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Examinations

An examination is a formal test of an individual student’s knowledge or proficiency in a subject on the curriculum. The results of examinations apply to individual students, enabling them to progress through school or apply for further education or employment. Taken together, examination results provide an overall snapshot of students’ performance at the end of a school year or course of learning. Examination results do not indicate the reasons behind high or low achievement of students.

Assessment Surveys

Assessment Surveys provide a measure of learning across a representative sample of students. They allow classification of students at a specific grade level by their ability (what students know and can do) in different subjects on the curriculum.

National Assessment Surveys provide a “Health Check” to the education system by analysing achievement based on a range of background factors (school, home, teachers). They potentially enable policy makers and practitioners to address the challenges to enhance student learning.

Introduction

The 2012 National Achievement Survey (NAS) of Class VIII students has been significantly updated in line with international best practice in student assessment. Conducted by the National Council of Educational Research and Training (NCERT), this marks the most comprehensive educational assessment survey in India to date.

The survey tested over one hundred thousand students in language, mathematics, science and social science, between March - May, 2012 for summer closing schools and November - December, 2012 for winter closing schools. In addition, questionnaires were used to collect information on schools, teachers, and pupils' school experiences and home backgrounds.

This booklet summarises the NAS methodology and findings in order to:

- explain improvements made in assessment techniques
- provide a snapshot of achievement levels in Class VIII
- provide information on background factors associated with achievement
- highlight areas for further investigation

Sarva Shiksha Abhiyan – towards universal elementary education

The 86th amendment to the Constitution of India made free and compulsory education for children aged 6-14 a fundamental right. The government's SSA programme is providing support to achieve this goal.

Spanning the whole country the programme addresses the needs of nearly 200 million children. In areas with no or inadequate schooling facilities, SSA is building new schools or improving existing infrastructure. Teaching capacity is being improved through recruitment and extensive teacher training and many other inputs.

See website for more details: www.ssa.nic.in

Nearly 98% of the students who took part in the Class VIII survey reported that they like being in school



Why we assess

India has made a significant investment in its education. The government's flagship programme Sarva Shiksha Abhiyan (SSA) has been successful in ensuring greater access, equity and quality in elementary education. The nation now needs reliable information about students' achievement in order to judge the quality of education provided.

The history of NAS

Carried out as part of SSA, the NAS aims to collect reliable information about the achievement levels of students in government and government-aided elementary schools.

In 2000, NCERT's NAS programme was incorporated into the SSA programme. The initial plan was to carry out three NAS cycles, each cycle covering three key grades:

- Class III,
- Class V,
- Class VII/VIII.

All three Classes are tested in mathematics and language. In Class V, students are also tested in environmental studies (EVS), while Class VII/VIII completes tests in science and social science.

The Baseline Achievement Survey (BAS) was carried out in 2001-2004, followed by the Mid-term Achievement Survey (MAS) in 2005-2008. The experience gained through these initial two cycles made the value of the NAS clear, and the surveys were made an ongoing feature of the national education system. To mark this shift from stand-alone surveys to continuous assessment, the Terminal Achievement Survey (TAS) has been renamed 'Cycle 3'.

Measuring progress in education

The NAS is an education health check that helps to establish the spread of what students know and can do at specific stages of education cycle. This helps teachers and policymakers to identify any areas of concern and address them. By repeating the NAS at regular intervals, the data can be used to measure trends in education achievement levels and measure progress made in the education system aided by reforms such as SSA and others.

It is also important to note that while the report is of performance of elementary grades its findings are particularly pertinent to secondary education, as they define the level of achievement of students entering the first grade of secondary and provide a measure of their preparedness for this transition to the secondary stage.

What are scale scores?

Scaled scores are scores that have been mathematically transformed from one set of numbers (i.e., the raw score) to another set of numbers in order to make them comparable in some way.

Test scores in the report are presented on a scale from 0 to 500. The national average was set to 250 and the standard deviation was set to 50. This means about 70% of students could potentially have a score between 200 and 300, and 95% of students could have a score between 150 and 350.

NAS is not a test for each individual student or school. NAS results are based on a carefully selected sample of students, further weighted by population to be generalised to the individual state. The 'Standard Error' is an estimate of the likely variation that may occur. For example if the average language score for students in a State was 247 with an estimated standard error of about 2.1 scale points, then the 'true' value of the State's average language score lies in the range of 244.9 to 249.1.

Turning test results into trends – methodology

For the first time in India, the Class VIII NAS has established robust baselines for achievement in reading comprehension, mathematics, science and social science. The introduction of sophisticated, internationally-recognised assessment methods means that future trends in educational standards can be judged with confidence against these new baselines.

Developing instruments is a crucial activity in any survey. In preparation for NAS Class VIII, NCERT developed test booklets in language, maths, science and social science. In addition, questionnaires were designed for students, teachers and schools to capture information on school employment, teacher qualifications and status, and student background.

Developing Class VIII tests

The Class VIII NAS differs from previous cycles of the survey as it uses Item Response Theory (IRT) to place results on meaningful scales, which are independent of the particular tests used. This method is in line with international best practice.

as the percentage of correct answers. This meant that results were specific to that year's test and could not be compared to results from other tests or survey cycles. The scales created using IRT, however, permit future comparison in each subject.

For each of the four subjects, the Class VIII syllabus and textbooks from across the country were used to develop assessment frameworks, which described the knowledge and skills to be tested in the tests.

Once developed, the test booklets were translated into 12 regional languages.

This round of the Class VIII survey used two test booklets per subject with a sufficient number of items. This allowed assessment of subject knowledge and skills in greater depth. To enable comparison across both tests, a block of common questions or 'anchor items' was used in both booklets.

For each subject the NAS presents 'item maps' which arrange items according to their level of difficulty. The scale score of an item on the map indicates the ability level of students who, on average, are likely to answer it correctly.

What is IRT?

- IRT measures the true ability of students regardless of different levels of difficulty of tests by calculating the probability of a student to respond to an item correctly
- IRT makes it possible to compare scores from tests used in different NAS cycles – which may help in monitoring progress in the system over time



Selecting samples and participants

Cycle 3 of NAS Class VIII used tests and questionnaires to gather information from 188,647 students in 6,722 schools across 33 states and union territories (UTs).

In each state and UT, the sample was generally selected in three stages. Firstly, districts were selected based on the number of Class VIII students enrolled. Secondly, the requisite number of schools was selected. In most states, 250-300 schools were selected. Finally, around 5000 Class VIII students for each of the subject were selected at random.



