Scorecard Spot Check Evaluation
BENAZIR INCOME SUPPORT PROGRAMME (BISP)

DATA ENTRY SPOT CHECK

PHASE ONE REPORT

AUGUST 30, 2011

Innovative Development Strategies

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INTRODUCTION

BACKGROUND
THE BENAZIR INCOME SUPPORT PROGRAM

The Benazir Income Support Program (BISP) was initiated in 2008 by the Government of Pakistan as the country's primary social safety net. The purpose of the program is to counter the effects of rising food and energy prices on poorer households. The BISP intends to give a cash grant of PKR 1,000 per month to deserving poor families. Since an additional purpose of the program is to empower women, therefore only the adult (above 18) ever married female(s) in a household are eligible to receive the cash grant.

METHODOLOGY AND KEY TASKS

IDS has been contracted by BISP to check the accuracy of data entry by the data entry organization (DEO) i.e. NADRA. For this purpose a sample (batches) of scorecards selected from those completed by various Partner Organizations (POs) who have been contracted to collect the scorecard information by BISP, are entered for each of NADRA's Data Entry Stations (DES), by IDS into an MIS system developed specifically for this purpose. These data are then compared with the DEO/DES entered data to establish accuracy of data entry. The purpose of this component of the spot check evaluation is to determine the performance of the DEO and the MIS. Batches which fall within a pre-defined error margin are deemed to be accepted. Those that do not, will be re-entered by the DEO.

The specific objectives of the data entry spot check are as follows:
- Test the accuracy of data entry: determine the frequency of incorrect entries
- Evaluate the performance of the DEOs[1]
- Check to see if there are systematic errors e.g. if the frequency of error is higher for particular questions or if frequency of errors are higher in particular offices of the DEOs
- Identify the reasons behind discrepancy in data entry

ANALYSIS TOOLS

Data entered by IDS is to be matched and compared with data entered by NADRA. Indicators have been formulated to measure the extent of discrepancies/incorrect entries and identify their source. Analysis is conducted using indicators that look for systematic errors and variability in accuracy across offices (DEOs). As such, the following indicators are used:
- Question Indicator: The percentage of incorrect entries will be calculated to determine if particular questions have heightened inaccuracy. The location of DEOs where the data entry error has originated is identified. This information will be passed on to all DEOs by BISP to allow them to rectify procedures where required in a timely manner.
- Office/DES Indicator: Originally, IDS had planned to calculate the percentage of incorrect entries per Data Entry Station. However, for analysis purposes, during the first phase of the data entry spot check, it was agreed that the sample for this phase be divided into segments based on source of the data. The three segments chosen were 1) Data from

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[1] Performance of DEO refers to how accurately the data entry stations enter data so that a comparison can be made between them.

the Test Phase survey, 2) Data from the initial Roll Out survey in Balochistan and 3) Data from the remaining districts of Pakistan surveyed in the National Roll Out. This report presents the analysis of data entry from these three segments.

DELIVERABLES

The deliverables under this BISP contract with Innovative Development Strategies for the Scorecard Spot Check Evaluation include the following:

- Data files (Excel or SPSS)
- Bi-weekly short reports presented to BISP officials and summary of progress of work done from all such reports shared with BISP head office staff in the bi-weekly meetings at BISP. Any other key information/ issue identified during the survey and analysis, which can be critical to the process, is also to be communicated to BISP.
- Feedback meetings and minutes of meetings
- Power point presentations containing summary findings
- Final report at the conclusion of the spot check evaluation

This is the Data Entry Spot Check Phase 1 Report which is provided as part of the overall deliveries which are proceeding as scheduled and discussed.

IMPLEMENTATION
WORK SCHEDULE BY PHASES

The Data Entry Spot Check is to be completed in 4 phases. The overall sample size is 22,000 households with 5,500 households being sampled per phase. Each phase has a three month duration and will follow the laid down work plan. During the first month and halfway into the second month, the data is processed, cleaned and entered into IDS's software for data entry. For this purpose, a database has been created at IDS using SQL Server 2000. From the end of the second month and into the third month the data is analyzed and prepared for a report. By the end of the third month, a report is generated with key findings and a conclusion.

