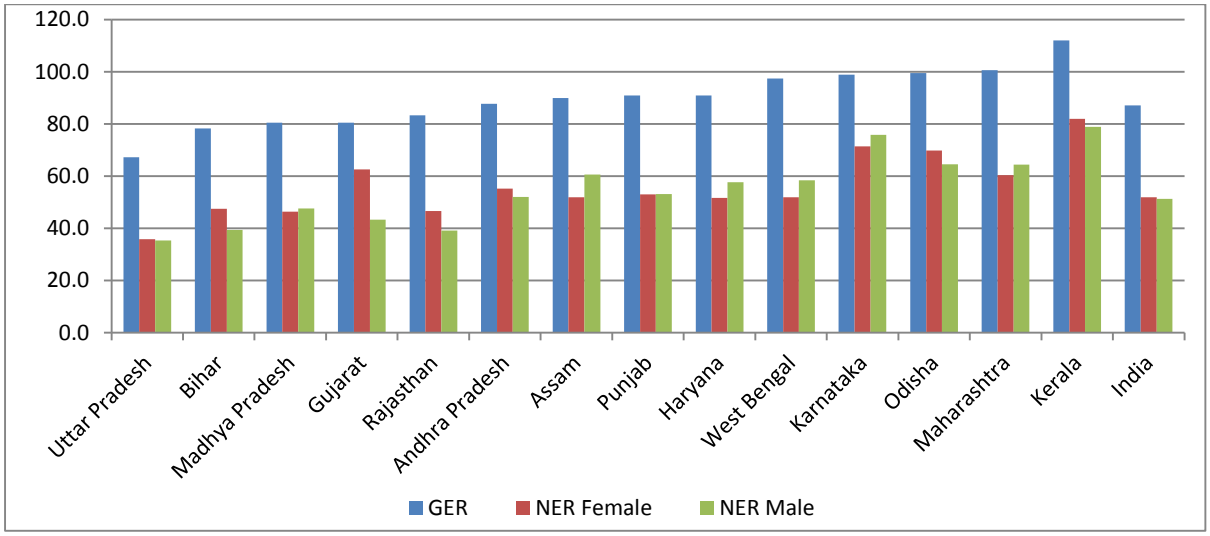
Figure 6: Secondary completion for the age group 17-22 years, by gender



The gap in enrolments between boys and girls in secondary schools has closed considerably. Figure 6 shows that whilst there were three times as many boys as girls enrolled in 1970, by 2014 boys' enrolment was only 5% more than that of girls. As many as 15 out of 36 States now have more girls than boys enrolled in secondary. The differences in enrolment rates by gender are much smaller than the differences related to household wealth.

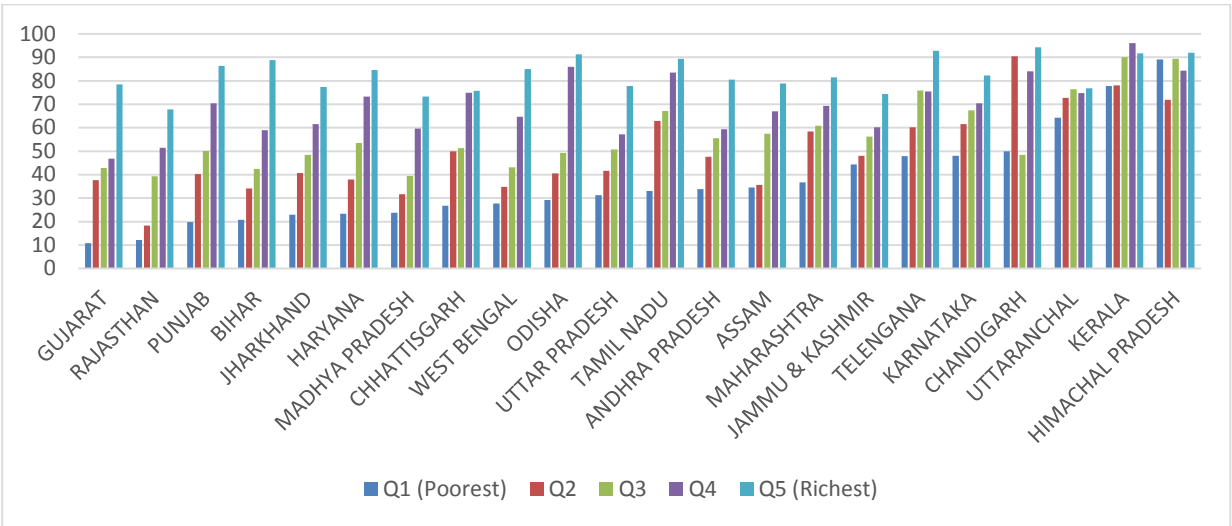
Figure 7 shows how GERs at secondary vary and how much lower age-specific enrolments are in different States. Though GERs are averaging over 80% it is clear that many children are not on schedule to complete secondary school by the age of 17 years. Over-age children are common in the elementary and secondary school systems. Being over age results from late entry to grade 1 and from repetition of higher grades. There are strong associations between being over-age and failure to transition to secondary school.

Figure 7: Gross Enrolment and Age Specific (14-15 years) Enrolment Rates-2014



The RMSA TCA analysis of enrolment by household wealth shows that there are very large differences in access to secondary school. The poorest quintile children can have a less than 30% chance of completing secondary compared with over 80% in the richest group (Figure 8). The poorest 20% of children are eight times less likely to complete secondary school than the richest 20% in Gujarat and Rajasthan. These differences are much bigger than those associated with urban and rural residence though these are also substantial. By comparison differences between girls and boys are much smaller but are also concentrated amongst the poorest with almost no difference between boys and girls in the richest quintile.

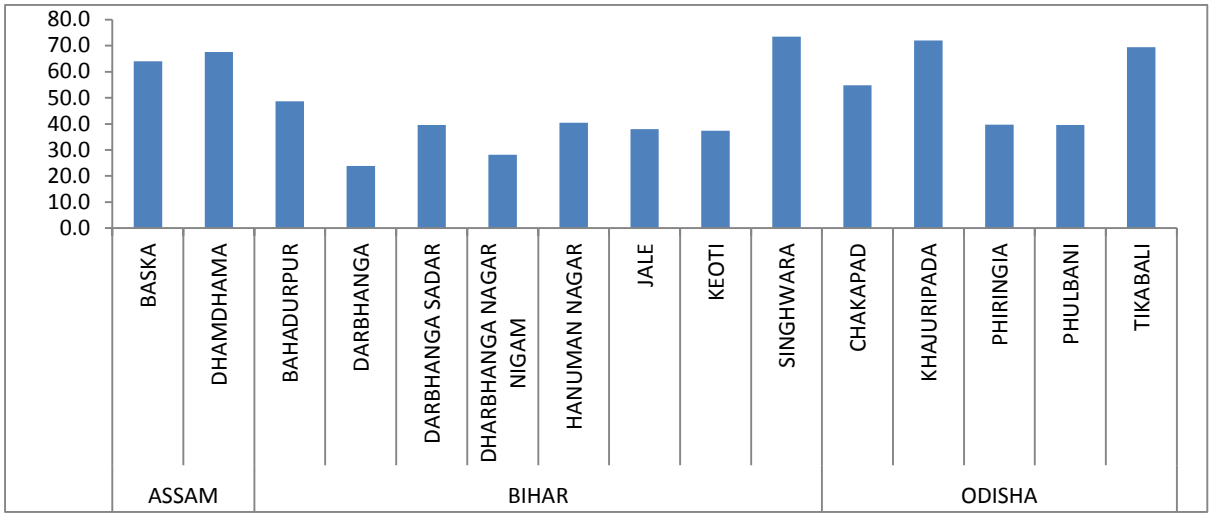
Figure 8: Secondary completion rate for those aged 17-25 years-2014



In addition to the problems that surround age-in-grade progression and limit progress towards universal access to secondary school RMSA-TCA case study data indicates that attendance as well as enrolment is problematic (figure 9). In samples of students in the case study districts across 75 schools it appears that daily attendance only averages about 40% of those enrolled. These are very high rates of non-attendance that must have an impact on learning. It may also mean that teachers teach less than a full timetable to very small teaching groups. It appears from other data that significant numbers of those not attending substitute private tuition for school attendance. Expanding capacity without

better utilisation of what is available is unattractive and the reasons for consistent absenteeism need to be understood and addressed.

Figure 9: Monthly average attendance in case study districts in three states



There are many other detailed insights into the flows of students through the system into and through secondary schools in the RMSA-TCA research reports. Managing an expanded flow of children such that almost all children reach grade 9 on schedule, master the elementary school curriculum, and take public examination successfully in grade 10 is central to achieving the goals of RMSA. This is a necessary but not sufficient basis on which to build improvements in quality, more equitable access and enhance efficiency in resource utilisation.

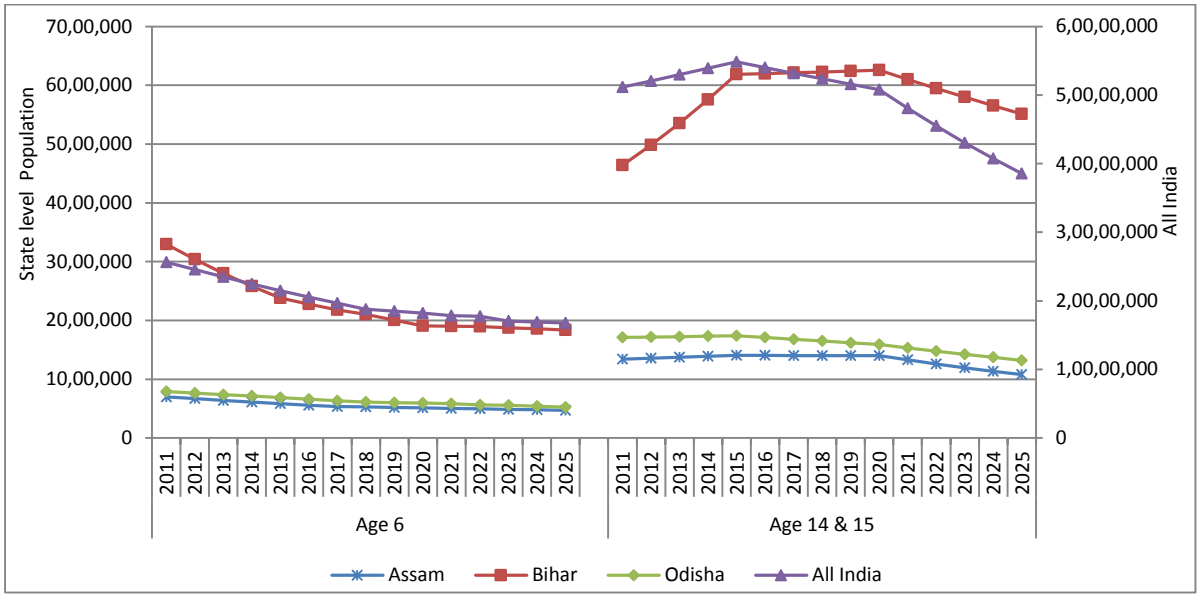
From the analysis of a range of data sets we note that:

- Participation rates in secondary school have increased over the RMSA period from around a GER of 60% to GER of 70%. Drop out in grade 8 and below remains substantial and results in about 40% of children failing to reach grade 9.
- The participation rates of boys and girls in secondary school are approaching parity. This does not mean that there are similar numbers enrolled since there are up to 15% more boys in the school age population in parts of some states like Gujarat and Punjab.
- Scheduled Tribe students have much lower enrolment rates than other groups but SCs and OBC also have further to go to reach universal enrolment than do general castes. STs are likely to be in smaller schools.
- Students from the poorest quintile of households have a much smaller chance of enrolling in secondary school than those from middle or high quintile households. Most future growth in provision needs to be in free government schools since it is those in the poorest quintiles who are most excluded by a wide margin.
- Gaps in enrolment rates between more and less advanced States may have increased during the recent period of rapid growth. There is also some evidence that in some States those in the middle and higher quintiles of household wealth have benefitted more from expanded secondary schooling than the poorest as discussed below in the section on equity.

2.2 Demographic transition and enrolment projection

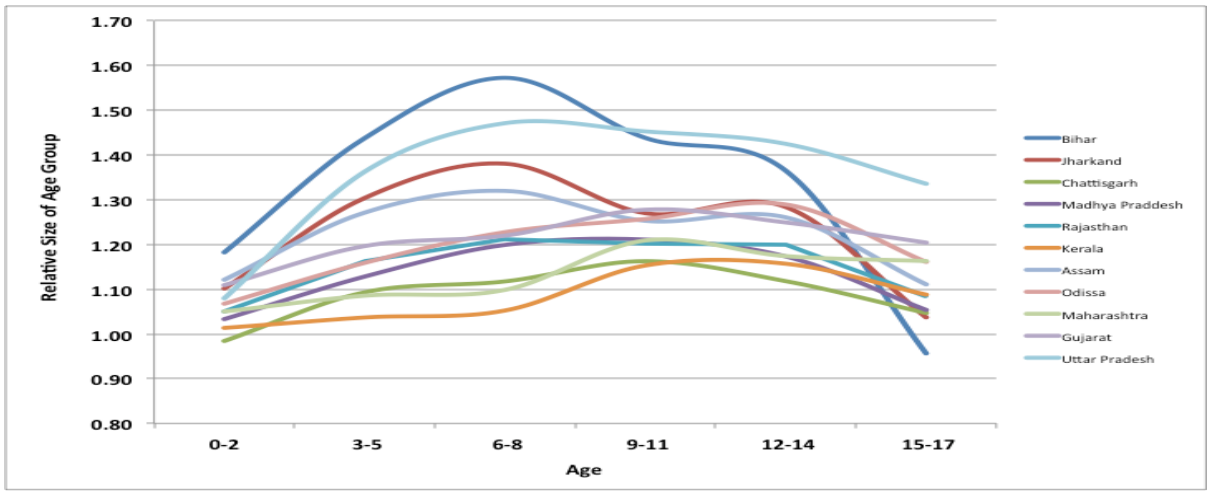
Demographic transition and migration will condition the demand for school places. India's fertility rates are declining. The population of six year olds is already shrinking in most States foreshadowing shrinkage in the numbers of secondary age children. Alongside demographic transition, urban migration is progressing rapidly and is changing where secondary school-aged children live. Where rates of migration are 7% a year then numbers of children seeking school places will double every ten years. There are risks that school location decisions based on current population distributions will be rapidly out dated and result in overcapacity in some places and shortages of places in others. Figure 10 shows how the population of secondary school-aged children in India is beginning to decline and will fall by over 20% by 2025.

Figure 10: Projected population of age 6 and ages 14&15- All India and select case study States



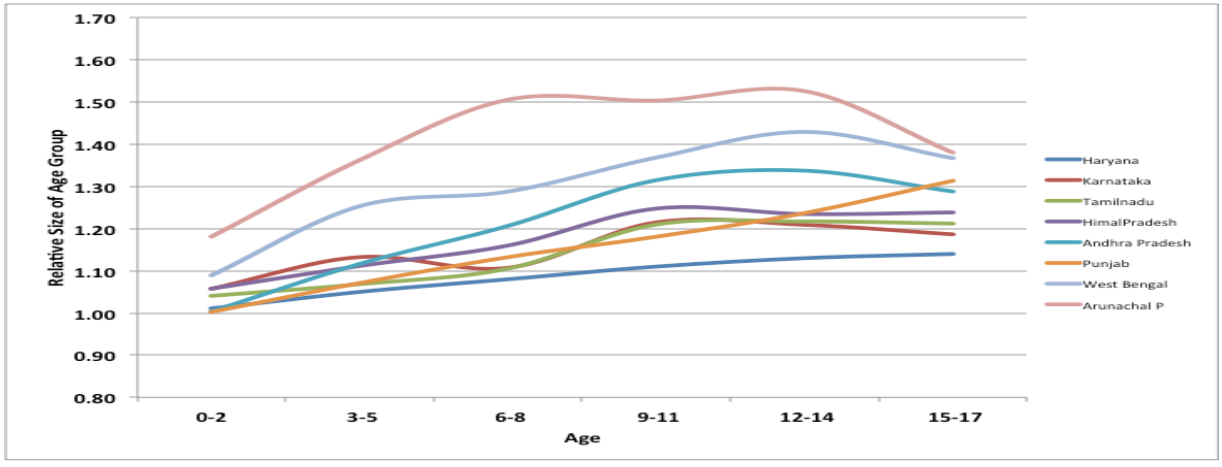
The number of 6 year olds for all-India is expected to decline from almost 25 million in 2011 to almost 17 million in 2025, or by more than 30%. This declining trend is consistent across all case study states which will witness a sharp drop in the age 6 population after 2017. The population of children aged 14 and 15 (secondary school age) is likely to decline from over 50 million to under 39 million by 2025. Expanded capacity needs to be profiled against demand otherwise there is a risk of overshoot as more places are created and the school age population starts to fall. This will happen at different rates in different locations.

