

Article

# A Spatial Multicriteria Analysis for a Regional Assessment of Eligible Areas for Sustainable Agrivoltaic Systems in Italy

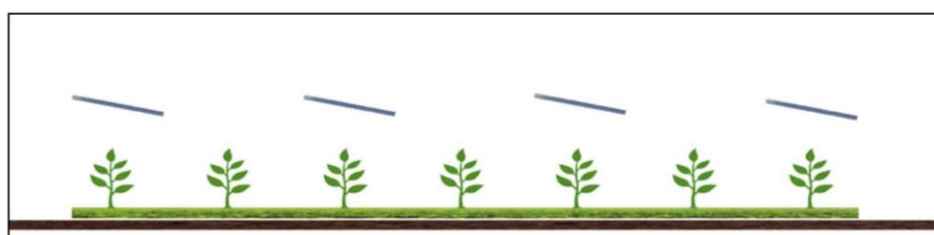
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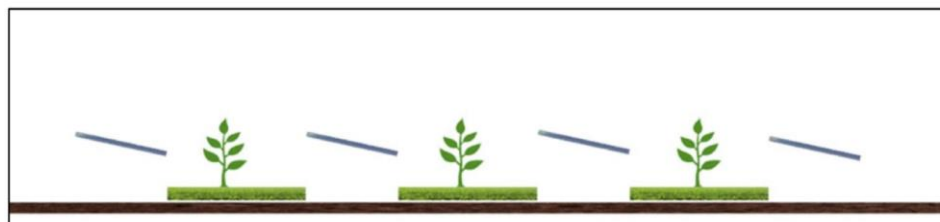
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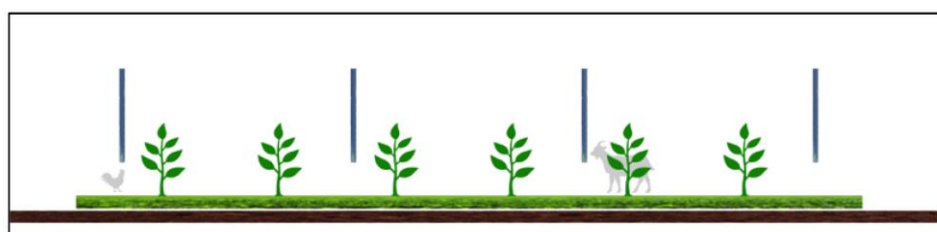
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(a) Agrivoltaic system configuration – Type 1