However, the start-date for each phase of the Data Entry spot check is dependent on when the sample questionnaires are made available. The start date proposed is when the data entry by the DESs and validation at NADRA is expected to be completed for any cluster.

SAMPLE SIZE AND METHODOLOGY PHASE 1

The overall sample for the Data Entry spot check is 22,000 households. The Data Entry spot check will be conducted over 4 phases. The sample size for each phase will be 5,500 households. Except for the first phase the sample for the next three phases will be drawn from the households covered in the Targeting spot check.

The sample and methodology for the first phase was determined through a discussion between IDS, and the BISP Project team. During this meeting the BISP Project Team requested IDS to modify the sample and methodology of Phase 1 of the Data Entry spot check. The aim of the modification was to provide an overview on the quality of data entry over the three distinct periods of the BISP program. The sample for this phase was therefore distributed over three segments of work completed by BISP. The three segments chosen were 1) Data from the Test Phase survey, 2) Data from the initial Roll Out survey in Balochistan

and 3) Data from the remaining districts of Pakistan surveyed in the National Roll Out survey. It was also decided that the sample size from each segment would be as under:

- Test Phase survey segment: 600 households
- Initial Roll Out(Balochistan) survey segment: 800 households
- National Roll Out survey segment: 800 households
- Total sample size for Phase I   2200households
- The balance 3,300 entries for this phase will be carried forward to the next phase.

LOGISTICS

Project Coordinator (Operations) is the overall in charge of the whole of data entry spot check activity. All communication with BISP headquarters and NADRA including transfer of data, reports at required interval and other deliverables take place through the Project Coordinator (Operations). The IDS head office supervises the overall activity and performance of the team members. The MIS Manager is responsible for managing all tasks that involve data at various stages. His major responsibilities include; receiving data from the BISP office, development of software for data entry and processing, testing of software, supervising the key punch operators (KPOs) and data editors in data entry and cleaning process, processing data to ensure accuracy and readability to carry out further analysis including the indicators defined in the preceding section.

Key Punch Operators (KPOs) are responsible for data entry into the software specially designed for this activity. KPOs work in close coordination with data editors and MIS Manager. Prior to the commencement of data entry, the KPOs were trained through a 3 day training workshop in understanding the questionnaire and the software. After the three-day training, KPOs were tested by holding a mock data entry exercise using the newly developed software in order to qualify for the real task. Software data editors are responsible for reviewing and cleaning data entered by the KPOs and providing them feedback on their performance in order to rule out human error at data entry stage at IDS. Data analysts work in close coordination with the MIS Manager and department in generating the indicators defined and report writing.

Data Base Development and Data Entry: A database has been created at IDS using SQL Server 2000. Data entry is being done on the basis of double entry and checked carefully to ensure near perfect accuracy providing a strong base against which to compare the DEOs' data entry. When a form is entered once by a KPO, a unique key is generated, and a colored tag is placed on the form which has information about the name of the KPO, identification code of the KPO who entered the form into the software, source of data (office) which in this case is NADRA, number of times the form has been entered into the software i.e., first or second entry, unique key generated by the software on completion of each form, survey phase, quarter number and date of data entry. This is to ensure that each form is entered twice and the unique key ensures traceability of the form in case errors during the data entry need to be corrected. The forms entered twice, as indicated by the information completed on the tag are passed on to the MIS department.

MONITORING AND SUPERVISION OF DATA ENTRY

Review and Monitoring: Once the data had been entered into the software, editors in the MIS department review the data entered of each part of the T1 form in order to clean data of any data entry errors. For further verification, both data sets are transferred to SPSS (at random intervals) in order to allow for a comparison of the software. This allows any bugs in the software to be detected. Once the data is verified, it is made available for analysis. The MIS manager then works in close coordination with the data analysts to get the required outputs for the reports.

