

**Scorecard Spot Check Evaluation
BENAZIR INCOME SUPPORT PROGRAM (BISP)**

**DATA ENTRY SPOT CHECK
PHASE EIGHT REPORT**

June, 2013



Table of Contents

Introduction.....	1
Background.....	1
Methodology.....	1
Sample Size.....	2
Analysis tools.....	2
Implementation	4
Work Schedule.....	4
Logistics.....	4
Data Base Development and Data Entry	4
Monitoring and Supervision of Data Entry.....	5
Hiring and Training of Staff	5
Hiring of Staff.....	5
Training.....	5
Analysis and Findings.....	5
NADRA’s Data Entry Methodology	5
Discrepant Households	6
Frequency of Errors	7
Calculation of PMT Score	8
PMT Score Discrepancy	9
Discrepancy in PMT Scores of Non-Discrepant Households.....	10
Findings.....	12
Conclusion	13
Annex 1: DEO wise discrepancy in questions	14

List of Tables

Table 1: Data Entry Spot Check Phase 5 Sample	2
Table 2: Data Entry Spot Check Phase 5 Sample-DEO Wise	2
Table 3: Number of Discrepant Households.....	6
Table 4: Number of Non Discrepant Households.....	6
Table 5: Number of Discrepant Questions.....	7
Table 6: Number of Errors per Question	7
Table 7: DEO Wise PMT Score Calculation	8
Table 8: PMT score Discrepancy.....	9
Table 9: DEO wise Difference in Score Range	10
Table 10: Non-discrepant households with Discrepancy in PMT scores	10
Table 11: Difference in data entry for the DEOs	12

List of Figures

Figure 1 Discrepant Households.....	6
Figure 2: PMT Score Calculated by NADRA	8
Figure 3: Score Discrepancy	9
Figure 4: Score Difference Range.....	10

Introduction

Background

The Benazir Income Support Program (BISP) was launched in 2008 by the Government of Pakistan as the country's primary social safety net. The idea behind this initiation 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) female(s) in a household are eligible to receive the cash grant. Eligibility is determined through the calculation of Proxy Mean Test (PMT) score. Those falling below a predetermined cut off point are determined as eligible to receive benefits through the program.

For this purpose households are surveyed by Partner Organizations (POs). The POs hand over all collected information (T1 forms) to NADRA Headquarters, Islamabad. These are scanned and sent for data entry across the country to the contracted Data Entry Organizations (DEOs). The forms are entered in a MIS developed specifically for this program. This MIS allows for entries such as names, CNIC, address, etc to be verified with NADRA's database. The software calculates the PMT scores of households and houses below the agreed PMT score are identified.

Methodology

IDS has been contracted by BISP to assess the accuracy of data entry conducted by NADRA. This study evaluates the performance of the DEOs contracted by NADRA for data entry. 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 Organization (DEO), by IDS into a MIS system developed specifically for this purpose. This data is then compared with the DEO 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 whole activity is to be divided over eight different phases out of which six phases have been completed. Phase Seven and Eight for the Data Entry spot check began when IDS was provided scanned copies of the 5,500 forms by BISP on April 30, 2013.

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 DEOs¹
- 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

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

Sample Size

The total sample size for the Data Entry Spot Check is 22,000 households. These were to be divided among 8 phases, i.e. approximately 2,750 households in each phase. The sample size for the Data Entry Spot Check phase 7 and 8, i.e 5,500 households, was drawn from the 17,577 matched households of the Targeting Survey Spot Check Phase 3. The sample for Phase 8 of the Data Entry Spot Check has been drawn from matched households from the following districts, as shown in Table 1.

Table 1: Data Entry Spot Check Phase 8 Sample

District	Number of Households
Muzaffargarh	434
Okara	635
Dadu	512
Jamshoro	308
Shikarpur	200
Sukkur	468
Bajur Agency	161
Total	2718

NADRA provided IDS with the sample divided over 9 DEOs for comparison of performance across the different DEOs. The sample size of each DEO was selected in proportion to the number of questionnaire each had entered from the matched Targeting Survey Spot Check Phase 3 households.

