Introduction of new oLIVE crop management practices focused on CLIMAte change mitigation and adaptation

oLIVE-CLIMA - LIFE11 ENV/GR/000942

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Preliminary Life Cycle Analysis on GHG emissions

Action	C5
Version	
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Table of contents

1. Summary

This report summarise the environmental performance of the 120 olive fields located in Greece and included in the of oLIVE-CLIMA Project. That performance has been carried out through a Life Cycle Assessment approach. Based on classical indexes (not renewable material and energy, greenhouse gases, ozone layer depletion, photochemical oxidation, acidification, eutrophication, ecotoxicity, human toxicity, land use and water consumption) the LCA highlighted possible spaces for the improvement of the environmental performance of the olive groves studied. This report is preparatory for the final one to be delivered within the oLIVE-CLIMA project.

2. Introduction

Apart from the removal of CO_2 from atmosphere, and the emission of CO_2 and other greenhouse gases (GHG) of biogenic nature, emissions occur from fuels of fossil origin during the production phase, linked directly to farming operations such as fertilizers use, tractor movement etc. However, from a Life Cycle perspective the emissions have to be accounted from the production phase of the materials and the equipment and depending on the scope of the Life Cycle study it may extend from the field phase to cover also the extraction phase as well as the packing phase. The latter two phases are also important. The extraction phase is characterized by the emission of Oil Mill Waste Water which presently is the most significant point-source of pollution related to olive oil production. The packing phase emissions depend a lot on the packing material, a choice that has to be taken after careful consideration of the target emissions of the final product in the market.

The basic goal of this Action C5 was to identify the main environmental burdens of current management practices and the sources of each of the environmental impacts. In a later version, more efforts will be devoted to the inclusion of the soil carbon storage issue the Life Cycle Assessment (LCA) approach.

The most important part of the study is the sensitivity test which will show how the interventions affect the production phase emissions. For example, avoidance of inorganic fertilisers by the use of raw or composted organic material has been found to reduce emissions significantly. Other significant comparisons are about the relative impact of the various practices e.g. spreading chopped pruned wood on the soil, as alternative to composting (both leading to augmentation of SOM, or to pelleting to avoid the production of extra fuel. And, of course these results will be compared to the current practice of wood burning. The approach for these comparisons in one hand is sensitivity tests. However, given the inter-relationships between of the various interventions the approach will also be to run LCA studies of sub-sets of the total population of parcels which received interventions (provided that a large enough sample will be available) and compare these sub-sets between themselves, as well as with the control parcels that received no interventions.

This leads to the need to carry out several LCA studies in parallel (and repeat them in time), for clusters of olive oil parcels that formulate distinct entities, e.g. irrigated vs non irrigated parcels. A large number of parcels per cluster will be needed, in order to overcome the high variation that is observed in olive culture.

Therefore, this LCA report focused 120 olive groves located in three areas (Nileas, Peza and Mirabello) with different management techniques.

3. Material and Methods

The LCA was carried out using SIMAPRO software and ECOINVENT Database. As for the method, and according to the Technical Description of the project, the Environmental Product Declaration (EPD) was used for the main impact categories, supplemented by the RECIPE Midpoint (H) method for the secondary ones. The latter was found more complete than the originally considered CML 2000 basic.

3.1 Functional/declared unit

The functional unit is 1 Hectare of olive crop.

3.2 System boundaries

The study's boundaries are from cradle to gate, i.e. inputs from nature, to outputs and emissions back to nature, at the point of delivery of the olive fruit to the olive oil mill.

3.3 Impact Categories

- NRE - not renewable energy (MJ-eq)
- NRM – not renewable material (Kg Fe-eq)
- GHG - greenhouse gases (Kg CO_2-eq)
- OLD - ozone layer depletion (Kg CFC-11-eq)
- PHO –photochemical oxidation (Kg C_2H_4-eq)
- ACD -acidification (kg SO_2 eq)
- EUT- eutrophication (kg $PO4^{---}$-eq)
- ECO – marine ecotoxicity (kg 1.4-DB-eq)
- HTX – human toxicity (kg 1.4-DB-eq)
- LND – land use (m_2a).
- WAT – Water use (other than irrigation) (m^3)

3.4. Data collection and quality assessment

Data used for the LCA are sourced from the Life Cycle Inventory LCI and the processed activity data sheets e.g. for pruning, soil management included in the file CALCLIMA provided by the partner RODAXAGRO.

