

SF 7.2C: Procedure to draw samples for physical verification and confirmation of placement

Procedure for physical verification

The sampling strategy and decision rules to be followed for interpretation of outcomes are discussed below.

Placement targets for release of instalments

Guidelines prescribe that placement target should be 75% of the training target for the project. As money is released in instalments, training target, placement target and the amount released in each instalment are as follows:

Instalment	Training target (%)		Minimum placement target (%) of trained candidates)		Financial releases (%)	
	Instalment Target	Cumulative	Instalment Target	Cumulative	Instalment value	Cumulative
First	0	0	0	0	25	25
Second	10	10	7.5	7.5	50	75
Third	57.5	67.5	43.1	50.6	15	90
Fourth	32.5	100	24.4	75	10	100

Estimate of sample size

The sample size varies as per the project size and is fixed as follows:

Sl. No.	Project size (training target)	Sample size for release of each instalment S	Total sample (sum of the samples at each instalment usually 3 times of the previous column) N
1	Up to 3000	50*	150**
2	3001 to 4500	75	225
3	4501 to 6000	100	300
4	6001 - 8000	160	480
5	Greater than 8000	(1/3) of 5 % of the target rounded to next highest number	3 times of previous column.

Note: * - If total placed candidates are less than 50, then the sample size will be same as the population.

** - Total samples will be less than 150, if placed candidates are less than 50 in any instalment.

Internal target for placement set by PIA

Past practical experience has been that most PIAs place more than 75% candidates as safety mechanism against unforeseen errors or short falls. Under DDU-GKY also, it is proposed to provide such a safety mechanism and use it for the benefit of the project and the PIA. Firstly, it will provide a cushion to the PIA against all sorts of mistakes that could happen in the process. In addition, the project and the programme will also be benefitted as the overall placement percentage will get a boost.

Thus, all PIAs can specify a higher placement percentage as the project internal target. However, it is clarified that placement target for DDU-GKY programme will be 75 % and all the releases will be based on this target. The higher internal target will be used in evaluation process to check if he had achieved the minimum 75 % based on sampling results. The implications become clearer when we decide on the instalment release (see section on Decision Rules).

Distribution of sample size over quality teams

All projects will have quality teams; the PIA Q team, State Rural Livelihood Mission (SRLM) teams for APS, Central Technical Support Agency (CTSA) teams for APS and YPS. Majority of the samples are checked by the PIA Q team and a smaller sample is to be verified by SRLM's team in APS and CTSA's team for APS and YPS. This is called primary verification. Some samples checked by PIA Q team will be rechecked by SRLM and CTSA for APS and by CTSA for YPS. These samples are called recheck samples.

Distribution of samples between quality teams for primary verification will be as follows:

- PIA Q team will check approximately 80 % of samples (rounded to nearest whole number) in all states
- In an APS: SRLM team will check approximately 15 % of samples (rounded down to nearest whole number) and CTSA team will check 5 % of samples (arrived at after subtracting PIA Q team and SRLM samples from the total samples).
- In an YPS: CTSA will check 20 % of the samples

Thus distribution of samples between various quality teams for an Annual Planned States (APS) and YPS will be as follows:

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Sample size and distribution of samples

Sl. No.	Project size (training target)	Sample size for each instalment - S (A)	Sample distribution			
			PIA Q team (B)	APS		YPS by CTSA (Role of SRLM will as mentioned below))
				SRLM (C)	CTSA (D=A-B-C)	
1	Up to 3000	If sample is less than 50	Rounded to nearest whole number of 80 % of (A)	whole number of 15 % of (A)	A-B-C	A-B
		50	40	7	3	10
2	3001 to 4500	75	60	11	4	15
3	4501 to 6000	100	80	15	5	20
4	6001 to 8000	160	128	24	8	32

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Sl. No.	Project size (training target)	Sample size for each instalment - S (A)	Sample distribution			
			PIA Q team (B)	APS		YPS by CTSA (Role of SRLM will as mentioned below))
				SRLM (C)	CTSA (D=A-B-C)	
5	Greater than 8000	whole number of (1/3 of 5 % of project target)	Rounded to nearest whole number of 80 % of (A)	whole number of 15 % of (A)	A-B-C	A-B

Rechecking of samples will be planned to ensure that:

- For APS: Q team samples to be rechecked by SRLM and Q team and SRLM samples by CTSA
- For YPS: Q team samples will be rechecked by CTSA

Recheck sample size will be 10% of the primary sample size. The recheck samples will be distributed in the ratio of 40% and 60 % between SRLM and CTSA for APS and assigned 100 % to CTSA for YPS. Distribution of recheck samples is given in the Table given below.

Role of SRLM in YPS

Though CTSA is solely responsible for verification in case of YPS, CTSA will make all efforts to progressively involve SRLMs of YPS in placement verification. This would help the state to transition from YPS status to APS status.