HIRING AND TRAINING OF STAFF

HIRING OF STAFF

All staff hired for the Data Entry Spot Check have at least a bachelors degree; preference was given to staff from IDS's existing roster. As already stated, a total of 30 Key Punch Operators (KPOs) worked on a full time basis from April 10, 2011 till data entry was completed on June 10, 2011. Additionally, IDS hired Quality Control Officers (software) who were responsible for cleaning the data entered by the KPOs and providing feedback on performance in order to minimize human error.

TRAINING

As already stated IDS organized a training session for the KPOs and Quality Control Officers (QCOs) at the IDS head office from 7-9 April, 2011. The purpose of this training session was to build capacity of the staff in terms of understanding of questionnaire, data entry software, and different quality / security protocols for data entry. At the end of the training course, the KPOs and QCOs were tested with a mock data entry test. Those who passed the test were selected for the task of data entry.

The first phase for the Data Entry spot check began when IDS was provided scanned copies of the 2200 forms by BISP on May 4, 2011.

ANALYSIS AND FINDINGS
NADRA'S DATA ENTRY METHODOLOGY
The data entry methodology adopted by NADRA during the NRO in Balochistan and the early NRO in other districts varies in the context of calculating age of household members and Room Ratio.

NADRA calculates the age of household members according to the rule:
> "*If Date of birth is given then age is calculated with following formula DOB – Current Fiscal Year (2011-07-01), otherwise given age is considered*"

IDS was not issued these instructions by the World Bank or BISP and hence had previously calculated the age of household members as per the date of interview. This has an implication on the number of dependents and children's education.

Room Ratio is a ratio of the number of rooms to the number of household members. As per instructions issued by The World Bank, the total number of household members was to be calculated from the household roster. However, as confirmed, NADRA considers the number of household members as entered for question 24(back side of the questionnaire) when calculating the room ratio.

The analysis in this report is based on IDS's data entry methodology.

USABLE SAMPLE SIZE

Table 1 below shows the number of households that were interviewed and the number of households that declined interviews in the sample for Phase I of the Data Entry Spot Check. The number of households whose scanned copies of T1 form had data available for entry was 2191 (or 99.6% of the sample households had granted interviews – the rest had declined).Only 0.4% households had declined interviews. Thus the usable sample size for further analysis is 2191 households.

Table 1: Number of households interviewed

	Households Interviewed	Percentage
Interviewed	2191	99.6%
Declined	9	.4%
Total	2200	100%

Table 2 below shows the number of households interviewed and number of declined interviews by segment. Households which declined interviews were largest in the Balochistan segment where 0.6% households declined to give interviews. In the Test phase and the National Roll Out survey only 0.3% and 0.25% of the households respectively refused to grant interviews.

Table 2: Number of households interviewed by segment

	Total number of households	Households Interviewed	% households interviewed by segment	Declined Interviews	% declined interviews by segment
Test Phase	600	598	99.7%	2	0.3%
Balochistan	800	795	99.4%	5	0.6%
National Roll Out Survey	800	798	99.75%	2	0.25%
Total	2200	2191	99.6%	9	0.4%

DISCREPANT HOUSEHOLDS

A discrepant household is defined as a household where there is a difference between the data entered for a question by NADRA and the data entered for the same question by IDS (Note: There can be a difference in more than one question. For our analysis, a household is considered discrepant if there is a difference in data entry in any ONE question).