4. Results

Results are summarised below for the EPD impact categories. In Annex 1 the detailed results per each olive field are reported.

The results reported in Figure 1 show a very similar behavior with regard to the environmental performance of olive crops in the three areas examined. Use of fertilizers, and to some extent electricity for irrigation, dominate the picture invariable for the three groups.

In the Figure 2 the comparison of performance for each of the impact categories, confirming clearly the above results. Mirabello's higher values on not renewable energy consumption are influenced by the additive effect of N fertilization and irrigation. The same is true for eutrophication, where the sludge of lignite processing is a source of phosphorus, a pollutant of water, leading to eutrophication.

The results are easily interpreted by comparing the rate of fertilisers supply (Kg per Ha) for each site (Figure 3).

5. Conclusions

This report shows that differences between the three areas of study are not significant, and are easily attributable to clearly defined hot-spots, i.e. by order of significance to: a) use of fertilizers, b) use of electricity for irrigation, c) use of fossil energy for a variety of activities (soil management, harvesting, pruning etc) and c) to some very low level, the use of Plant Protection Products. The latter is a little bit more important in Peza area.

The overall performance although relatively (to other studies for crops, e.g. for Alcubilla organic olive oil, http://environdec.com/en/Detail/?Epd=10771) low in environmental burden, still shows that attention is needed due to low yields / Ha. The environmental performance indicators e.g. EPD or PEF seem that could finally be commercially unattractive.

Considering the main objective of OLIVECLIMA project, i.e. the demonstration of farming practices that help replace some of the inputs (e.g. fertilizers), or make their use more efficient (water, energy) the findings are quite important in order to assess the effect of the practices introduced, to the environmental performance as measured by the LCA method, with a clear focus on the effect of dedicated enrichment of soil with organic material. After the analysis carried out in this study we have a clearer quantitative picture of the degree that the addition of organic matter could help to replace part of nitrogen fertilizers, lessen the need for the yearly replenishment of P and K nutrients and achieve better management of water, reducing thus the need for electricity.

The results of this study will be examined in combination with the results of added organic matter assessments, pruning effect on yield soil organic matter and fractions and soil moisture assessments.

