

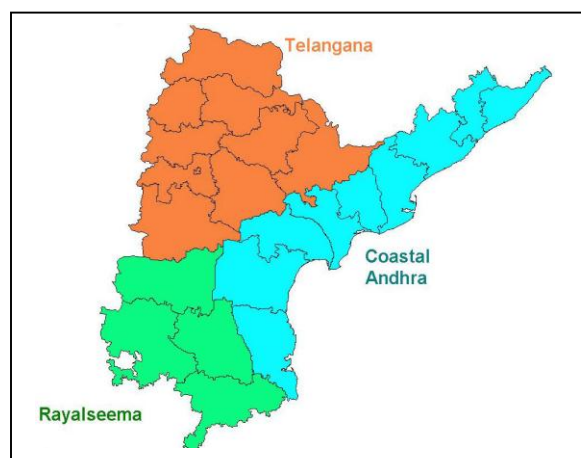
# School Inputs and Incentives Study



## SCHOOL INPUTS AND INCENTIVES STUDY

**Background:** This research study was conducted in 5 rural districts of Andhra Pradesh over a period of 5 years (2005 – 10). A randomized evaluation methodology was used wherein a set of schools were grouped on observable characteristics and then a subset of these schools were randomly chosen for a specific intervention program or combination of programs. Prof Karthik Muralidharan was the principle investigator for the study which was funded jointly by the World Bank, the government of Andhra Pradesh and the Azim Premji Foundation.

**Methodology:** Sub-district (mandal) level schools were randomly chosen as detailed below:



### Design of APREST

1. 5 districts were selected in 3 regions of Andhra Pradesh i.e. Telangana, Coastal Andhra and Rayalseema
2. Next, 10 Mandals (blocks) were randomly selected within each district
3. 12 schools were randomly chosen from each Mandal
4. Of these 12 schools, 2 were assigned to a treatment group which received a specific intervention and 2 assigned to a control group, with no intervention.

Since the program is randomly assigned, the remaining group of potential recipients provides a perfect control group of SIMILAR entities that did NOT receive the program. The specific program interventions that were tested in this manner were:

Intervention	No of Schools	Nature of Intervention
<b>Only Diagnostic Feedback</b>	<b>100</b>	Teachers these schools were provided with detailed diagnostic feedback on the performance, strengths and weaknesses of their students aimed at improving teacher intrinsic motivation and goal orientation.
<b>Feedback + Block Grants</b>	<b>100</b>	These schools were provided cash grants of Rs. 125 per student each year for inputs used directly by students in addition to the diagnostic feedback.
<b>Feedback + Contract Teacher</b>	<b>100</b>	These schools were provided funds to hire an additional contract teacher in addition to giving them the diagnostic feedback. Such contract teachers were allocated to the school and not to any specific grade.
<b>Feedback + Performance Based Recognition / Bonus</b>	<b>200</b>	<p><b>A. Group Incentive:</b> Teachers in 100 schools were paid bonuses based on performance of all students in school.</p> <p><b>B. Individual Incentive:</b> Teachers in 100 schools were paid bonuses based on performance of students in their respective classes.</p>

## Process and Timelines

1. Conducted baseline learning achievement tests	June-July 2005
2. School randomly assigned to various treatments	July 2005
3. Diagnostic feedback on test performance provided to all schools	August 2005
4. Process monitored with unannounced monthly surveys	Sept 05 – Feb 06
5. End line tests conducted to assess impact on learning levels	Mar 06 – Apr 06
6. Teachers interviewed before communicating test outcomes	July 2006

The entire process of testing, measuring results and providing feedback of test results covered the school academic year. Processes 3 to 5 were repeated every year for 500 schools over a period of five years starting 2005.

## KEY FINDINGS FROM THE STUDY

### Analysis of Test Scores

Average learning achievement scores during end line tests (curriculum based pencil-paper tests) conducted every year are summarized below.

