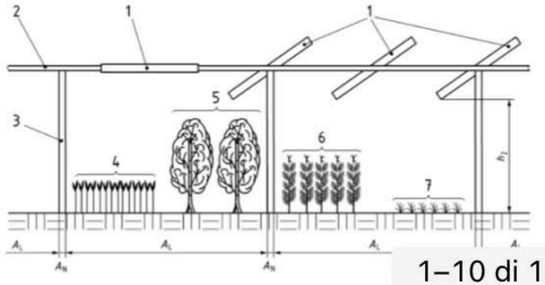
Agrivoltaico: una grande sfida

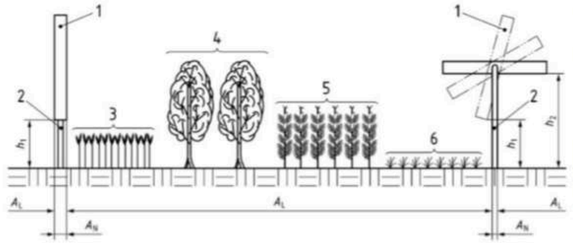
Franco Miglietta, Istituto di Bioeconomia - CNR, Firenze, I

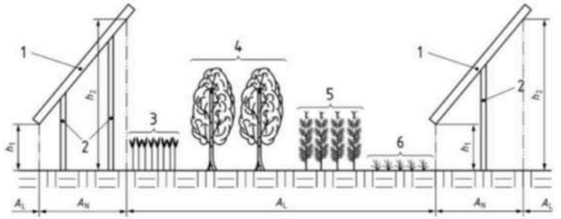
- Cos'è un impianto agrivoltaico ?
- E' davvero possibile integrare produzione di energia e di cibo ?
- L'agrivoltaico sarà un punto di svolta verso l'agricoltura di precisione ?

