



MEDITERRANEAN SEA BASIN ENI CBC PROGRAMME 2014-2020

ANNEX 11 TO DMCS

EXPENDITURE SAMPLING METHODOLOGY FOR THE MANAGEMENT VERIFICATIONS WITHIN THE ENI CBC MED PROGRAMME 2014-2020

Introduction

The purpose of this document is to describe the sampling methodology to perform the management verifications on the expenditures reported by the projects, under responsibility of the MA Operational and Authorizing unit and to be performed by the JTS.

The reference document of this analysis is the note *"EGESIF_16-0014-00 20/01/2017 Guide to sampling methods for audit authorities"*; some differences can be evidenced with the EGESIF model such as the frequency for implementing the verifications by the JTS, the sampling units and the population to be controlled:

- frequency: whenever an interim report is submitted by a project;
- sampling unit: the individual expense item contained in an interim report;
- population: the set of expenditure items included the interim report.

The sampling model set up for this purpose is based on an analysis of the data available up to April 2022, consisting of 51,712 individual expenses (items), for a total amount of € 39.427.951 reported by 341 Lead Beneficiaries and project partners of 49 projects out of the 80 financed in the framework of the ENI CBC MED Programme. These expenses, already verified by the project auditors, have been subjected to control by the MA/JTS on the entire population, based on the supporting documents.

The model for the sampling of expenditures is based on the definition of a real (non-estimated) error rate as follows:

- A = expenditure reported (by each Lead Beneficiary/Partner)
- $B (\leq A)$ = the amount of expenditure reported (A) deemed ineligible by the auditor
- $C (\leq A)$ = the amount of expenditure reported (A) deemed ineligible after the MA/JTS controls
- Error Rate % = absolute value $(C - B)/A$

The amount of not eligible expenditures has been extracted from the MIS (ref. document Export_tagli). The total reported value (BV) and the total error (TE) are obtained considering the sum of all the A_i and all the absolute values of $(C_i - B_i)$ - where "i" goes from 1 to 51,712. The TE/BV ratio sets the overall average Error Rate on the population.

To build up the model, the Interim reports were grouped by nationality of the Lead Beneficiaries/partners. The Error Rate was then calculated as the Total Error / average of the error rates detected by Lead Beneficiary / partner weighted on the basis of the total reported amount by Beneficiary / partner.

The values resulting from this analysis are shown in Table 1.

The overall average Error Rate calculated is 4.92%; however, significative differences emerged taking into account the nationality of the LB'/Partners/Auditors. On the basis of the database examined, three homogeneous macro-areas could be identified, each of them characterized by similar error rates. Based on this result, a stratification of the population to be examined can be applied.

Table 1: Detected error rate (total and by country)

Country	Reported amount (BV)	Total error (TE)	Error Rate (TE/BV)	number of LBs/partners - interim reports	TE 0 - 1.23 %	TE 2.38 - 2.53%	TE 3.2% - 6.24%	TE >7.40 %
Portugal	24,648.05	128.54	0.52%	1	1			
Malta	349,291.77	3,161.62	0.91%	4	4			
Spain	6,448,500.25	79,050.53	1.23%	52	52			
Italy	10,715,145.56	244,017.49	2.28%	74		74		
Greece	2,943,315.50	74,465.70	2.53%	30		30		
Cyprus	216,988.49	6,942.51	3.20%	3			3	
Palestine	3,322,485.34	138,567.04	4.17%	25			25	
Egypt	1,197,306.63	73,586.71	6.15%	13			13	
Israel	945,311.43	59,030.70	6.24%	9			9	
Lebanon	3,939,046.41	291,453.97	7.40%	38			38	
Jordan	4,108,007.71	416,729.97	10.14%	36				36
Tunisia	4,317,316.04	452,287.32	10.48%	50				50
France	546,467.56	83,879.86	15.35%	6				6
Total	39,073,830.74	1,923,301.96	4.92%	341	57	104	88	92

Sampling methodology

As clarified in the Note EGESIF16-0014-00, a stratification is applied when the population is divided into sub units, and for each of them individual samples are obtained.

The purpose of the stratification is double: on the one hand, it usually allows for greater accuracy (with the same sample dimension) or a reduction of the sample dimension (with the same level of accuracy); on the other hand, it ensures that the sub units corresponding to each stratum are represented in the sample.

If the level of error (anomaly) is expected to vary across population groups (e.g., by programme, region, , risk of the operation), there is potentially a good opportunity to apply stratification.

Considering that the size of the population to be examined, i.e., all the expense items contained in the interim report of a LB/partner, and that the average number of individual expenses reported ($51.712/342 = 151$) are quite low to carry out a statistical sampling, the use of a **non-statistical sampling¹** is considered as a preferable option.

¹Note EGESIF_16-0014-00 20/01/2017 Guide to sampling methods for audit authorities. Chapter 6.4 - The EGESIF note specifies that even in situations where a non-statistical sampling method is applied, the sample must be selected using a random method. The size of the sample must be defined taking into account the level of assurance provided by the

The stratification is a very effective tool for improving the quality of projections therefore its use is strongly recommended in the context of non-statistical sampling.