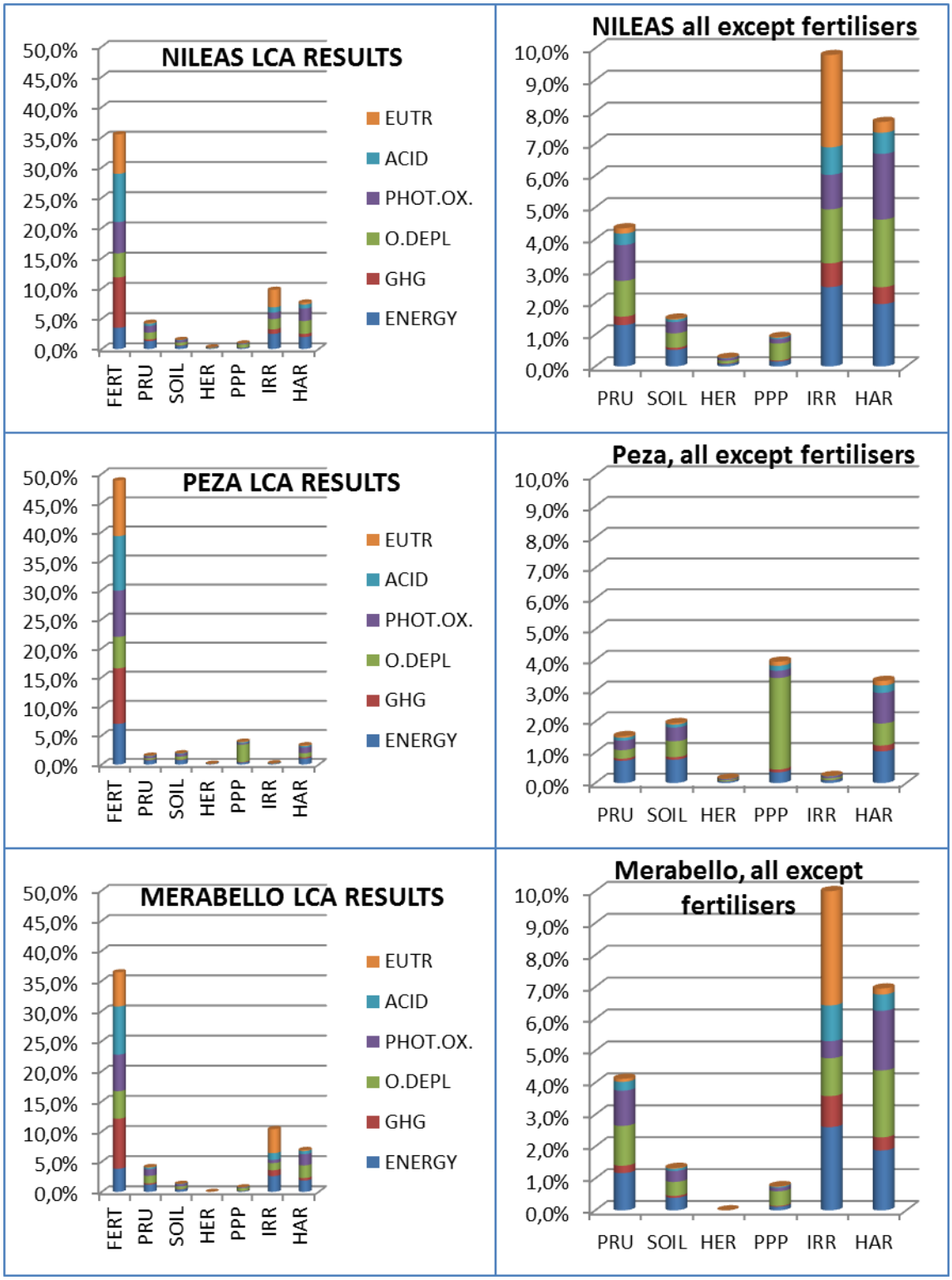

Figure 1 – Relative contribution of the principal farming activities to the environmental impacts.