Category I



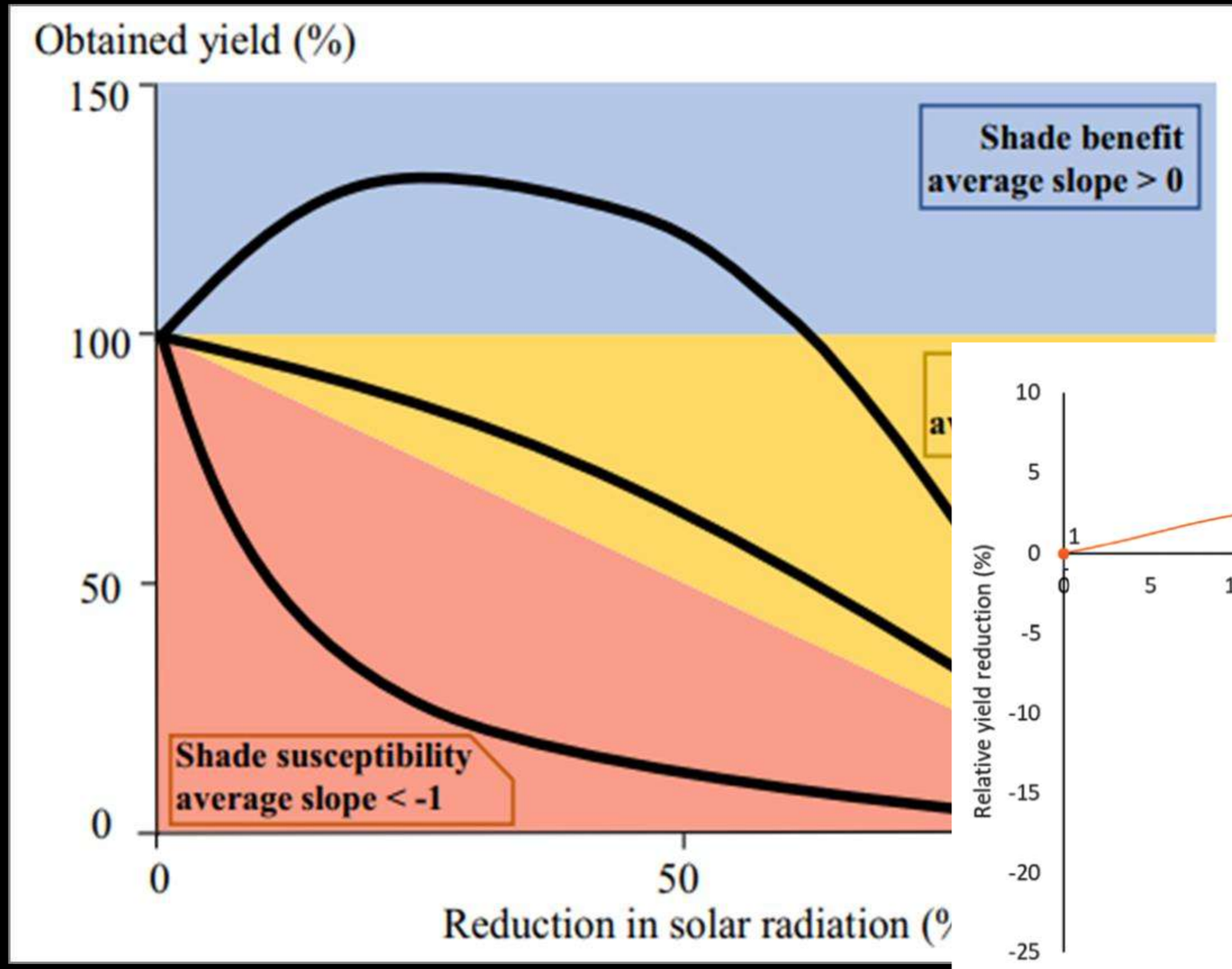
Category II





1–10 di 15

- Strumenti di controllo



Applied Energy 220 (2018) 545–561

Contents lists available at ScienceDirect

Applied Energy

journal homepage: www.elsevier.com/locate/apenergy

Agrivoltaic systems to optimise land use for electric energy production

Stefano Amaducci[a,*], Xinyou Yin[b], Michele Colauzzi[a]

[a] Department of Sustainable Crop Production, Università Cattolica del Sacro Cuore, via Emilia Parmense, 84, Piacenza, Italy
[b] Centre for Crop Systems Analysis, Department of Plant Sciences, Wageningen University & Research, Droevendaalsesteeg 1, Wageningen, The Netherlands

HIGHLIGHTS

- A simulation platform to simulate crops under agrivoltaic was developed.
- Shading under agrivoltaic improves soil water balance and increases water saving.
- Agrivoltaic conditions increased and stabilized yield of rainfed maize.
- Agrivoltaic doubled renewable energy land productivity.