Sample size

In a non-statistical sampling, sample sizes are calculated on the basis of professional judgment and taking into account the level of assurance provided by systems audits. The ultimate goal is to obtain a sample size large enough for the MA to reach valid conclusions about the population.

Concerning the 2014-2020 programming period and as established by Article 127(1) CPR, a non-statistical sample should cover at least 5% of operations and 10% of expenditure. Since the regulation refers to a minimum coverage, these thresholds therefore correspond to the "best case scenario" of high reliability offered by the system. In line with Annex 3 of ISA No. 530, the sample size shall be larger in cases that a significative error risk is detected by the auditor. The following table included in the EGESIF note summarizes the indicative thresholds that can be used for the definition of the sample size in the context of non-statistical sampling:

Table 2: reference values for the sample size according to the level of reliability of the control system

Level of assurance from systems audits for declared expenditure	Recommended coverage for operations	
	items	declared expenses
Works well. No improvements are needed or only minor improvements are required.	5 %	10 %
Works. Some improvements are needed.	Between 5% and 10% (to be defined by the AdA on the basis of its professional judgement)	10 %
It works partially. Substantial improvements are needed.	Between 10% and 15% (to be defined....)	Between 10% and 20% (to be defined...)
Basically, the system doesn't work.	Between 15% and 20% (to be defined.....)	Between 10% and 20% (to be defined...)

Keeping as reference the sampling percentages indicated in Table 2, for the purposes of the management verifications to be carried out by the MA/JTS, the population has been divided into four groups characterized by similar error rates, whose sample sizes are indicated in Table 3 .

With regard to the selection of the sample, the identified methodology **considers as many strata as there are the LBs/partners/auditors' nationalities** represented in a given report. This choice will guarantee the controls on expenses reported by all the partnership, as well as the periodic update of the error rates by country, which constitute the parameter for choosing the sample size.

control system and must be sufficient to allow a valid audit opinion to be drawn on the legality and correctness of the expenditure

Table 3: Subdivision of the population into four strata and determination of the sample size

Country	Error Rate (TE/BV)	Group	sample size	
			Item	Total expenses
Portugal	0.52%	a	10%	10%
Malta	0.91%			
Spain	1.23%			
Italy	2.28%	b	15%	15%
Greece	2.53%			
Cyprus	3.20%	c	20%	20%
Palestine	4.17%			
Egypt	6.15%			
Israel	6.24%			
Lebanon	7.40%			
Jordan	10.14%	d	25%	25%
Tunisia	10.48%			
France	15.35%			

Selection of the Sample

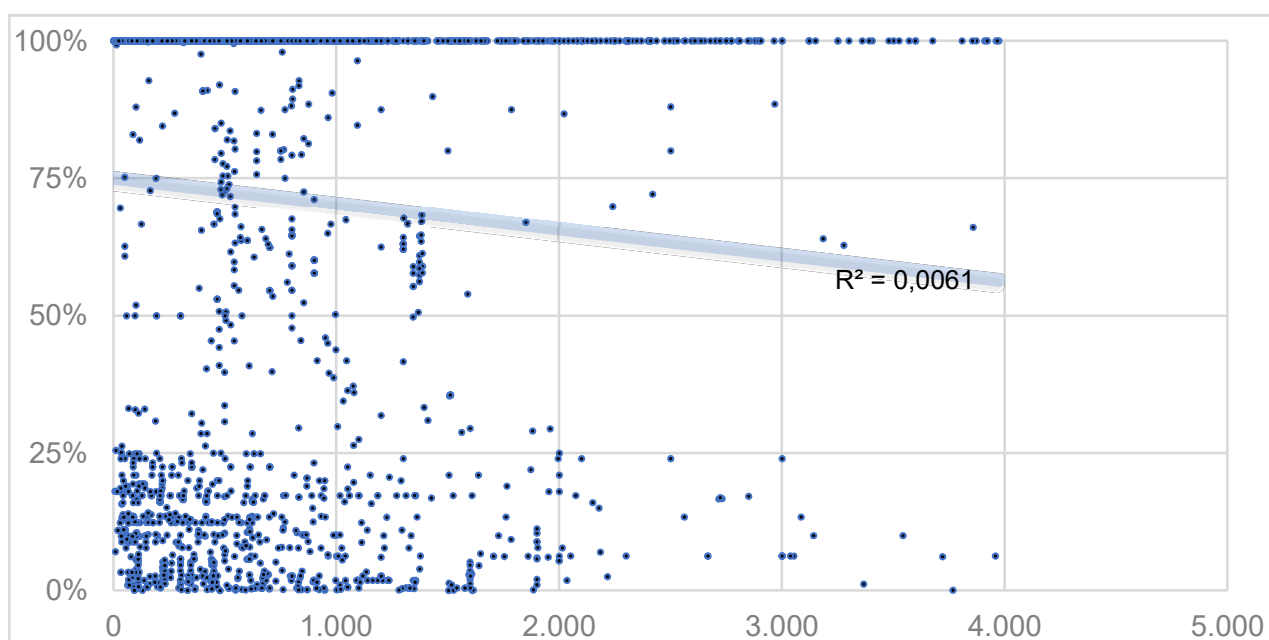
The sample is selected by applying a random method. In particular, the selection can be made using:

- equal probability: each sampling unit has an equal chance of being selected regardless of the amount of expenditure declared, as in a simple random sampling; or
- probability proportional to the size, i.e., to the amount of the expenditure: following a random selection of the first item, subsequent items are selected using a range until the desired sample size is reached.