Analysing the results

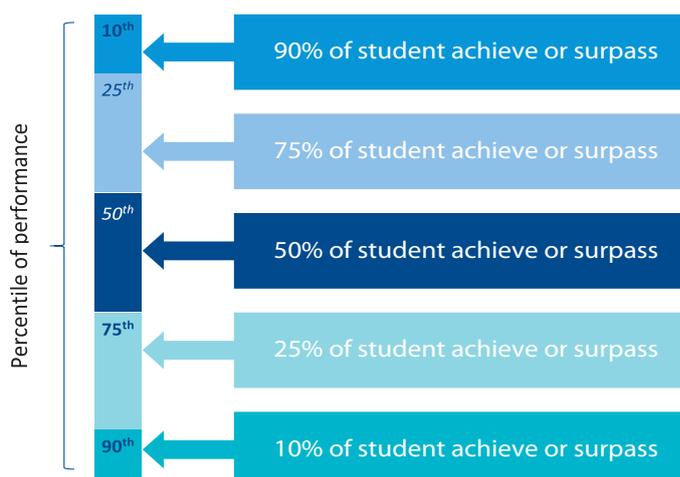
Following IRT analysis, the Class VIII test results have been placed on a scale, which was normalised with a mid-point of 250. Achievement scores on this scale cannot be interpreted as being equivalent to any particular score on any particular test. Instead, they can be used to make meaningful comparisons between states. The results can identify relatively high achieving states and those states in which achievement is relatively weak.

Not only does the survey report the average performance in each state, it also presents the range of students' performance across the ability

range. This range of achievement is presented as five key 'percentiles': 10th, 25th, 50th, 75th and 90th. For example, the score at the 25th percentile is that which 75% of students achieve or surpass, and the score at the 90th percentile is that which 10% of students achieve or surpass.

The range between the 25th and 75th percentile, or the 'inter-quartile range', represents the middle 50% of students. The smaller the inter-quartile range, the greater the homogeneity within the state's student cohort. This allows us to infer about issues of equity.

What are percentile scores?



In this report, tests have a confidence level of 95%. This means that if a difference is marked as being 'statistically significant', then the probability of it happening by chance is less than 5%.

Snapshot of a nation – the results

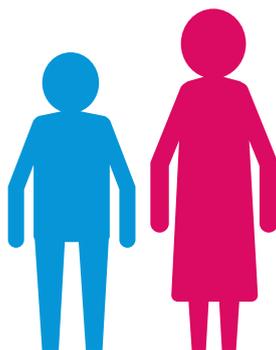
Overall the NAS reveals significant differences in the average achievement levels of students between states. Some difference may be accounted for by contextual factors, but on balance the results suggest that the quality of educational outcomes is far from equal across the country. While the methodologies are different, NAS confirms the findings from a number of other studies such as ASER, Educational Initiatives etc. and identifies learning as the big challenge facing Indian education.

In number of States NAS results show great diversity in achievement between the highest and lowest performing students within the states. Inequity of outcomes suggests that, in some states, higher achieving students are receiving support while their less achieving peers may not be receiving adequate levels of support and opportunities to reach more acceptable levels of learning.

National trends

The NAS found the following national trends in Class VIII students:

Gender



Language

Nationally, there was no significant difference between boys and girls achievement levels in maths, science and social science. This was also true for most states although in Kerala, girls outperformed boys in all three subjects and in West Bengal girls performed less well than boys in science.

In reading comprehension, girls outperformed boys. This was also true in several states but in most states girls and boys performed equally well. Only Bihar was an exception where girls performed less well than boys.

Urban-Rural



Science and Mathematics

In science and mathematics, rural students outperformed urban students, in social science they performed the same but in reading comprehension rural students performed less well than urban students.