Figure 11: Relative size of age group by age group (1)



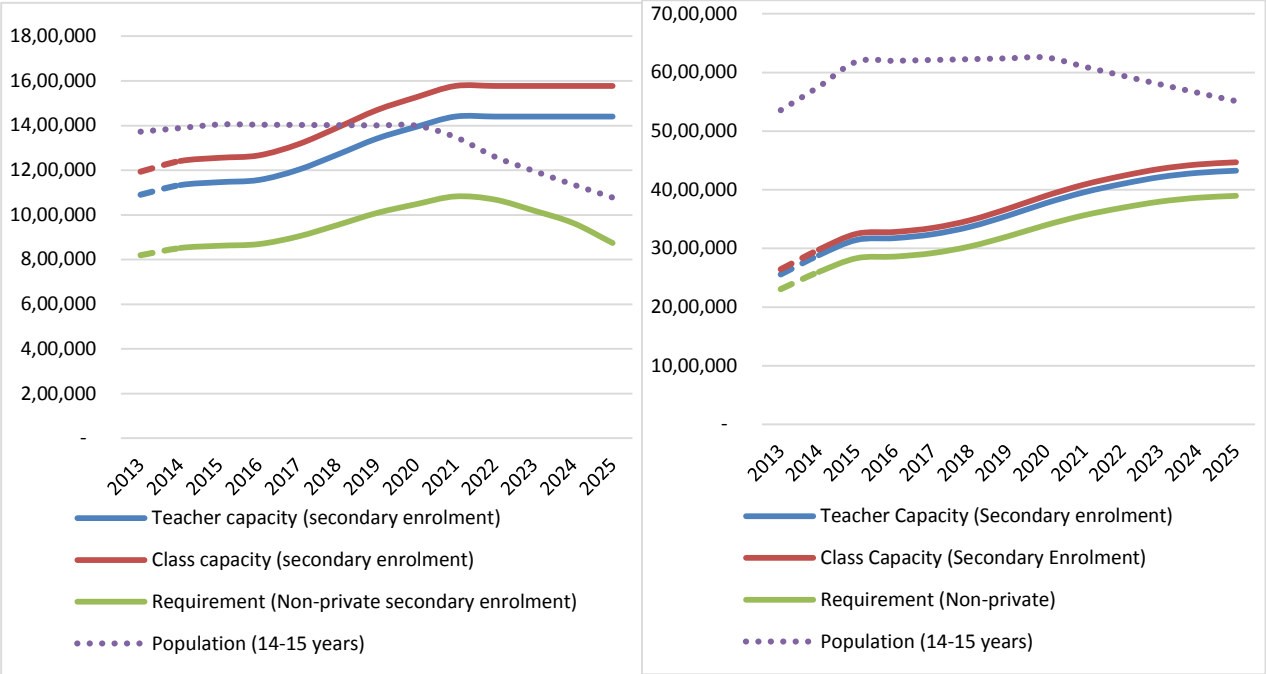
Figures 11 & 12 disaggregates the data and illustrates that in some States the fall in the size of the age group will be much greater than in other States.. It identifies States where the number in an age cohort peaked in the 6-8 or 9-11 year old age group in 2011 according to the census data. Since then the numbers in an age group have been falling. These children will be of secondary age from 2015 onwards. In all the States listed the total number of secondary age children will begin to fall. Figure 12 identifies the States that have experienced an earlier demographic transition to lower growth. Here the declining numbers in the age group amongst 12-14 and 15-17 years olds were already a reality in 2011. By 2015 the trend to a smaller secondary age group was well established.

Figure 12: Relative size of age group by age group (2)



These falls in the number of secondary age children are predictable and certain since the data are based on children already born in 2011. The falls will continue for at least the next 15 years. This both makes it easier to achieve higher levels of enrolment at secondary and carries the risk of overshoot in capacity if more schools are opened when overall demand is set to fall, as shown in figure 13. Local conditions, especially urban migration, may create patterns of demand that diverge from the overall trend towards a falling student population. Falls will be greatest where existing enrolments are lowest and where increased participation rates compensate for falling numbers of school age children.

Figure 13: School capacity utilization: Assam **School capacity utilization: Bihar**



Demographic transition is only one dimension of the factors that will affect demand for secondary schools. This research has developed projections of different pathways to meet national and state targets for expanded access to secondary education using an enrolment driven multi-level model developed specifically for the purpose written in Excel (RMSA-TCA research report: *Demographic Transition and Education Planning*). The state education systems have been modelled from national school and population census data to generate enrolment projections through to 2025 from which progress towards targets linked to key dates can be extracted (2017, 2020 and 2022). The changing output of the primary school system is factored into projections to ensure that demand does not outstrip the supply of grade 8 graduates. In addition this 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.

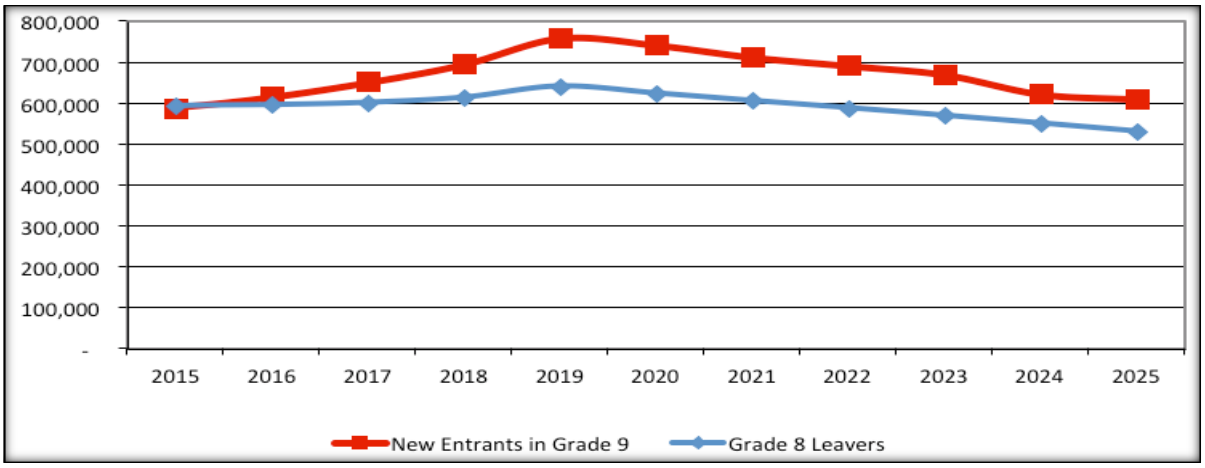
The projection modelling was driven by three key policy questions:

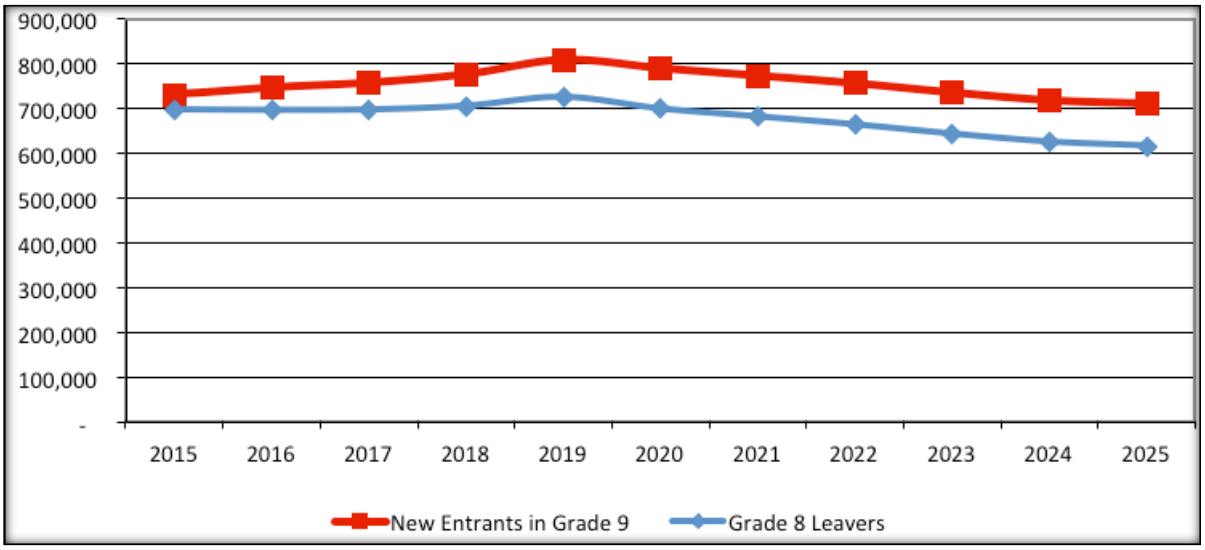
- Can the target levels of enrolment for RMSA be achieved in particular states in the time available?
- If not, what are the constraints on growth?
- How can growth be accelerated in ways that that are demographically possible, administratively feasible, and financially sustainable?

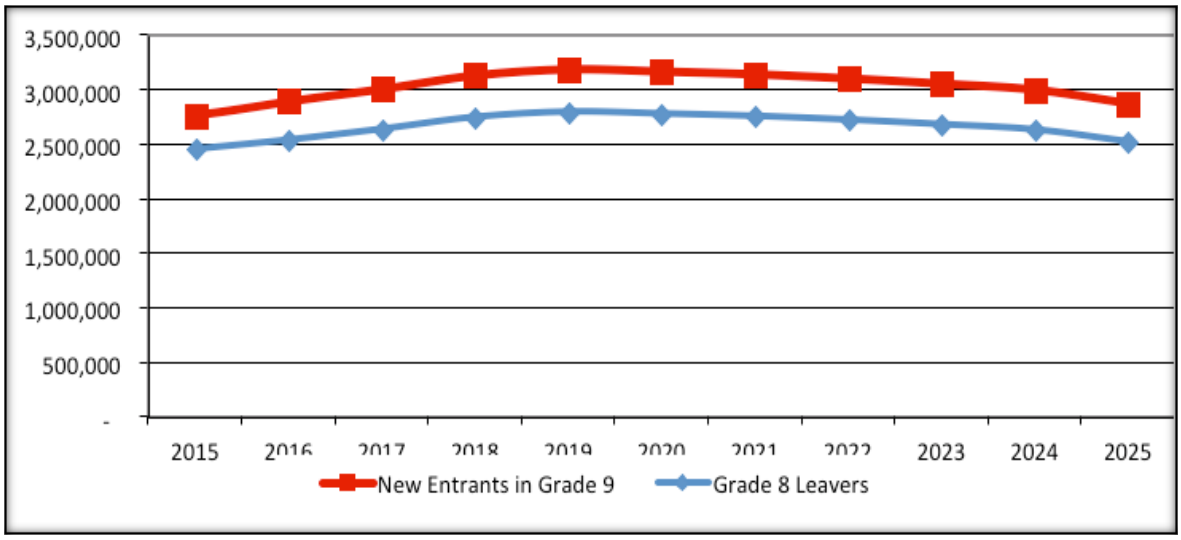
The detailed results of the projections are reported in the RMSA-TCA Report no 2. The results are specific to each state, taking into account the different contexts, and are reported as individual case studies.

In summary the projection modelling shows wide variations in the challenges of RMSA between states in planning and managing expansion. All the three case study states – Assam, Bihar, and Odisha - have issues about the supply of grade 8 students as can be seen in figure 14 (a-c). To meet RMSA targets in Assam those enrolled in grade 9 would have to be about 25% more than those projected to be in grade 8. This is clearly impossible. In Odisha the shortfall is about 15% and in Bihar 20%. Until there is less dropout in elementary school universal participation will not be possible.

Figure 14 a,b,c: Grade 8 Leavers and Projected Need for Grade 9 Entrants to meet RMSSA Target – Assam, Odisha and Bihar







More generally the modelling does provide insights that have more significance across many States. For example:

- The modelling shows the dynamics of how 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. A GER of 100% will not be achieved in those states which do not have near-universal levels of grade 8 completion.
- 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 start to decline before 2020 almost everywhere. The modelling shows there is a risk that meeting peak demand before the number of 14-year-olds starts to fall will result in overcapacity in the long run. Planning improved and expanded infrastructure must take account of demographic transition and patterns of internal migration which are rapidly increasing the numbers enrolled in urban and peri-urban areas.
- Pupil-teacher ratios in some states are unacceptably high (and can be double the current RMSA norm of 30:1 in some states,(e.g. Bihar where it is 54:1 and the pupil to classroom ratio is 80:1) while in others pupil teacher ratios are low and may fall below 10:1 in some schools representing a great inefficiency in the use of resources. Assam has a PTR of 17:1 but a pupil classroom ratio of 70:1.
- 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 150 in grade 9 and 10. The cost per student in these schools may be as much as four times greater than for schools with more than 300 students.
- Many schools currently do not have a full complement of trained teachers in all of the four main subject areas of the curriculum and modelling shows how many teachers would be needed. 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.
- New classrooms and other facilities are needed in existing secondary schools to increase capacity, and new schools need to be strategically located and built to service areas with no secondary schools. A substantial amount or rehabilitation is also needed of existing facilities that fall short of RMSA standards. Expanding composite schools is much more efficient than building free standing secondary schools

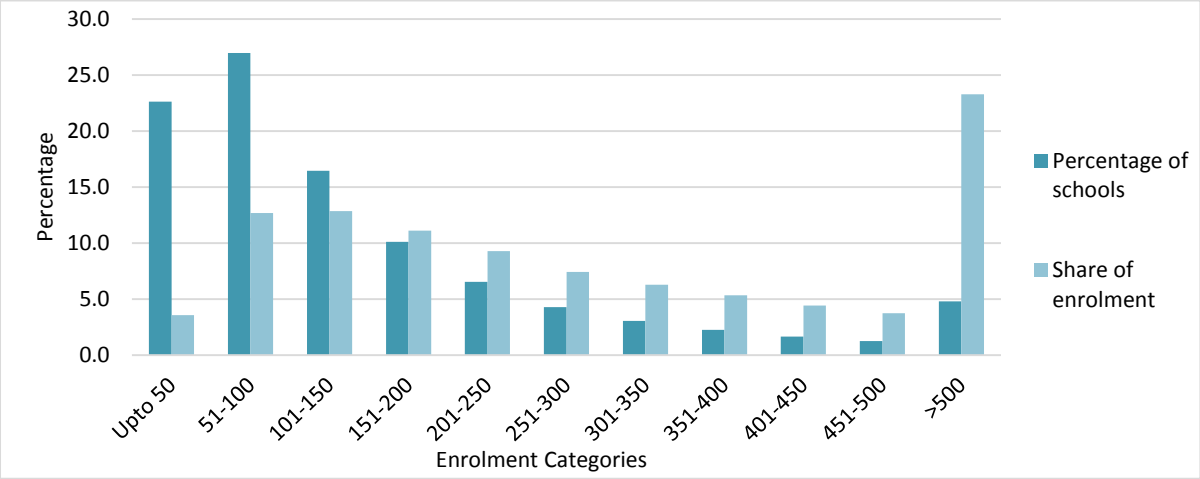
- Scheduled Tribe and Scheduled Caste children enrol in secondary school at half (or less) of the rate of their more privileged peers. Higher participation rates can only be achieved with an understanding that simple average enrolment rates conceal the fact that for the most excluded groups enrolment rates in secondary will have to triple or quadruple to reach universal levels.
- 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.

There are many other issues revealed by the projections. All the states will need to make reforms if they are to reach RMSA targets by 2020 and do so without allocating more than about 1% of SGDP to secondary schools. This is a maximum for long terms sustainable financing.