In the participation process the state can either opt to independently verify the samples or do verification jointly with the CTSA. Of course, a combination of both the processes also can be followed. The details for both the processes are summarised below.

Independent verification of samples by SRLMs of YPS:

- A. SRLM should ensure that it has sufficient manpower certified for SOP implementation.
- B. Depending on the staff available SRLM can inform the maximum number of samples that it can verify to CTSA any time after signing of MoU.
- C. CTSA will allot the samples every month such that the number would not exceed:
 - The maximum number that the SRLM agreed to verify
 - The maximum number that would have been assigned to an APS in that month for project of corresponding size.

This is explained in different cases in the Table below:

Let maximum number of samples agreed to be verified by SRLM of an YPS be 10.

Sl no.	Sample for the month	Sample assigned to SRLM in the month	Explanation
1	15	10	As sample of 15 > 10 (the

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Sl no.	Sample for the month	Sample assigned to SRLM in the month	Explanation
			maximum samples that SRLM agreed to verify), then the SRLM is assigned 10 samples.
2	10	10	As sample for SRLM equals the maximum, then SRLM is assigned 10 samples.
3	5	5	As the sample is less than the maximum agreed by the SRLM, they will verify all samples.

Joint verification of samples

If SRLM of an YPS doesn't have sufficient manpower certified for SOP implementation, then all efforts will be made to have a joint inspection for verification of placements. This process will be as follows:

- CTSA has to inform SRLM on its official e-mail id regarding verification visit along with the place at least 3 days before the visit
- SRLM will nominate a person and pass on the contact details to the CTSA
- From then on it is responsibility of both the persons to ensure that the inspection is done jointly.

- However, as timelines are important it should be ensured that timelines are adhered to meticulously. In no case the timelines will be sacrificed.

CTSA has to ensure the SRLM officials to be included during their inspection visits.

Recheck sample size and distribution of recheck samples

Sl. No.	Project size (training target)	Recheck sample size (E)	Recheck sample distribution		
			APS		YPS
			SRLM (All samples from team samples) (F)	CTSA (G)	
1	Up to 3000	5	2	3 (Q team 2, state 1)	5
2	3001 to	8	3	5 (Q team 4,	8

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Sl. No.	Project size (training target)	Recheck sample size (E)	Recheck sample distribution		
			APS		YPS
			SRLM (All samples from team samples) (F)	Q CTSA (G)	
	4500			state 1)	
3	4501 to 6000	10	4	6 (Q team 4, state 2)	10
4	6001 – 8000fa	16	6	10 (Q team 8, state 2)	16
5	Greater than 8000	Nearest round number of 10 % of sample size	Whole number of 40% of [E]	E-F (Q team 80 % and state 20 % corrected to round numbers)	Same as E

Placement verification process

Drawing of samples

The process for drawing samples in a month is as follows:

- From the list of candidates uploaded every month by the PIA, an automated process will scan for candidates who are eligible for placement as defined for the DDU-GKY programme by the end of the previous month.
- There will be two cases here and they are illustrated below (The actual semantics of how they are calculated is discussed in the example given below):
 - First case is where cumulative sum of all placed candidates is less than target number of candidates to be placed for release of instalment. (For example, if the target number of candidates to be placed for release of instalment is 1000, then cumulative sum of all candidates should be less than or equal 1000). All the candidates placed in the month would be included for the sampling purposes.
 - Second case is where cumulative sum of all candidates placed is more than candidates to be placed for release of instalment. (For example, if the target number of candidates to be placed for release of instalment is 1000 then cumulative sum of all candidates placed should be greater 1000). In such a case number of candidates will be chosen such that cumulative sum equals the target number of candidates to be placed for release of instalment. Rest would be carried forward for the next instalment. (For example, if the candidates placed in the previous month are 165 and cumulative total is 1070 and then 95 candidates would be selected so that 1000 candidates required for this instalment is fulfilled. The rest 70 would be carried forward for the next instalment).
- These candidates will form sampling frame for the month.
- Samples will be drawn and distributed randomly between quality agencies. Process will be automated and completed by 6th of every month.
- The process of notification of the sample units to different agencies is discussed in the section on verification process.

Example

An example is given below to explain the above steps.

Basic Data

Project size	1333
Placement percentage (as per guidelines)	75
Placement target (as per guidelines) (P)	1000
PIA Internal target (I)	80
PIA Internal target for placement	1067

The number of placed candidates from which samples are to be drawn is given in the Table below. For example, for release of 1st instalment with 75 % target (as per guidelines) samples will be drawn from only 100 placed candidates and with 80 % target, PIA's internal target sample will be drawn from 107 candidates.