Table 2: Data Entry Spot Check Phase 8 Sample-DEO Wise

DEO	Number of Households
Adv. E-Tech	87
Deloitte	367
DPS	815
IA	260
MYASCO 360	215
NCBMS	135
NIFT	556
Systems	256
Others*	27
Total	2718

*Others represent several DEOs with a very small sample size. These include HQ, PHQ Karachi, RHQ Multan, RHQ Sukkur and others.

Analysis tools

Data entered by IDS is matched and compared with data entered by the DEOs. 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:** This indicator measures the percentage of incorrect entries to determine if particular questions have heightened inaccuracy.
- **DEO Indicator:** This indicator measures the percentage of incorrect entries by each DEO in order to identify DEOs with higher errors.
- **PMT Score Indicator:** The percentage of households with difference in score calculated by IDS and NADRA/DEO.

This is the Data Entry Spot Check Phase 8 Report which is provided as part of the overall deliverables.

Implementation

Work Schedule

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 DEOs and validation at NADRA is expected to be completed for any cluster. Scanned copies of forms of the selected beneficiaries for this phase were received on April 30, 2013.

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. The KPOs hired for Phase 5 were the same as in the previous phases. These KPOs had already gone through the three days training workshop and had been tested by holding a mock data entry exercise using the developed software in order to qualify for the real task. Since the KPOs had already attended the training sessions, they went through a one day refresher for this phase. 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 carried out 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

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 had at least a bachelor degree; preference was given to staff from IDS's existing roster. A total of 25 Key Punch Operators (KPOs) worked on a full time basis for the period under report. 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 one day refresher session for the KPOs and Quality Control Officers (QCOs) at the IDS head office on May 12, 2013. The KPOs hired for this phase were the same as the previous phase and were familiar with the questionnaire and the software. The purpose of the one day refresher was to review the understanding of the questionnaire, data entry software and different quality/security protocols for data entry.

Analysis and Findings

NADRA's Data Entry Methodology

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”

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 ratio².

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

² The number of household members from the household roster and question 24 should be same. However, there were cases where these did not match, identifying enumeration error.

Discrepant Households

A discrepancy is identified when there is a difference between data entered for a question by NADRA/DEO and data entered for the same question by IDS. A discrepant household is a household for which there is a discrepancy in at least one question. As the figure 1 shows, overall there were 5.3 percent discrepant households.

Figure 1 Discrepant Households

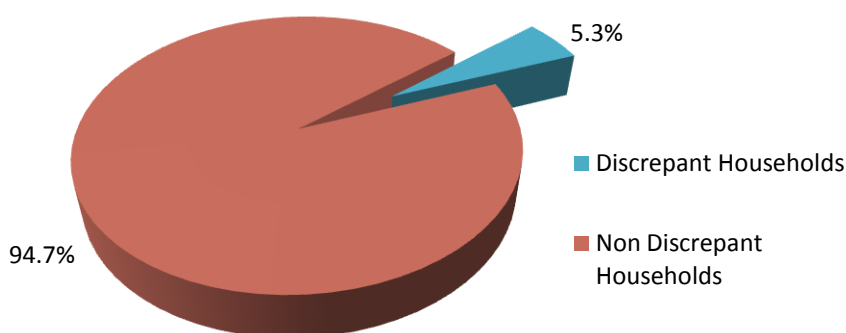


Table 3 shows the DEO wise percentage of data entry errors. For all DEOs except DPS and Deloitte the percentage of this error was more than 4 percent. It was higher for MAYSCO 360 and NCBMS, i.e. 14.9 percent and 11.1 percent of their respective samples with errors in data entry.

Table 3: Number of Discrepant Households

DEO	Number of households surveyed	Number of Discrepant Households	Discrepant Households(As a percentage of households interviewed)
Adv. E-Tech	87	8	9.2%
Deloitte	367	12	3.3%
DPS	815	23	2.8%
IA	260	12	4.6%
MYASCO 360	215	32	14.9%
NCBMS	135	15	11.1%
NIFT	556	25	4.5%
Systems	256	16	6.3%
Others	27	2	7.4%
Total	2718	145	5.3%

Table 4 shows the number of non-discrepant households. Data entry carried out by the DEOs was accurate for 94.7 percent of the selected households.