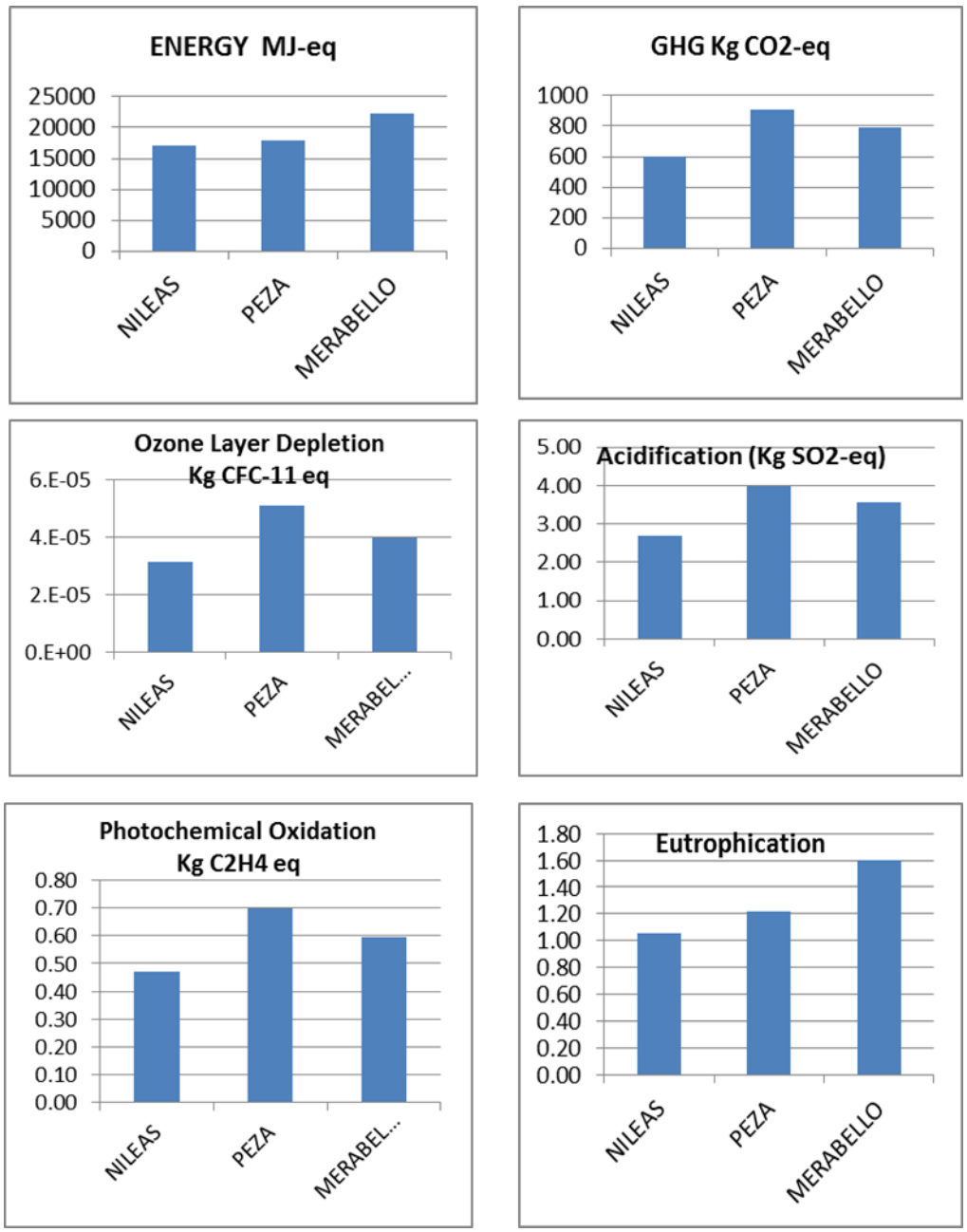

Figure 2 – Comparison on performance against each of the EPD Impact Categories

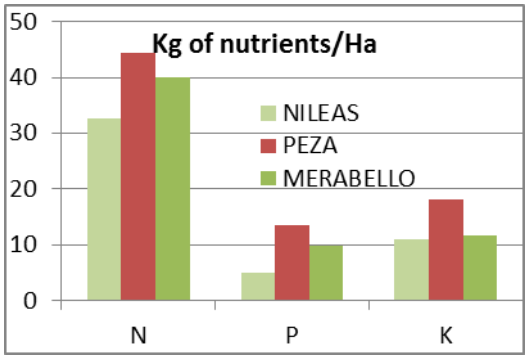

Figure 3 – Comparison between N and other nutrients use, in the three areas of the study.

6. ANNEX 1

Table 1 – Results per olive grove (parcel) of NILEAS group T = Treated, C = Control

		NILEAS		NRE	NRM	GHG	OLD	PHO	ACD	EUT	ECO	HTX	LND	WAT
		Field code	Farmer	MJ-eq	Kg Fe-eq	Kg CO_2-eq	Kg CFC-11-eq	Kg C_2H_4-eq	kg SO_2 eq	kg $PO4^{---}$-eq	kg 1.4-DB-eq	kg 1.4-DB-eq	m2a	m^3
1	C	8.02	8	11466.09	1,62	52.89	0.00	0.19	0.30	0.05	0,27	5,82	0,81	36,96
2	C	41.04	41	1236.80	1,27	14.72	0.00	0.04	0.08	0.02	0,12	3,99	1,26	26,48
3	C	43.02	43	4042.71	3,13	42.37	0.00	0.12	0.25	0.05	0,31	10,00	3,02	66,32
4	C	30.01	30	3679.43	1,48	28.42	0.00	0.10	0.16	0.03	0,19	5,07	1,23	33,84
5	C	23.01	23	24134.16	109,76	1623.37	0.00	0.85	7.37	2.40	12,96	477,82	108,78	1315,92
6	C	55.05	55	3851.38	2,64	42.05	0.00	0.12	0.25	0.05	0,28	8,62	2,39	56,96
7	C	17.03	17	6979.61	2,76	56.32	0.00	0.19	0.31	0.06	0,35	9,21	2,05	59,42
8	C	20.02	20	8891.36	13,88	382.45	0.00	0.33	2.11	0.63	1,62	49,93	87,08	299,41
9	C	23.02	23	28319.37	122,10	1847.19	0.00	0.98	8.05	2.58	14,27	522,42	112,86	1367,46
10	C	48.01	48	2404.85	0,75	14.70	0.00	0.05	0.08	0.01	0,10	2,56	0,62	17,04
11	C	27.03	27	58840.62	188,02	3145.48	0.00	1.41	13.26	6.31	34,08	1298,49	155,97	2834,55
12	C	10.02	10	44930.01	8,30	275.92	0.00	1.09	1.48	0.22	1,56	31,64	4,07	209,42
13	C	59.05	59	23558.03	76,46	1168.40	0.00	0.67	5.57	2.20	11,44	431,39	81,85	1162,91
14	C	10.05	10	45692.60	9,71	292.24	0.00	1.12	1.58	0.24	1,68	36,16	5,51	239,57
15	C	17.07	17	2894.69	0,39	13.79	0.00	0.05	0.08	0.01	0,07	1,48	0,20	9,81
16	C	17.10	17	1781.77	1,09	16.30	0.00	0.05	0.09	0.02	0,11	3,47	1,02	22,99
17	C	180.11	180	1.74	0,00	0.00	0.00	0.00	0.00	0.00	0,00	0,00	0,00	0,00
18	C	180.06	180	2.10	0,00	0.00	0.00	0.00	0.00	0.00	0,00	0,00	0,00	0,00
19	C	98.02	98	9769.76	4,82	87.46	0.00	0.28	0.49	0.09	0,57	16,31	4,04	108,10
20	C	8.04	8	26625.34	8,26	272.32	0.00	0.47	1.47	1.42	7,20	282,76	5,01	633,12