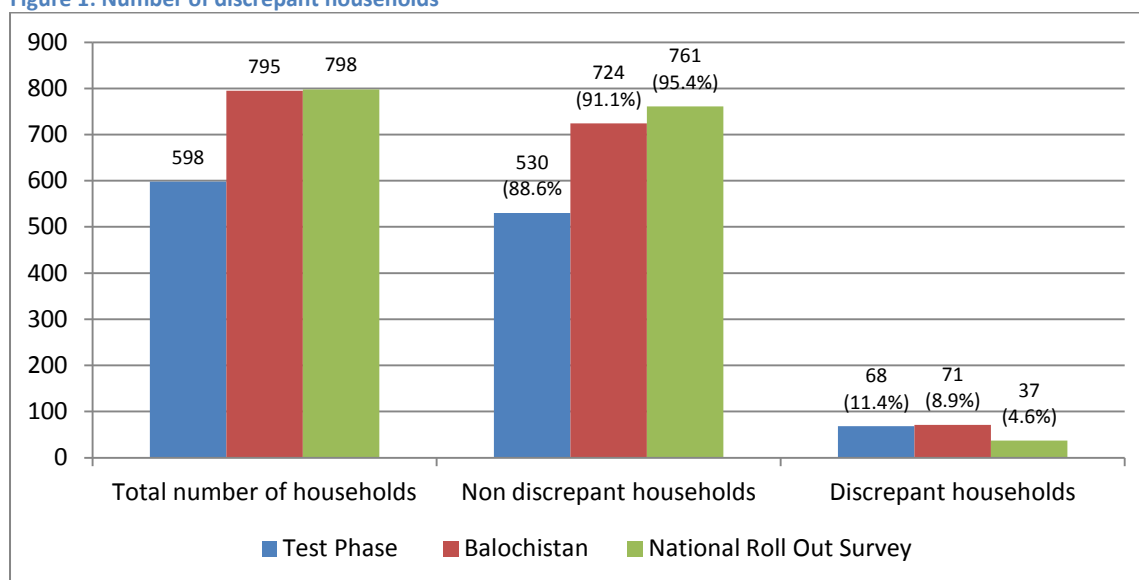**Figure 1: Number of discrepant households**

Figure 1 above shows the number and percentage of discrepant households by segment (discrepancy in questions). During the Test phase 11.4% of the households were found to have a data entry discrepancy. This percentage reduces to 8.9% during the initial Roll Out (Balochistan) segment and further reduces to 4.6% during the National Roll Out segment. This progressive reduction over time is significant and probably has been brought about as a result of the improvements incorporated by BISP and NADRA through lessons learnt in the earlier phase.

Table 3 below shows the number of errors in data entry per household. The table shows that 92% of the households displayed no errors in data entry. Of the remaining 8% households which had discrepancy 5.7% households had 1 error and 1.8% households had 2 errors in data entry. The largest numbers of errors committed in entry of one household form were 7; but that was in the case of 1 household only.

Table 3: Number of errors in data entry per household

Number of errors	Number of households	Percent
0	2015	92.0%
1	125	5.7%
2	39	1.8%
3	6	.3%
4	2	.1%
5	2	.1%
6	1	.0%
7	1	.0%
Total	2191	100.0

Table 4 below shows details for the specific questions where errors were made in data entry. Errors have been calculated for questions related to the household roster, number of rooms and asset ownership. The highest number of errors 15.9% (40) was committed in the question related to number of people in household as per roster. Questions on live stock ownership 14.3% and children's education 8.3% were the other more frequently committed error questions.

Table 4: Number of errors per question

Question	Number of errors
Number of people in household as per roster	40
Discrepancy in number of rooms	10
Discrepancy in household education	12
Discrepancy in child education	21
Discrepancy in toilet ownership	7
Discrepancy in refrigerator ownership	3
Discrepancy in cooking range ownership	3
Discrepancy in freezer ownership	8
Discrepancy in washing machine ownership	11
Discrepancy in cooking stove ownership	18
Discrepancy in AC ownership	5
Discrepancy in aircooler ownership	5
Discrepancy in geyser ownership	5
Discrepancy in heater ownership	4
Discrepancy in TV ownership	14
Discrepancy in Tractor ownership	4
Discrepancy in motorcycle ownership	9
Discrepancy in scooter ownership	2
Discrepancy in car ownership	1
Discrepancy in bull ownership	6
Discrepancy in goat ownership	12
Discrepancy in buffalo ownership	12
Discrepancy in cow ownership	12
Discrepancy in sheep ownership	6
Discrepancy in land area	6
Discrepancy in land unit	16
Total	252

CALCULATION OF PMT SCORE BY NADRA

Figure 2shows data for the number of households for which NADRA calculated or did not calculate the PMT score.

