



eco-friendly ceramic
MEMBRANE
BIOREACTOR **MBR**
based
on RECYCLED
agricultural and industrial
wastes for waste water reuse

D 4.3 List of specific indicators: specific indicators selected for the environmental and socioeconomic assessment of the Project actions



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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	5
2. LIST OF INDICATORS: specific indicators selected for the environmental and socioeconomic assessment of the Project actions.....	6
2.1. Specific indicators selected for the environmental assessment of the Project actions.....	6
2.2. Specific indicators selected for the socioeconomic assessment of the Project actions.....	8
3 CONCLUSIONS	9



LIST OF FIGURES

Figure 1: Indicators	5
Figure 2: Environmental indicators	7
Figure 3: Socioeconomical indicators	8

LIST OF TABLES

Table 1: Water quality parameters	7
Table 2: Dissemination indicators	9



1. EXECUTIVE SUMMARY

The aim of this Deliverable is to define the indicators to monitor during the execution of the project.

The measurement of these indicators will provide us with useful information about the MBR performance, such as the permeate quality.

To this end, different parameters will be measured in the effluent of REMEB MBR, as well as in the Aledo MBR already existing with commercial membranes. These parameters are explained in detail in the Deliverable 4.2 *Experimental Plan*.

The indicators list will provide a base of comparable information that could be useful to respond to common policy goals, to fulfill the current and future regulations shown in the draft of the new Directive of “Development of minimum quality requirements for water reuse in agriculture irrigation and aquifer recharge”.

These indicators will be divided in two categories according to environmental and socioeconomic aspects (Figure 1). The first ones are related to the quality of water and the environmental benefits of water reuse by means of MBR technology, while the second are associated to the impact on society.

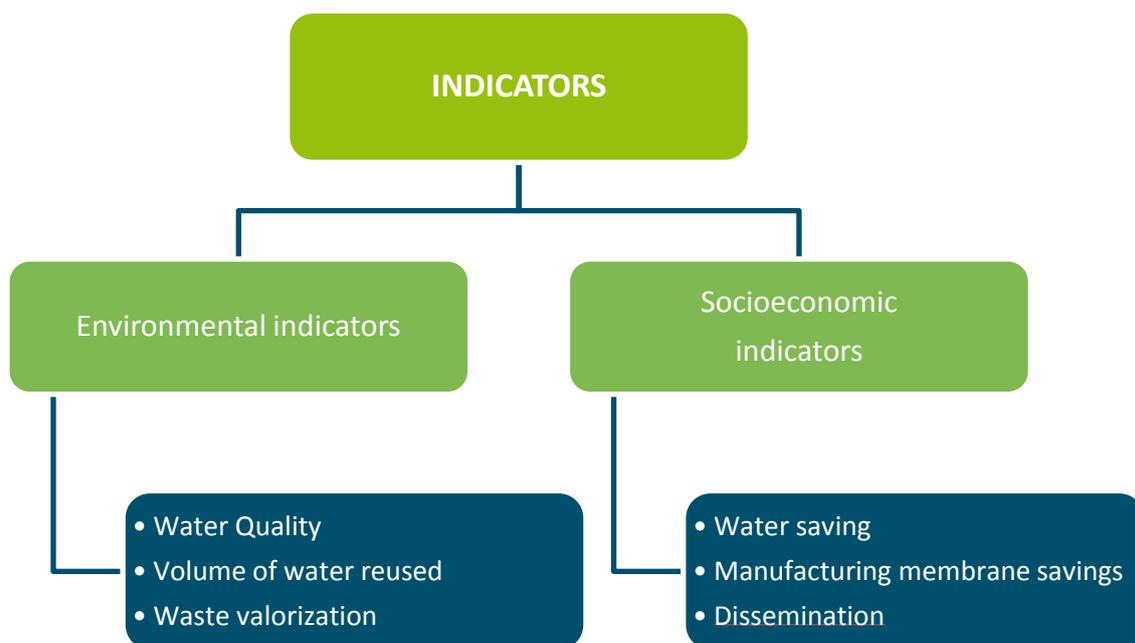


Figure 1: Indicators



■ 2. LIST OF INDICATORS: specific indicators selected for the environmental and socioeconomic assessment of the Project actions

2.1. Specific indicators selected for the environmental assessment of the Project actions

The environmental indicators that are going to be monitored during the progress of the project are listed below. This indicator can be divided in three areas according to different criteria:

- Water quality: where physico-chemical and biological parameters will be measured in order to see if the permeate has the required quality to be reused in agriculture.
- Volume of water reused: will provide us with information about the efficiency of the technology and the sustainability of the process.
- Waste valorization: the use of recycle materials, such as olive stones, marble dust and chamotte, will allow reducing the amount of raw materials used, with the consequent lower impact on the natural resources.

These last two indicators could be also related to the socioeconomic indicators due to the associated cost reduction. Both imply a lower dependence on natural resources, such as water or natural raw materials.

