



PROPOSAL LIFE 16-ENV-ES-000341

**“DESALINATED SEAWATER FOR ALTERNATIVE AND
SUSTAINABLE SOILLESS CROP PRODUCTION”**



“MID-TERM REPORT FOR INDICATORS TABLE”

**ACCIÓN E2. “COMPILATION OF INFORMATION FOR
INDICATOR TABLES”**



October 2019



1. Abstract

The LIFE "Key Performance Indicators (KPIs)" allow the quantification of the impact of the project. For the estimation of many of the proposed KPIs, in particular for the more technical KPIs, it has been necessary to have the results of the experimental trial, which started in September 2018. This is the case of KPIs that evaluate the savings of water and energy, the CO₂ footprint or the conservation of soils and aquifers.

In compliance with EASME [2017] - 6804961 requirements (Annex I of First Progress Report), the compilation of a set of LIFE Program KPIs in the web application (01/2018; <https://webgate.ec.europa.eu/eproposalWeb/kpi>) was carried out. To update the KPIs for which data was generated in the first and the second years of the project, a new scenario called "Mid-Term Report (MTR) scenario" was created. All KPIs updates are explained in section 4 (highlighted in green).

2. Resumen

Los LIFE "Key Performance Indicators (KPIs)" permiten la cuantificación del impacto del proyecto. Para la estimación de muchos de los KPIs propuestos, especialmente los KPI más técnicos, ha sido necesario disponer de los resultados del ensayo experimental de este proyecto, el cual ha comenzado en septiembre de 2018. Este es el caso de los KPIs que evalúan los ahorros de agua y energía, la huella de CO₂ o la conservación de suelos y acuíferos.

Atendiendo a la petición de EASME [2017] – 6804961 (Annex I de First Progress Report), se procedió a la compilación de LIFE Programme KPIs a través de la aplicación web habilitada a este efecto (01/2018; <https://webgate.ec.europa.eu/eproposalWeb/kpi>).

Para la actualización de aquellos KPIs para los que se dispone de datos generados en el primer y segundo año del proyecto, se ha creado un nuevo escenario denominado "Mid-Term Report Scenario (MTR)". Todas las actualizaciones de KPIs (destacadas en verde) se describen en el apartado 4 de este informe.



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3. Table of indicators based on the EASME KPI web application

INDICATOR	Specific contexts	Unit	Begin Value	End Value	Beyond 3 years Value	Progress Report Scenario	Mid-Term Report Scenario	Explanation of change
1.5. Project area/lenght	1.5.1 Implementation of irrigation closed soilless systems	ha	0	500	6000	0,0758	0,0758	a151
	1..5.2. The use of desalinated sea water for irrigation	ha	0	500	6000	0,0252	0,0252	a152
1.6. Humans to be influenced by the project	1.6.1 Implementation of irrigation closed soilless systems	Humans	0	500	3000	+2000	+2000	a161
	1.6.2 The use of desalinated sea water for irrigation	Humans	0	500	3000	+2000	+2000	a162
2.3.5.3. Water consumption for production	2.3.5.3.1 Implementation of irrigation closed soilless systems	kg tomato/year/ha	140000	307000	307000	NO DATA	89700	a23531
	2.3.5.3.2 The use of desalinated sea water for irrigation	m ³ /kg	0.06	0.04	0.02	NO DATA	0.03	
4.1.1. Recource efficiency – energy - consumption	4.1.1.1. Implementation of closed soilless systems and irrigation with desalinated seawater	Kw-h/year	3840	3072	3072	NO DATA	13844	a4111
8.1.1. CO2 emissions	8.1.1.1. Implementation of irrigation closed soilless systems	kgCO2/kg produced	0.01	0.01	0.01	NO DATA	0.432	a8111



	8.1.1.2. Implementation of irrigation closed soilless systems	kgCO2/year	1014	811	811	NO DATA	38,750	
10.2. Involvement of non-governmental organisations (NGOs) and other stakeholders in project activities	10.2.1 Implementation of closed soilless systems and irrigation with desalinated seawater	Number	0	5	10	2	>10	a1021
11.1. Website	11.1.1 Implementation of closed soilless systems and irrigation with desalinated seawater	No. of unique visits	0	150	2000	+1300	2335	a1111
	11.1.2 Implementation of closed soilless systems and irrigation with desalinated seawater	No. of individuals	0	150	2000	NO DATA	276	
	11.1.3 Implementation of closed soilless systems and irrigation with desalinated seawater	No. Downloads	0	20	200	+500	+500	
	11.1.4 Implementation of closed soilless systems	Average visit duration (minutes)	0	3	5	NO DATA	2 minutes and 18 seconds	