2.3 School Size

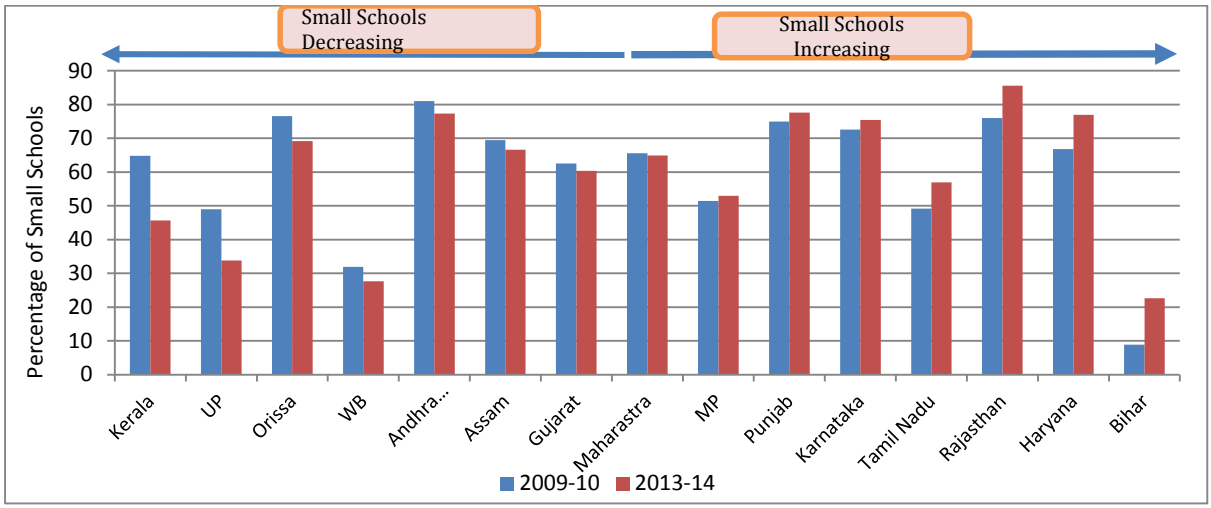
The third issue is that the expansion in the number of secondary schools has resulted in large proportions of small schools and very small schools. Detailed analysis of school size is included in RMSA-TCA report No 3 '*Equity and Efficiency in Expansion of Secondary Schools*'. It is already the case that 50% of all secondary schools in some States have fewer than 100 students in grades 9 and 10. As shown in figure 15, across India about 66% of secondary schools had fewer than 150 children and 23% less than 50 children in 2012-13. In terms of enrolment share, only 3.6% students attended the smallest schools with less than 50 enrolled. The cost per student in these schools may be as much as four times greater than for schools with more than 300 students. It may also be the case that academic performance in small schools is lower as a result of the difficulties of providing qualified staff for all subjects and adequate facilities.

Figure 15: Distribution of secondary schools by enrolment size categories and enrolment share



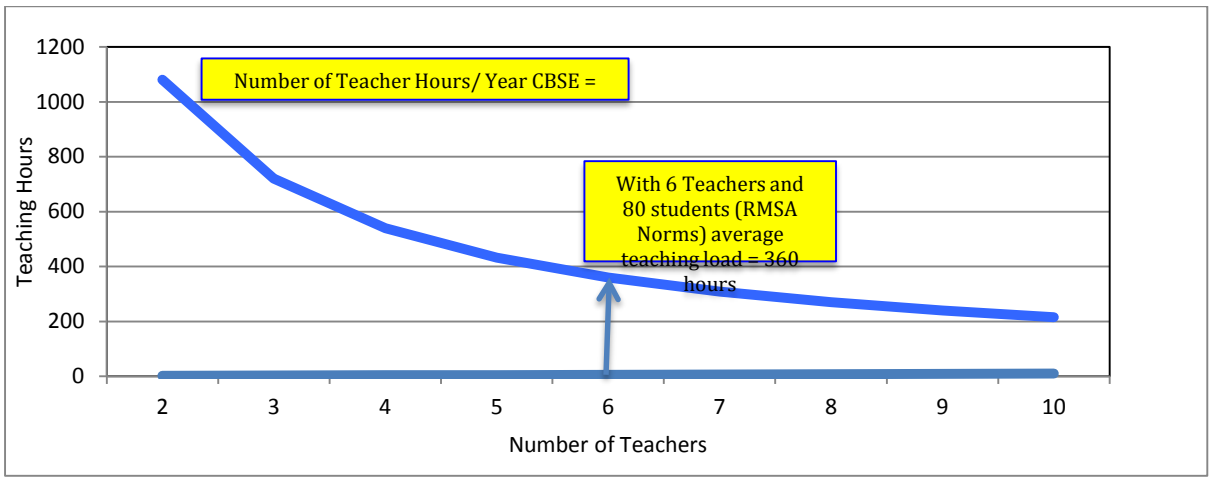
In some states the number of small schools with enrolment below 150 have been increasing in number in others they have been decreasing (Figure 16). Six States have more than 70% of small schools which are likely to be cost inefficient and are unlikely to be fully staffed with qualified teachers in all core subjects. Despite recommendations under different policy frameworks including RMSA, an increasing proportion of schools have been established as standalone schools which only offer grades 9 and 10. While 14% of schools opened between 1951-2000 were standalone this number increased to almost 21% of the schools opened after 2011.

Figure 16: Changes in the percentage of small schools between 2009-10 and 2013-14



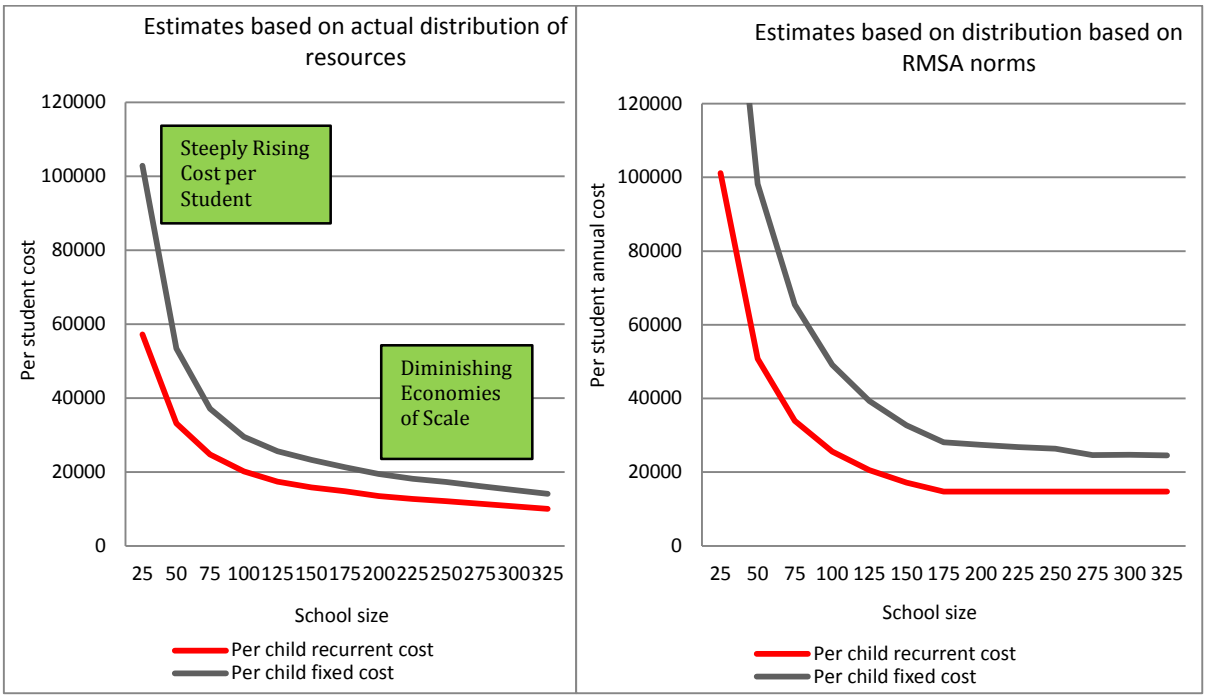
Staffing norms and standards provide for every school to have minimum of six teachers. In a secondary school with one class in grade IX and one class in grade X there are 48 x 2 = 96 classroom teaching periods a week. This is an average of 16 periods a week or just over three 40 minute periods a day if the teaching is evenly shared. With this staffing and workload teachers would only complete about 360 hours of teaching a year, or only 30% of a full workload. This is illustrated in figure 17.

Figure 17: Maximum teaching loads in a 2 class secondary school with 80-100 students



The pupil teacher ratio in a six teacher, two class school with 80 students is about 13:1. This is much less than the 30:1 guideline of RMSA. Some subjects are likely to require specialist teachers e.g. Hindi, English, Mathematics, and Science. If these teachers only teach their own subject they will have very light workloads of only 12 periods a week or 2.4 periods a day. Specialized school facilities are likely to be underutilized in small schools. A science laboratory in schools with two classes would only be used for 4 periods a week, and a mathematics lab for 2 periods a week if the CBSE curriculum is followed. Other specialist rooms would also be underutilized – e.g. computer room, art room and library.

Figure 18: Expenditure per student (in INR) - Actual Distribution and Norms Based Distribution



Small schools have much higher costs than larger schools. Recurrent costs are primarily determined by teachers salaries and pupil teacher ratios. RMSA norms produce a cost per student profile that show that schools below enrolment 150 have rapidly rising costs (Figure 18). Data from the three case study States on enrolments, pupil teacher ratios and salaries produces a similar curve of rising costs with a longer range of diminishing costs with increased school size up to about 500 per school.

The importance of the increase in costs in small schools can be seen in Table1. Here five different ways of enrolling 960 children are shown with school sizes varying from 960 to 40. Recurrent costs are five times greater with the smallest school scenario (scenario 5) and fixed costs for construction etc are about seven times greater than for a single large school (scenario 1).

Table 1: School size scenarios and associated unit costs

Size	Large school	Medium school	Small school	Small school	Small school
	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
Size	Large	Medium	Small	Very Small	Single Classroom
Average enrolment per school	960	320	160	80	40
Number of Schools	1	3	6	12	24
Number of Classrooms	24	24	24	24	24
Per student recurrent cost INR	12,982	14,232	16,107	31,857	63,357
Per student fixed cost INR	16,533	20,513	30,052	59,688	119,375

This research identifies several factors as influencing the growth of small schools. These include:

- Norms and standards criteria that allow schools to be established when there are only 25 students in grade 8 (one section school), or 50 students in grade 8 (two section school). These can result in free standing secondary schools with enrolments of 50 or 100 which are very small.

- Population density can shape the distribution of schools by size. Low density areas will have widely dispersed communities with relatively few school age children. Where communities are fragmented by social status and religious affiliation this may subdivide the population of school age children even in areas of higher population density.
- Geography and local topography determines travel times and accessibility as an overlay on distance to school. Secondary schools are generally larger than village primary schools and recruit students from a wider catchment area with several elementary schools. Travel times of much more than an hour to and from school may become exclusionary and can also have substantial costs so small schools may be favoured despite their higher costs per student.
- In some parts of India private fee paying schooling has been growing. Fee paying private schooling is more likely in middle and high income areas and may have the effect of hollowing out public school systems by attracting students from richer households out of public schools. This can leave public schools in periods of contraction that lead to becoming a small enrolment school.
- Demographic transition and migration are changing the number of school age children and where they are located. This is likely to have a considerable effect on demand for school places and additional teachers which will have long term implications for how capacity should be expanded and managed.
- Faith based groups may favour segregated schooling for a variety of reasons. This can result in small schools where there are not enough children of that faith in a particular area. Other social groups defined by ethnicity, language, gender and civil status may have a preference for separate schooling that then results in smaller enrolments in schools.
- Small schools cannot provide sufficient teaching to all teaching staff when fully staffed according to the norms and standards.
- Pupils in larger composite schools consistently and fairly significantly out-perform pupils in smaller schools. It is possible that there is some self-selection issue, with pupils from high income households and better socioeconomic backgrounds electing to go to larger schools. The positive effect on learning achievement of school size holds for SCs but not for STs. This may be because STs in large schools may have moved outside tribal areas and be distant from support in their own language etc.

The last reason for small schools to exist relates to the raw politics of patronage and the self-interest of local politicians and political institutions. In some areas this may be the single most important dimension of decision making. If it is not addressed then refining norms and standards and more legislation may have a limited impact on improving the efficiency of the secondary education system. School building and classroom construction offers opportunities to award jobs to supporters and legitimate and illegitimate capture of contracts and other resources. The appointment of new teachers brings stable and substantial income into rural locations and may be associated with favouritism, kick-backs and nepotism. More small schools provide more opportunities for political and financial capital transactions

It is clear that small schools are highly cost inefficient. If small schools were resourced according to the relevant norms, the unit cost per pupil in the smallest school category would be seven times that in schools of 400 pupils. Not only are such schools inefficient in terms of unit costs, but they are also inefficient in converting inputs into educational outcomes, as measured in this study by scores on Board examinations. Presently most schools are not in fact resourced according to norms, with more generalist teachers and worse facilities and resourcing than norms indicate. Fewer schools with higher

quality staffing and facilities could be provided with the same allocation of resources if small schools were combined where they are in close proximity.

The research evidence suggests that enrolment growth, and the resource needs of small schools, have not been managed efficiently. The intention has been to provide a school within a short distance of every habitation. If many schools are established in poor communities with small enrolments and are poorly resourced, then the result may be that these already marginalised communities are receiving a sub-standard education. Disadvantaged children often require more resources for learning and more effective schools. Paradoxically it may be inequitable if very small schools are left to struggle with very poor physical resources and under qualified staff.

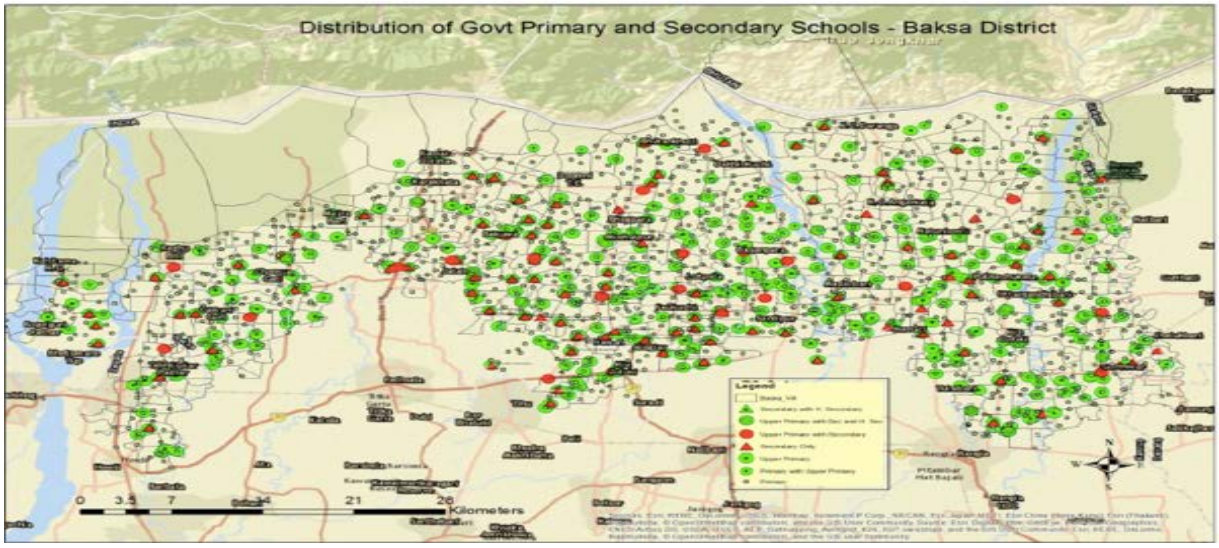
Under the norms for resourcing schools there is no carefully calibrated differentiation on how to address the small school issue. These schools may call for modified curricula and pedagogies to deal with real-world situations where it is impracticable to equip and staff a very small school in the same way as a large school with all of the required facilities and infrastructure, such as laboratories, libraries, computer rooms and other facilities. While it may appear equitable to bring schools close to those who need them, this is only true if provision is of similar quality in schools of different sizes.

2.4 School Location

The fourth set of concerns relate to school location. This has a strong influence on costs of service delivery, size, and access and equity issues. Under RMSA additional schools and upgradations are built to expand capacity. These should be planned to fill gaps in current provision where there are populations that currently have no reasonable access to government secondary schools. RMSA stipulated that there should be access by all households to a secondary school within 5 kilometres. This is an arbitrary norm established in the distant past which may need to be revisited. It is not clear to what extent it is applied or whether it now serves any purpose.

Analysis shows that in some States secondary schools are now located much closer together than 5 km suggested, and that there are areas where small schools have proliferated. There has also been a tendency to co-locate primary and secondary schools without combining school administration and thereby creating economies of scale. This situation co-exists with areas where there is a shortage of secondary school places. Location is significant for the intensity with which human and physical resources can be used. Under enrolled schools and small schools may utilise classrooms less than 70% of the time and teachers cannot have a full workload.