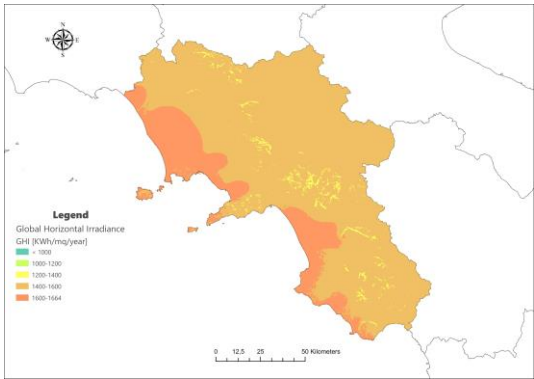


(b) Agrivoltaic system configuration – Type 2

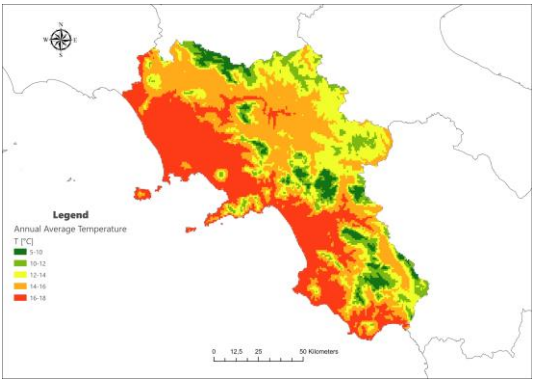


(c) Agrivoltaic system configuration – Type 3

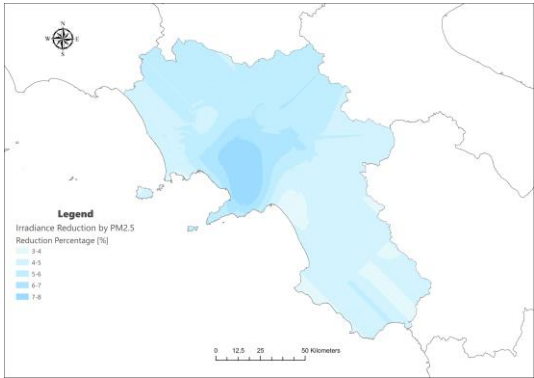
Figure S1. Agrivoltaic systems configuration types: (a) Type 1 - inclined PV panels overhead (4–5 meters from ground) to allow for agricultural activities, including the use of machinery; (b) Type 2 - inclined PV modules among the crops; (c) Type 3 - vertical PV modules among the crops (Source by A. Scognamiglio, ENEA [3])