Table 4: Number of Non Discrepant Households

DEO	Number of Households Interviewed	Number of Non-discrepant Households	Non-Discrepant Households (As a Percentage of Total Households Interviewed)
-----	----------------------------------	-------------------------------------	---

Adv. E-Tech	87	79	90.8%
Deloitte	367	355	96.7%
DPS	815	792	97.2%
IA	260	248	95.4%
MYASCO 360	215	183	85.1%
NCBMS	135	120	88.9%
NIFT	556	531	95.5%
Systems	256	240	93.8%
Others	27	25	92.6%
Total	2718	2573	94.7%

Frequency of Errors

The frequency of errors is measured by the number of questions with erroneous data entry. Table 5 summarizes the number of households for different number of errors. Of the total discrepant households 89 percent (129 of 145) had errors in the data entry of one question. The maximum number of data entry errors for a household was in five questions. There was only one such case.

Table 5: Number of Discrepant Questions

	Number of Questions with Discrepant Answers in Each Household			
	1	2	3	5
Adv. E-Tech	8	0	0	0
Deloitte	12	0	0	0
DPS	23	0	0	0
IA	11	1	0	0
MYASCO 360	27	4	0	1
NCBMS	13	2	0	0
NIFT	22	2	1	0
Systems	12	2	2	0
Others	1	1	0	0
Total	129	12	3	1

Table 6 shows the number of errors for each question. Most of the differences identified were in the data entry of the number of dependents and children's education. The number of dependents and children's education did not match for 58.6 percent and 15.2 percent, respectively, of the 145 discrepant households. Both of these are not directly taken from the questionnaire but depend on the age calculated of the household members listed in the roster³. IDS followed the methodology as shared by NADRA for the calculation of age. Hence, the discrepancy in these variables can be attributed to errors in data entry.

Table 6: Number of Errors per Question

Questions	Number of Households with Discrepancy
Discrepancy in Number of Dependents	85
Discrepancy in Childrens' Education	22
Discrepancy in Microwave Ownership	9
Discrepancy in Heater Ownership	9
Discrepancy in Goat Ownership	5
Discrepancy in Washing Machine Ownership	4
Discrepancy in Cooking Stove Ownership	4
Discrepancy in Television Ownership	4

³ For questionnaires following the old format children's education and number of dependents was taken from the back side and did not depend on the age calculation.

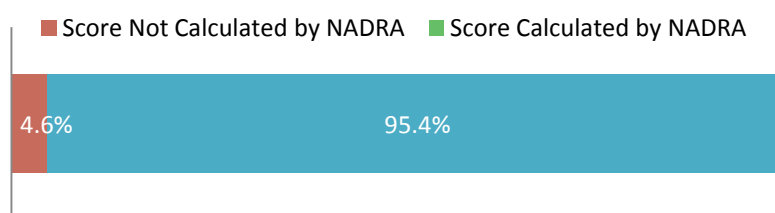
Discrepancy in Tractor Ownership	4
Discrepancy in Motorcycle Ownership	4
Discrepancy in Air Cooler Ownership	3
Discrepancy in Scooter Ownership	3
Discrepancy in Household head Education	2
Discrepancy in Bullock Ownership	2
Discrepancy in Cow Ownership	2
Discrepancy in Number of Household Members	1
Discrepancy in Geyser Ownership	1
Discrepancy in Buffalo Ownership	1
Discrepancy in Sheep Ownership	1
Discrepancy in Land Unit	1

When analyzed across DEOs, number of dependents and children’s education remain questions with the most discrepancies. (See Annex 1 for DEO wise results)

Calculation of PMT Score

Figure 2 below shows that PMT scores were not calculated by NADRA for only 4.6 percent of the total households interviewed. Thus, the PMT score calculation has been compared for the remaining 95.4 percent of the households interviewed.

Figure 2: PMT Score Calculated by NADRA



Of the total households for each DEO, Systems had the higher proportion of households for which PMT scores were not calculated, i.e. 9.8 percent. For all other DEOs this percentage was lower than 7 percent. See table 7.