#### Learning Achievement in Tests (Absolute Scores in %)

	Feedback (Reference)	Contract Teacher	Block Grant	Group Incentive	Individual Incentive
Base line test	27.0	25.2	25.5	26.0	25.1
End of Year 1	33.1	34.4	34.2	35.4	<b>35.6</b>
End of Year 2	31.1	33.8	32.2	33.7	<b>36.6</b>
End of Year 3	30.2	32.9	32.2	31.8	<b>32.6</b>
End of Year 4	31.4	32.4	35.6	32.9	<b>36.9</b>
End of Year 5	32.1	34.1	33.3	31.4	<b>33.3</b>
5 Yr Average	31.58	33.52	33.50	33.04	<b>35.00</b>

The data above suggests that over the five year period, all the interventions have had some impact on learning out comes as compared to the 'Feedback' group (which is used as the reference group). However, it is important to look at the statistical significance of the average scores. The confidence interval at which different groups can be said to be statistically different is summarised below.

## Significance of Learning Achievement Scores as Compared to 'Only Feedback' Group

	Individual Incentive	Group Incentive	Contract Teacher	Block Grant
End of Year 1	5%	5%	NS	NS
End of Year 2	1%	1%	1%	NS
End of Year 3	5%	10%	1%	5%
End of Year 4	1%	NS	NS	1%
End of Year 5	NS	NS	NS	NS

**Legend**  High Significance  Medium Significance  No Significance

### WHAT DO THE FINDINGS MEAN?

Detailed analysis of the data suggests the following:

1. Performance based bonus groups have shown best results
2. Individual performance based bonus groups did well across multiple dimensions
3. Contract teacher and block grant have shown mixed results
4. The 'Composite Group' shows a significant impact in both the years that it was tried
5. Only providing 'feedback' after the tests does not impact learning outcomes
6. Teacher absence data does not show any variations across the four intervention groups

#### 1. Performance based bonus groups have shown best results

These groups show better results than the other two interventions. While Individual Incentive group has clearly shown a significantly higher impact over the first four years the impact of the Group Incentive group has been significantly high over first three years. Here too, the significance in year 3 is only 'directional'. Further, in year 5, the average is actually lower than in the Feedback group.

#### 2. Individual performance based bonus groups did well across multiple dimensions

- Students in incentive schools do better for all major subgroups, including: all five grades (1-5); both subjects; all five project districts; and levels of question difficulty
- The performance is good across most student and household demographic variables
- Students in such schools also do better in both conceptual and mechanical questions, as well as in non-incentive subjects
- Improvements are also seen across children with low as well as high base line scores

### 3. Contract teacher and block grant have shown mixed results

Contract Teacher intervention and Block Grant intervention have each shown significant impact in two of the five years but no significant difference in the remaining years.

### 4. The 'Composite Group' shows a significant impact in both the years that it was tried

The 'Composite Group' was a sub group of schools (starting year 4) that was provided all the interventions viz contract teacher, block grant and incentives. This group was created to test 'cumulative impact' of the interventions.

### 5. Only providing 'feedback' after the tests does not impact learning outcomes

The learning achievement data suggests that the performance of Feed Back schools is only marginally better than Pure Control group schools. This can perhaps be attributed to the 'measurement effect'. The teachers in this group also have put in effort to make change but that has not yielded significant improvements in learning – perhaps due to what and how they have attempted the change. There is no evidence of their having used the feedback provided effectively. The lack of impact, despite enhanced teaching activity suggests that teachers temporarily changed behavior when observed, but did not actively change teaching habits.

Analysis of the response to question 'how useful was the feedback on the test' looks as follows

Usefulness of Feed Back Reports				
School Group	Very useful	Somewhat useful	Not useful	Correlation between stated usefulness and outcomes
Performance Bonus (Both)	55.8%	33.0%	11.2%	0.098 (significant)
Feedback group	43.5	44.5	12.0	0.064

This data perhaps provides the clue that while effort put in by teachers in different groups of schools may not have been different, the Incentive school teachers may have made better use of the feedback reports.