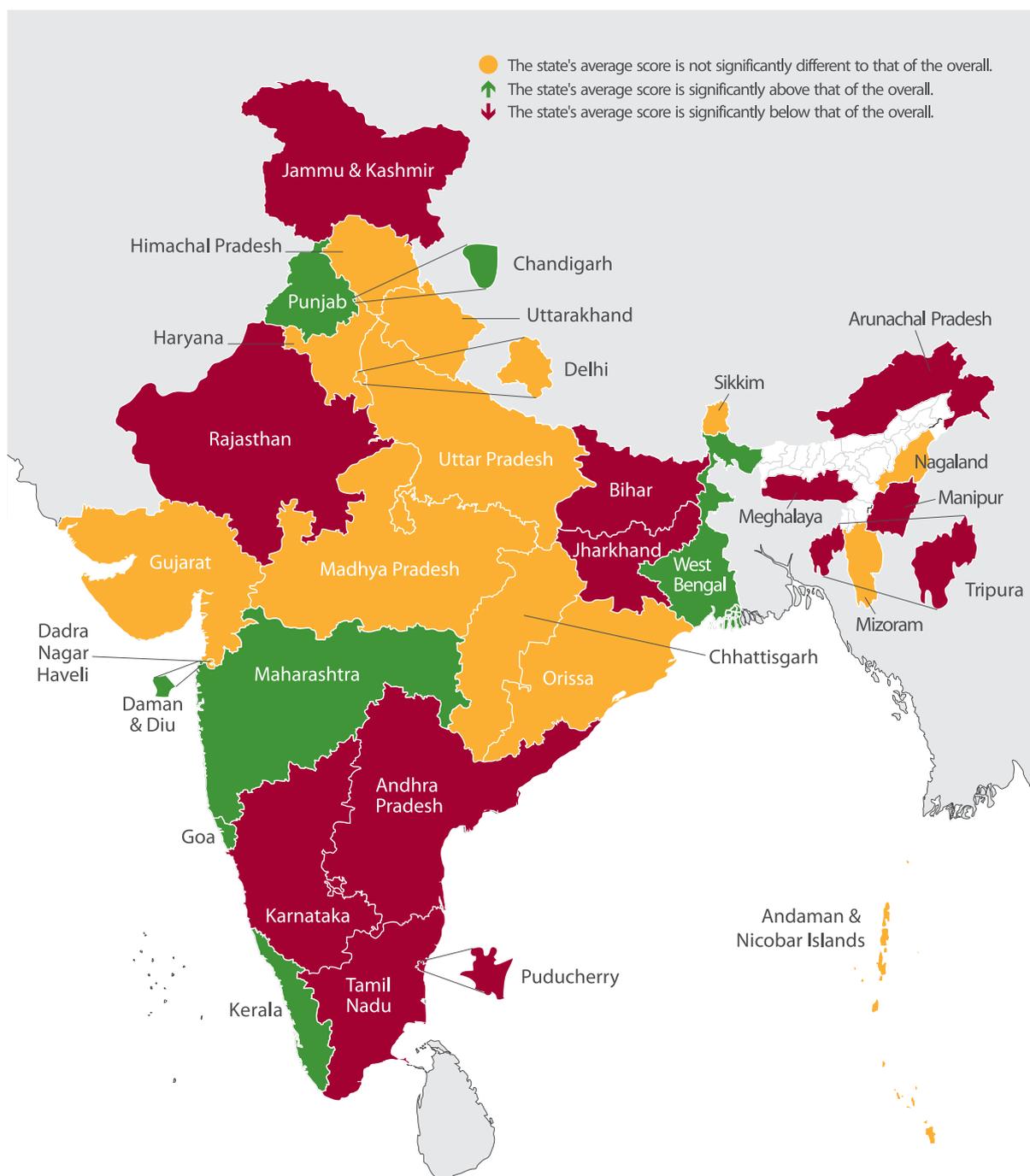
Social Groups



All School Subjects

But ... some equity issues need to be studied further as students from some groups, comprising Scheduled Castes, Scheduled Tribes and Other Backward Categories, scored significantly lower than students in the General category. Similarly students who reported being physically challenged scored lower than those who did not.

Achievement by subject: Reading Comprehension



Students were good at identifying the more obvious information*

There was a great variation in students' ability in reading comprehension.

The advertisement is about the importance of

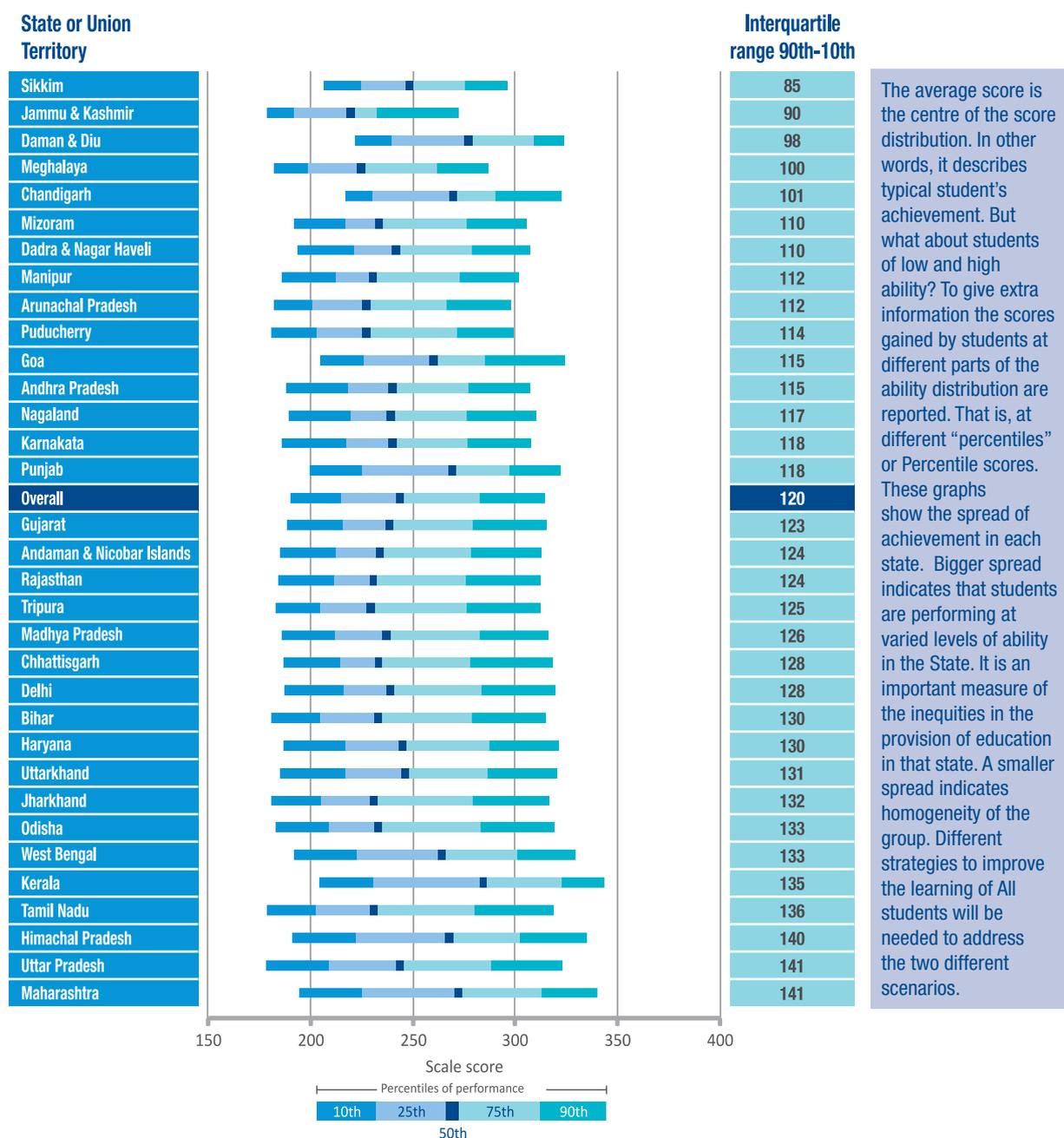
1. nutritious food.
2. peas and dal.
3. reasonably priced food.
4. yellow peas dal.

*example of test item from the surveyed set of items

46%



Reading Comprehension



Students struggled to identify more complicated information*

The study about yellow peas dal was conducted by

1. Kendriya Bhandar.
2. Ministry of Consumer Affairs, Food and Public Distribution.
3. Central Food Technology Research Institute.
4. Mother Dairy.