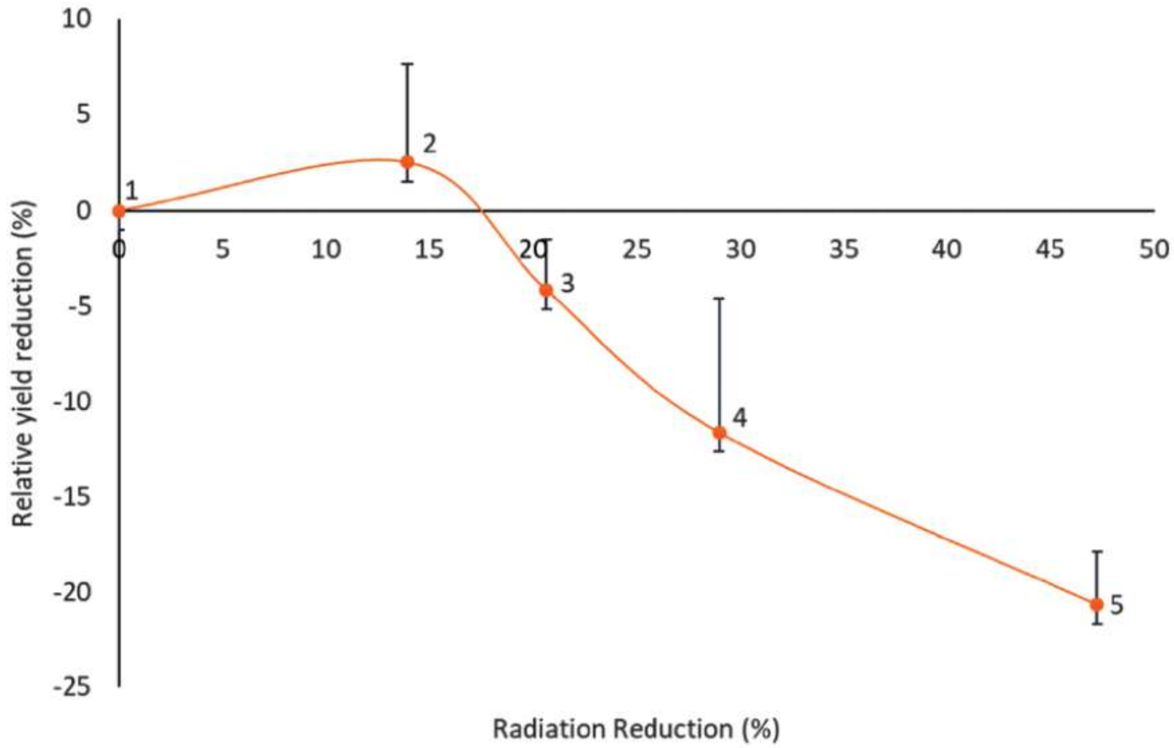