Instalment wise samples and target break up

Instalment	Samples	Amount	Target placement
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		released (in %)	As per programme (75%)	PIA's internal target 80%
2 nd	50	10	100	107
3 rd	50	57.5	575	613
4 th	50	32.5	325	347
	150		1000	1067

A monthly breakup of the samples is given in Table below. Please notice the sample breakup given for months 2 and 6. In month 2 the placed candidates are distributed between 2nd and 3rd instalment and in month 6 the break up is between 3rd and 4th instalment.

Month	Placement at 75% (as per guidelines)					Placement at 80% (as per internal targets)				
	Candidates in placement reckoning	Cumulative	Sample for each month and instalment			Candidates in placement reckoning	Cumulative	Sample for each month and instalment		
			2 nd	3 rd	4 th			2 nd	3 rd	4 th

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Month	Placement at 75% (as per guidelines)					Placement at 80% (as per internal targets)				
	Candidates in placement reckoning	Cumulative	Sample for each month and instalment			Candidates in placement reckoning	Cumulative	Sample for each month and instalment		
			2 nd	3 rd	4 th			2 nd	3 rd	4 th
1	50	50	25	0	0	50	50	23	0	0
2	75	125	25	2	0	75	125	27	1	0
3	150	275	0	13	0	150	275	0	12	0
4	200	475	0	17	0	200	475	0	16	0
5	150	625	0	13	0	150	625	0	12	0
6	150	775	0	4	15	150	775	0	8	8
7	72	847	0	0	11	72	847	0	0	10
8	50	897	0	0	8	50	897	0	0	7

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Month	Placement at 75% (as per guidelines)					Placement at 80% (as per internal targets)				
	Candidates in placement reckoning	Cumulative	Sample for each month and instalment			Candidates in placement reckoning	Cumulative	Sample for each month and instalment		
			2 nd	3 rd	4 th			2 nd	3 rd	4 th
9	60	957	0	0	9	60	957	0	0	9
10	43	1000	0	0	7	110	1067	0	0	16
	1000		50	50	50	1067		50	50	50

Verification process

After the samples are selected randomly the verification process will involve the following steps:

- An automated system will indicate the number of samples assigned to an audit agency in each place (Place means either an urban agglomeration - for example, National Capital Region, Hyderabad Metropolitan region etc. or a district if it is a small place. This is to ensure that the samples remain anonymous till the day of check).
- All quality personnel will carry geo tagged time stamped equipment for providing their location data to the ERP system.
- Checking person should first go to the place and confirm position to the ERP system.

- Once they are ready to go on quality assessment, the person should confirm to the system. Sample details will be conveyed to the person then.
- Once the sample details are conveyed, movements of the person will be tagged with geo tagged time stamped device.
- Once the person physically reaches the candidate the candidate will be interviewed as per a pre prepared questionnaire with a geo tagged, time stamped, video device. The start and close of interview should be indicated to the ERP system.
- After the interview is over, the video record will be uploaded in 15 minutes to the ERP system.
- Within 45 minutes of completion of interview, decision about the placement status of the candidate should be made and the report uploaded to the ERP system. However, if the quality person feels that a further probe on placement status is to be made, this should be also reported along with the nature of action to be taken.
- Any exceptions to the above, will be treated by the system as if the candidate is not placed.
- PIA in such a case can file a report to CTSA for YPS/SRLM for APS. Status of the sample can be decided based on evidence presented by PIA. If necessary, further verification can be conducted.
- All such samples will be compiled by the system as exception reports and brought to the notice of CTSA, SRLM and MoRD.
- Similar process should be repeated for all candidates.

Note: If ERP system is not functional at the time of issue of SOP, interim arrangements will be notified by MoRD separately.

Errors in estimating placement percentage due to sampling

Sampling is a process of estimating certain parameter of large number of units (called population) - in our case the placement percentage; by studying a smaller number of units (called sample). Two kinds of errors arise here:

- Errors arising out of estimating a parameter for the population based on a sample - called the sampling error.
- Errors in the system which arise from processes not related to sampling errors – called non-sampling errors.

While errors arising from sampling error are controlled by appropriately controlling the sample size, non-sampling errors that arise mostly from data collection and compilation processes are germane to the system.

Data is presented or handled in the system by the following:

- Data presented by the employer to the PIA
- Data shared by the PIA with monitoring teams (CTSAs and SRLMs)
- Information conveyed by candidates
- CTSA and SRLM's understanding and interpretation of the data

The information is conveyed through various communication channels including written media, electronic media, visual media including photographs and videos and by oral communication. To add, it is the geographical and linguistic dispersion which adds to the communication channel distortions.

Further, the issue is complicated by data entry errors, confusion in a questionnaire and inaccurate information provided by various participants in the process. The reasons for inaccuracy in information could be inadvertent or intentional.