		NILEAS		NRE	NRM	GHG	OLD	PHO	ACD	EUT	ECO	HTX	LND	WAT
		Field code	Farmer	MJ-eq	Kg Fe-eq	Kg CO_2-eq	Kg CFC-11-eq	Kg C_2H_4-eq	kg SO_2 eq	kg $PO4^{---}$-eq	kg 1.4-DB-eq	kg 1.4-DB-eq	m2a	m^3
21	T	40.04	40	14185.66	32,26	545.87	0.00	0.49	2.37	0.69	3,79	125,77	30,22	369,31
22	T	58.01	58	15439.87	44,15	688.68	0.00	0.56	3.08	0.94	5,13	176,56	40,15	540,83
23	T	200.01	200	42064.91	161,42	2433.29	0.00	1.46	11.34	3.64	19,24	700,07	169,48	2019,46
24	T	41.03	41	8936.18	22,60	371.64	0.00	0.32	1.62	0.48	2,61	87,35	21,37	264,59
25	T	73.02	73	12845.49	31,98	517.44	0.00	0.46	2.26	0.66	3,66	122,81	30,33	384,26
26	T	8.01	8	16517.34	35,22	602.27	0.00	0.55	2.63	0.76	4,16	137,50	32,87	402,74
27	T	21.01	21	8890.33	14,59	250.44	0.00	0.27	1.11	0.31	1,72	56,50	13,53	179,44
28	T	211.01	211	6719.27	20,79	345.96	0.00	0.26	1.49	0.45	2,41	81,19	19,72	231,27
29	T	30.04	30	11655.12	15,29	263.24	0.00	0.36	1.20	0.32	1,81	58,43	14,12	205,31
30	T	10.03	10	22974.96	21,03	374.50	0.00	0.53	1.73	0.45	2,52	80,61	19,15	283,73
31	T	180.10	180	7019.17	22,38	371.23	0.00	0.27	1.60	0.48	2,59	87,46	21,26	247,34
32	T	10.04	10	8693.01	28,41	469.98	0.00	0.33	2.01	0.61	3,30	111,26	27,01	312,38
33	T	27.04	27	31127.91	114,47	1876.03	0.00	0.91	7.86	3.18	17,37	645,53	98,06	1473,60
34	T	180.08	180	6348.75	19,14	318.09	0.00	0.24	1.36	0.41	2,23	74,80	18,10	212,00
35	T	59.01	59	36241.73	107,01	1770.74	0.00	1.02	7.51	3.03	16,57	613,79	91,33	1433,25
36	T	8.03	8	33615.16	39,55	789.91	0.00	0.73	3.65	2.25	11,66	441,82	34,96	1033,26
37	T	55.03	55	27363.47	22,91	559.26	0.00	0.39	2.67	2.50	12,72	502,37	18,53	1058,82
38	T	17.04	17	14069.20	30,02	488.36	0.00	0.48	2.17	0.62	3,43	114,45	28,33	372,88
39	T	12.01	12	32955.69	37,57	805.51	0.00	0.56	3.71	2.92	14,97	582,25	32,47	1264,83
40	T	44.01	44	15105.23	42,69	704.40	0.00	0.55	3.03	0.91	4,96	166,43	40,49	483,17
NILEAS AVERAGE				**17046.77**	**35.50**	**598.081**	**3.11E-05**	**0.47**	**2.68**	**1.05**	**5,60**	**204,10**	**34,48**	**531.82**