	and irrigation with desalinated seawater							
11.2. Other tools for reaching/raising awareness of the general public	11.2.1 Implementation of closed soilless systems and irrigation with desalinated seawater	Publications/reports	0	5	10	3	14	a1121
	11.2.2 Implementation of closed soilless systems and irrigation with desalinated seawater	Print media	0	10	25	2	5	
	11.2.3 Implementation of closed soilless systems and irrigation with desalinated seawater	Other media (video/broadcast)	0	1	1	0	0	
	11.2.4 Implementation of closed soilless systems and irrigation with desalinated seawater	Hotline/information centre	0	1	2	2	2	
	11.2.5 Implementation of closed soilless systems and irrigation with desalinated seawater	Events/exhibitions	0	5	10	5	11	
	11.2.6 Implementation of closed soilless systems and irrigation with desalinated seawater	Displayed information (poster, information boards)	0	3	6	4	3	
11.3. Surveys carried	11.3.1. Implementation of	Number	0	38	60	0	+50	a1131



out regarding awareness of the environmental	closed soilless systems and irrigation with desalinated seawater							
12.1 Networking	12.1.1 Implementation of closed soilless systems and irrigation with desalinated seawater	Number	0	6	10	3	4	a1211
12.2 Professional training and education	12.2.1 Implementation of closed soilless systems and irrigation with desalinated seawater	Number	0	13	15	0	4	a1221
13. Jobs	13.1 Implementation of closed soilless systems and irrigation with desalinated seawater	Number	0	6	10	+10	2, +10	a131
14.1 Running cost/operating costs during the project and expected in case of continuation	14.1.1 Implementation of closed soilless systems and irrigation with desalinated seawater	€	0	1048026	105000	180738.91	180738.91	a1411
14.2 Capital expenditure expected in case of continuation	14.2.1 Implementation of closed soilless systems and irrigation with desalinated seawater	€			105000	NO DATA		a1421
14.3	14.3.1	€			105000	NO DATA		a1431



Future funding	Implementation of closed soilless systems and irrigation with desalinated seawater							
14.4.3 Entry into new areas	14.4.3.1 Implementation of closed soilless systems and irrigation with desalinated seawater	España ESTE				NO DATA	Contacts and business cases initiated	a14431
	14.4.3.2 Implementation of closed soilless systems and irrigation with desalinated seawater	ITALIA SUD				NO DATA	Contacts and business cases initiated	a14432



4. Explanation of changes in KPIs

Project area/length 1.5.1 Returna151
<p>Baseline scenario. 0 ha of closed soilless culture. At the end of the Project. Between 1 ha and 500 ha of closed soilless culture. Beyond 3 years. Up to 6000 ha of closed soilless culture During the Project, the implementation of closed soilless system for tomato crops will be demonstrated in a 758 m2 greenhouse in Almería. At the end of the Project, it is expected, due to the transference and replication plans, that the results of the projects are extended up to 500 ha (other plots with similar conditions). 3 years after the Project ends about 6.000 ha could have adopted closed soilless systems.</p> <p>Progress Report Scenario. The experimental plot has 0.0758 ha of soilless closed systems. Mid-Term Report Scenario. The experimental plot has 0.0758 ha of soilless closed systems.</p>
Project area/length 1.5.2 Returna152
<p>Baseline scenario. 0 ha of land irrigated with desalinated seawater. At the end of the Project. Between 1 ha and 500 ha of land irrigated with desalinated seawater. Beyond 3 years. Up to 6000 ha of land irrigated with desalinated seawater. During the Project, the sustainable implementation of desalinated seawater for tomato crops irrigation will be demonstrated in a 758 m2 greenhouse in Almería. At the end of the Project, it is expected, due to the transference and replication plans, that the results of the projects are extended up to 500 ha (other plots with similar conditions). 3 years after the Project ends about 6.000 ha could have implemented the desalinated seawater in the irrigation programs.</p> <p>Progress Report Scenario. The experimental plot has 0.0252 ha of soilless closed systems irrigated by desalinated seawater. Mid-Term Report Scenario. The experimental plot has 0.0252 ha of soilless closed systems irrigated by desalinated seawater.</p>
Humans to be influenced by the project 1.6.1 Returna161
<p>Baseline scenario. 0 Humans influenced by the project.</p>



At the end of the project. The Project contemplate to have, at the end of the project (i) more than 38 general stakeholders contacted, (ii) at least 150 visits to the webpage, (iii) 10 press released, (iv) 5 published manuscripts, (v) 5 conferences and (vi) 4 technical visits.