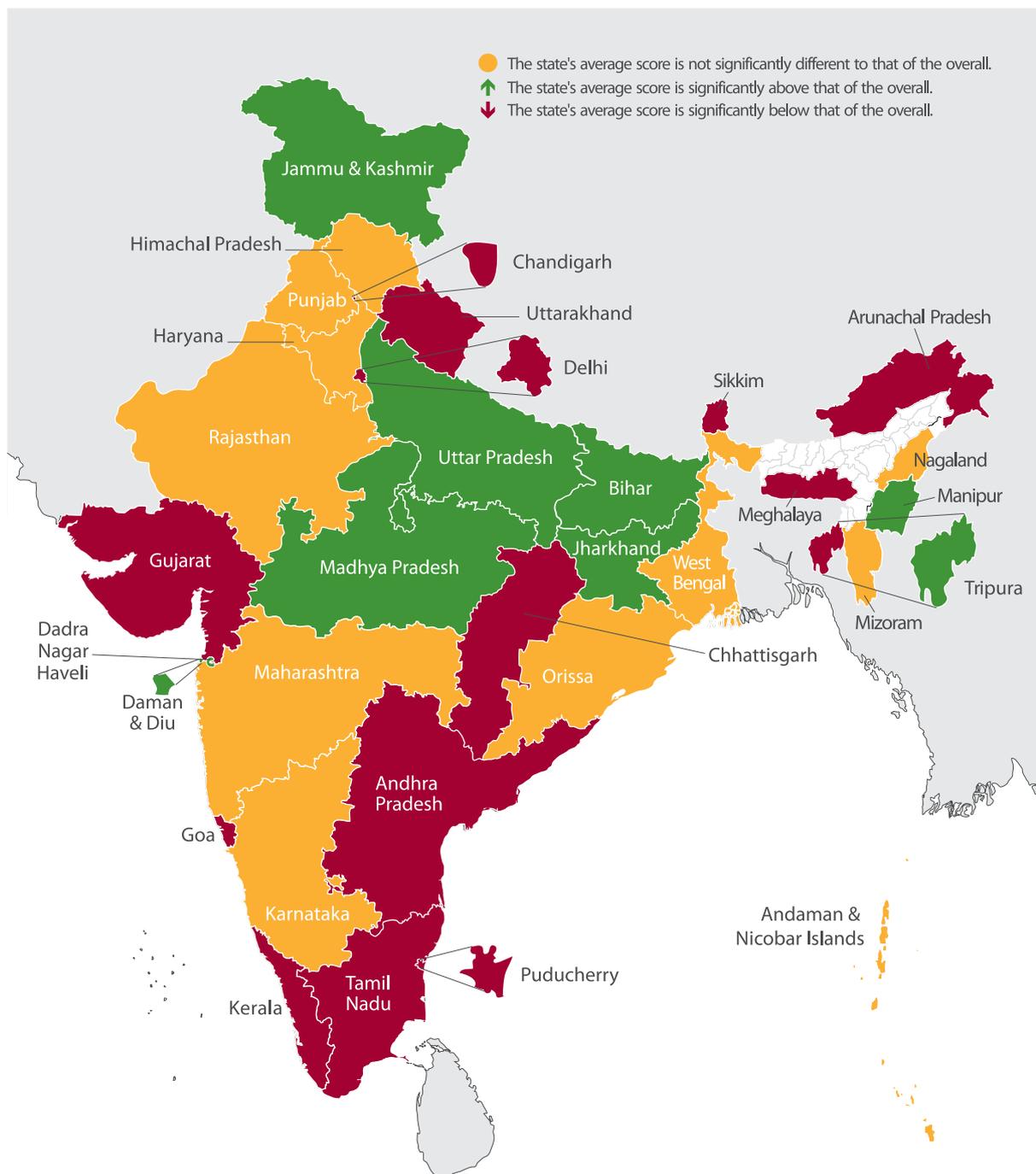
36%



only 36% being able to identify who the study had been conducted by.

*example of test item from the surveyed set of items

Achievement by subject: Mathematics



Where the task was clearly set out and uncomplicated students tended to do well*

Three exterior angles of a quadrilateral are 70° , 80° and 100° . The fourth exterior angle is :