## WHY DO SOME INTERVENTIONS WORK AND OTHERS DO NOT?

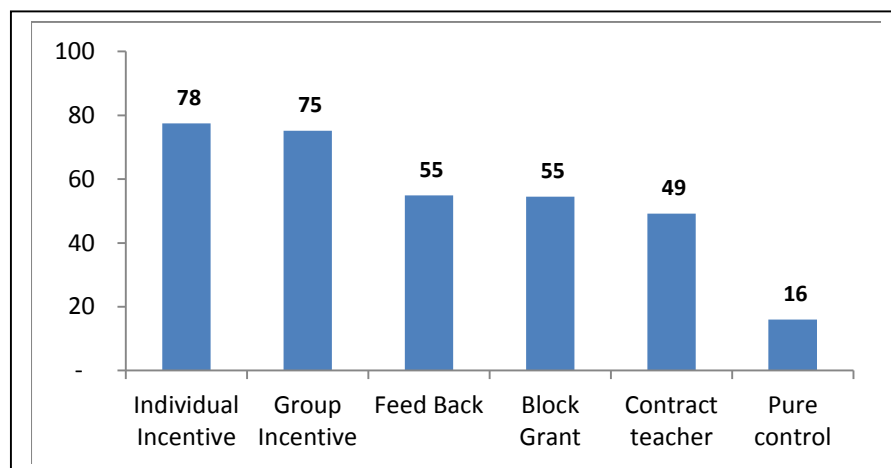
Qualitative analysis suggests that the following factors are at play.

1. Teachers in performance based groups have put in more additional efforts
2. Teachers are favourably disposed towards performance bonus scheme
3. Block Grant Schools – the teachers show no innovation in using the grant amount
4. Contract Teacher Schools – positive impact even though they are paid lower
5. Contract teachers are more engaged than regular teachers

## 1. Teachers in performance based groups put in more additional efforts

Teachers were asked if they did any special preparation for the year end assessment. Over half the responding teachers from various groups of schools indicated that they did make special preparations.

**Percentage of Teachers Who Made Special Efforts**



### Special Efforts by Teachers

Special efforts put in by teachers in incentive schools was more than in other schools. Pure control schools hardly took any extra effort.

Special activities undertaken by the teachers were the usual kind involving additional class work, homework, practice tests etc.

## 2. Teachers are favourably disposed towards performance bonus scheme

The teachers were asked their opinion on incentive scheme 'before' they were informed about the results of their respective performance. Their opinion on performance pay was overwhelmingly positive

- **75% teachers said the program increased their motivation** while 25% said it remained unchanged
- **Almost 85% teachers had a favourable opinion** about the idea of bonus payment on the basis of improvement in student performance
- Close to 75% teachers were willing to accept a performance-pay system

Interestingly, the gains in the 'Group Incentive' schools have been varied and in fact show a declining trend. This indicates possibly a 'trust deficit' or issues with constructive cooperation among the teachers.

## 3. Block Grant Schools – the teachers show no innovation in using the grant amount

Most of the schools have used the block grant amount for the usual items – note books (50%), practice books (18%), teaching-learning material (12%), pens/pencils (8%) and sports goods (3%). There is clearly no attempt by the schools to experiment with new material or make creative use of the funds. In this context, feedback from households suggests that parents actually started spending less on items like stationery as they found that the children were being provided these from the school. This indicates that some **substitution effect** could have taken place.

#### 4. Contract teachers had a positive impact even though they are paid lower

The overall findings from this segment suggest that the impact on outcome has been second only to the Individual Incentive segment. This is in spite of the fact that contract teachers differ significantly from their regular counterparts in many ways.

Parameter	Regular Teachers	Contract Teachers
Proportion male	63.1%	31.8%
Average age	40.4 yrs	25.8 yrs
College degree or higher	84.3%	45.5%
Formal teacher training degree or certificate	98.3%	9.1%
Received any training in last twelve months	93.5%	54.5%
From the same village	7.2%	81.8%
Distance to school	11.9 kms	1.1 kms
Average salary (Rs./month)	8,698	1,250

#### Profile of Contract Teachers

The contract teachers typically tend to be young females, with no formal teacher training qualification and are typically from the same village as the school in which they teach.