Figure 19: Example of School Mapping of Primary and Secondary Schools



School mapping can be used to identify where schools and classrooms are needed and where current provision is adequate. This can account for existing capacity, the future flow of school age children, and indicate where merger of small schools is desirable and whether there are areas that are underserved. A basic school map of a sample district is shown in Figure 19. This illustrates that in this district the density of schools is high with an average distance between secondary schools of no more than two kilometres and many primary and upper primary schools within a kilometre. About 70% of schools are being operated at less than 50% of their capacity and large savings are available from rationalising school provision. If there were half the number of schools substantial investments could be made in enhancing quality and infrastructure. A full discussion of the use of GIS is presented in RMSA-TCA Research Report '*Efficient School Siting using GIS Modelling*'.

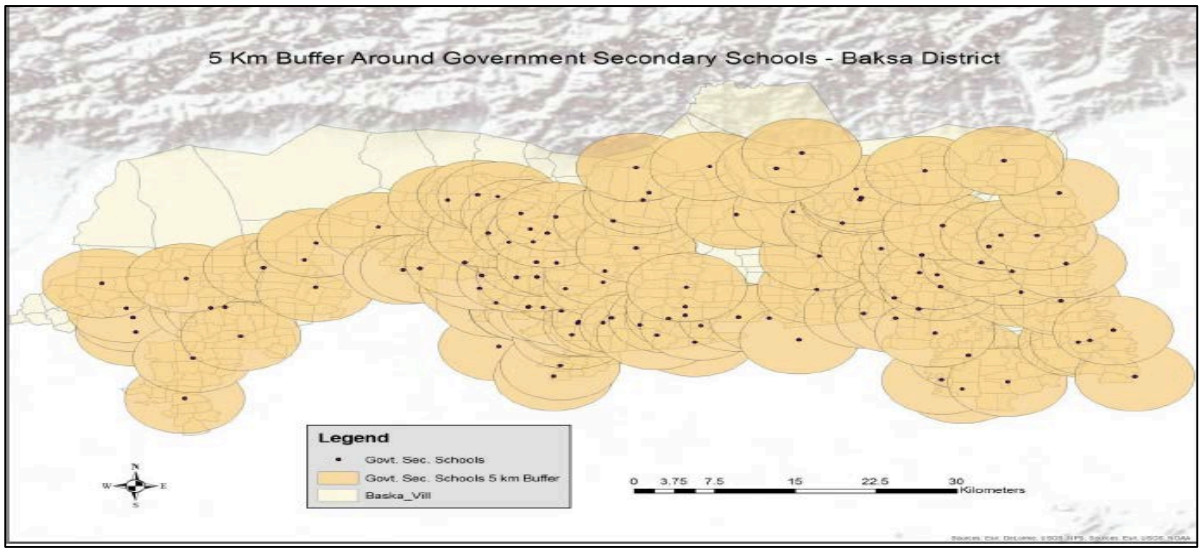
The work on GIS based school mapping was designed to demonstrate the usefulness of the technique by applying it to a district within one of the case study states. The approach sought to establish:

- How many secondary schools (along with their locations) will be needed if the plans are developed using school planning norms and what will be their respective school size over next 5-10 years?
- What are the implications of relaxing distance norms and using school size criteria to determine school location?
- What are the efficiency and effectiveness trade-offs associated with different methods of school siting?
- How can GIS information be used to optimise school resourcing for ensuring maximum efficiency?

Location-allocation analysis was used to determine the best locations of schools using different distance norms and criteria of appropriateness. Three different average school sizes were modelled 160, 340 and 520. For each scenario, two optimizing criteria were examined: minimizing average distance of the secondary school age population in villages to the nearest school facility and, to maximize the secondary school age population covered with capacity constraints. For each criterion four distance norms are assessed: no distance constraint, 5 km, 10 km and 15 km distance constraints. Optimal school locations are examined in terms of their feasibility for school location planning.

Figure 20 shows the extent to which school catchment areas overlap and are much less than 5 km. There are many schools which are within less than 5 km of several other secondary schools in a district which is largely on level ground and no exceptionally difficult terrain.

Figure 20: Example of School Mapping of Primary and Secondary Schools



The key findings for this case study district are that:

- On average, secondary schools are located less than 2 km from each other and are less than 1 km from primary and upper primary schools. As a result, there is a proliferation of small sized schools with inadequate catchment areas to sustain demand. There is also a pattern of co-location of schools on separate sites that has inbuilt inefficiencies and suggests a process of rationalization.
- School utilisation rates indicated that 71% of government secondary schools are operating at or below 50% capacity with corresponding low enrolments and low student-teacher ratios. It is estimated that there are presently 2,690 surplus seats available across the secondary system, or about 12% of enrolment.

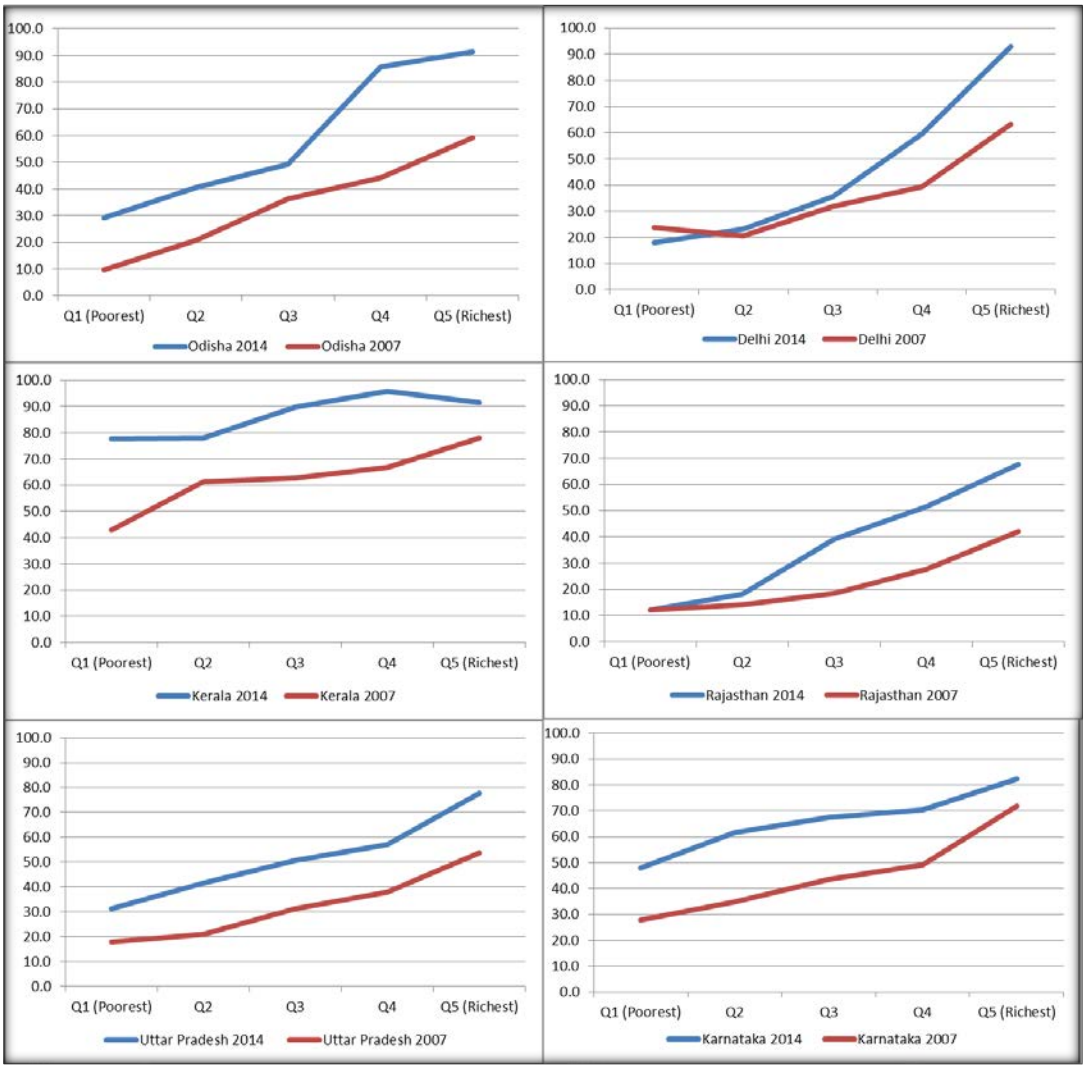
- Demographic data for villages indicates that the secondary school age population over the next 5-10 years will decline in net terms. This no growth in demand situation has an immediate effect on demand for new schools.
- Projected demand by persons aged 14-15 (grades 9-10) is only expected to increase over the next 2 years so that the number of schools expected of size 160 is 75 across the district. After this demand will fall.
- If the average school size is increased to about 160 and demographic transition takes its course the analysis indicates that the total costs of providing 75 schools would be approximately $USD 7.91 million or equivalent to 520.3 million Rupees. Only 300 classrooms would be required and 375 teachers for the 75 schools compared to the present 147 schools and 1798 secondary teachers. Teacher salaries would decrease from 539.4 million Rupees to 112.5 million Rupees on an annual basis.
- In relaxing distance norms and school size criteria, GIS was used to model the impact of schools of size 160, 340 and 520 with distance constraints of 5 km, 10 km and 15 km. By using these respective school sizes, it was estimated that there would be a need for 75, 35 and 23 new secondary schools respectively.
- The average distance travelled from a village to a school location increased from 2.8 km to 3.6 km for a school size of 160, from 2.7 km to 6.9 km for a school of size 340, and from 3.1 to 6.5 for a school size of 520. A doubling of school size, on average, leads to a doubling of the average distance travelled.
- Similarly, increases in school size and varying of distance constraints leads to enlargements in school catchments areas; these effectively double as school size doubles, but they also increase as the distance constraint increases. On average, the size of school catchments increases from 32.9 sq. km at a school size of 160, then to 62 sq. km for a school of size 340 and up to 79 sq. km for a school of size 520. These school catchments are sustained by high population densities and the optimum solutions provide a high level of coverage to the relevant population – persons aged 14-15 over the next 5-10 years.

From this analysis it is clear that it is possible to reduce the number of separate schools by combination and merger of schools, co-location of schools as composite schools sharing resources, and careful deployment of teaching staff. This would produce considerable gains in terms of efficiency and the quality of the school environment. The analysis recognises that these savings depend on an adequate population density and that some remote unserved areas may still need schools with small enrolment. However the number of small schools needed that are essential is a small proportion of the total. Though it is unrealistic to believe that all the savings identified above are available it is clear that there is scope for much greater locational efficiency. Half the number of schools of twice the size would be much more efficient, better endowed with facilities and trained teachers in core subjects, and likely to produce better academic performance.

2.5 Inequality and Household Affordability

The fifth issue the research highlights is that greater equity is essential to higher levels of participation. Inequalities in access to secondary school have been growing in some States and shrinking in others. There are six patterns, as illustrated in figure 21 which shows how enrolment rates in secondary school have varied between 2007 and 2014 within each quintile, in 6 different locations. In Delhi the lowest three quintiles of household wealth have not seen an improvement in access, while this is also the case for the poorest in Rajasthan. In both locations the richest groups (those in quintiles four and five) have benefitted most from expanded participation. In Odisha while the participation of the poorest has improved, it is only by half as much as the improvement for the richest 40% of people. Other states with similar patterns of unequal growth include Bihar, Gujarat, and Punjab. More equal growth has occurred in Uttar Pradesh where all income quintiles have enjoyed increased participation but the gap between rich and poor has not changed dramatically. Madhya Pradesh and West Bengal also follow this pattern. Andhra Pradesh has a different pattern where the richest and the poorest have benefitted less than those in the middle; Maharashtra and Tamil Nadu are similar. Lastly in Kerala the greatest beneficiaries of increased participation have been the poorest, which has also been the case in Assam and Karnataka.

Figure 21: Secondary completion rates by wealth quintile for selected states, 2007 and 2014



Future growth in participation will have to be more equitable and focused on the poorest who have the lowest enrolment rates. Little more than 20% of SCs and STs in the poorest quintile, aged 17-25 years, completed secondary school in 2014 which can be compared with over 65% completing amongst their peers in the richest quintile. Other castes had enrolment rates that averaged nearly double those of SCs, STs and OBCs.

Affordability is a serious constraint on universalising access to secondary school. Costs to households may be more than four times those for enrolment at local primary schools depending on location and school type. One source of increased costs results from longer distances to travel daily to secondary schools. Safety and security issues are also associated with distance and are problematic in some states, especially for adolescent girls, and this will affect new entrants. Household poverty interacts with other sources of inequality including caste, language, gender and disability.

Additional demand for secondary education will come from marginalised groups not previously able to enrol. These groups disproportionately include children from low income households, those from rural areas and from urban slums, those from scheduled tribes and castes and other backward castes, and, in some states, girls. Many of these children belong to groups with systematically different characteristics to those children who currently attend secondary school and will be from poorer households with much lower cultural capital and levels of capability to support a secondary school student. RMSA-TCA research report '*Cost and Equity in Accessing Secondary Education*' details the issues and the evidence around affordability.

Thus the affordability of secondary school to households is a critical issue. This research estimates that poor households need to spend as much as 30% of household disposable expenditure on every child in public secondary schools. The next poorest quintile has to spend at least 12%. In grant-aided schools the proportions are 50% and 17% for quintiles 1 and 2, and in private schools 75% and 29%. These levels are clearly unaffordable

In 2007-08 households in rural areas spent on an average INR 2400 on secondary education while in urban areas this was INR 6100. Expenditure on fees (tuition, exam and other fees) constitutes 28 percent of the total costs of secondary in rural areas and 42 percent in urban areas. These urban-rural differences are partly explained by the higher proportions of urban children attending private aided and unaided schools. Uniforms and learning materials costs are the largest element of direct costs to households. The cost of tuition can be comparable and represents an additional burden.

Figure 22: Percentage of household expenditure on different items by expenditure quintile

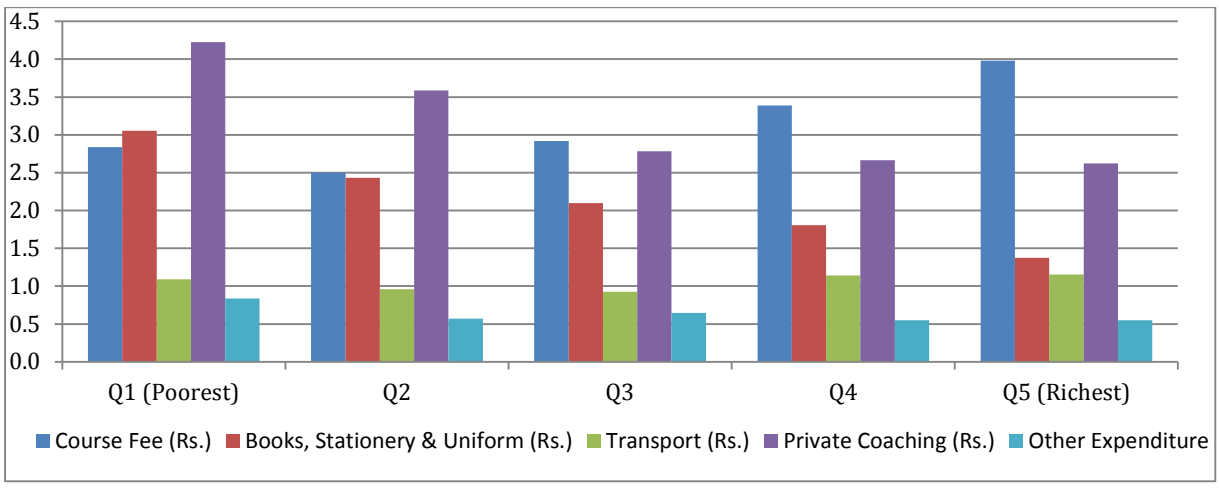


Figure 22 reports the percentage of household education expenditure in different categories. Those in the poorest income group spend 3% of their household education expenditure on course fees compared to 4% amongst the richest, and it is noteworthy that these proportions are so similar. The reason is that the poorest households use mostly cheaper government schools, but spend a much larger share on private tuition. In terms of absolute amounts the rich are spending more, as the percentage spent applies to much larger incomes. Expenditures on books, stationery and uniform also constitute significant proportions of annual household expenditure of the poorest.

Over one-third of all parents appear to borrow money to pay for secondary schooling, including 39% of private unaided school parents, and 35% of government school parents. Nearly a third of government and private school parents borrow money to pay for private tuition (29% and 32% respectively) with around the same proportion of parents sometimes having to pay school fees late (34% and 32% respectively). These are the key coping mechanisms that poor parents use to access secondary schooling for their children when an analysis of their finances would otherwise indicate that it is unaffordable. Such strategies often sink families deeper into poverty.