Beyond 3 years. The Project beyond 3 years expects (i) more than 60 general stakeholders contacted, (ii) at least 2000 visits to the webpage, (iii) 25 press released, (iv) 10 published manuscripts, (v) 10 conferences and (vi) 4 technical visits.

Progress Report Scenario. (i) 150 general stakeholders contacted in events organized by project partners, (ii) +1300 visits to the webpage, (iii) 5 press releases, (iv) 3 published manuscripts, (v) presentation of DESEACROP in 2 conferences with +150 people and (vi) 2 technical visits with +20 people. TOTAL = +2000 people.

Mid-Term Report Scenario.

Humans to be influenced by the project 1.6.2 [Returna162](#)

Baseline scenario. 0 Humans influenced by the project.

At the end of the project. The Project contemplate to have, at the end of the project (i) more than 38 general stakeholders contacted, (ii) at least 150 visits to the webpage, (iii) 10 press released, (iv) 5 published manuscripts, (v) 5 conferences and (vi) 4 technical visits.

Beyond 3 years. The Project beyond 3 years expects (i) more than 60 general stakeholders contacted, (ii) at least 2000 visits to the webpage, (iii) 25 press released, (iv) 10 published manuscripts, (v) 10 conferences and (vi) 4 technical visits.

Progress Report Scenario. Same as a161.

Mid-Term Report Scenario.

Water consumption for production 2.3.5.3.1 [Returna23531](#)

Baseline scenario. The per ha water consumption of tomato irrigated with well water rounds 8000 m³/ha with a yield of 140,000 kg/ha. This figure makes a water consumption for production of 0.057 m³/kg.

At the end of the project. With the implementation of closed soilless systems and the recirculation of the treated drainages, about 1600 m³/ha can be saved. Accordingly, 6400 m³/ha will be used for irrigation with a yield of 140000 kg/ha. This figure makes a water consumption for production of 0.043 m³/kg. In addition, with the implementation of desalinated seawater, the closed soilless systems and the recirculation of the treated drainages, about 1600 m³/ha can be saved. Accordingly, 6400 m³/ha will be used for irrigation with a yield of 307000 kg/ha. This figure makes a water consumption for production of 0.0208 m³/kg. In the case of the units produced/year it is normal to observe an increase as the use of desalinated seawater will increase the yield.

Progress Report Scenario. No data available yet.



<p>Mid-Term Report Scenario. Trial under soilless system with reutilization of drainages has achieved $8.97 \text{ kg/m}^2 = 89700 \text{ kg/ha}$. This makes a water consumption for production of $0.03 \text{ m}^3/\text{kg}$, which represents an improved figure compared to the envisaged situation. Differences in production with respect to the proposed are due to the duration of the cycle of tomato. In our case tomato reached yields of 89700 kg/ha with $2780 \text{ m}^3/\text{ha}$.</p>
<p>Resource efficiency – energy - consumption 4.1.1.1 Returna4111</p>
<p>Electricity Baseline scenario. Energy consumption of the open soilless system before starting the project is $3,840 \text{ kW}\cdot\text{h/ha}$. After the Project. Energy consumption of the closed soilless system will be $3,072 \text{ kW}\cdot\text{h/ha}$. If desalinated sea water (DSW) is considered, energy consumption will increase up to $28,480 \text{ kW}\cdot\text{h/ha}$. This energy consumption comes mainly from the desalination plant activity. Therefore it cannot be reduced if DSW is used for irrigation. On the contrary, when the indicator is $\text{kW}\cdot\text{h/kg}$, such a specific value would allow the comparison. Not with the present indicator. 3 years beyond the project. Same scenario as After the project as data are rated per hectare</p> <p>Progress Report Scenario. No data available yet. Mid-Term Report Scenario. Energy consumption was $13,844 \text{ Kw}\cdot\text{h/ha}$. In our study we considered the production at the desalination plant.</p>
<p>CO2 emissions 8.1.1.1 Returna8111</p>
<p>Baseline scenario. CO2 emissions from the irrigation with underground water and open systems is $1,014 \text{ kgCO}_2/\text{ha}/\text{year}$ with a yield of $140,000 \text{ kg/ha}$ After the Project. With the implementation of the closed soilless systems they will be reduced up to $811 \text{ kgCO}_2/\text{ha}/\text{year}$ with the same production. 3 years beyond the project. The same value as After the project as it is rated per hectare.</p> <p>Progress Report Scenario. No data available yet. Mid-Term Report Scenario. We obtained $0.432 \text{ kgCO}_2/\text{kg}$ and $38750 \text{ kgCO}_2/\text{ha}$. Our data are significantly higher than the envisaged, which is totally normal as we considered in the analysis aspects that were not considered before such as the nursery, the greenhouse infrastructure, the irrigation equipment, the fertilizers production, the machinery, etc. In addition, our yield was notable lower than the envisaged as the tomato crop cycle was shorter than estimated in the proposal.</p>
<p>Involvement of non-governmental organizations (NGOs) and other stakeholders in project activities 10.2.1 Returna1021</p>
<p>Baseline scenario. 0 people involved in DESEACROP After the Project. The Project contemplate to have, at the end of the project (i) more than 38 general stakeholders contacted, (ii) at least 150 visits to the</p>