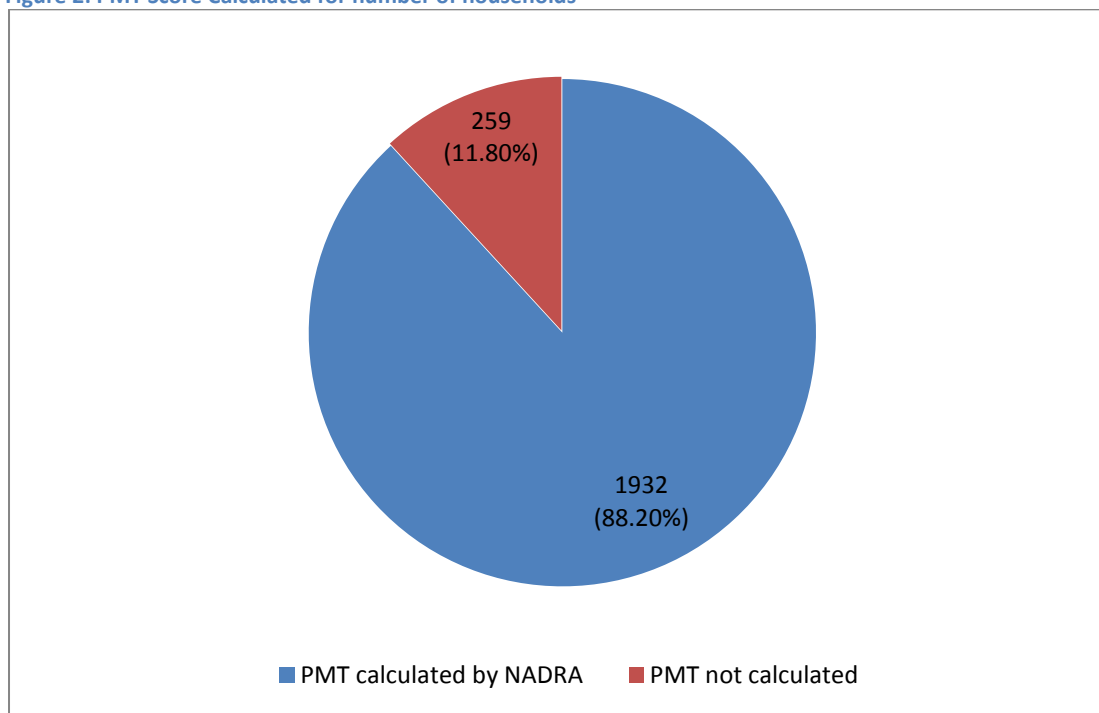**Figure 2: PMT Score Calculated for number of households**

Figure 2 shows that NADRA was able to calculate the PMT score of 88.2% of the households in the given sample of 2191. NADRA did not calculate the PMT score for 259, or 11.8% of the households.

Table 5 below shows the segment wise data for the number of households NADRA calculated and did not calculate the PMT score for a household.

Table 5: PMT calculated for number of households by segment

	Total households	PMT Calculated	% PMT calculated by segment	PMT not calculated	% PMT not calculated by segment	Total percentage
Test Phase	598	496	82.9%	102	17.1%	100%
Balochistan	795	689	86.7%	106	13.3%	100%
National Roll Out Survey	798	747	93.6%	51	6.4%	100%
Total	2191	1932	88.2%	259	11.8%	100%

The table shows that NADRA did not calculate the PMT score for 17.1% of the households from the Test Phase. For the Balochistan phase NADRA was unable to calculate the PMT score of 13.3% of the households. During the National Roll Out survey there is a significant improvement; the number of households whose PMT score could not be calculated is reduced to 6.4%. Here too we see a progressive improvement in the data accuracy level over the three segments.