2.5.1 Sustainable Public Financing

The research report also discusses in detail issues relating to public financing of secondary education. Public expenditure on secondary education is largely determined by State governments who receive centrally-allocated funds from the national budget. Allocative decisions reflect different spending priorities to invest at different educational levels, and preferences for patterns of school organisation that have different costs.

RMSA financing is outside the scope of this research but it should be noted that existing studies indicate that the allocations under RMSA vary widely by State, low enrolment States do not necessarily receive more resources per secondary student, and there are procurement issues that appear to have severely delayed spending in some States.

The cost to the public budget of expansion of participation at secondary level in India is determined by

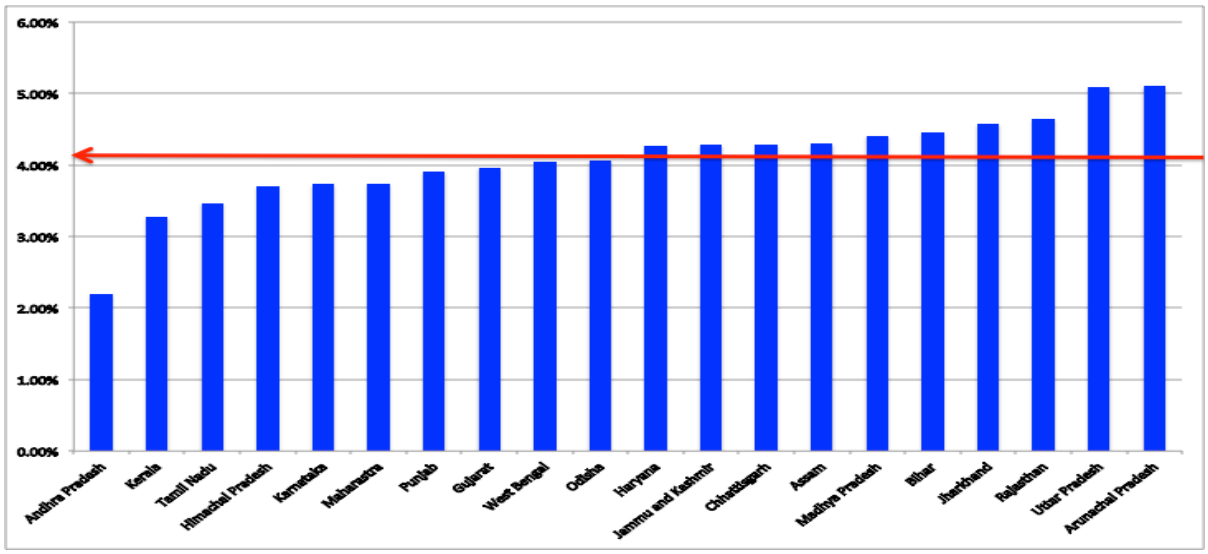
- the number of secondary age children,
- the costs of secondary school places,
- the willingness to allocate public spending to secondary education

The number and proportion of children of secondary school age varies by State. On average a little over 4% of children are of secondary age with the smallest proportions in Andhra Pradesh, Kerala and Tamil Nadu. Rajasthan, Uttar Pradesh and Arunachal Pradesh have much higher proportions of school age children as a result of higher population growth (Figure 23). In many States the number of secondary school age children has started to fall as a result of declining fertility. The census data indicates that by 2020 most States will begin to experience a long period of reduced numbers of children passing through the school system as family size gets smaller. Where private schools are well established and a proportion of households opt out of public schooling there should be savings to the public budget. This may allow some investment to be directed away from such areas, in favour of poor areas experiencing greater need.

Public recurrent expenditure per secondary student is easy to estimate in aggregate. However it can vary greatly school by school. Costs per child are determined by all the associated costs including

teachers' salaries, non-teaching salaries, and non-salary recurrent costs. The costs of capital works also needs to be financed over the lifetime of such assets. Universal provision will be difficult if not impossible where unit costs at secondary are more than twice those at primary level. What can be achieved will also depend on the marginal costs of the enrolment of additional children into the school system. These costs may be lower or higher than the average costs depending on how difficult it is to reach excluded groups.

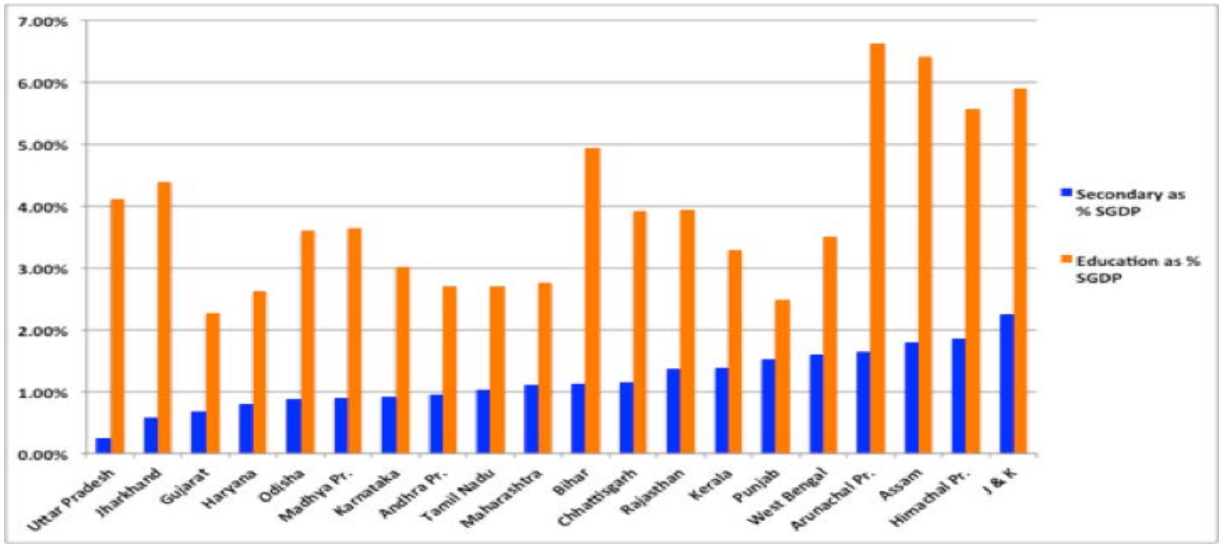
Figure 23: Secondary school-aged children as a percentage of State population



Source: Census, GoI 2011

The availability of public finance is indicated by proportion of State GDP allocated to secondary education (figure 24). It is partly dependent on allocations to other educational levels since there is an internal competition for funds within an overall budget. The assumption is that enough places need to be financed to enrol all children apart from those in the fee paying private sector and there will be an upper limit determined by affordability. The amount of tax collected determines the domestic revenue from which funds are drawn for public services. This in turn depends on State GDP and fiscal measures which differ between States.

Figure 24: Expenditure on secondary level education and total education as a percentage of SGDP



Costs per child to government vary from about INR 6,000 (e.g. Bihar) to over INR 20,000 (e.g. Assam). As noted previously school size is directly related to cost per student. Levels much below INR 20,000 per student depend on schools that have more than 150 students and which may have pupil teacher ratios in excess of 30:1. Secondary schools have to be financed at costs per child that do not exceed about 30% of State GDP per capita if universal participation is to be affordable.

Providing universal secondary education with current costs per student is projected to require as much as 2% of State GDP (SDGP) in States where pupil teacher ratios are low and costs per student are high. This level is financially unsustainable without a disproportionate allocation of the State budget to secondary education. In contrast some States spend less than 0.7% on secondary schools which suggests they are underinvesting. Planning should profile investment to lead to systems that can be financed at levels that are sustainable and which are not likely to cost more than 1% of SGDP.

Public financing is essential to provide access at affordable costs to poorer households. Most below the top quintile will not be able to finance secondary school attendance in unsubsidised private for-profit schools. Public finance will remain the major source of funds for mass secondary schooling and it will be the provider of last resort to many of the most marginalized communities.

This research report has explored affordability in relation to RMSA and the expansion of secondary schools across India. It has approached the issues both in terms of household expenditure and in terms of public budgets. Affordability is intimately linked to household expenditure, costs of participation per child, and numbers of children. The cost to the public budget depends on teachers' salaries and other recurrent costs, pupil teacher ratios, and participation and dropout rates.

Several conclusions can be reached. First, the direct costs and indirect costs to households of attendance at secondary school vary greatly by school types, and families of different levels of wealth dedicate different proportions of expenditure. In absolute terms, the poorest 20% of households spend less than one ninth of what the richest spend on secondary schooling. Average household expenditure in government schools is typically about half that for private aided schools and one quarter the average for private unaided schools. Students from more advantaged castes spend as much as twice as much on school attendance as those from SCs or STs, not least because they are often richer. Secondary schooling is typically about 2.5 times more expensive than primary schooling for the poorest, but less than 1.3 times more for the richest who have a much more even pattern of spending by educational level. For the poorest costs are over eight times as much as at primary level and for the richest about three times more.

Second, the proportion of household expenditure allocated to education and secondary education varies for each quintile and within different social groups. Expenditure can be considered in relation to the poverty line to establish affordability, which can in turn be compared with what proportion of household income is needed to attend secondary school for different quintiles. Households spend between 3% and 18% of their income on secondary education with most income groups allocating between 5% and 10%. If only disposable income is considered then the amount involved may represents as much as 50% of the discretionary expenditure of the poorest in government schools. This is both undesirable and likely to be unsustainable. Other types of schools would absorb most if not all of the discretionary expenditure for this group.

The median household income in different States varies from INR 150,000 to INR 300,000. Especially in the poorer states the costs of secondary school can drive households from above the poverty line to below it. Even for those above the poverty line the impact is serious if school costs absorb a third

or more of disposable income, as they do for middle quintile households. Strikingly over 9% households of Q2 move from above the poverty line to below it as a result of educational costs especially if they are supporting participation in secondary.

Third, the composition of costs to households for direct and indirect costs varies. Most of the cost arises from expenditure on uniforms, books, stationary and tuition fees. For government schools these costs are 51% of the total, but as much as 75% in unaided schools. Uniforms reportedly cost as much as materials for learning, while transport costs are generally less than 10% of total costs. Importantly the poorest households spend a smaller proportion on fees largely because most are in government schools.

Of concern is the finding that the largest expenditure for the poor is to access private tuition. Poorest quintile households allocate between 4% and 6% of household expenditure to private tuition while this is only 1.5%-3.0% for the richest. Private tuition represents 36% of the total expenditure associated with accessing government schools, 22% for aided schools and 13% for private schools. This, coupled with parents' propensity to borrow money to make these expenditure results in a highly inequitable and probably ineffective, inefficient situation. In a sample of over 8000 households about 40% of those with children in government and aided schools said they borrowed money to pay the costs. A smaller proportion - about 28% - of those with children in private schools also said they borrowed. In general, healthcare needs represent the most common reason for borrowing, followed by educational expenses. Of note, in response to income shocks households are reportedly most likely to cut back on consumption, sell assets or send children to work, while very few would reduce educational expenditure, highlighting the high priority placed on education.

The proportion of students who receive fee waivers and scholarships to reduce the costs of attendance to households vary widely by social groups and by States. Most fee waivers are received by the poorest and more often by STs than SCs. Overall fee waivers are awarded to between 5% and 10% of SC and ST students Scholarships are more common with half of ST students in quintiles 1 and 2 receiving awards and about 40% of SC students. Surprisingly, over 20% of the richest SC and ST students also receive scholarships. The governments of Punjab and Tamil Nadu give scholarships to fewer than 5% of students whereas Gujarat and Madhya Pradesh give scholarships to more than 40% of secondary school children. Though fee waivers are much more common amongst the poorest, the amounts given are larger for the richest who receive them. More significantly the value of scholarships is about twice as much to those in the richest quintile than for those in the poorest.

Most scholarships and fee waivers are allocated to reserved groups, but often not to the poorest amongst these groups. The poor not belonging to reserved groups are also eligible to receive these benefits, however families in quintiles 2, 3 and 4 tend to avail themselves of these much more than those in quintile 1. Quintile 1 students may be receiving other entitlements under reserved group status, however it could also be the case that these families are less empowered and less well-informed regarding their rights.

The issues of affordability are central to the success of RMSA and sustained levels of increased participation and achievement. Most of what may need to be done is likely to revolve around incremental change to improve the efficiency and effectiveness of existing systems. This requires a sustained ambition to make secondary schooling more affordable to the state and to households.

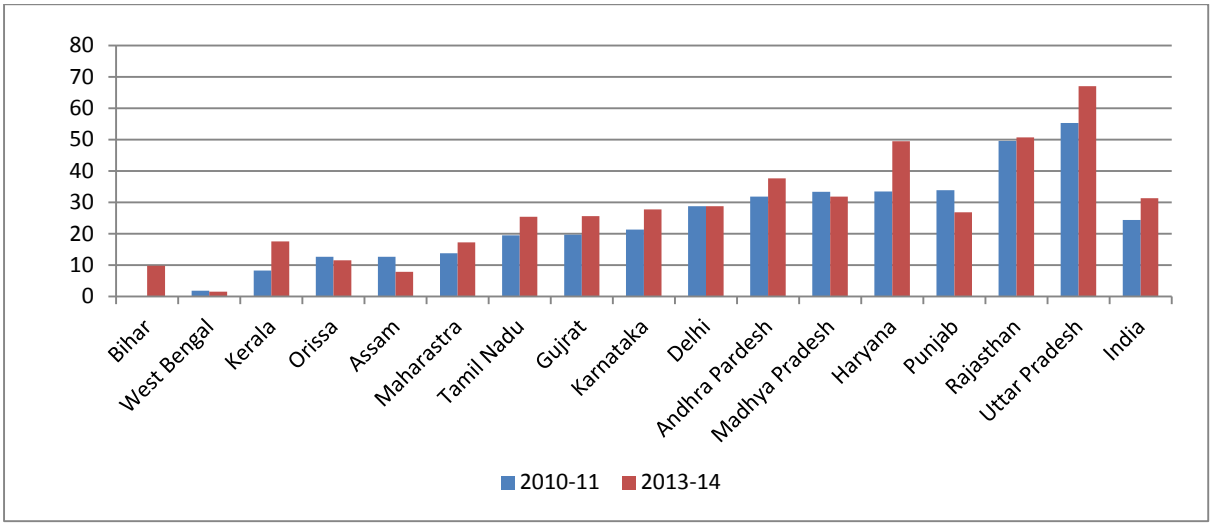
Affordability levels need to be defined at the State level in terms of the costs of attendance to households relative to levels of household expenditure. At some threshold of costs households will

have to reduce expenditure on basic needs (food, shelter and health) in order to afford school attendance. The poverty line is the minimum level below which fees should be waived, scholarships awarded and transport, books and uniforms subsidised. This is likely to be insufficient to ensure that households are not placed under financial stress by educational expenditure and the threshold should be drawn at a higher level in quintile 2 or quintile 3 depending on the levels of SDGP per capita and patterns of income distribution.

2.6 The Contribution of Private Schools

Enrolments in private schools have been growing but the pattern is very uneven with more growth in some States than others. The profile of private school growth and its dimensions are discussed in depth in RMSA TCA Research Report '*The Shifting Terrain of Public and Private Provision'*. Nationally private schools accounted for 24.4% of secondary school enrolments in 2010 and 31.4% in 2014 (figure 25). Over this period increasing numbers of pupils were transiting to secondary schools but in many States less than 70% of all children were completing this level. If enrolment in private schools is 30% and the net participation rate is 60% then only 18% of all children are in private schools. This is the same order of magnitude as the number of children in the richest quintile.