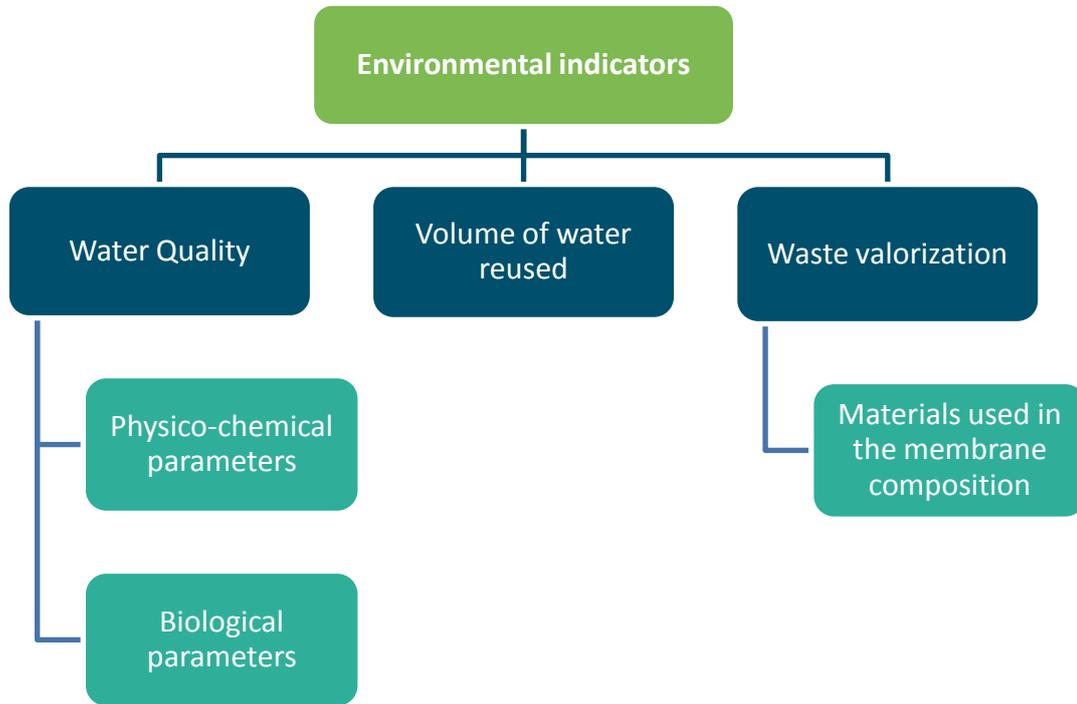


Figure 2: Environmental indicators

Table 1 shows the physico-chemical and biological parameters monitored to evaluate the quality of the permeate in REMEB MBR and in the commercial one.

Table 1: Water quality parameters

Physic-chemical parameters
Chemical oxygen demand (COD)
Total organic carbon (TOC)
Biochemical Oxygen Demand (BOD)
Turbidity
pH
Conductivity
Total suspended solids (TSS)
Phosphorus Total
Nitrogen Total



Biological parameters (pathogens)
Escherichia Coli
Nematode eggs

The above mentioned parameters will be monitored weekly or 2-weekly in the permeate of both MBRs (REMEB and commercial one).

2.2. Specific indicators selected for the socioeconomic assessment of the Project actions

Although the technology developed in Remeb project will provide advantages from the environmental point of view. The socio-economic benefits provided by project results should be also taken into account. With this aim, different socio-economic indicators have been selected to be evaluated during the project execution, shown in Figure 3.

This indicator can be divided in three areas according to different criteria:

- Water savings: regarding the volume of water treated in the MBR, the use of the permeate will involve a reduction in the use of groundwater or surface water.
- Manufacturing membrane savings: due to the use of recycled materials in the membrane composition.
- Dissemination: dissemination indicators are presented in the Midterm Report, where all the dissemination activities issued during the project progress to maximize project impact are collected: press releases, publications and conferences or seminaries in which the project has been presented and the audience they are addressed.

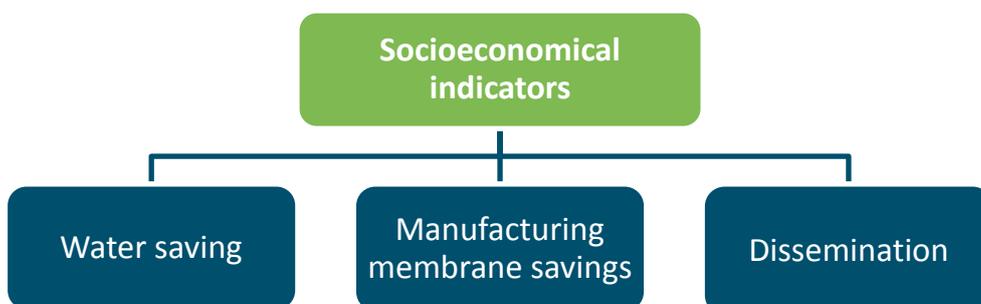


Figure 3: Socioeconomical indicators



Table 2 shows the indicators that are being used to monitor the impact of REMEB project in the society.

Table 2: Dissemination indicators

Dissemination parameters monitored
Project website
Social networks
Production of informative and promotional materials
Direct dissemination activities through participation in events or formal meetings
Newsletters
Dissemination through general and specialised media

3 CONCLUSIONS

The main objective of the selection of specific indicators for the environmental and socioeconomic assessment of the Project actions is to have a useful tool to compare both MBR treatments. To this end, after the definition and assessment of specific environmental and socioeconomic indicators, the obtained results will allow to assess both, the efficiency of the technology and the impact of project results.