Table 2 - Results per olive grove (parcel) of PEZA Union of Cooperatives

		PEZA		NRE	NRM	GHG	OLD	PHO	ACD	EUT	ECO	HTX	LND	WAT
		Field code	Farmer	MJ-eq	Kg Fe-eq	Kg CO_2-eq	Kg CFC-11-eq	Kg C_2H_4-eq	kg SO_2 eq	kg $PO4^{---}$-eq	kg 1.4-DB-eq	kg 1.4-DB-eq	m2a	m^3
1	C	501.01	501	28868.46	85,04	1311.17	0.77	1.03	6.06	1.95	10,11	371,28	102,43	1051,16
2	C	102.05	102	3942.05	1,67	32.95	0.15	0.11	0.18	0.03	0,22	6,28	1,11	39,85
3	C	104.02	104	28866.93	105,36	1471.00	1.03	0.56	7.03	2.29	12,75	473,02	80,79	1369,30
4	C	104.01	104	22417.87	80,76	1126.92	0.79	0.43	5.40	1.75	9,78	362,85	61,73	1054,44
5	C	107.05	107	5685.12	0,70	30.46	0.13	0.10	0.16	0.02	0,17	2,90	0,18	19,20
6	C	108.01	108	5521.39	0,70	30.46	0.13	0.08	0.16	0.02	0,17	2,90	0,18	19,19
7	C	120.13	120	43938.30	244,16	3759.45	1.67	0.53	16.81	5.50	28,84	1063,05	278,07	2809,69
8	C	504.05	504	14117.68	80,68	1266.88	0.56	0.17	5.74	1.87	9,53	351,27	104,49	948,26
9	C	117.19	117	9163.12	4,34	80.64	0.33	0.23	0.45	0.08	0,54	15,65	3,20	100,66
10	C	117.21	117	34640.23	139,99	2222.85	1.32	0.54	10.15	3.24	16,62	607,16	178,61	1695,92
11	C	123.02	123	1791.50	1,77	20.31	0.06	0.03	0.11	0.03	0,17	5,52	1,76	36,58
12	C	505.03	505	5674.88	0,70	30.46	0.13	0.09	0.16	0.02	0,17	2,90	0,18	19,20
13	C	506.01	506	24375.88	138,70	2125.99	0.95	0.31	9.73	3.20	16,44	606,91	168,97	1664,46
14	C	128.10	128	15759.57	59,17	926.11	0.53	0.21	4.26	1.37	7,10	259,20	71,60	721,00
15	C	507.02	507	0.32	0,00	0.00	0.00	0.00	0.00	0.00	0,00	0,00	0,00	0,00
16	C	508.10	508	0.91	0,00	0.00	0.00	0.00	0.00	0.00	0,00	0,00	0,00	0,00
17	C	142.11	142	22725.54	94,03	1450.66	0.85	1.07	6.65	2.12	11,16	410,59	103,94	1139,52
18	C	510.03	510	9006.65	5,68	83.82	0.24	0.14	0.53	0.12	0,70	24,00	3,31	131,63
19	C	510.06	510	3762.97	4,24	49.89	0.11	0.06	0.35	0.09	0,49	18,96	2,27	98,19
20	C	510.07	510	3765.13	4,25	49.98	0.11	0.06	0.35	0.09	0,49	18,99	2,29	98,42