Table 7: DEO Wise PMT Score Calculation

DEO	Number of households surveyed	PMT Score Calculated by NADRA	Percentage of Total Household interviewed	Score not calculated by NADRA	Percentage of Total households interviewed
Adv. E-Tech	87	84	96.6%	3	3.4%
Deloittee	367	355	96.7%	12	3.3%
DPS	815	776	95.2%	39	4.8%
IA	260	254	97.7%	6	2.3%
MYASCO 360	215	208	96.7%	7	3.3%
NCBMS	135	126	93.3%	9	6.7%
NIFT	556	534	96.0%	22	4.0%
Systems	256	231	90.2%	25	9.8%
Others	27	26	96.3%	1	3.7%
Total	2718	2594	95.4%	124	4.6%

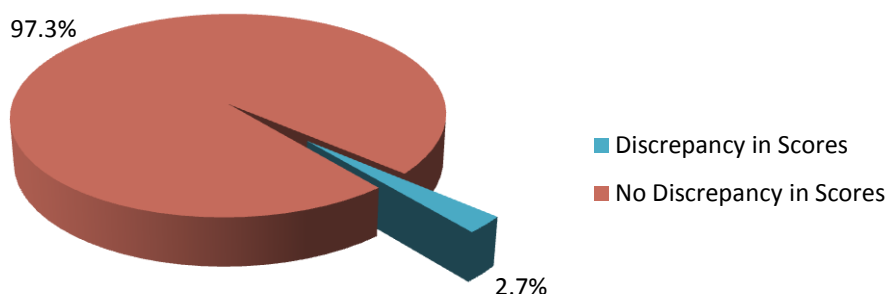
NADRA does not calculate the PMT scores for households that are marked as empty, annulled or discrepant. As per NADRA a discrepant household is defined as a household for which there are enumeration errors in the questionnaire, for example, a response was not

selected for one or more questions or multiple responses were chosen for a single response question. In this case it is not possible to determine the true answer. Thus, the household is marked as discrepant and the score is not calculated. As shown in Table 7, NADRA did not calculate scores for 124 or 4.6 percent of the surveyed households.

PMT Score Discrepancy

IDS was left with 2,718 households for PMT score comparison. Of these households, 2.7 percent had a discrepancy in PMT score, i.e. the scores calculated by IDS did not match the scores calculated by NADRA. The PMT scores matched for the remaining 97.3 percent.

Figure 3: Score Discrepancy



DEOs with higher errors in data entry had higher score discrepancy. However, despite no errors in the data entry conducted by the DEOs there may be households with score discrepancy. Such cases are analyzed later.

Table 8 shows the score discrepancies for each DEO. MAYSCO 360 and NCBMS had higher proportions of discrepancy i.e. 8.7 percent and 7.1 percent. For the remaining DEOs this discrepancy existed for less than 4 percent households.

Table 8: PMT score Discrepancy

DEO	Number of Households with Scores Calculated by NADRA	Households with Discrepant Score	Households with Discrepant Score (Percentage)	Households with no Discrepancy in Score	Households with no Discrepancy in Score (Percentage)
Adv. E-Tech	84	3	3.6%	81	96.4%
Deloitte	355	7	2.0%	348	98.0%
DPS	776	9	1.2%	767	98.8%
IA	254	10	3.9%	244	96.1%
MYASCO 360	208	18	8.7%	190	91.3%
NCBMS	126	9	7.1%	117	92.9%
NIFT	534	8	1.5%	526	98.5%
Systems	231	4	1.7%	227	98.3%
Others	26	1	3.8%	25	96.2%
Total	2594	69	2.7%	2525	97.3%

The degree of discrepancy in score varies for the 2.7 percent households with differences in scores calculated by NADRA and IDS. Figure 4 summarizes differences in the two scores. The smallest range of difference was of 0-2.99, which was the second most common margin of error, with 39.4 percent of the score discrepant households falling in this range. The most common range of difference was 5-7.99, with the difference of 43.9 percent of the score discrepant households within this range. Remaining 19.7 percent had a difference of 3 to 4.99 score points, while only 1.5 percent had a difference in score of more than 11 points.