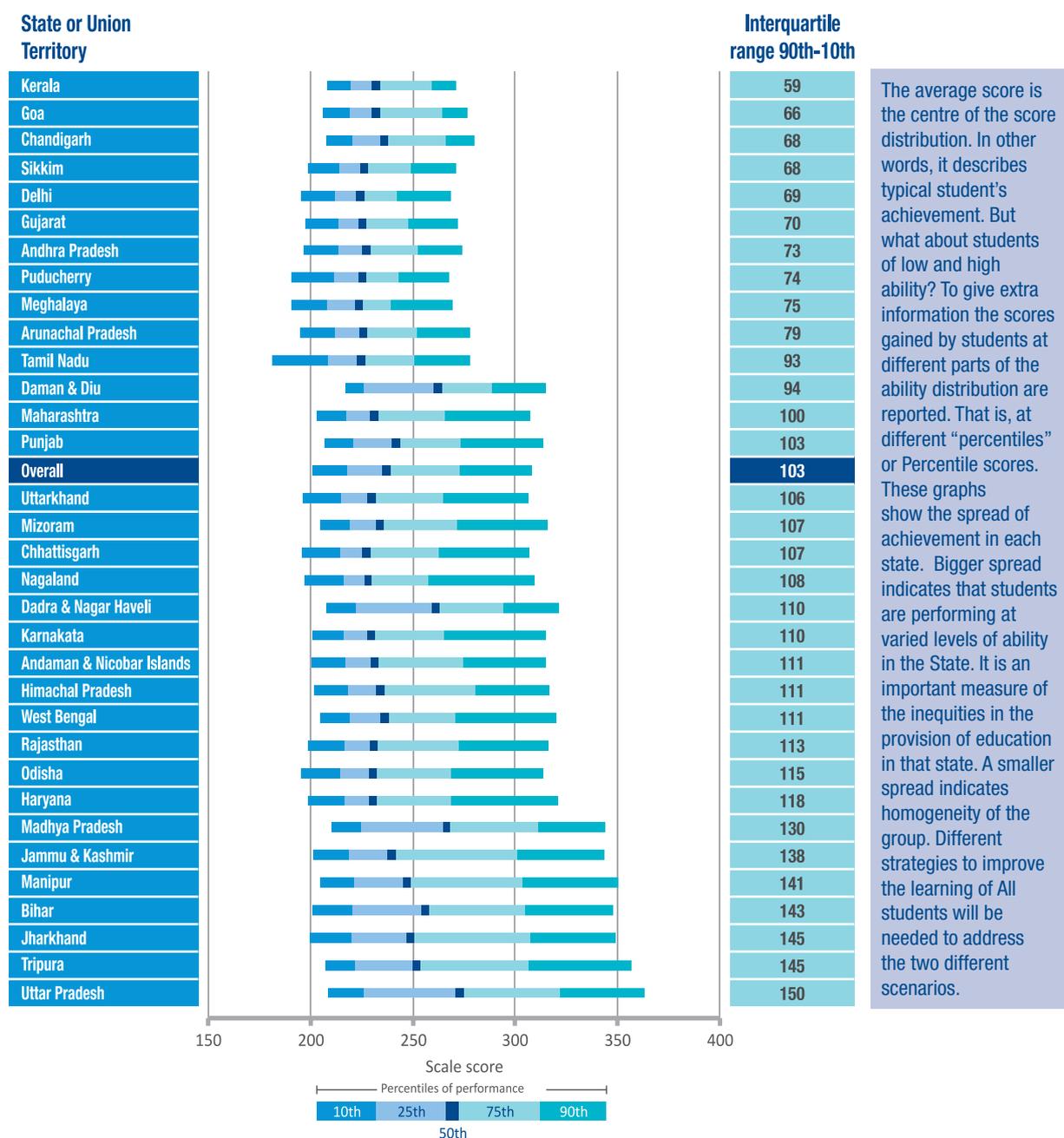
1. 70°
2. 80°
3. 100°
4. 110°

53%



*example of test item from the surveyed set of items

Mathematics



Students struggled with complex mathematical problems*

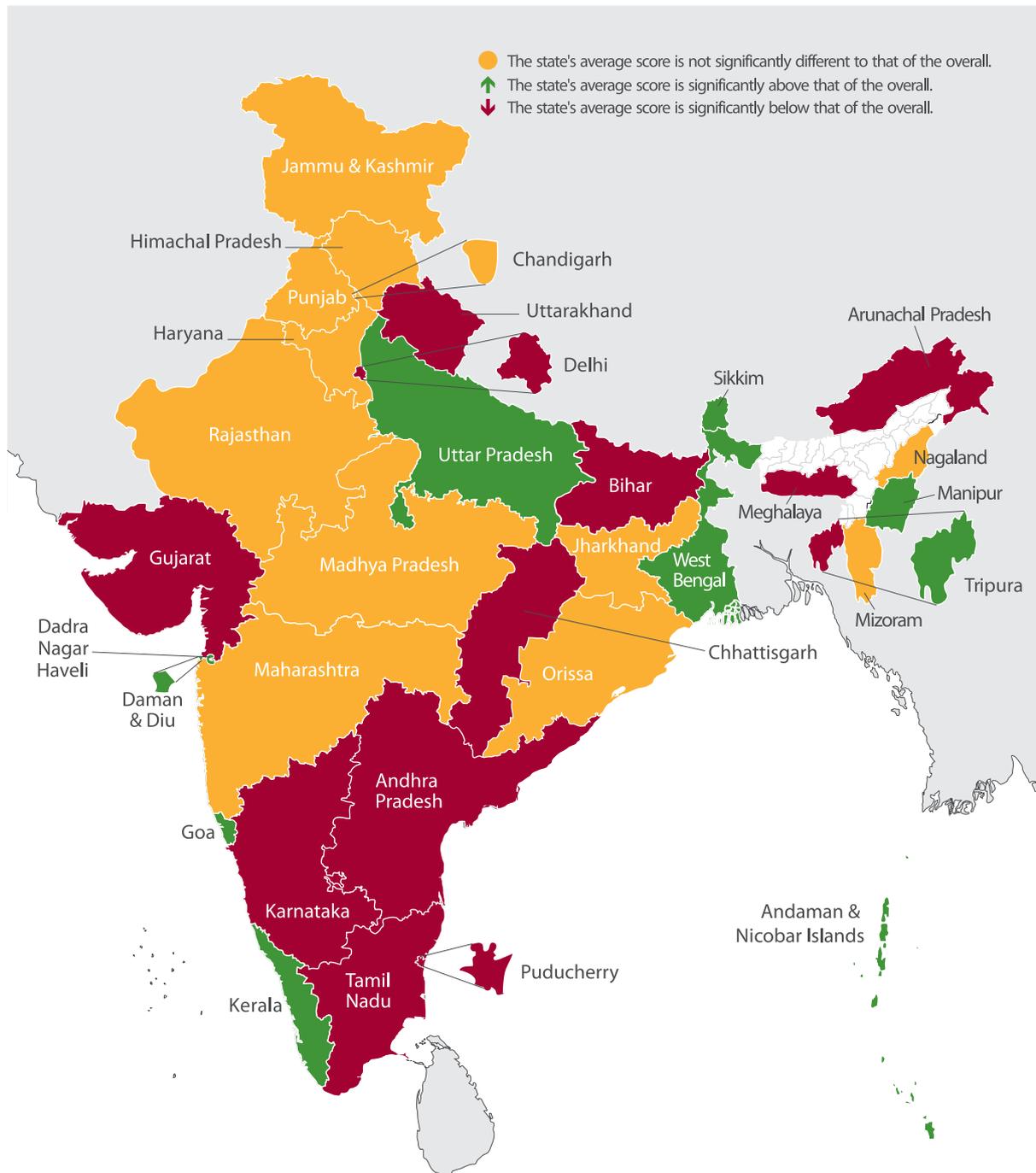
If $\frac{2x+1}{x+3} = 1$, then the value of x is :