		PEZA		NRE	NRM	GHG	OLD	PHO	ACD	EUT	ECO	HTX	LND	WAT
		Field code	Farmer	MJ-eq	Kg Fe-eq	Kg CO_2-eq	Kg CFC-11-eq	Kg C_2H_4-eq	kg SO_2 eq	kg $PO4^{---}$-eq	kg 1.4-DB-eq	kg 1.4-DB-eq	m2a	m^3
21	T	501.02	501	32784.70	105,28	1697.05	1.43	0.60	7.43	2.25	12,23	400,80	101,84	1282,95
22	T	502.18	502	24798.47	40,36	723.33	1.09	1.11	2.92	0.72	4,47	102,20	16,83	506,89
23	T	502.03	502	22239.51	34,94	637.92	0.94	1.06	2.54	0.63	3,90	87,50	13,65	424,99
24	T	503.02	503	3896.82	2,83	39.66	0.10	0.06	0.26	0.06	0,35	12,11	1,64	66,00
25	T	503.01	503	4837.82	3,58	50.14	0.13	0.07	0.31	0.08	0,43	14,70	2,27	82,84
26	T	504.04	504	18834.87	35,55	648.16	0.88	0.98	2.51	0.63	3,91	84,59	12,90	409,93
27	T	123.01	123	4028.78	1,69	33.79	0.11	0.62	0.19	0.04	0,21	5,52	1,36	35,81
28	T	505.04	505	18761.82	35,49	643.19	0.87	0.36	2.47	0.62	3,90	84,53	12,89	409,98
29	T	506.10	506	39077.89	175,65	2772.58	1.71	0.59	12.24	3.86	20,49	703,06	186,30	2086,18
30	T	179.12	179	30738.14	35,24	646.25	0.90	1.82	2.51	0.62	3,90	84,10	12,79	408,86
31	T	179.15	179	19046.09	33,67	618.12	0.86	0.92	2.40	0.59	3,72	80,38	12,22	390,97
32	T	179.16	179	18493.80	32,38	595.23	0.83	0.91	2.31	0.57	3,59	77,35	11,75	376,40
33	T	179.20	179	19206.41	35,18	642.45	0.88	0.72	2.48	0.62	3,88	83,85	12,78	407,29
34	T	507.08	507	15671.22	33,14	598.10	0.78	0.94	2.30	0.58	3,61	78,38	12,07	378,06
35	T	507.09	507	15488.36	33,42	600.73	0.78	0.68	2.30	0.58	3,64	78,98	12,18	380,79
36	T	141.01	141	18980.94	32,15	592.25	0.84	0.73	2.30	0.57	3,57	77,01	11,64	375,27
37	T	509.06	509	34000.21	185,70	2549.49	1.19	1.26	11.99	4.04	22,31	834,40	145,08	2303,50
38	T	142.12	142	36567.06	131,01	2102.54	1.63	1.52	9.09	2.75	15,10	493,82	116,51	1551,04
39	T	510.04	510	39519.96	165,63	2631.72	1.55	1.32	10.80	3.33	19,10	661,71	127,15	1696,81
40	T	510.02	510	17116.56	83,01	1278.53	0.60	0.65	5.38	1.71	9,63	353,94	68,87	859,11
PEZA AVERAGE				**17952.85**	**57,20**	**904.279**	**5.09E-05**	**0.70**	**3.98**	**1.22**	**6,68**	**225,06**	**51,45**	**686,26**

Table 3 - Results per olive grove (parcel) of Merabello Union of Cooperatives

		MERABELLO		NRE	NRM	GHG	OLD	PHO	ACD	EUT	ECO	HTX	LND	WAT
		Field code	Farmer	MJ-eq	Kg Fe-eq	Kg CO_2-eq	Kg CFC-11-eq	Kg C_2H_4-eq	kg SO_2 eq	kg $PO4^{---}$-eq	kg 1.4-DB-eq	kg 1.4-DB-eq	m2a	m^3
1	C	103.04	103	4303.0118	0,71	16.89	0.01	0.06	0.09	0.01	0,1	2,5	0,5	16,93
2	C	234.14	234	1840.5175	0,89	16.47	0.02	0.05	0.09	0.02	0,1	3,0	0,7	20,02
3	C	222.04	222	0.1699923	0,00	0.00	0.00	0.00	0.00	0.00	0,0	0,0	0,0	0,00
4	C	103.06	103	8743.2303	2,66	63.61	0.06	0.23	0.35	0.06	0,4	9,6	1,9	63,77
5	C	103.09	103	5013.3802	1,52	36.47	0.03	0.13	0.20	0.03	0,2	5,5	1,1	36,57
6	C	209.02	209	13804.626	3,03	86.77	0.08	0.33	0.48	0.08	0,5	12,0	1,5	75,40
7	C	234.15	234	1633.7544	0,78	14.57	0.01	0.05	0.08	0.01	0,1	2,8	0,6	17,83
8	C	233.07	233	3139.4817	1,40	30.79	0.03	0.13	0.18	0.03	0,2	5,2	0,8	31,88
9	C	238.02	238	6343.5157	16,09	262.54	0.33	0.19	1.11	0.33	1,9	67,8	13,3	170,16
10	C	136.03	136	3800.669	1,46	30.47	0.03	0.10	0.17	0.03	0,2	5,1	1,1	33,50
11	C	206.02	206	80581.32	326,62	4945.29	9.33	2.28	22.98	9.33	49,2	1870,5	319,7	4758,66
12	C	203.1	203	31180.356	178,93	2805.23	3.92	1.10	11.47	3.92	22,0	813,2	150,5	1830,81
13	C	222.08	222	0.1062452	0,00	0.00	0.00	0.00	0.00	0.00	0,0	0,0	0,0	0,00
14	C	101.03	101	39903.578	33,05	665.86	1.58	0.93	3.50	1.58	7,9	291,8	47,4	816,37
15	C	232.07	232	7876.4152	3,31	70.69	0.16	0.19	0.39	0.16	0,9	31,3	2,6	110,33
16	C	232.1	232	3327.1236	1,75	34.69	0.10	0.08	0.19	0.10	0,5	19,1	1,4	61,90
17	C	206.08	206	6259.5521	1,63	68.96	0.45	0.08	0.36	0.45	2,3	91,2	0,8	188,67
18	C	233.02	233	28005.001	64,56	1139.83	2.66	0.60	4.88	2.66	14,2	544,6	51,9	1182,63
19	C	233.04	233	21170.386	14,98	385.14	1.57	0.42	1.75	1.57	8,2	307,5	5,9	691,78
20	C	203.11	203	35234.699	137,13	2230.82	3.76	0.99	9.27	3.76	20,7	775,2	114,2	1715,10