Figure 25: Percentage share of private secondary school enrolments out of total secondary enrolments



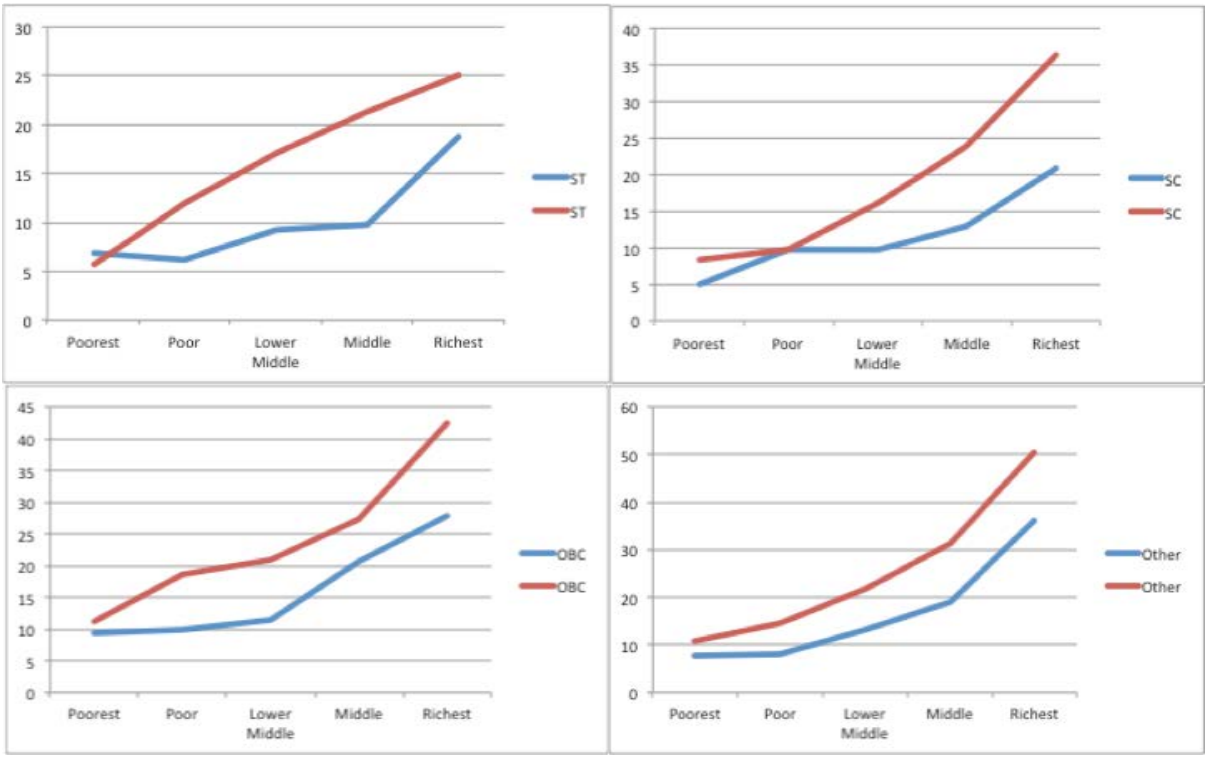
The results of a multivariate analysis from this research confirm that family wealth is the largest determining factor with every quintile below the richest quintile (from which most children are privately educated) having a successively smaller chance of accessing private schools as wealth diminishes. Fully 80% of boys and 62% of girls in private schools are from the richest two quintiles (i.e. top 40% of income) households. Other factors also can have a strong impact. These include caste or tribe; rural residence; having poorly educated and poorly employed parents. Being a girl child also negatively impacts on the chance of private school attendance.

The evidence indicates that parents believe that private schools are offering higher quality education though what this means is unclear. They do believe that private schools provide access to learning English; to higher-class and caste peers; and to improved job prospects. However, though private schools appear to perform better on tests, the bulk of private pupils' raw test score advantage comes from differences in family background with wealth the most important factor.

The full costs of attending private schools at secondary level are way beyond the capacity of the poorest households to finance. It would require at least 75% of disposable income to fund one school place for those in the lowest quintile and this would have to be a low price private school. The analysis suggests that below the second highest quintile of income private schools will be broadly unaffordable. This places an upper limit on expansion of this type of school since the market will not bear the costs of secondary schools financed from households at or near the poverty line.

Increased enrolments in private schools are unlikely to have a direct impact on most of those children who do not currently transit from grade 8 to grade 9. This is because most of the expansion in enrolments has been of children from the richer households (figure 26). This is clear when the proportion of enrolment in private schools is plotted against income quintile for different social groups. STs SCs and OBCs have seen little change in participation amongst the poorest group in private school enrolment. The gains have been for the richest members of these social groups. Indeed these groups have gained more than those who are classified as from other castes amongst whom participation in private schools has grown but with a slightly more even pattern across wealth quintiles.

Figure 26: Participation in private schools by social group 2007 and 2014



There is a clear indication that what has been happening is that there are rising shares of wealthier families accessing private schools rather than public schools. Public schools are the only option for most poor households because private schools are generally unaffordable. They have little direct impact on access to secondary school for marginalised groups. Increasing private schooling in India is not contributing to the universalisation of secondary schooling by bringing hitherto unreached children into school. Private schools attract families away from government schools, with no evidence (for the most part) that children enrolling in private schools would otherwise have been out of school and unenrolled.

Growth in private schooling which charges full economic costs will stagnate and that future gains in enrolment rates that depend on the enrolment of children from poor households will be predominantly in government schools. If government chooses to subsidise private for-profit providers on a large scale, or to extend the Right to Education requirement for private schools to admit 25% of disadvantaged students, this would increase the role of private schools in RMSA. However since such schools would be publicly financed and regulated and their admissions would be controlled they would be more public than private in character.

The key take away of our research is that growth in private secondary schooling which is not subsidised from the tax base is uneven and likely to plateau at no more than 40% of enrolments, and may well be less than this if it becomes clear that there is not a very large private school effect. Universal access cannot be left to the market with so many families unable to afford private provision, and with private providers' inability to serve remote and sparsely populated areas. Planners must take these issues into account when moving forward with expansion of secondary schooling. Growth in private enrolments has been and will continue to be of students who would otherwise have attended a public school except in areas where there is no public school. Under RMSA every child should have access to a public school and this promise should be honoured. Most out of school adolescents of secondary age cannot afford private schools as they are unaffordable to households.

A clear policy on private schools is needed, especially if there is any intention of extending public subsidy to include private schools. It is possible that some public-private partnerships (PPPs) could utilise the flexibility of private provision to meet short- to medium-term demand for contract teachers. However demand for places in secondary school will peak and then decline due to demographic transition. Private schooling with financial support could contribute to enrolment growth in limited contexts. Existing grant-in-aid models have a historical presence in some states and may perform effectively. However they typically operate at levels of cost to households intermediate between public and private schools. They are therefore often unaffordable to the poorest. PPPs that have sub-contracted school building, maintenance and staffing to private companies have consistently proved poor value for money in OECD countries and are now no longer favoured as a mechanism for financing. In formulating any new partnership arrangements it must be remembered that public subsidy of private schools has opportunity costs. The investment could have been used to improve public schools and extend their reach. Sub-contracting to non-government entities carries risks such as bankruptcy and closure, and changing business priorities. Clear legal frameworks and agreements are needed to manage the relationship and ensure delivery, accountability, tax compliance, and indemnities for public liabilities and systemic risk.

2.7 The Growth of Private Tuition

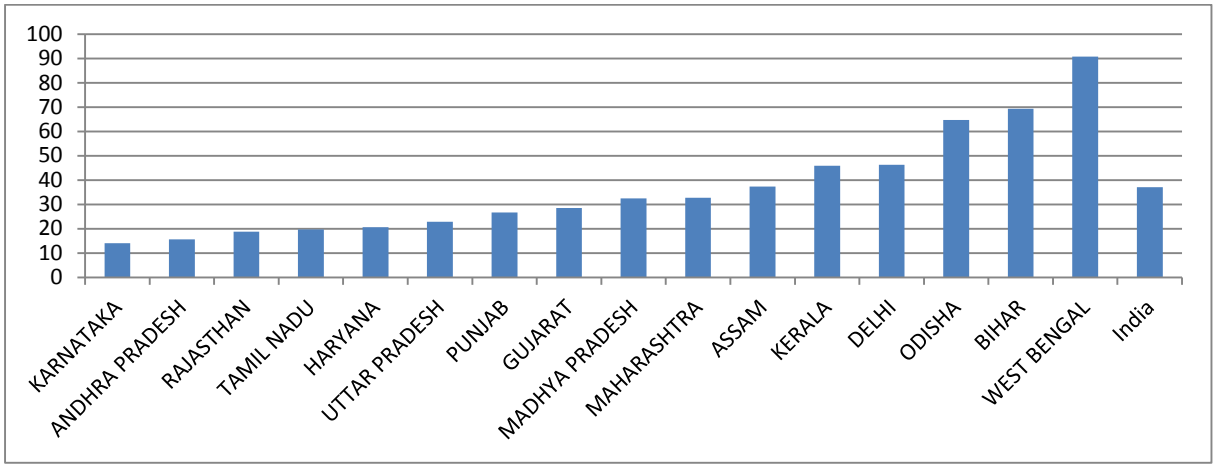
Private tuition is widespread at secondary level and is an additional cost to households. The evidence on this is presented with an analysis of data in RMSA-TCA Research Report '*Private Tuition: Extent, Pattern and Determinants'*. Estimates by the Asian Development Bank suggest that currently the value of the private tutoring industry in India is $6.4 billion and is likely to grow by 15 percent annually. The most recent national data shows that the incidence of uptake of private tuition has reached 19% amongst SCs to 35% amongst OBCs, and 48% amongst other groups. Even the poorest groups appear to contract private tuition on scale placing an additional burden on their household expenditure. In general richer students amongst SCs and STs are more likely to take private tuition. Those in the 'Others' caste category all have about the same propensity to have private tuition indicating the practice is very widespread across the school system. Table 2 shows participation at all levels by wealth group.

Table 2: Percentage of students taking private tuition by caste and income group

	ST	SC	OBC	Others
Q1 (Poorest)	14	36	35	53
Q2	18	35	37	53
Q3	21	29	32	41
Q4	21	32	36	46
Q5 (Richest)	29	44	41	51
Overall	19	34	35	48

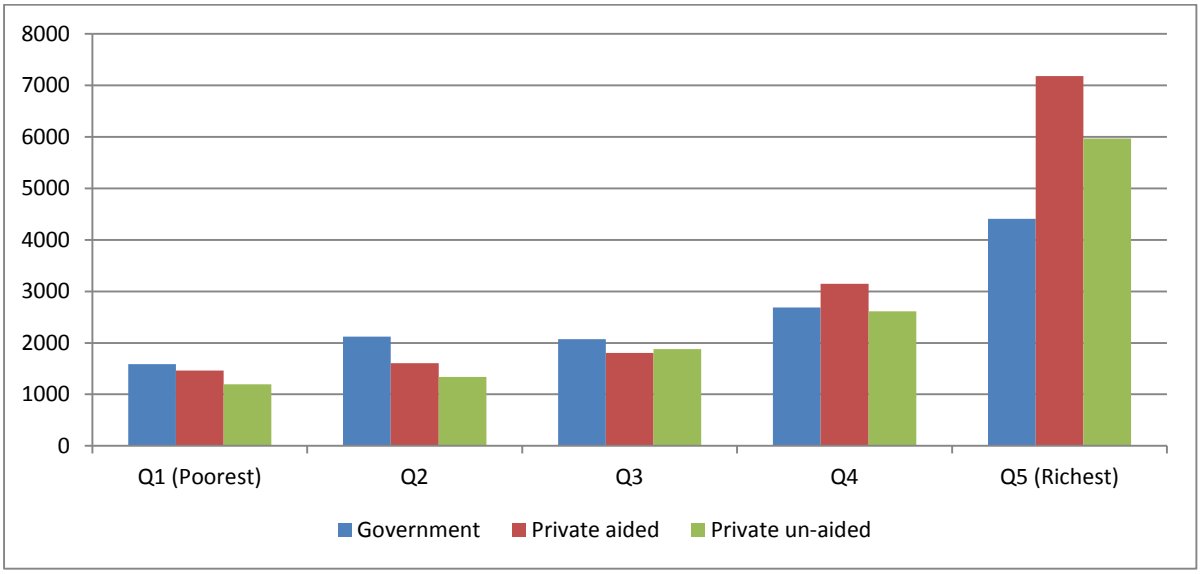
Private tuition is most common at the secondary level. On average, about one-fifth of the students at elementary and one-third of the students at secondary level enrolled in the formal schooling system attended private tuition. The rate of participation in private tuition increases with household wealth and with the level of education.

Figure 27: Percentage of secondary school students taking private tuition by States



States vary in the amount of private tuition that appears to be taking place. West Bengal, Bihar, Odisha and Delhi have high rates of 50% or more. Karnataka, Andhra Pradesh, Rajasthan and Tamil Nadu have low rates as shown in figure 27. There is no consistent pattern with educational development suggesting that the underlying cause for different levels of private tuition have several different dimensions.

Figure 28: Average amount spent on private tuition by school type

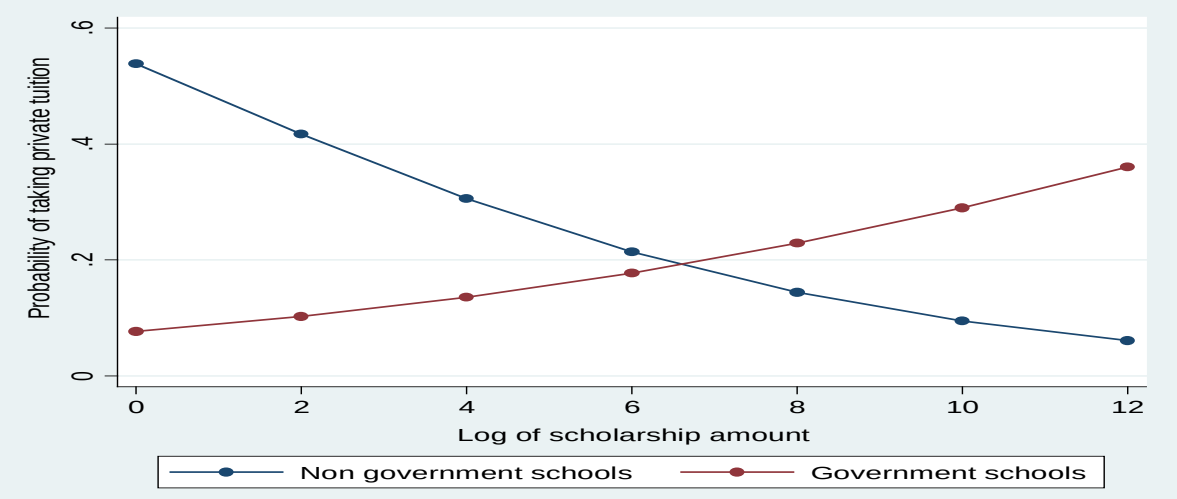


On average the poorest households spend over INR 1500 per year on private tuition for children attending government schools, The richest income group spends about three times as much on private tuition for children attending government schools. It is only in the richest quintile that household spending on private tuition for children attending private schools exceeds the amount spent by students enrolled in government schools (figure 28).

Private tuition appears to have become 'the norm' for those who can afford to pay, which has clear implications for equity, efficiency and effectiveness. At secondary level private tuition occurs on a very large scale. Case study data suggests that for many, private tuition is becoming a dominant mode of secondary education with students enrolling in school but often not attending. Instead they choose to rely on tutoring to prepare for high stakes selection examinations. There are several possible motivations for private tuition. These include dissatisfaction with existing public and private schools, demand for marginal advantage in the competition for scarce places in higher education institutions regulated by high stakes assessment, learning difficulties experienced by individual children and in relation to specific subjects, preferences for particular pedagogic styles and learning environments (e.g. small groups or one-to-one), teacher absenteeism, and social stratification leading to exclusive institutions serving particular communities.

The probability of attending private tuition is strongly related to the socioeconomic background of the students. It should be noted that first, the chances of attending private tuition are observed to increase with the level of education that the student is attending. Second, students from ST and SC background have a smaller incidence of uptake of private tuition. Third, students enrolled in government schools are more likely to take private tuition. Fourth, English as the medium of instruction has a strong effect on the chances of taking private tuition. Fifth, the amount of scholarship received increases the chance of taking private tuition amongst the students enrolled in government schools compared to the chance of students enrolled in non-government schools who also receive scholarships (figure 29). This may mean that much scholarship money is being diverted to private tuition.

Figure 29: Probability of taking private tuition with the interaction effect



Where rapid expansion has degraded school quality and led to large classes, more untrained teachers, and shortages of learning material this creates incentives for private tuition. Expansion increases the competition for places at higher levels in the education system especially when these grow more slowly than secondary enrolments. The result may be private tuition to provide a competitive edge. Private tuition may also be contracted to provide social as well as cognitive gains that differentiate students in the labour market. Most of the drivers of demand appear to relate to the benefits of additional study for selection for educational opportunity and for the labour market.

3. Overview of Issues Arising

This portfolio programme of research for RMSA-TCA has collected, analysed and reached policy relevant findings across a broad range of concerns. The baseline for RMSA going forward is that no more than 60% of all Indian children complete secondary school successful and net enrolment rates are little more than 40% suggesting that many are overage for their grades. 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.

The analysis in this research report identifies twelve concerns that will shape secondary school development in India over the next decade.