1. 2
2. $\frac{3}{2}$
3. 1
4. -1

22%  

*example of test item from the surveyed set of items

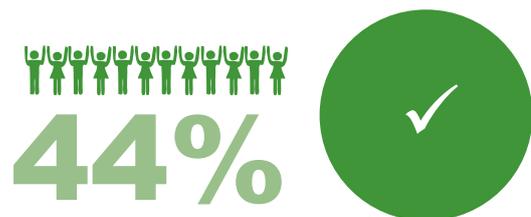
Achievement by subject: Science



Students were good at simple recall questions*

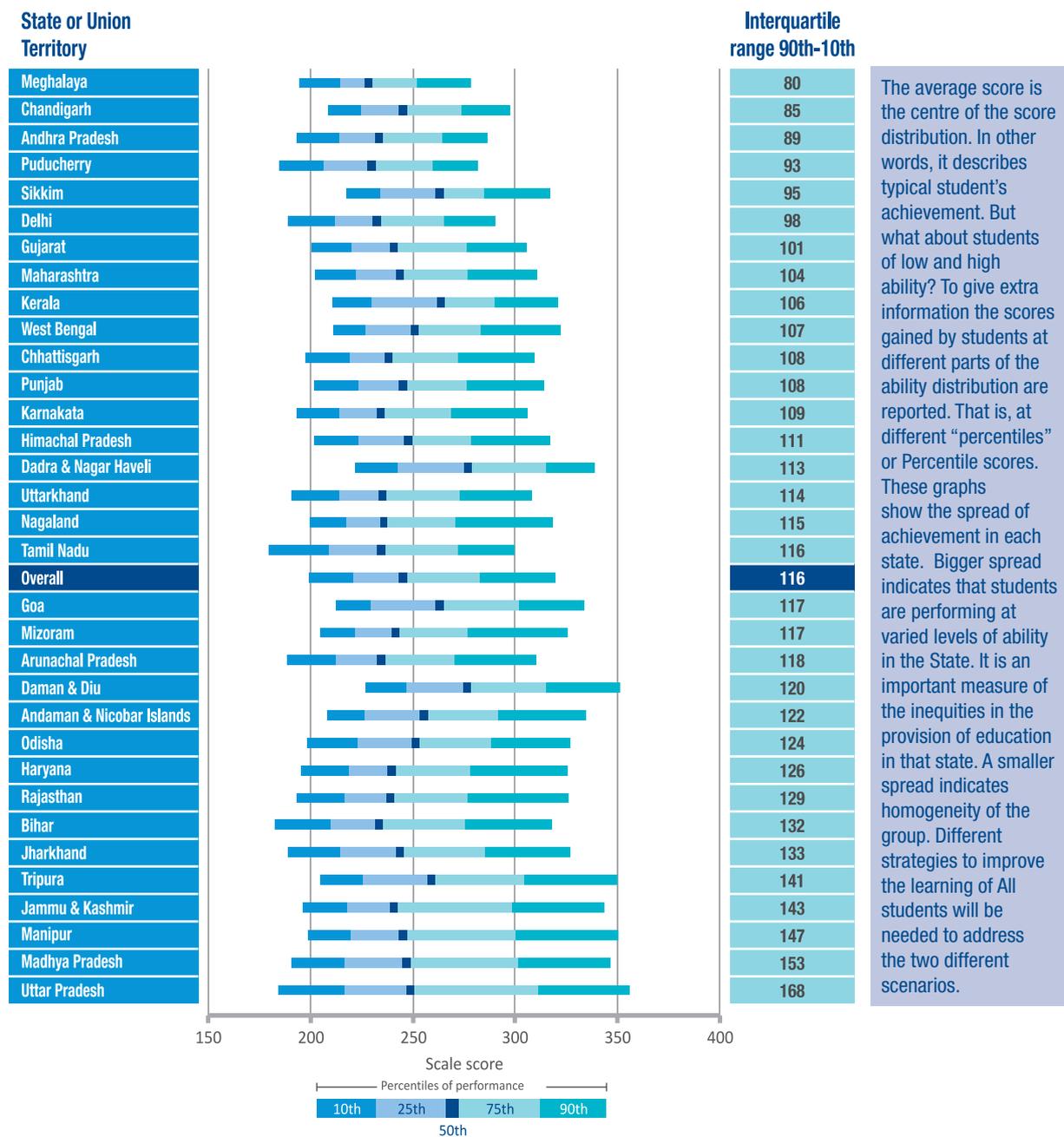
Chlorination is the process to purify water. It is done to

1. remove harmful gases.
2. separate suspended impurities.
3. kill harmful germs.
4. change the colour of water.



*example of test item from the surveyed set of items

Science



The average score is the centre of the score distribution. In other words, it describes typical student's achievement. But what about students of low and high ability? To give extra information the scores gained by students at different parts of the ability distribution are reported. That is, at different "percentiles" or Percentile scores. These graphs show the spread of achievement in each state. Bigger spread indicates that students are performing at varied levels of ability in the State. It is an important measure of the inequities in the provision of education in that state. A smaller spread indicates homogeneity of the group. Different strategies to improve the learning of All students will be needed to address the two different scenarios.

Students struggled in questions that required reasoning*

Given below is a list of doctor's advice to a person.

- Get your blood glucose checked regularly
- Control your diet
- Exercise regularly
- Take your medicines without fail

The person to whom this advice is given is likely to be a

1. growing child having respiratory problem.
2. person suffering from diabetes.
3. pregnant woman of 35 years age.
4. hockey player injured in a match.