Keeping the background in view expecting 100 % accurate data is not possible. However, while the sources of errors are diversified the risk is entirely borne by the PIA. Further, as the entire placement process is streamlined and tightened at various levels before the physical verification process starts, the non-sampling errors due to system limitations should be factored in before placement targets are finalised.

The whole issue was discussed with different academics having expertise in sampling and different operational functionaries to make statistically valid but operationally simple rules. The expert committee recommended:

Let p^* be the fraction placed as per the PIA. (Note that this will be greater or equal to 75% as per the guidelines of the project.) Our sample will be from this list and suppose the sample fraction is p along with an associated confidence interval. The upper end of this confidence interval has to be multiplied by the p^* . If this is greater than 75%, the acceptable level is satisfied.

The above process involves a correction factor, but it varies from case to case. Operationally, it is felt that such a varying yardstick would be difficult to communicate and implement. Hence, a fixed measure should be developed which should broadly corroborate with expert committee suggestion. Thus after detailed analysis and discussions it was decided that 4 % margin¹ (see footnote for justification for the 4 %) should be given to for non-sampling errors in the system. Thus, the placement target of 75 % changes to 72 % ($75\% \times 96\%$ [i.e. $100-4$]).

Decision rules for Release of Instalment

Let p_i be the sample success proportion for instalment i ($i=2,3,4$)

i.e. $p_i = (\text{correctly placed candidates for instalment } i) / (\text{sample size for instalment } i),$

¹ The sample sizes for the project are fixed such that the confidence interval (CI - alternately called as margin of error) is 4 % or less (it should be noted that lesser the confidence interval the better it is) when the sample proportion is 98 % or better (as against 100% claim). Assuming 75% placement the claim should be 100 % accurate for a PIA to meet the minimum placement criterion. As per expert suggestion if the verified placement percentage is 96 then the upper bound for it would be 100 % ($96 + 4$ CI). Thus instead of 75 % we are accepting 72 % owing to inherent variability in the sampling.

The same thing is being achieved by fixing a 96 % accuracy reducing the placement target from 75 % to 72 %.

It may be noted that what is shown is a broad correspondence and not an equivalence. As the underlying processes are different a complete equivalence is not feasible but a broad correspondence can be established provided one works within with numerical ranges closer to those mentioned above – ranges within which most DDU-GKY projects operate.

and

p be the proportion of successes for cumulative

i.e. $p = (\text{correctly placed candidates for all samples verified}) / (\text{total of samples verified})$

p and p_i are always between 0 and 1 (between 0 and 100 %)

I (> 75%) is the internal target fixed by the PIA (I=75 %, the programme target if PIA has not fixed a higher target) and

T (>72%) will be the revised target for the verification process when shortfall occurs in the previous instalment.

Revised placement target to account for errors: $75\% * 0.96 = 72\%$

Release of 2nd instalment

The instalment release will be as follows:

1) If $p_1 * I \geq 72\%$ then the PIA is entitled for full fund release due in the instalment subject to fulfilling other conditions for release of funds

2) If $65\% \geq p_1 * I < 72\%$ then

- Release funds to PIA as per the success rate ($p * I$ [same as $p_1 * I$]/72) subject to fulfilling other conditions for release of funds. For example if $p_1 = 70\%$, then funds to be released would be $70/72$ of the instalment release.
- Issue advisories
- Revise the minimum placement target for the project for the next instalment to T %, so that the overall target of minimum of 72 % will be achieved

3) If $p_1 * I < 65\%$,

- Take action for orderly closure of the project
- Release funds as per closure advise

Release of 3rd instalment

The placement will be against revised target T ($\geq 72\%$) after 2nd instalment is released.

1) If $p_2 * I \geq T \%$ then PIA is entitled for full fund release subject to fulfilling other conditions for release of funds

2) If $p_2 * I < T \%$ and $70 \% \geq p * I < 72 \%$ then

- Release funds to PIA as per the overall success rate ($p * I / 72$) subject to fulfilling other conditions for release of funds
- Issue advisories
- Revise the minimum placement target for the project for the next instalment so that the overall target of minimum of 72 % will be achieved

3) If $p_2 * I < T \%$ and $p * I < 70 \%$,

- Take action for orderly closure of the project
- Release funds as per closure advise

Release of 4th instalment

1) If $p_3 * I \geq T \%$ then PIA is entitled for full fund release subject to fulfilling other conditions for release of funds

2) If $p_3 * I < T \%$ and $70 \geq p * I < 72\%$ then

- Release funds to PIA as per the overall success rate ($p \cdot I / 72$) subject to fulfilling other conditions for release of funds
- Issues advisories

3) If $p_3 \cdot I < T \%$ and $p \cdot I < 70 \%$,

- Take action for closing the project

Release funds as per closure advise