First, most states will find it difficult to achieve secondary level GERs greater than 100% by 2020 and will not succeed by the target date of 2017[9]. This has several causes. These include insufficient numbers of students reaching and graduating from grade 8 since more than 40% of children who start grade 1 do not reach the secondary level; inadequate levels of achievement of grade 9 entrants who may then fail to complete grade 10 successfully; insufficient access to secondary school places in some areas and oversupply in other areas; poor attendance of students and absenteeism by teachers; wide variations between schools in staffing, class size and availability of learning materials; diversion of resources from free public provision to subsidies for private schools which do not enrol children from poor households; and failure to ensure adequate financing at State level to universalise access.

Rates of growth needed in some States and Districts may need to exceed plausible rates at which new capacity can be procured and sustained. RMSA need to 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 make the transition to grade 9. Expansion should also be managed at rates that allow adequate numbers of teachers to be employed to achieve pupil teacher ratios of 30:1 and class sizes to be limited to 40 students to maintain quality.

Second, 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 before 2020 after which the number of secondary age children will fall by 20% or more over

[9] 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%.

a decade. The pattern of demand for school places will be determined by demography, topography and the current stock of schools and classrooms. The temptation to build and provide staff and facilities to meet peak demand need to 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.

Third, additional demand for secondary education will come mostly 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 support, will need curricula adjusted to their capabilities, pedagogies adapted to less capable learners, and curricula 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 States[10] (e.g. Assam). In these States more than 50% of secondary schools have enrolments below 100 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.

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. It

[10] 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.

is also the case that 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.

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. Mega schools need to be planned to establish the extent to which they are justified by lower costs and levels of achievement. Geographic information systems (GIS) can provide detailed insight into current patterns of school location in relation to habitations. This can lead to the development of plans to increase locational efficiency that are both technically effective and educationally and politically feasible. The goal should be to have fewer schools of much greater quality.

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 disadvantaged children will study curriculum and learning material originally intended for a select group of children who have attained a certain level of academic achievement. 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 schooling requires many more qualified teachers covering all major subjects and electives, especially where current PTRs 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 achieve and maintain a PTRs of 30:1. Where PTRs are low it is the mix of teachers that needs to change so that there are enough qualified teachers in all subjects. Merging 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, could greatly increase efficiency and allow more investment in quality.

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 indirect costs of secondary school attendance and to avoid contracting debt at high interest rates to pay school costs. No child should be excluded from secondary school by the costs of attendance. This means that secondary school should be fee free and supported by scholarships or cash transfers for all for all those in the lowest two quintiles of household expenditure.

Ninth, private schools now enrol as many as 30% of those in secondary schools or about 15% of all secondary age children. Most of those participating in private schools are from the richest households. Most private schools are in areas of high population density and relative wealth. This will place a constraint on the extent to which private for-profit providers can contribute to expanded access to secondary schooling since most households in the poorer half of the population will find private schools unaffordable, even where there are lower price schools available. Private schools generally do not increase access but attract students who would otherwise be in government schools. There is yet to be any systematic evidence that private schools raise standards in government institutions as a result of competition; rather, it can be detrimental where most or all of the more advantaged and motivated families abandon government provision in favour of private options. Public subsidy of private provision always has an opportunity cost that could have been invested in improved access and quality in public systems.

Tenth, private tuition has grown rapidly and is very common at secondary level. It can cost households as much as all the other costs of secondary school attendance. There is some evidence that those with scholarships are more rather than less likely to pay for private tuition. Surprisingly large numbers of those in private schools also buy private tuition. It is not clear what are the net effects of the considerable investment. It may encourage or facilitate student's absenteeism. It may favour the rich who can afford to buy more of it and it is therefore socially regressive. It may simply be raising the price of selection by high stakes examinations without much impact on who gets selected. The probability is that private tuition and its cost will continue to grow and affect more and more households. The poorest will contract debt to pay the costs thus making themselves even poorer.

Eleventh, financing universal secondary education with current cost structures in some States could require more than 2% of SGDP. This level is financially unsustainable without a disproportionate allocation of the State budget to the education sector. Planning should allocate about 1% 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 that 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.

The research has shown that although considerable progress has been made RMSA still has many challenges to overcome. Planning changes in capacity, managing flows of students in the light of demographic change and migration. Improving quality will require consistent effort, continuing analysis, and political will. The issues around small secondary schools must be addressed if access is to become universal and equity, efficiency and effectiveness are to improve. Planning needs to adapt norms and standards to suit circumstance at State and District levels and provide incentives to maximise gains in participation and performance at affordable costs. Only this can ensure the development of a truly universal system of secondary schooling that can help deliver national aspirations to close the gaps within India and with more developed economies.

For all the reasons listed above and in the previous sections 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.

A matrix of policy options has been developed broadly following the thematic concerns developed within the research programmes as a result of suggestions in the JRMs and from the national and State teams. This provides a range of possibilities that need interpretation for action at different levels. Much more detailed analysis and discussion is available in the relevant RMSA-TCA reports.

3.1 A Matrix of Policy Options

Intervention Area	Policy Option
Improving access to secondary education	• Strategically invest in standalone/composite schools/upgraded schools with specific criteria that take into account considerations of cost effectiveness. • Pilot modalities for new school and upgradation procurement using decentralised norms and standards suit local circumstances. • Review the selection and transition issues surrounding entry into secondary schools to increase the efficiency of the flow of students into grade 9 and 10 and through from grade 1 to grade 8 in elementary school. • Develop a basket of subsidies and supports for poor households that can meet the direct and indirect costs of secondary schooling. • Determine goals in terms of attendance and retention of all children to grade 10 at affordable costs.
Improving equity in access and resourcing	• Review patterns of participation and identify evidence of inequality in access, progression and completion and ascertain the causes for SCs STs, etc. • Develop pro-poor funding of schools and households to ensure that no child is excluded from secondary school as a result of inability to pay. • Make secondary school fee-free for all those classed as *Below the Poverty Line* (BPL). Allocate scholarships to all in quintiles 1 and 2. • Invest in girls' schools where this is culturally appropriate, and in support programs for SCs, STs and OBCs, and in secure transportation. • Balance investment in girls with investment programmes for disadvantaged boys. • Track all children through elementary school and into secondary and identify those from marginalised and reserved groups so that their participation can be monitored and enhanced to reduce gaps arising from different forms of discrimination and disadvantage.
Improving efficiency in resource utilisation	• Develop school and district planning and management systems designed to improve the cost efficiency of teacher deployment and reduce inefficiencies created by uneven distribution of teachers and excessive numbers of small schools. • Use GIS and other EMIS to rationalise small schools where this is feasible and to identify sites for new schools and upgradations that contribute to efficiency. • Review practice on teacher qualifications and appointments to phase-in norms which require qualified teachers to teach at least two specialist subjects. • Develop context-specific strategies related to private provision and its interaction with government schools and teachers to ensure constructive and complementary development rather than overlap and unproductive competition leading to inefficiencies. • Reduce variation between schools and between districts and between states in key indicators associated with quality.
Improving learning standards	• Review curriculum in relation to the needs and capabilities of new entrants with lower academic ability and different levels of social capital. • Develop options for different pathways through secondary schooling which would make core curricula accessible to all new students and offer appropriate tracks towards qualifications with value in the labour market. • Develop curricula and learning materials that can be used effectively in schools at affordable levels of cost, using innovative approaches. • Devise methods for learning material production and distribution that are affordable to poor households. • Invest in the development of formative assessment systems which are designed to assist in managing learning which can diagnose difficulties and link these to intervention strategies to reduce the probability of low achievement and subsequent dropout. • Reform Board examinations to improve assessment of higher cognitive level skills and develop methods of reducing practice effects; undertake predictive validity analysis for high stakes assessments.

Sub-fields	Evidence	Policy Options	Additional Information Requirement	Comments
Making it Past Elementary Education				
Supply of qualified applicants	In some states no more than 50% reach grade 8 and can demonstrate competence. Learning levels are low at elementary level (and largely determined by SES), leading to drop out and lack of necessary knowledge for secondary level curriculum	• Take measures to improve the quality of education at lower levels, particularly in early grades so that children have strong foundations for further learning. • Use formative assessments of learning at the elementary level to identify students who are struggling to learn. Provide fee-free remedial support before transition from primary and from upper primary levels. • Reduce costs to families of upper primary education	Head teachers at lower levels should be tasked with finding out from families why children are (firstly) not attending regularly, and (secondly) why they drop out. This information can help inform policies to boost retention.	Some States achieve this, most do not. Lessons should be learned from states that are keeping children in school through the elementary level.
Participation and transition rates for different groups	Poverty is key determining factor in participation at secondary level. Unaffordable to roughly half the families. Most other disadvantages overcome with sufficient spending power.	• Act to increase participation of the poorest (BPL), SCs, STs, OBCs, girls and the disabled where they are disadvantaged, by reducing/eliminating costs of secondary schooling • Set performance targets for school management for inclusion and equity • Incentivise teachers to keep children in school, using Aanganwadi local census information. Teachers should provide marginalised and poor families with information on scholarships and fee waivers.	Analyse year on year trends for enrolment of different social groups Make use of records already kept by Aanganwadi workers; ensure enough information is gathered to be able to seek out poor and marginalised young people and support their inclusion.	Excluded groups, especially the poorest, have not benefitted as much as others from expansion. Non reserved castes have also benefitted more than others. Future increases in access should be pro-poor and pro-excluded social groups. It is likely that these groups have not been empowered with information on any available support for their children's secondary schooling.
High repetition and dropout from secondary grades	Average attendance rate in Assam, Bihar and Odisha around 40%. Low attendance leads to low learning, inability to cope with the curriculum and failure in examinations.	• Identify and address causes of low attendance and drop out. See above - teachers should be incentivised to find out why children are not in school and encourage their continued participation. • Ensure all schools undertake diagnostic and formative assessment of new students • Adapt curricula and pedagogy consequentially; • Complement automatic promotion with remedial and enrichment programmes	Identify and address causes of drop out, as above.	Drop out is related to cost, opportunity cost, interest and perceived relevance, early marriage etc. Offer fee waivers to all BPL. Scholarships for those in Q1 and Q2. Reduce costs of transport, uniforms, books and all other costs.
Different gains in participation and learning in different social groups	In most states except for Kerala increases in participation at the secondary level have been greatest for the richest children. In several states the poor have made no gains over recent years.	• Develop formative assessment related to national curriculum competencies • Create a circles of support to manage learning around every child • Ensure minimum physical conditions for learning in schools are met • Invest in free learning materials • Ensure every child has a qualified teacher in core subjects • Set differentiated targets for different social groups and for different levels of household wealth • Create different streams, differentiating more practical/vocational curriculum in one stream from academic curriculum in other stream.	Analyse board examinations to determine areas of learning difficulty of different sub populations of students and use this for formative feedback to individual schools Measure student progress against students previous performance as well or instead of comparisons with other students	Core subjects may be too difficult for universal access if they are designed for the top 20%. Curricula differentiation is inevitable if diverse needs and capabilities are to be recognised. Diagnostic feedback at classroom level coupled to targeted support Participation is likely to become unattractive when children attend school but do not learn. Teachers should be more accountable for and to their students, pushing for better attendance. Better attendance means it is easier for teachers

Sub-fields	Evidence	Policy Options	Additional Information Requirement	Comments
		• Create incentive programmes specifically targeted at poor and marginalised groups.	Measure inequalities (range, standard deviation, top and bottom quintile households etc). Make better use of existing evidence on different degrees of learning amongst different social groups at lower levels and investigate causes of differences.	to work through the syllabus. More learning and more pressure to attend at the lower levels are likely to result in more children and families seeing it as worthwhile to stay in school and to attempt to transition to secondary level.
Demographic Transition and Education Planning				
Flow of students to across elementary grades and transition to secondary level to limit demand for secondary education.	Across most States number of grade 9 entrants needed for achieving RMSA GER target will be more than grade 8 completers. Internal efficiency issues limit flow of students through the elementary cycle with large variability between different caste groups (SC, ST)	• Model projections of aggregate demand for school places in different types of school in different districts using U-DISE data • Invest in planning capacity at secondary level • Develop GIS as district level to inform decision making on location and capacity • Develop and maintain data systems driven by decision making and resource allocation • Develop medium term perspective plan for secondary schools based on projections software, school mapping and administrative data	Anticipate future flows of students Ten year projections iterated every year Locate areas where more capacity is needed and where capacity needs to be reduced.	GIS needs to be accompanied by district level assessment of options and qualitative insights into efficiency and effectiveness since a mechanical application of GIS will not optimise on the ground. Managing the flow of students is critical to efficient resource allocation and matching forward liabilities to likely resources so that demands on domestic revenue are predictable and budgeted, teacher supply is adequate, and schools are located where there is future effective demand.
Demographic transition to low growth in school age children will have a significant and sustained impact on the total number of school places needed	Demand for additional places will peak and then decline at different times in different states. Nationally it will peak in 2020.	• Plan to manage peak demand between 2016 and 2020 without creating surplus capacity • Plan for falling enrolments at secondary level after 2020 on a timescale dependent on participation rates and school age population decline • Consider time-bound public-private partnerships in specific contexts to buy places in private schools for the interim period before declining numbers of places will be needed.	Which areas at block, district and state levels need extra places in the next five or so years? Base decisions not only on demographic information but on current and projected survival rates, and extent of private provision.	Though in many areas the number of school age children is falling the point at which this will be reflected in falling aggregate demand for places will depend on how rapidly there is progress towards universal participation. Some States need to double participation rates in grade 9.
Some sub-populations defined by location (e.g. urban informal settlements) and by social group (differential birth rates) may grow or contract at very	Demographic transition varies not only by geographical region but also by socio economic background	• Identify and target excluded groups for interventions dependent on causes of exclusion • Link indicators of participation to changing population of school age children for different social groups • Come up with constructive plan for educating children in illegal/informal settlements/slums. Provide catch-up and accelerated programmes for these groups in the place of formal	Where are key areas of population growth from migration, etc, that require more provision of school seats at all levels.	Historically excluded groups are likely to need additional support and learning inputs to take advantage of access to secondary school otherwise they may fail and drop out. Targeted interventions will recognise the needs for this.

Sub-fields	Evidence	Policy Options	Additional Information Requirement	Comments
different rates to the average		secondary schools were necessary, or to allow them to transition into formal schooling. • Identify and address the needs for access to secondary school of non-local migrants		
Equity and Efficiency in Expansion of Secondary Schools				
There are very large number of small schools (enrolment below 150) in many States.	64 % of secondary schools have fewer than 150 pupils. 6.6% have fewer than 25 pupils	• Use school mapping and GIS to identify over supply of school places • Identify governance structures and incentives to reduce the number of small schools • Provide creative solutions to transport issues if small schools are to be merged with others. For example the provision of bicycles for girls in Bihar.	Additional information on actual attendance at small and large schools would be useful, as well as more information on learning outcomes and what thresholds might be for schools that are too small or too large to be effective.	It may be better to have half the number of schools of twice the quality. Addressing transport issues for girls and the poor will help to smooth a transition from many very local schools to fewer, and farther schools.
Small schools consume disproportionate amounts of resources and many underperform compared to larger schools with a critical mass of facilities and staff.	Application of the norms in the smallest schools, with enrolments of 25 or less in grades 9 and 10, costs per child would exceed INR 100,000.	• Develop composite schools rather than small stand-alone secondary schools • Develop national curriculum materials that can be used to structure learning and teaching in small schools and make use of multi-grade approaches. • Incorporate multi-grade teaching methods (for all grade levels) into the teacher training curriculum.	As above, the critical threshold or lower-bound for minimum school size. Learning outcomes from small monograde schools versus multi-grade schools where teachers are trained for this context.	Multi-grade teaching can be effective at secondary level and may be more efficient and effective. It depends on appropriate learning materials and systematic management of learning.
Staffing norms have resulted in low pupil teacher ratios (and therefore high costs per child) in some states	Smallest government schools have PTR of 4.1. Small PTRs mean high unit costs.	• Change staffing norms to provide disincentives to maintain small schools in areas where this is not essential • Ensure all teachers can teach several curriculum subjects • Ensure staff in composite schools can teach at different levels e.g. grade 7 and 8 and 9 and 10	How many teachers are there who are currently capable of teaching several secondary level subjects? Number of teachers who can be transferred to areas of greater need. This information should be gathered and used to deploy teachers to areas of shortage.	School timetables in composite schools should allow teachers to work across the elementary school – secondary school grades.
Efficient School Siting using GIS Modelling				
Application of distance norm non-existent. If applied may lead to	Distance norm appears to be ignored widely. In the case study area there are too many secondary schools too close together with average distance	• Develop local norms as appropriate to existing stock of school, demography and terrain • Enhance incentives to increase efficiency and performance. • Manage use of resources to increase participation	Undertake mapping of school, across all levels, in conjunction with mapping of single age population, network of roads and geographical constraints.	Descriptive analysis of disposition of school resources is essential to plan new capacity.