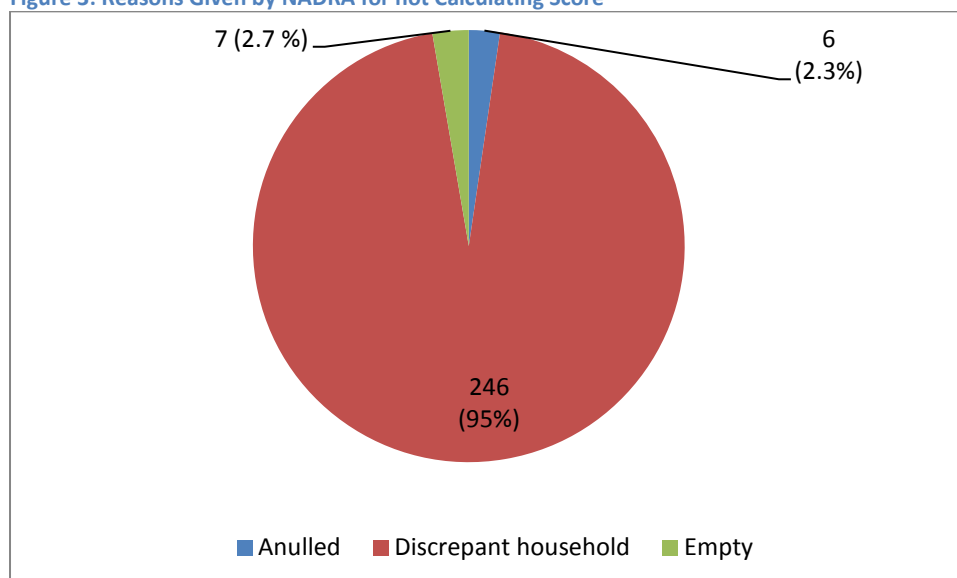**Figure 3: Reasons Given by NADRA for not Calculating Score**

Figure 3 above shows that PMT score of 246 (or 95%) households could not be calculated because they were declared discrepant households by NADRA. The remaining 5% were either declared annulled or empty.

DISCREPANCY IN PMT SCORE

A discrepancy in PMT score is defined as a difference between the PMT score for a household calculated by NADRA and the PMT score for the same household calculated by IDS.[2]

Table 6 below shows that of the 1932 households whose PMT score was calculated by NADRA (see Figure 2), the PMT score of 94.4% of the households matches in the two data sets ie NADRA PMT score calculation and IDS score calculation is identical. However, in case of 5.6% or 108 households a discrepancy between the two data sets exists

Table 6: Discrepancy in PMT score

	Households Interviewed	Percent
Non Discrepant PMT Score	1824	94.4%
Discrepancy in PMT score	108	5.6%
Total	1932	100.0%

Table 7 below shows the distribution of the discrepant households across the three segments. In the Test Phase 8.1% of the households had a discrepancy in score, in the Balochistan segment, 5.8% of the households had a discrepancy in score. This discrepancy was reduced to 3.7% during the National Roll Out segment. The progressive improvement in qualitydescribed previously underlies the improvement in the scores also seen here.

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[2] It is not necessary that % discrepancy in questions is equal to % discrepancy in PMT score.