Figure 4: Score Difference Range

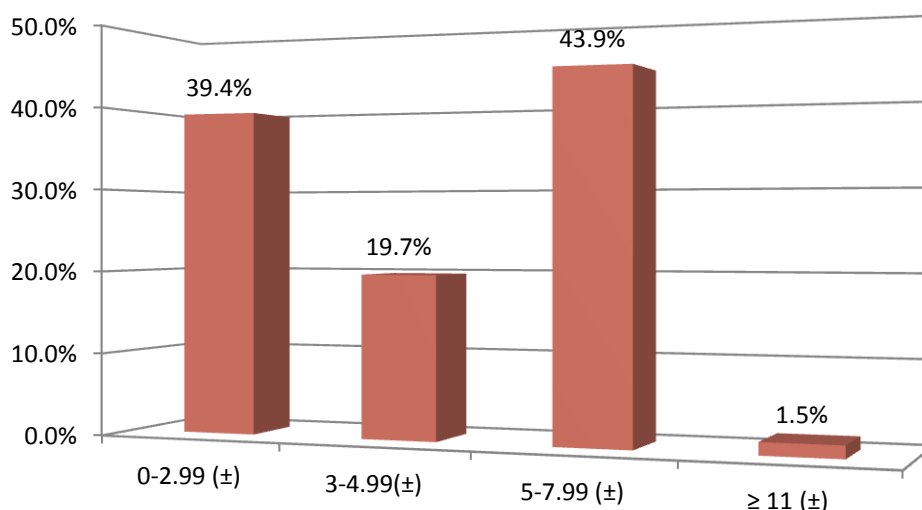


Table 9 reports the differences in the scores calculated by NADRA and IDS across the nine DEOs.

Table 9: DEO wise Difference in Score Range

	Adv. E-Tech	Deloittee	DPS	IA	MYASCO 360	NCBMS	NIFT	Systems	Others
0-2.99 (±)	33.3%	42.9%	22.2%	37.5%	33.3%	33.3%	50.0%	25.0%	100.0%
3-4.99(±)	33.3%	28.6%	11.1%	37.5%	11.1%	22.2%	12.5%	25.0%	0.0%
5-7.99 (±)	33.3%	28.6%	66.7%	25.0%	55.6%	33.3%	37.5%	50.0%	0.0%
≥ 11 (±)	0.0%	0.0%	0.0%	0.0%	0.0%	11.1%	0.0%	0.0%	0.0%
Total	100	100	100	100	100	100	100	100	100

Discrepancy in PMT Scores of Non-Discrepant Households

Out of the total sample of 2,718 households, 94.7 percent or 2,573 households were non-discrepant households. Table 10 shows the variation in the scores of these households. Households that have their data entered correctly should not have a variation in the two scores. However, there were three cases for which the scores did not match.

Table 10: Non-discrepant households with Discrepancy

DEO	Non-Discrepant Households	Score Calculation by NADRA of Non-Discrepant Households	Non-Discrepant Households with difference in Score	Percentage
Adv. E-Tech	79	77	0	0.0%
Deloittee	355	343	0	0.0%
DPS	792	755	0	0.0%

IA	248	243	2	0.8%
MYASCO 360	183	177	0	0.0%
NCBMS	120	112	0	0.0%
NIFT	25	514	0	0.0%
Systems	531	222	0	0.0%
Others	240	25	1	4.0%
Total	2573	2468	3	0.1%

An analysis revealed that the interview of these three households was administered on the questionnaires designed according to the old format. For these households the PMT score was calculated up to two decimal places by NADRA. Hence, IDS calculated and compared the scores up to two decimal places for these households. Consequently, there was no discrepancy in the scores of two of these cases, while there was a difference of only 0.01 score points for one household. This difference is negligible and could be attributed to variations in rounding off by NADRA and IDS.