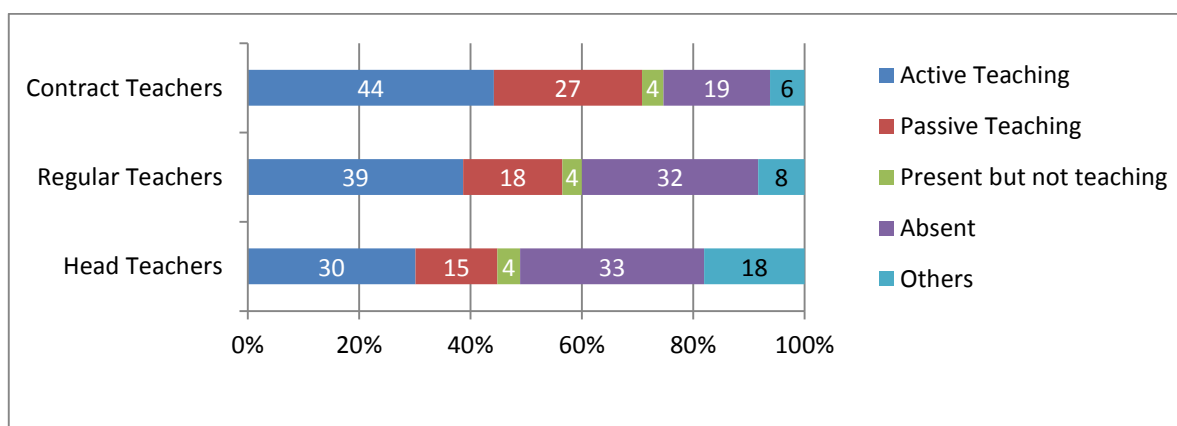
They typically tend to be significantly less qualified and do not have any formal teaching training or certification. They are also unlikely to have undergone any 'in-service' teacher training programs.

Importantly they are paid significantly less than the regular teachers.

#### 5. Contract teachers are more engaged than regular teachers

The contract teachers clearly seem to be more engaged (presence in school, active teaching / passive teaching in class) than the regular teachers or the head teacher as can be seen from the table below.

#### Contract and Regular Teachers: Activity Wise Breakdown



It is clear that 44% of contract teachers are actively teaching while only 39% of regular teachers are doing so. Only 19% of them were absent as opposed to 32% of regular teachers.

Some possible reasons why contract teachers perform better or equal to regular teachers even though they are less qualified, less trained and paid less could be:

1. Greater intrinsic motivation: being from local area, they feel more connected to community
2. Greater extrinsic motivation: their contracts are annually renewable - hence greater interest
3. Greater accountability: they are identified by the community hence could be questioned by them
4. Convenience: they live much closer to the school and hence find it easier to attend

## SUMMARY OF KEY FINDINGS

- a. **No intervention has had sustained and significant impact over 5 years**: While all the interventions have shown some impact on the outcomes, it must be noted that none of them have shown consistently significant impact across all 5 years of the research.
- b. **Performance bonus based interventions have had relatively larger impact**: Group Incentives have shown a varied and a somewhat declining impact. The positive impact in the Individual Incentive group is valid across household, student and teacher backgrounds. However, this is not consistent across the years reducing its implication on the ground to some extent.
- c. **A majority of the teachers have welcomed the performance bonus program**: In particular, the incentive program has found favour with almost three fourths of the teachers and the need to upscale it has been expressed. A majority of teachers seem willing to make performance based pay a part of their compensation.
- d. **Good teachers look forward to getting recognized or rewarded**: The incentive program has found greater acceptance from teachers (ex ante) who have shown better outcomes (ex post).
- e. **The contract teachers have shown lower absence and greater commitment** than regular teachers. *This is in spite of being paid substantially lower than regular teachers.* There is some evidence to suggest that their effectiveness has been more in remote schools and among children of lower grades. This is perhaps a reflection of the nature of the contract (at local level, from among local people). The opportunity to renew the contract in subsequent year could have also contributed to their better performance
- f. **The impact of providing Block Grants is relatively the lowest**: The impact is more prominent towards the later years. The schools do not seem to have made any effort to use the amounts provided in innovative manner. This (as also the non usage of feedback reports in any meaningful manner) is perhaps indicative of a general inability or un willingness to experiment with new ideas or try to make changes in class room processes



- g. **There is no evidence of teacher absenteeism having reduced** in any of the intervention schools.
- h. **There is no correlation between student outcomes and teacher training:** Clearly, teacher training (pre service as well as in-service) as it is carried out now needs to be seriously reviewed. There is some evidence, however of younger teachers being more effective.
- i. **There is some evidence to suggest the presence of ‘measurement effect’:** Carrying out assessment on a regular basis could have a positive effect, though very limited. This is in line with the general management philosophy of measurement for management.
- j. **Providing feedback reports by itself is not good enough:** It does not result in any significant improvement in learning outcomes. The feedback needs to be accompanied by some other intervention or support