Table 7: Disaggregated data on discrepant PMT score by segment

	Total households	Households with Discrepant Score	Percent
Test Phase	496	40	8.1%
Balochistan	689	40	5.8%
National Roll Out Survey	747	28	3.7%
Total	1932	108	5.6%

Of the 108 PMT score discrepant households shown in Table 7/8, 81 or 75% of the households are from the already data entry discrepant households group (176 households- Figure 1). The remaining 27 households for which there was no discrepancy in the data entered, but the PMT scores calculated by IDS and NADRA do not match were a cause of serious concern. After extensive analysis the cause of the discrepancy was identified mostly as calculation of the number of dependants which was varying in the two data sets and hence creating a discrepancy in score.

Table 8below shows the range of differences in the scores for cases where the PMT scores of NADRA and IDS did not match. 29.6 % of the scores differences fell in the range "0 through 2.99" and 28.7% in the range "5 through 7.99". A further 24.1% (or 26 households) fell in the category 3 through 4.99 and 11.1% (or 12 households) had score differences beyond 11. These values are absolute.

Table 8: Score difference range for cases where there is difference in PMT score

Score Difference Range	Households Interviewed	Percent
0 – 2.99 (±)	32	29.6%
3 – 4.99 (±)	26	24.1%
5 – 7.99 (±)	31	28.7%
8 – 10.99 (±)	7	6.5%
≥ 11	12	11.1%
Total	108	100.0

FINDINGS

- Despite the numerous safeguards such as the double entry system, inbuilt checks and rigorous monitoring systems, used by the DEOs, data entry errors exist
- Discrepancy in data entry was found to be 8% in the sample analyzed.
- The data entry discrepancy percentage varied for the three segments. It was highest at 11.4% for the Test Phase segment andreduced in the early Roll Out segment (Balochistan) to 8.9%. During the final National Roll Out phase the discrepancy in data entry has been further reduced to 4.6%
- Out of the 8% discrepant households (n=176), 71% households and 22% households had errors in one and two questions respectively. The largest extent of discrepant questions is 7 entered only in the case of 1household
- The three questions in which discrepancy is largest are: 1) # of persons in household as per roster- 15.9%, 2) Livestock ownership- 14.3%, and 3) Children education-8.3%.

BISP may want to communicate this finding to the DEO to further improve the quality of data entry

- NADRA for various reasons has been unable to calculate the PMT score of 11.8% of the sample households. As this is a fairly large percentage of households, BISP needs to follow up on this aspect with NADRA.
- Of the remaining 88.2% households (n=1932) whose PMT score was calculated, 94.4% of the PMT scores calculated by NADRA and IDS matched. In case of 5.6% or 108 households the PMT Score did not match
- Of these 108 households 75% households were those which had a discrepancy in the data entry for one or more questions. The remaining 25% households had a discrepant score because of the difference in calculation of dependants etc.
- The discrepancy in data entry, PMT score calculation and discrepancy in PMT score has reduced over the three phases and in all three factors it is lowest in the National Roll Out Phase as shown in Table 9 below:

Table 9: Difference in data entry for the three segments

	Difference in data entry	NADRA did not calculate PMT score	Difference in PMT score
Test Phase	11.4%	17.1%	8.1%
Balochistan	8.9%	13.3%	5.8%
National Roll Out	4.6%	6.4%	3.7%
Overall	8%	11.8%	5.6%

The above analysis allows us to conclude that the data from the National Roll Out survey was the most accurately entered data for Phase I of the Data Entry Spot Check. The analysis also concludes that the process of data entry gradually improved from the Test Phase survey till the National Roll Out survey. This improvement can be attributed to the remedial measures put in place by BISP through lessons learnt from earlier phases.

CONCLUSION

The Data Entry spot check for the first phase was conducted to give an overview on the quality of data entry across the three distinct periods of the BISP program i.e. the Test Phase, the Initial Roll Out in Balochistan and the final National Roll Out. The aforesaid analysis concludes that the quality of data entry has progressively improved. This improvement can be attributed to the remedial measures put in place by BISP through lessons learnt from earlier phases. It is recommended that BISP continues to rigidly enforce the earlier remedial measures and also improve them in the light of this report to ensure better quality of data input.