The use of the probability proportional to the expense would be preferable in case of a positive correlation (association) between errors and values, i.e., when it is expected that the items with a higher value tend to show greater errors.

Since such a correlation is not observable on the population of 51,712 items verified by the MA/JTS (see graph 2 below), **the first option - selection with equal probabilities** - is applied.

Graph 1: error rate detected in relation to the amount of the expenses



Practical application

In order to facilitate the selection of the sample according to the methodology described above, an excel tool has been developed. The tool extracts the sample in terms of n. of items and amount to be checked starting from the list of expenditures included in the interim reports. The tool includes error calculation and additional sampling possibilities according to the rationale detailed below.

Following the selection of the sample containing N# expenditure items for each LB/PP's nationality, and the verification of the expenditure eligibility, a total **error E will be determined in the sample** given by the sum of all the errors detected for each of the N# items of expenditure controlled.

The **Error Rate (ER)** in the sample will be then equal to the total error E divided by the total amount of expenditure in the sample (BVs), **ER=E/BVs**.

In the absence of particular situations, such as the detection of systemic errors, it can be assumed that the Total or projected Error Rate is equal to the Error Rate found in the sample **TER=ER**.

The total amount at risk is therefore given by application of the error rate to the population: **BV x TER**.

Corrections (removal from eligible expenditure) = C

The remaining amount at risk = Amount at risk – corrections = (BV x TER) – C

Residual Total Error Rate (RTER) = Residual Amount at Risk ((BV x TER) – C)/(BV – C)

The **Residual Total Error Rate (RTER) must be lower than the relevance** threshold, set at 2%, to consider the sampling procedure and the elimination of errors to be considered positively concluded.

If the RTER is greater than the relevance threshold, **additional sampling will be carried out**. In this case, the sample size is recalculated, increasing the percentages of both items to be selected and total expenditure to be controlled.

The additional sample size is obtained as the difference between the original sample size and the recalculated sample size; the additional items to be audited are selected using the same method used for the original sample.

The two samples (original and additional) are then added together, resulting in the final sample. The results of the checks (Error Rate and Residual Error Rate) are then recalculated using the data obtained from the final sample.

Example 1: a population **N = 120** expenditure items included in an interim report of one or more partners of a country, which has a total reported expenditure **BV = €200,000**

- the concerned country falls into category D, therefore the sample size equal to 20% of the population and 20% of the expenditure
- therefore **n = 20% N = 24** and a total sampled expense **BVs = €55,000** (given by the sum of the values of the 24 items randomly selected)
- finding a total error in the sample **E = 1,485 €**, the result is an error rate of **TE = E/BVs = 2.7%**; since no systemic errors are detected, **the Projected or Total Error Rate (TER) is the same 2.7%**.
- **the total amount at risk = BV x TER = 200,000 x 2.7% = € 5,400**
- **the corrections** made to the population are equal to the error found **C = € 1485**
- **the residual amount at risk = Amount at risk – corrections = (BV x TE) – C = €3,915**
- **the Residual Total Error Rate = Residual Amount at Risk ((BV x TE) – C)/(BV – C) = ((200,000 x 2.7%) – 1,458) / (200,000 – 1,458) = 1.97%** therefore lower than the relevance threshold (2%); no additional sampling is needed.

Example 2: same starting data of example 1 and same Error Rate in the sample, but from the extraction of the sample of size **n = 24**, a total expense selected of **BVs = 45,000**. Under the same hypothesis and with the same **Error Rate detected in the sample = 2.7%** given by an error **E equal to € 1,215**:

- **the total amount at risk = BV x TER = 200,000 x 2.7% = € 5,400**
- the corrections made are equal to the error found **C = TER x BVs = 2.7% x 45,000 = €1,215**
- the remaining amount at risk = Amount at risk – corrections = **(BV x TER) – C = €4,185**
- the **Total Residual Error Rate = Residual Amount at Risk ((BV x TER) – C)/(BV – C) = ((200,000 x 2.7%) – 1,215) / (200,000 – 1,215) = 2.1%** therefore **above the relevance threshold (2%)**

In this case, additional sampling will have to be carried out; in this case, the sample size is recalculated, increasing the percentages of both the Items to be selected and the total expenditure to be controlled.

The additional sample size is obtained as the difference between the original sample size and the recalculated sample size; the additional items to be controlled are selected using the same method used for the original sample.

The two samples (original and additional) are then added together, resulting in the final sample. The results of the checks (Error Rate and Residual Error Rate) are recalculated using the data obtained from the final sample.