<p>webpage, (iii) 10 press released, (iv) 5 published manuscripts, (v) 5 conferences and (vi) 4 technical visits. 3 years beyond the project. The Project beyond 3 years expects (i) more than 60 general stakeholders contacted, (ii) at least 2000 visits to the webpage, (iii) 25 press released, (iv) 10 published manuscripts, (v) 10 conferences and (vi) 4 technical visits.</p> <p>Progress Report Scenario. 2 entities. HERMISAN S.A. (private entity which develops advanced projects of agricultural drip irrigation, automation and fertirrigation) and Vitalplant S.L. (Plant nursery which supplies the latest plant varieties).</p> <p>Mid-Term Report Scenario. More than 10 external companies have worked in DESEACROP activities up to the mid term report.</p>
<p>Website 11.1.1 Returna1111</p>
<p>Baseline scenario Average visit duration (0), N° Downloads (0), N° of individuals (0), N° of unique visits (0) After the Project Average visit duration (3), N° Downloads (20), N° of individuals (150), N° of unique visits (150 - at least the same as no of people) 3 years beyond the project. Average visit duration (5), N° Downloads (200), N° of individuals (2000), N° of unique visits (2000 - as number of people)</p> <p>Progress Report Scenario. Average visit duration (NO DATA), N° Downloads (+500), N° of individuals (NO DATA), N° of unique visits (+1300). A new plug-in is to be implemented to retrieve more detailed information.</p> <p>Mid-Term Report Scenario. Average visit duration (2 minutes and 18 seconds), N° Individuals (576), N° Downloads (+500), N° of unique visits (2335).</p>
<p>Other tools for reaching/raising awareness of the general public 11.2.1 Returna1121</p>
<p>Baseline scenario Displayed information (poster, information boards) (0), Events/exhibitions (0), Hotline/information centre (0), Other media (video/broadcast) (0), Print media (0), Publications/reports (0) After the Project Displayed information (poster, information boards) (3), Events/exhibitions (5), Hotline/information centre (1), Other media (video/broadcast) (1), Print media (10), Publications/reports (5) 3 years beyond the project. Displayed information (poster, information boards) (6), Events/exhibitions (10), Hotline/information centre (2), Other media (video/broadcast) (1), Print media (25), Publications/reports (10)</p>



<p>Progress Report Scenario. Displayed information (poster, information boards) in 3 conferences in 2018 (Spain National Irrigation Conference, IWARESA, AEDYR) and Notice Boar in demo plot. Events/exhibitions (5 events: DESEACROP organized seminars, IWARESA, Irrigation National Congress, AEDYR, CUCN seminar), 2 Hotline/information centres (2 direct lines for information about the project), Other media (video/broadcast) (0), Print media (2: Project Flyer, Notice board), Publications/reports (3 manuscripts).</p> <p>Mid-Term Report Scenario. Displayed information (poster, information boards) in 9 conferences in 2018, 2019 (Spain National Irrigation Conference, IWARESA, AEDYR, II Jornada JMVC, XXXVI CNR, Malasya Congress, AgroIng2019, XXXVIII CNR, CAN Orihuela) and Notice Boards in demo plot. Events/exhibitions (11 events: DESEACROP organized seminars, IWARESA, Irrigation National Congress, AEDYR, CUCN seminar, II Jornada JMVC, XXXVI CNR, Malasya Congress, AgroIng2019, XXXVIII CNR, CAN Orihuela), 2 Hotline/information centres (2 direct lines for information about the project), Other media (video/broadcast) (0), Print media (3: Project Flyer, Notice boards, roll ups), Publications/reports (5 manuscripts).</p>
<p>Surveys carried out regarding awareness of the environmental 11.3.1 Returna1131</p>
<p>Baseline scenario. 0 After the Project. 38 3 years beyond the project. 60</p> <p>Progress Report Scenario. 0. First surveys planned for 2019. Mid-Term Report Scenario. +50 surveys were conducted at the first DESEACROP Course (Agua desalada para la agricultura).</p>
<p>Networking 12.1.1 Returna1211</p>
<p>Networking with other LIFE projects such as DRAINUSE, IRRIMAN. Baseline scenario. 0 After the Project. 5 3 years beyond the project. 10</p> <p>Progress Report Scenario. 3 Networking activities done to date which include visits to the facilities of the LIFE project DRAINUSE and ERANET project DESERT and <i>Dirección General del Agua</i> (Water Authorities of Murcia Region Government). Mid-Term Report Scenario. 4 Networking activities done to date which include visits to (i) the facilities of the LIFE project DRAINUSE, (ii) ERANET project DESERT, (iii) <i>Dirección General del Agua</i> (Water Authorities of Murcia Region Government) and (iv) SEARRISOST Project.</p>