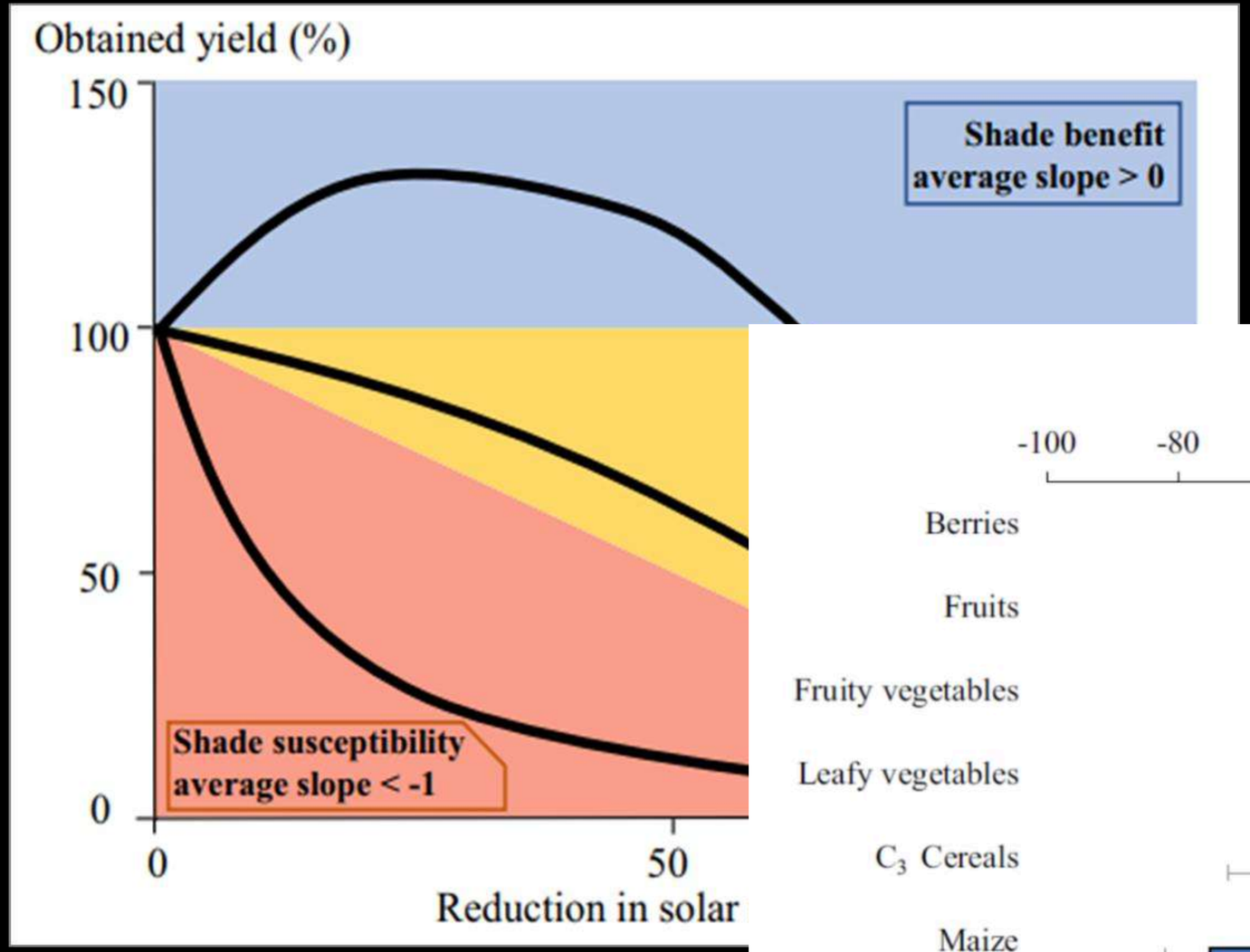
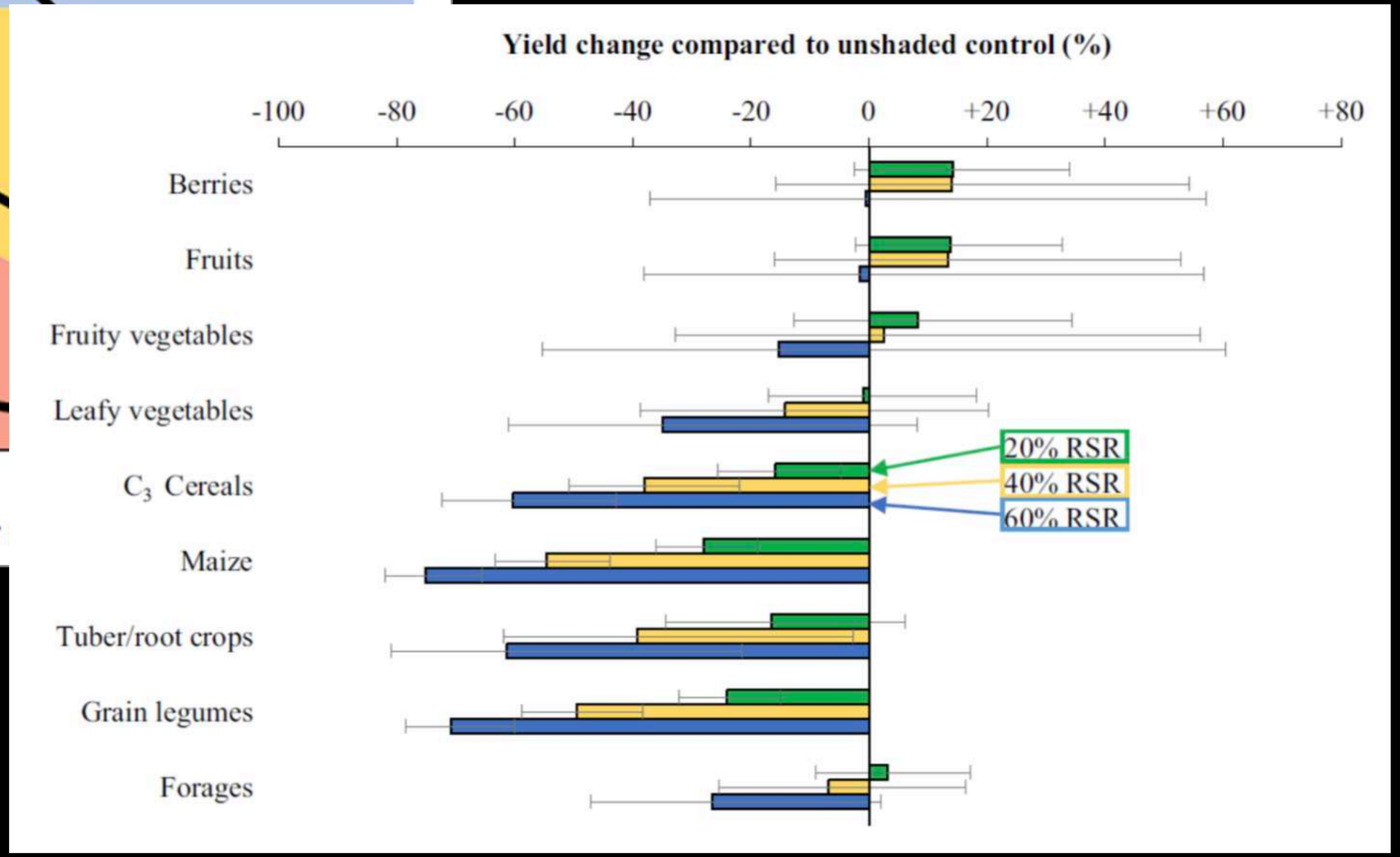