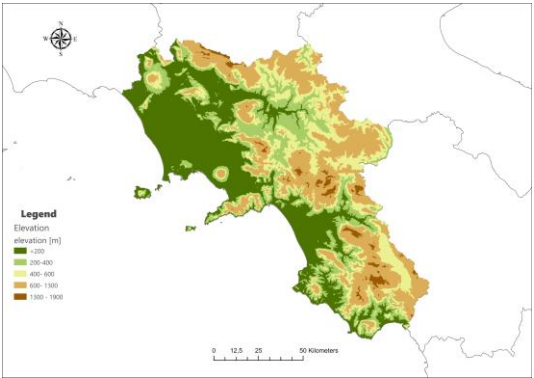
(a) Global Horizontal Irradiance Map



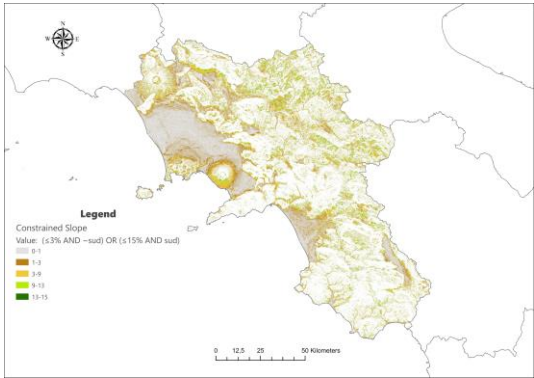
(b) Annual average temperature Map



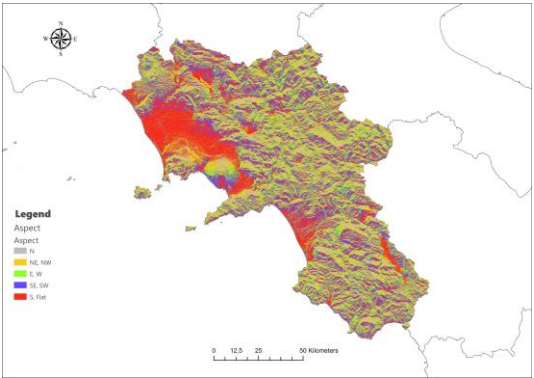
(c) Insolation reduction by PM2.5 Map



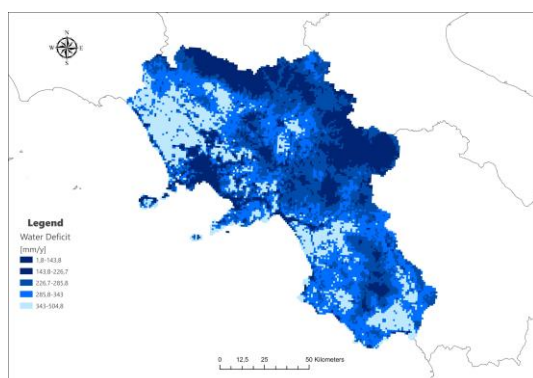
(d) Elevation Map



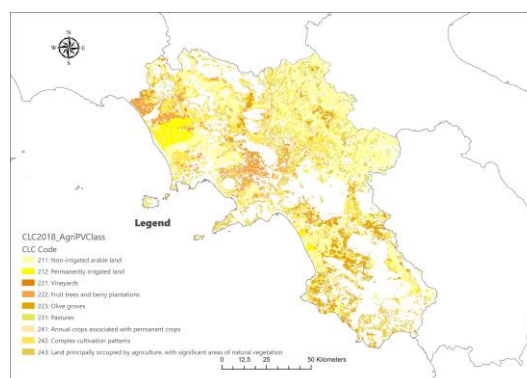
(e) Slope Map



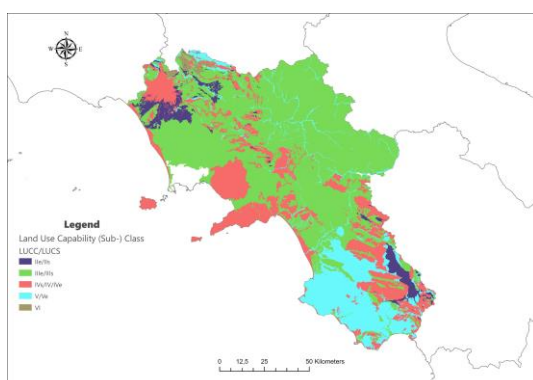
(f) Aspect Map



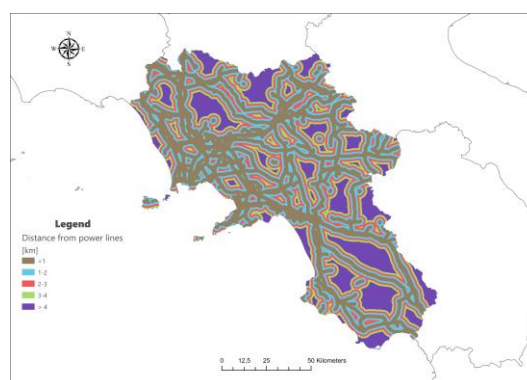
(g) Water Deficit Map



(h) Land use and cover (CLC) Map



(i) Land use capability classification (LUCC) Map



(j) Distance from power lines Map

Figure S2. Map layers of the evaluation criteria for site suitability analysis: (a) Global Horizontal Irradiance Map; (b) Annual average temperature Map; (c) Elevation Map; (d) Aspect Map; (e) Slope Map; (f) Irradiance reduction by PM<sub>2.5</sub>; (g) Land use and cover (CLC); (h) Land use capability classification; (i) Water deficit; (j) Distance from power lines.

Table S1.1 Table of changed weights vectors associated to each simulation run - criterion GHI

Simulation/Weight	Weights-10%	Weights-5%	Weights Base	Weights +5%	Weights +10%
<b>Global horizontal irradiance</b>	<b>26.89</b>	<b>28.39</b>	<b>29.88</b>	<b>31.37</b>	<b>32.87</b>
Distance from power line	14.88	14.57	14.27	13.97	13.66
Annual average temperature	14.69	14.39	14.09	13.79	13.49
Slope	11.90	11.65	11.41	11.17	10.92
Elevation	7.87	7.71	7.55	7.39	7.23
Aspect	5.89	5.77	5.65	5.53	5.41
Irradiance reduction by PM <sub>2.5</sub>	5.04	4.93	4.83	4.73	4.62
Land Use Capability Classification	4.80	4.70	4.6	4.50	4.40
Corine Land Cover	4.58	4.48	4.39	4.30	4.20
Water Deficit	3.48	3.41	3.34	3.27	3.20
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

Table S1.2 Table of changed weights vectors associated to each simulation run - criterion DDPL

Simulation/Weight	Weights-10%	Weights-5%	Weights Base	Weights +5%	Weights +10%
Global horizontal irradiance	30.38	30.13	29.88	29.63	29.38
Distance from power line	12.84	13.56	14.27	14.98	15.70
Annual average temperature	14.32	14.21	14.09	13.97	13.86
Slope	11.60	11.50	11.41	11.32	11.22
Elevation	7.68	7.61	7.55	7.49	7.42
Aspect	5.74	5.70	5.65	5.60	5.56
Irradiance reduction by PM2.5	4.91	4.87	4.83	4.79	4.75
Land Use Capability Classification	4.68	4.64	4.6	4.56	4.52
Corine Land Cover	4.46	4.43	4.39	4.35	4.32
Water Deficit	3.40	3.37	3.34	3.31	3.28
Total	100.0	100.0	100.0	100.0	100.0