Professional training and education 12.2.1 Returna1221
Baseline scenario. 0 After the Project. 13. 8 educational training plus 5 seminars at the end of the Project. 3 years beyond the project. 15 Progress Report Scenario. 0 No trainings have been done up to date. First trainings planned for 2019. Mid-Term Report Scenario. 2 trainings and 2 seminars have been done up to date. Two more trainings are expected by November 2019
Jobs 13.1 Returna131
Baseline scenario. 0 After the Project. 6 new contracts to develop and extend the project results. 3 years beyond the project. It is envisaged that closed systems may be installed in 20% of greenhouse surface; i.e. 6,000 ha. 100 new contracts to develop and extend the project results in the 6,000 ha Progress Report Scenario. 2 full time new contracts and +10 indirect contracts (contractors). Mid-Term Report Scenario. 2 full time new contracts and +10 indirect contracts (contractors).
Running cost/operating costs during the project and expected in case of continuation 14.1.1 Returna1411
3 years beyond the project. UPCT and UAL will continue the demonstrative monitoring and the dissemination efforts by providing own personnel. It is envisaged a contribution about 30,000 euros each for a period of 5 years after the Project ends as personnel costs. In the case of Valiza-Agua, they will follow with the implementation of DESEACROP results following the replication plan. It is envisaged a contribution of 35000 euros for a period of 5 years after the Project ends as personnel costs and 2.000 euros year for infrastructures. Progress Report Scenario. 180,738.91 € at progress report date. Mid-Term Report Scenario. 180,738.91 € at mid-term report date.
Capital expenditure expected in case of continuation 14.2.1 Returna1421
UPCT and UAL will continue the demonstrative monitoring and the dissemination efforts by providing own personnel. It is envisaged a contribution about



<p>30,000 euros each for a period of 5 years after the Project ends as personnel costs. 3 years beyond the project. UPCT and UAL will continue the demonstrative monitoring and the dissemination efforts by providing own personnel. It is envisaged a contribution about 30,000 euros each for a period of 5 years after the Project ends as personnel costs. In the case of Valiza-Agua, they will follow with the implementation of DESEACROP results following the replication plan. It is envisaged a contribution of 35000 euros for a period of 5 years after the Project ends as personnel costs and 2.000 euros/year for infrastructures.</p> <p>Progress Report Scenario. No data available yet. Mid-Term Report Scenario. No data available yet.</p>
<p>Future funding 14.3.1 Returna1431</p>
<p>UPCT and UAL will continue the demonstrative monitoring and the dissemination efforts by providing own personnel. It is envisaged a contribution about 30,000 euros each for a period of 5 years after the Project ends as personnel costs. In the case of Valiza-Agua, they will follow with the implementation of DESEACROP results following the replication plan. It is envisaged a contribution of 35000 euros for a period of 5 years after the Project ends as personnel costs and 2.000 euros/year for infrastructures.</p> <p>Progress Report Scenario. No data available yet. Mid-Term Report Scenario. No data available yet.</p>
<p>Entry into new areas 14.4.3.1 Returna14431</p>
<p>Southeast of Spain will adopt these technologies</p> <p>Progress Report Scenario. No data available yet. Mid-Term Report Scenario. Contacts and business cases initiated with Campo de Cartagena Irrigators Community</p>
<p>Entry into new areas 14.4.3.2 Returna14432</p>
<p>They will face the same problem as us.</p> <p>Progress Report Scenario. No data available yet. Mid-Term Report Scenario. Contacts and business cases initiated with La Puglia Region</p>