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 5.3 percent in the sample of 2,718 households
- For all DEOs except DPS the percentage of this error was more than 3 percent. It was higher for MYASCO 360 and NCBMS, i.e. 14.9 percent and 11.1 percent of their respective samples with errors in data entry.
- Data entry errors were only in 1 question for 89 percent of the total discrepant households
- Two questions in which discrepancy is larger are: 1) Number of dependents – 58.6 percent and 2) Children’s education – 15.2 percent
- NADRA for reasons specified earlier has been unable to calculate the PMT score of 4.6 percent of the sample households.
- Of the remaining 95.4 percent (2,594) households whose PMT score was calculated, 97.3 percent of the PMT scores calculated by NADRA and IDS matched. In case of 2.7 percent or 69 households the PMT Score did not match. This is primarily because of the 5.3 percent discrepant households where data entry errors were committed.
- Of the 2,573 non-discrepant households, the PMT scores did not match for 0.1 percent (3 households).
- IDS calculated and compared the scores up to two decimal places for these households. Consequently, there was no discrepancy in the scores of two of these cases, while there was a difference of only 0.01 score points for one household. This difference is negligible and could be attributed to variations in rounding off by NADRA and IDS.
- The discrepancy in data entry and PMT score calculation is summarized below

Table 11: Difference in data entry for the DEOs

DEO	Errors in Data Entry	PMT Score not Calculated by NADRA	Discrepancy in PMT Score
Adv. E-Tech	9.2%	3.4%	96.4%
Deloitte	3.3%	3.3%	98.0%
DPS	2.8%	4.8%	98.8%
IA	4.6%	2.3%	96.1%
MYASCO 360	14.4%	3.3%	91.3%
NCBMS	11.1%	6.7%	92.9%
NIFT	4.5%	4.0%	98.5%
Systems	6.3%	9.8%	98.3%
Others	7.4%	3.7%	96.2%
Overall	5.3%	4.6%	97.3%

Conclusion

The eight phase of Data Entry Spot Check was carried out to give a detailed outline of the quality of the data entry in the DEO's that were mentioned earlier. This analysis shows us that DPS had errors below 3 percent, which made them the DEO's with the lowest number of errors. Consequently, they also had the lowest difference in PMT scores. On the other hand, MYASCO 360 and NCBMS showed the greatest errors in data entry as well as the greatest difference in PMT scores.

Annex 1: DEO wise discrepancy in questions

	Adv. E-Tech	Deloitte	DPS	IA	MYASCO 360	NCBMS	NIFT	Systems	Others	Total
Discrepancy in Number of Dependents	6	8	18	5	16	9	13	8	2	85
Discrepancy in Children Education	0	1	4	2	11	1	2	1	0	22
Discrepancy in Microwave Oven Ownership	0	0	0	1	1	1	1	5	0	9
Discrepancy in Heater Ownership	0	0	0	1	1	1	2	4	0	9
Discrepancy in Goat Ownership	0	0	0	2	2	1	0	0	0	5
Discrepancy in Cooking Stove Ownership	0	0	0	1	0	0	3	0	0	4
Discrepancy in TV Ownership	0	2	0	0	0	2	0	0	0	4
Discrepancy in Tractor Ownership	0	0	0	0	1	0	1	2	0	4
Discrepancy in Motorcycle Ownership	1	0	0	0	1	0	1	0	1	4
Discrepancy in Air Cooler Ownership	0	0	0	0	1	0	0	2	0	3
Discrepancy in Scooter Ownership	0	0	0	0	2	0	1	0	0	3
Discrepancy in Household Head Education	0	0	0	0	0	1	1	0	0	2
Discrepancy in Bull Ownership	0	0	0	0	2	0	0	0	0	2
Discrepancy in Cow Ownership	0	0	0	0	0	0	2	0	0	2
Discrepancy in Number of Household Members	0	0	0	0	1	0	0	0	0	1
Discrepancy in Geyser Ownership	0	0	1	0	0	0	0	0	0	1
Discrepancy in Land Unit	0	0	0	0	1	0	0	0	0	1
Discrepancy in Sheep Ownership	1	0	0	0	0	0	0	0	0	1
Discrepancy in Buffalo Ownership	0	0	0	1	0	0	0	0	0	1