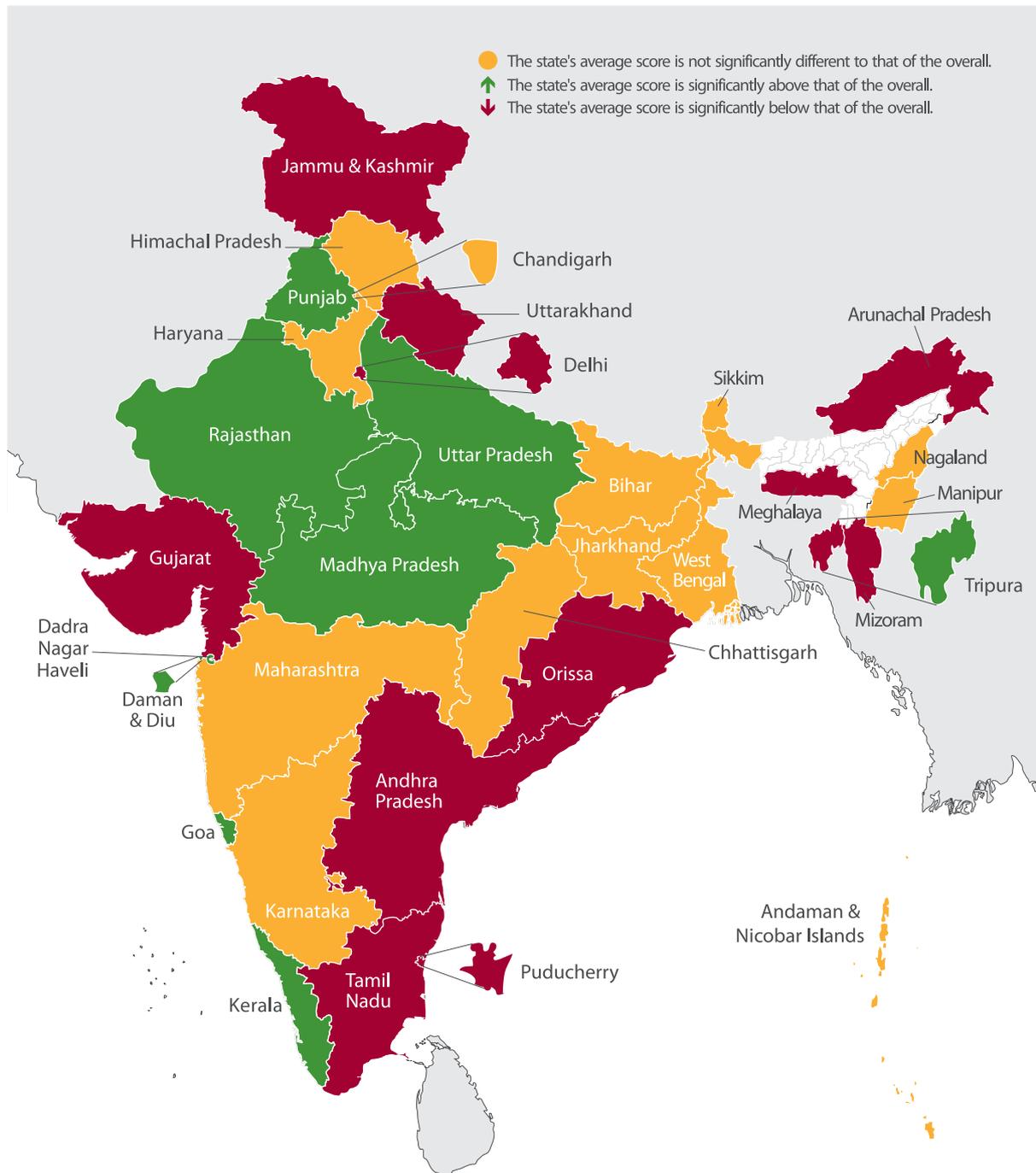


29%



*example of test item from the surveyed set of items

Achievement by subject: Social Science



Students were good at straight recall*

What attracted European trading companies to India?

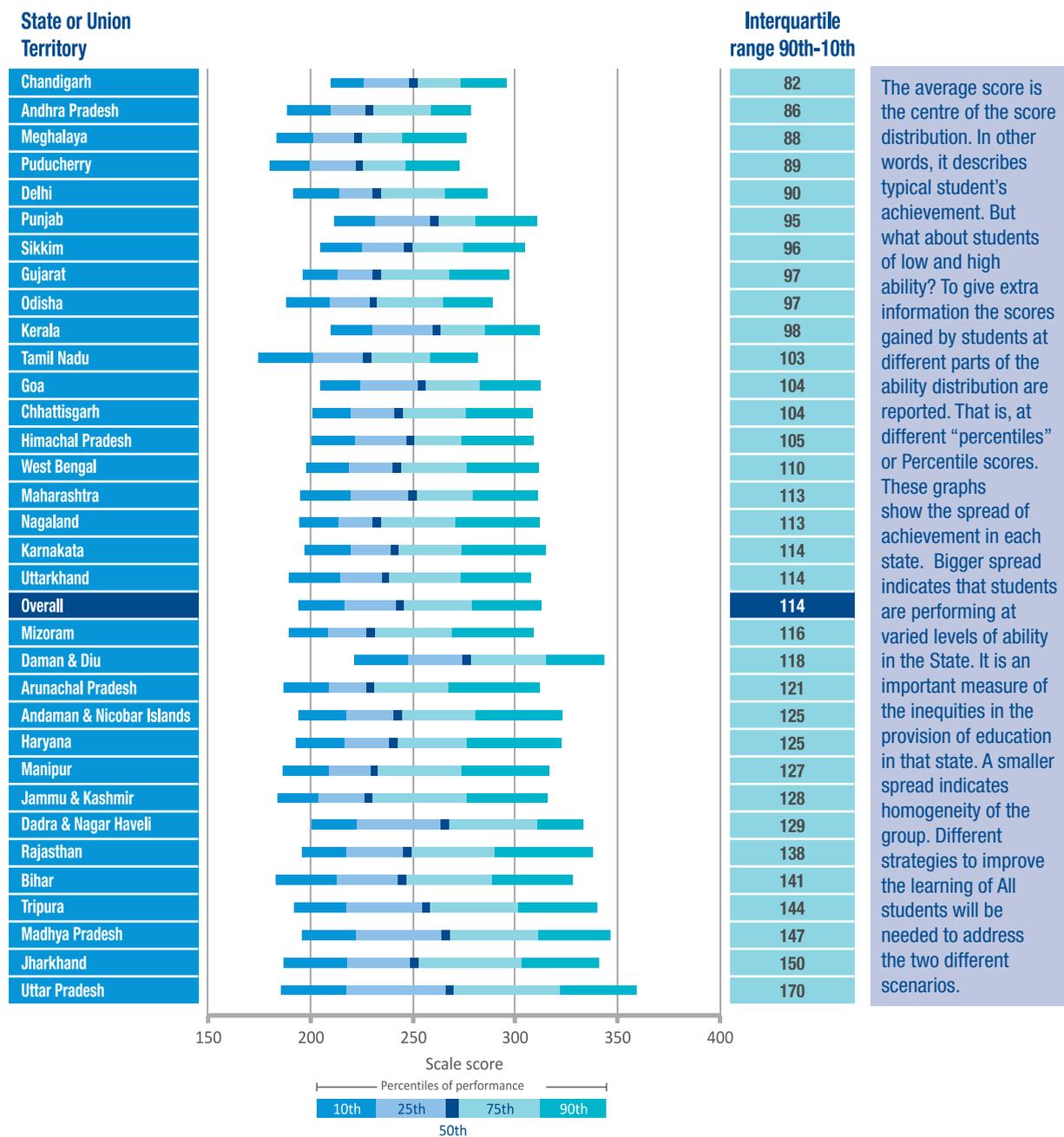
1. Gold and Silver
2. Cotton, Silk and Spice
3. Flora and Fauna
4. Horses and Cattle

48%



*example of test item from the surveyed set of items

Social Science



Students struggled with questions that required application and reasoning*

A powerful caste decided to teach Rathnam a lesson. They set his hut on fire. He escaped and filed a case in a local police station. Which of the following acts rescues him?