Table S1.3 Table of changed weights vectors associated to each simulation run - criterion AAT

Simulation/Weight	Weights-10%	Weights-5%	Weights Base	Weights +5%	Weights +10%
Global horizontal irradiance	30.37	30.13	29.88	29.63	29.39
Distance from power line	14.50	14.39	14.27	14.15	14.04
Annual average temperature	12.68	13.39	14.09	14.79	15.50
Slope	11.60	11.50	11.41	11.32	11.22
Elevation	7.67	7.61	7.55	7.49	7.43
Aspect	5.74	5.70	5.65	5.60	5.56
Irradiance reduction by PM2.5	4.91	4.87	4.83	4.79	4.75
Land Use Capability Classification	4.68	4.64	4.6	4.56	4.52
Corine Land Cover	4.46	4.43	4.39	4.35	4.32
Water Deficit	3.39	3.37	3.34	3.31	3.29
Total	100.0	100.0	100.0	100.0	100.0

Table S1.4 Table of changed weights vectors associated to each simulation run - criterion Slope

Simulation/Weight	Weights-10%	Weights-5%	Weights Base	Weights +5%	Weights +10%
Global horizontal irradiance	30.26	30.07	29.88	29.69	29.50
Distance from power line	14.45	14.36	14.27	14.18	14.09
Annual average temperature	14.27	14.18	14.09	14.00	13.91
Slope	10.27	10.84	11.41	11.98	12.55
Elevation	7.65	7.60	7.55	7.50	7.45
Aspect	5.72	5.69	5.65	5.61	5.58
Irradiance reduction by PM2.5	4.89	4.86	4.83	4.80	4.77
Land Use Capability Classification	4.66	4.63	4.6	4.57	4.54
Corine Land Cover	4.45	4.42	4.39	4.36	4.33
Water Deficit	3.38	3.36	3.34	3.32	3.30

<b>Total</b>	100.0	100.0	100.0	100.0	100.0
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Table S2.1 Table of cell distribution within classes for each simulation run – Criterion GHI

GHI						
Class	1	2	3	4	5	Cell Total
-10%	0	2535	1550095	1369944	0	2922574
-5%	0	1443	1495223	1425908	0	2922574
Base	0	814	1445380	1476380	0	2922574
5%	0	407	1390070	1532097	0	2922574
10%	0	205	1336365	1586004	0	2922574

Table S2.2 Table of cell distribution within classes for each simulation run – Criterion DFPL

DISTANCE FROM POWER LINE						
Class	1	2	3	4	5	Cell Total
-10%	0	488	1475652	1446434	0	2922574
-5%	0	663	1459427	1462484	0	2922574
Base	0	814	1445380	1476380	0	2922574
5%	0	984	1433123	1488467	0	2922574
10%	0	1294	1412544	1508736	0	2922574

Table S2.3 Table of cell distribution within classes for each simulation run – Criterion AAT

ANNUAL AVERAGE TEMPERATURE						
Class	1	2	3	4	5	Cell Total
-10%	0	485	1336843	1585246	0	2922574
-5%	0	658	1396359	1525557	0	2922574
Base	0	814	1445380	1476380	0	2922574
5%	0	991	1496368	1425215	0	2922574
10%	0	1289	1546733	1374552	0	2922574

Table S2.4 Table of cell distribution within classes for each simulation run – Criterion Slope

SLOPE						
Class	1	2	3	4	5	Cell Total
-10%	0	768	1473484	1448322	0	2922574
-5%	0	758	1454807	1467009	0	2922574
Base	0	814	1445380	1476380	0	2922574
5%	0	853	1434508	1487213	0	2922574
10%	0	776	1367476	1554315	7	2922574