		MERABELLO		NRE	NRM	GHG	OLD	PHO	ACD	EUT	ECO	HTX	LND	WAT
		Field code	Farmer	MJ-eq	Kg Fe-eq	Kg CO_2-eq	Kg CFC-11-eq	Kg C_2H_4-eq	kg SO_2 eq	kg $PO4^{---}$-eq	kg 1.4-DB-eq	kg 1.4-DB-eq	m2a	m^3
21	T	206.1	206	11883.116	11,61	275.74	0.34	0.42	1.33	0.34	1,4	34,7	30,4	192,91
22	T	240.01	240	69576.774	180,01	2647.34	4.52	2.28	13.86	4.52	22,8	815,4	218,2	2805,96
23	T	234.11	234	9762.5164	10,75	206.72	0.19	0.36	0.86	0.19	1,2	27,3	4,2	140,68
24	T	166.07	166	6490.972	5,54	112.25	0.10	0.22	0.48	0.10	0,7	14,5	2,2	76,73
25	T	209.01	209	15359.819	16,29	305.87	0.30	0.55	1.32	0.30	1,9	43,4	7,0	228,29
26	T	238.05	238	10104.128	27,25	451.15	0.55	0.36	1.86	0.55	3,2	105,9	20,2	285,67
27	T	136.02	136	15690.791	15,29	298.56	0.28	0.55	1.26	0.28	1,8	39,5	6,2	206,69
28	T	234.04	234	9025.0066	7,29	145.95	0.14	0.29	0.64	0.14	0,9	19,6	3,1	104,78
29	T	234.06	234	1248.9342	1,03	19.74	0.02	0.04	0.09	0.02	0,1	3,0	0,5	16,02
30	T	234.08	234	14030.146	11,33	215.85	0.21	0.41	0.94	0.21	1,3	30,2	5,2	164,16
31	T	222.07	222	9527.4101	11,44	222.29	0.21	0.36	0.90	0.21	1,3	28,3	4,1	141,07
32	T	206.09	206	43766.122	38,40	902.99	2.48	1.04	4.27	2.48	12,4	453,3	58,0	1137,88
33	T	206.12	206	54529.209	128,27	2038.86	4.51	1.52	10.19	4.51	23,0	856,6	141,3	2410,43
34	T	175.03	175	25073.763	17,76	430.72	1.35	0.60	1.93	1.35	7,1	256,5	6,8	625,84
35	T	180.01	180	103765.01	38,49	1498.87	9.98	1.06	7.41	9.98	50,5	2016,2	13,5	4054,41
36	T	203.16	203	34390.914	107,66	1758.71	2.49	1.16	7.29	2.49	14,1	496,5	83,4	1247,67
37	T	233.03	233	23904.751	15,66	390.64	1.30	0.55	1.79	1.30	6,8	248,9	6,2	599,09
38	T	203.14	203	48958.866	152,16	2508.28	3.71	1.56	10.42	3.71	20,8	745,7	120,0	1790,89
39	T	203.17	203	45855.633	141,39	2353.93	3.84	1.38	9.79	3.84	21,3	775,1	111,2	1811,10
40	T	203.15	203	39473.657	127,77	2115.71	3.49	1.20	8.78	3.49	19,3	705,5	100,6	1647,20
MERABELLO AVERAGE				**22364.46**	46,40	**795.132**	**3.97E-05**	**0.60**	**3.57**	**1.60**	1,60	8,54	314,35	787,74


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