1. Sedition Act 1870
2. Civil Rights Act 1964
3. Prevention of Atrocities Act 1989
4. Minimum Wages Act 1948

33%



*example of test item from the surveyed set of items

Background factors – survey results

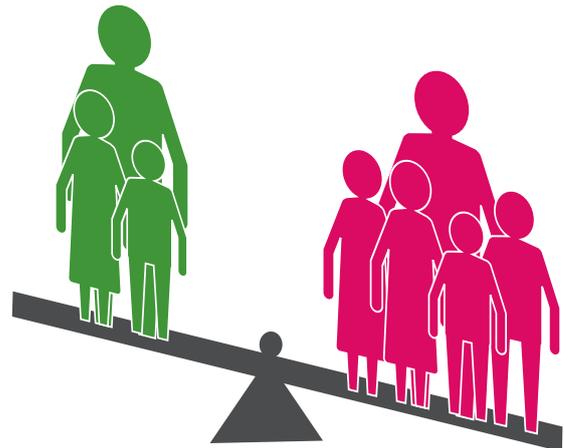
The NAS survey used three questionnaires designed for schools, teachers and pupils, to collect information on background factors that could potentially influence learning outcomes.

The results from these findings*, however, do need to be treated with caution and should only be used to indicate where more research and study can be usefully done to help guide educational improvement. They also show only where a certain factor is associated with improved achievement and not that it necessarily causes it. For example behaviour problems such as absenteeism are associated with lower achievement but there might be other factors which contribute to lower achievement. Some factors lie outside the school and educational system, for example parent's education and the number of siblings both are associated with achievement. But some background factors are under the control of the education system and by looking at how these impact upon achievement we can identify areas where policy makers and academicians can research further to determine what the problems are, what seems to work and how they can best improve performance.

The more significant of these factors are taken into account when determining if other factors have an impact and are called the 'key variables'. Socio-economic status, language spoken at home and location (urban/rural) of the school are treated as 'key variables' because of their importance to educational success.

Home factors

The results suggest that coming from a larger family is associated with lower than average performance. Students with only one sibling outperform by a small, but statistically significant amount, those who have two or more brothers and sisters. Similarly the results suggest that the higher the parents education the more likely a student is to do well. Similarly if the language spoken at home is the same as the language of instruction or whether the school is in an urban or rural environment can be associated with the achievement.



School factors



There are several school factors associated with achievement. Government aided schools have lower performance, even when the key factors such as socio-economic status of parents, location etc. are taken into account. Similarly schools with pucca buildings tend to do better. Co-ed schools do better than single sex schools. Students who go to schools which have a 6 day week do better than those which have a 5 day week. Similarly students at schools which have more than 180 working days a year tend

to achieve better than those with fewer working days per year than this. Greater time on task by the student has a positive influence on the student performance.

*The associations are based on analysis of Mathematics results

School leadership and governance

School leadership and governance seems to have a key role in achievement. Students at schools where the head teachers also teach classes tend to do better. Students at schools which have been inspected tend to do better. Students at schools who reported behaviour problems, such as late arrivals, absenteeism, skipping classes or violations of school rules, tend to do worse. Having VEC/AEC/SMC committees is associated with better performance.

The pupils' perspective

The pupils perspective is very important and anything that affects a students' ability or desire to attend school regularly and pay more attention in various curricular activities could be associated with achievement. To help encourage students to attend and stay in school more regularly, schools are offering various incentives. Incentive schemes such as offering



a midday meal, free uniforms and scholarships appear to be associated with higher achievement. Of these incentives, scholarships seemed to have the highest impact.



Teaching and learning approaches

The teacher has a key role in mediating learning and the study looked at various factors around the teacher and their teaching practices. Students who had their homework checked by their teacher every day tend to do better. What the teacher asks students to do in class also is associated with student achievement levels. Students who reported that they work with other students in small groups in solving mathematical problems tended to perform significantly better in mathematics than those who did not.



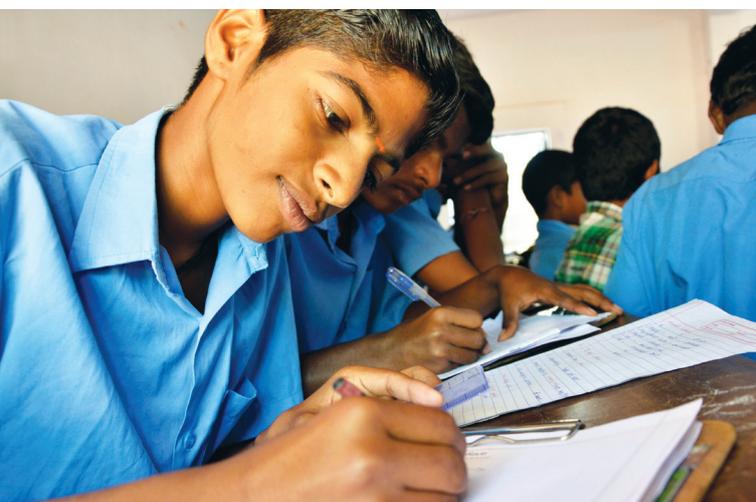
Data is just the start – what next?

The Class VIII NAS is important in its own right, but it cannot answer every question on the quality of India's elementary education.

National Achievement Surveys provide reliable information about levels of educational outcome and also give quantitative data about the relationships between background variables and outcomes. This objective information is an important starting point for identifying challenges within teaching and learning and deciding on the best way to improve educational processes. For example, NAS results can identify the questions that students at different levels of ability find most difficult. It is then for curriculum experts and teachers to decide how such difficulties can be resolved by, for example, changing teaching practice and improving textbooks and other materials.

Making the most of the results

Each NAS cycle should be followed by further analysis and action by national and state level decision makers. For example, state educational authorities should review findings within their local context and against local priorities. It is recommended that state-specific reports and corresponding action plans are produced.



Ongoing improvements

The Class VIII Cycle 3 NAS was more sophisticated than earlier surveys, however conducting large-scale assessments in India remains technically challenging.

Three lessons learnt during this latest survey offer the potential to improve future NAS cycles:

- Future rounds of NAS should focus on better defining what students can and cannot do to help develop levels of performance that can easily be understood. Resulting in development of a robust assessment framework.
- Development of future survey tests should be based on wider debate on which curriculum domains should be given priority –should surveys focus on subject curricula or on identified learning outcomes.
- To maximise the value of National Achievement Surveys the findings and implications need to be communicated to a wider audiences and follow up actions on policy and practices taken.

Find out more:

The full NAS Class VIII report will be available online from March 2014. To read this and other NAS reports please visit the websites:

www.ncert.nic.in
www.ssatcfund.org
www.rmsatca.org



एन सी ई आर टी
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