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creation of surplus school capacity	from the household to be well under 5 km			
School location not determined by demand and changes in demography	Weal correlation between schooling demand and school location. School mapping identifies the supply of school places in relation to the demand arising from the school age population. This suggests more efficient allocations of resources are possible.	• Develop process for review and optimisation of investment in new capacity at secondary level utilising GIS and key informants • Demand based allocation of resources • Develop GIS at district level to allow annual updating of demographics and projected future demand	Undertake analysis of school location and demand of secondary schooling across the country to determine locations where the demand may increase or decrease as a result of demographic movement and expansion of elementary education.	A generic school location planning model may not cater to the needs of different context. The mechanical process needs to be complemented with an assessment of ground reality when deciding locations for either new schools or for consolidating existing one.
Cost and Equity in Accessing Secondary Education				
Household Affordability				
The costs of secondary school act as a disincentive for the poor to enrol; poor households spend a greater proportion of their income on school costs. The poorest (BPL) are made poorer by school costs	With each quintile of household wealth below the richest quintile, participation rates drop successively. Cost is found to be the single largest determining factor in participation at the secondary level, The jump in cost from the elementary to the secondary level is too large for many families to manage.	• Provide fee waivers and scholarships as below • Target subsidies to lower income households • Provide bus passes and /or school buses as appropriate • Provide uniform material for home tailoring • Review costs of school feeding and MDM for Q1 and Q2 in secondary school • Provide core text books free or at very low cost	The number of children who should now be receiving such support. The implications for state budgets of providing the necessary incentives to get poor children into secondary school.	Charging fees to students who are BPL or Q1 and Q2 makes little sense especially if there are waivers and scholarships for some and not others. Conditional cash transfers may have some impact on attendance (all day or partial day). Vouchers with a cash value have no advantage over a validated capitation system and the disadvantage of diversion of resources.
School fee waivers are not distributed to all households below quintile 3	5.7% of children in Q1 and 4.1% in Q2 are currently receiving fee waivers.	• Fee waivers to all Q1 and Q2 in public secondary schools • Provide fee waivers on a gender equitable basis to both boys and girls • In certain areas where boys are more likely to drop out, support should be targeted at boys.	The blocks and districts where boys need targeted incentives. As above, numbers of children in need of fee waivers/scholarships Cost to state budgets for providing these Number of pupils for who additional support is needed beyond fee waivers.	Income foregone as a result of fee waivers should be replaced by capitation payments

Sub-fields	Evidence	Policy Options	Additional Information Requirement	Comments
Scholarships appear to only reach 50% of the poorest and in some state are not allocated to general cast boys	29% of children in Q1 and 26% in Q2 are currently receiving scholarships.	• Scholarships to all Q1 and Q2 in public secondary schools of a value sufficient to meet costs of attendance, conditional on regular, all-day attendance • Provide scholarships on a gender equitable basis to boys and girls	Reasons why half of the poorest are not currently getting scholarships. Is it lack of information or are they being declined, and if so, why?	Scholarships should cover all key educational expenses including textbooks, learning materials, bus passes, uniforms, etc.
Public Financing				
Financing public secondary schools depends on • ***The number of school age children*** • ***The amount of the State budget allocated to secondary education*** • ***The cost per student***	*Some states under invest in secondary education and spend less than 0.7% SGDP while some spend more than 1% of SGDP* *Teachers salaries are likely to need to be between 3 times and five times SGDP per capita for them to be affordable to the State budget.*	• Project budget needed for universal participation over the next 10 years as above and plan necessary allocation • Identify efficiency and cost saving reforms that may be necessary to balance public finances • Consider increase in investment in secondary • Consider efficiency gains to reduce costs and increase participation • Fix cost per student to be between 20% and 30% of SGDP per capita ensuring it is less than twice as much as cost per student at primary level • Review teachers salaries in relation to GDP, labour market conditions, state economic level, and domestic revenue base • Identify long term sustainable levels of salaries that allow universal participation	Review composition of costs per student in different types of school Identify affordable levels of funding linked to the organisation of teaching and learning	Cost to government are reduced if a predictable number of households choose to pay for private schooling which is not subsidised Note that private expenditures will not compensate for low allocations of SGDP to secondary education since the poorest will not be able to pay If more than 1% of SGDP is spent this will reduce investment at other levels and is unlikely to be sustainable with universal participation No OECD country has costs at secondary that are more than twice those at primary. Typically the ratio is less than 1.5:1
The Shifting Terrain of Government and Private Provision				
Enrolments in private schools at secondary level have grown. Many schools remain unregistered and many are unlicensed and unregulated	Over 31% of enrolments are currently in private schools, up from over 24% in 2010. Uptake of private schooling varies greatly between states and between social groups and wealth quintiles.	• License and regulate all private schools at secondary level, in a constructive spirit • PPP arrangements that lead to (in certain appropriate contexts) more students enrolling at private schools may encourage more private schools to come forward for registration. • Transparency in academic performance and attainment is needed • Private school teachers should have at least the same levels of competency in subject matter and pedagogical knowledge as civil service teachers.	How many private schools are currently operating unknown to government. How many children are attending unregistered private schools.	Private schools should be licensed and regulated to ensure minimum standards, health and safety, sanitation, building quality and qualified staffing but not in a punitive way that drives private providers underground, or that are non-comparable to requirements in government schools. Ensure that teachers in private schools undertake similar competency assessments as government teachers.
Private secondary schools appear to be unaffordable to most households in quintile 1, 2 and in some states 3.	The share of private enrolments amongst poorest quintile households is around 10%. This only rises to just over 20% for	• Consider providing funding for poor students (Q1 and Q2) to attend private schools where these are closer to their homes, or where there are other access issues regarding government school attendance. • Also consider subsidisation of places at private schools in strategically selected locations in relation to the demographic	Locations where there is a temporary need for more secondary school places.	Private providers have the ability to be more flexible and responsive at shorter notice, meaning that there are some limited contexts, such as where greater demand is temporary, or where government is under-providing, to

Sub-fields	Evidence	Policy Options	Additional Information Requirement	Comments
	the middle wealth quintile and over 30% for the richest.	transition where additional secondary school places may be needed only temporarily.	Locations where there is sudden expansion of population for e.g. through migration. Is it cost effective to subsidise some children to attend private schools instead of expanding government provision on limited contexts?	capitalise on this and fund some children to attend these schools.
Private schools may be socially exclusive and have no obligation to provide school places to all children in a district	As above, fewer poor children attend private schools. Also, fewer SC, ST and OBC children attend private schools. Such families are more often poor, meaning that private schools are less accessible to marginalised groups.	• Transparency about social group of enrolments • Provide subsidies to the poorest and the poorest SC, ST and OBC students to access private schools where appropriate (i.e. where access to government schools is problematic. • Regulation of admissions as appropriate where places are funded by government (e.g. 25% of seats reserved and funded by the government for poor and marginalised groups). • Admissions policies should be public documents along with reporting on relevant criteria	Are schools exercising social group-based entrance criteria? Or is admission most usually dependent on ability to pay the fees?	While the outcome is that the poor and the marginalised access private schooling much less often than more advantaged peers, it is likely that this is simply an outcome of inability to pay fees. Private schools are most likely to exclude only based on inability to pay fees. However this has an exclusionary effect and helps to reinforce stratification.
It is not clear that private schools perform better public schools when selection effects are taken into account.	There is some evidence to suggest a private school effect in some cases, but in others there is no effect.	• Publish data on private school performance that is independently validated and reports selection effects and distributions of results, not simple pass rates • Ensure that both students and teachers are assessed and results published, along with those for government schools. • Standard metrics for comparison of performance should be agreed and should include “value added” methods that take into account the quality of school admissions.	Learning outcomes should be tracked periodically and continually.	There is no evidence to support any privatisation of education based on quality grounds.
Public support for private schools has an opportunity cost which reduces investment in public schools	With a limited budget, money spent on private schools means less to spend on government schools.	• Introduce a public benefit condition for public subsidies to private schools • Develop strict criteria for when and where it is more efficient and effective to pay for children to access private schools rather than expand government provision.	More information on true and complete unit costs of government and private schools.	New subsidies to private schools should only be possible in cases where it would be inefficient to set up a new government school/for other strategic purposes to do with demographic transition. Subsidies should be tested against value for money criteria and opportunity costs.
Demand for private schools is influenced by a) declining quality of public schools b) individual advantage c) social exclusion d) pedagogic practice	85% of students in TCA case study research cited issues to do with teaching quality/levels of learning in school for their need to take private tuition. This indicates that private schooling may also be driven by quality concerns. Students are twice as likely to move from government	• If quality is declining in public schools the deterioration must be reversed so that they provide education of good quality. This would reduce demand for private schools. • If demand is driven by competition for selection consider fairer methods for selection not rationed by price • If private schools are socially exclusive consider implications for social cohesion and national unity • If private schools have more effective pedagogy and management practices share this with the public school system	More survey evidence on why parents choose private schools. Understanding their key concerns regarding government schools can help to address these issues.	Increasing quality in government provision from the early grades will stop outflow of students from government to private schools, and will boost the numbers of qualified candidates ready and eager to transition to secondary school. It is important to identify and learn from the many successful public schools and to replicate their successful practices.

Sub-fields	Evidence	Policy Options	Additional Information Requirement	Comments
	to private schools than vice versa.	• Greater accountability of civil service teachers will help to reduce any differences between the sectors		Parents do want their children to mix with more advantaged peers. However if government school quality improves, low cost and high quality is highly likely to win out over social considerations.
Private Tuition: Extent, Pattern and Determinants				
Private tuition is widespread	On an average, about one fifth of the students at elementary and one third of the students at secondary level attended private tuition. Participation in private tuition ranges from 14% in Karnataka to 91% in West Bengal.	• Improve public school quality • Make available free topic related tuition linked to the national curriculum free on line, on TV and radio, on national portals • Develop high stakes selection tests that are less susceptible to practice effects and memorisation	Research on the types of learning issues prompting students to seek private tuition, and in what subjects.	Private tuition should not be necessary if the quality of education available in schools is good and at least acceptable. No private tuition should be necessary to cope with the curriculum.
Additional economic burden on the poorest households	Poorest households spend about 4% of their average annual consumption expenditure on private tuition. Spending on private tuition constitutes 21% of total household spending on secondary education.	• As above and consider school based additional lessons • Consider making self-instructional curriculum material widely available at little of no cost.		Where any opportunity to learn is conditional on ability to pay this will have the effect of further disadvantaging poor children and adding pressure on their parents.
Households may borrow to support the costs of tuition and as a result make households poorer especially if interest rates are those of local moneylenders.	29% of government school parents and 32% of private school parents borrow money to pay for private tuition.	• Regulate money lending, payday loans and high rate microcredit • Provide public information on the pitfalls of borrowing money from informal money lenders. • Reduce costs of attendance for Q1 and Q2 • Improve the quality of school education to eliminate the perceived need for private tuition.	More information on how many people are borrowing money at very high interest rates.	Where poor families borrow money this is almost certainly at extremely high interest rates. Any expenditure driving families to seek funds in this way is likely to disadvantage these families. It illustrates the high priority placed on education.

4. Conclusion

Navigating the ocean of possibilities for RMSA to develop requires not one road map but a series of State and District level medium term perspective plans sensitive to local opportunities and priorities that roll over from year to year and have the benefit of projection modelling and GIS. There are many detailed policy options suggested by the research of RMSA-TCA. These are contained in the thematic reports. In conclusion we identify twelve major reforms that can be a basis for dialogue and which would be transformational and constructively disruptive innovations that could transform the landscape of secondary education in India.

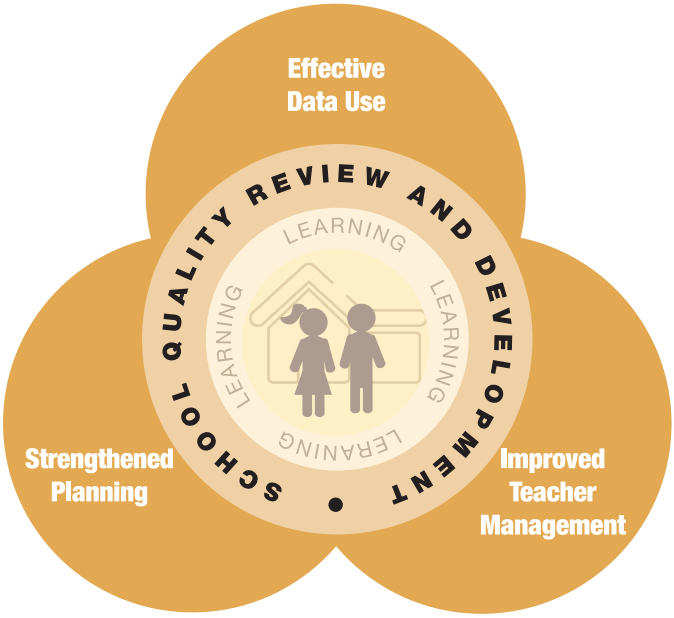
i. Implement a district level medium term planning process using District Five-Year Rolling Plans. These would use school mapping, GIS and demographic projection to analyse supply and demand for school places, teachers, learning materials and infrastructure, school size and distance travelled to existing and new schools, and identify needs for elementary school upgradation and the establishment of new schools.
ii. Promote equity explicitly and monitor indicators of inequality and place data and results in the public domain. Reduce variation in key indicators of participation, achievement and attainment between States and within States of participation. This would require a radical departure from using averages, to using range and variation in key measures to of progress. All main indicators that have distributional characteristics should be reported in terms of average, range and standard deviation.
iii. Abolish fees for children from wealth quintile 1 and quintile 2 and provide scholarships for all boys and girls Below the Poverty Line (BPL). Offer free secondary schooling to all those who cannot afford the direct and indirect costs. Replace income from fees with capitation grants to schools.
iv. Develop a new secondary school curriculum to recognise the broader range of capabilities, aspirations and preferences of grade 9 students. Embed the systematic management and tracking of learning in the curriculum with learning outcome levels and regular school based formative assessments.
v. Develop curriculum teachable in small secondary schools with staffing and other costs no more than 50% more than average costs per student in schools with 500 students.
vi. Develop a diagnostic entry test to be used in schools for grade 9 to provide baseline data for teachers to use to target pedagogic support to new and old students who may need this. Require National Achievement Survey (NAS) to produce detailed pedagogic guides and systematic intervention programmes to identify learning difficulties for grade 8 and grade 10 students.
vii. Reform Board examinations to increase their predictive validity and reliability, offer different pathways for different students, improve their relevance to life futures, and reduce the incentives for private tuition to obtain marginal gains in marks.
viii. Commit States to ensure every child in secondary school is taught by qualified teachers possessing the necessary subject content and pedagogical knowledge, and manage teacher education and the appointment of teachers to achieve this goal.
ix. Extend the Right to Education (RTE) requirement for 25% of enrolment to be of Economically Weaker Section (EWS) students to include private secondary schools. The rationale is similar to RTE 6-14 years. If the cycle of universal participation is extended to grade 10 it is logical to extend RTE.
x. Regulate and facilitate the growth of the private schools so that they are complementary to public schools rather than in direct competition for students and locations. Test any Public Private Partnership (PPP) propositions against their opportunity costs and value for money.

xi. Develop and agree a secure and predictable system of funding of public secondary schools that guarantees adequate resources for learning and a qualified teacher in all core subjects. This is likely to need the allocation of between 0.7% and 1% of SGDP to secondary schools and cost effective delivery methods which provide school places at a cost of no more than about 30% of SGDP per capita.

xii. Provide all core learning material free on line and copyright free through a national portal. Include core texts, pod casts, video clips and enrichment and examination preparation material to give access to additional tuition to all students independent of household wealth.

5. Annexure: List of Research Products

- **Research Report 1:** Making it Past Elementary Education
- **Research Report 2:** Demographic Transition and Education Planning
- **Research Report 3:** Equity and Efficiency in Expansion of Secondary Schools
- **Research Report 4:** Efficient School Siting using GIS Modelling
- **Research Report 5:** Cost and Equity in Accessing Secondary Education
- **Research Report 6:** The Shifting Terrain of Government and Private Provision
- **Research Report 7:** Private Tuition: Extent, Pattern and Determinants



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Secondary Education Enhancement Programme

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