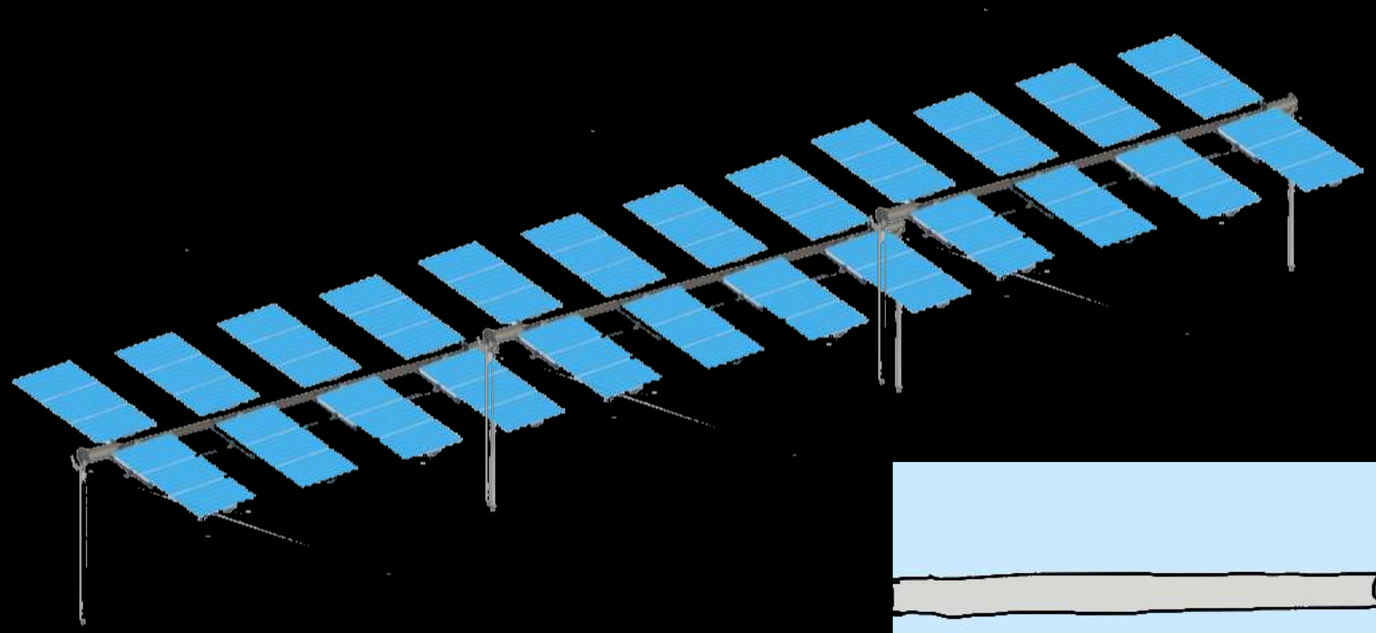


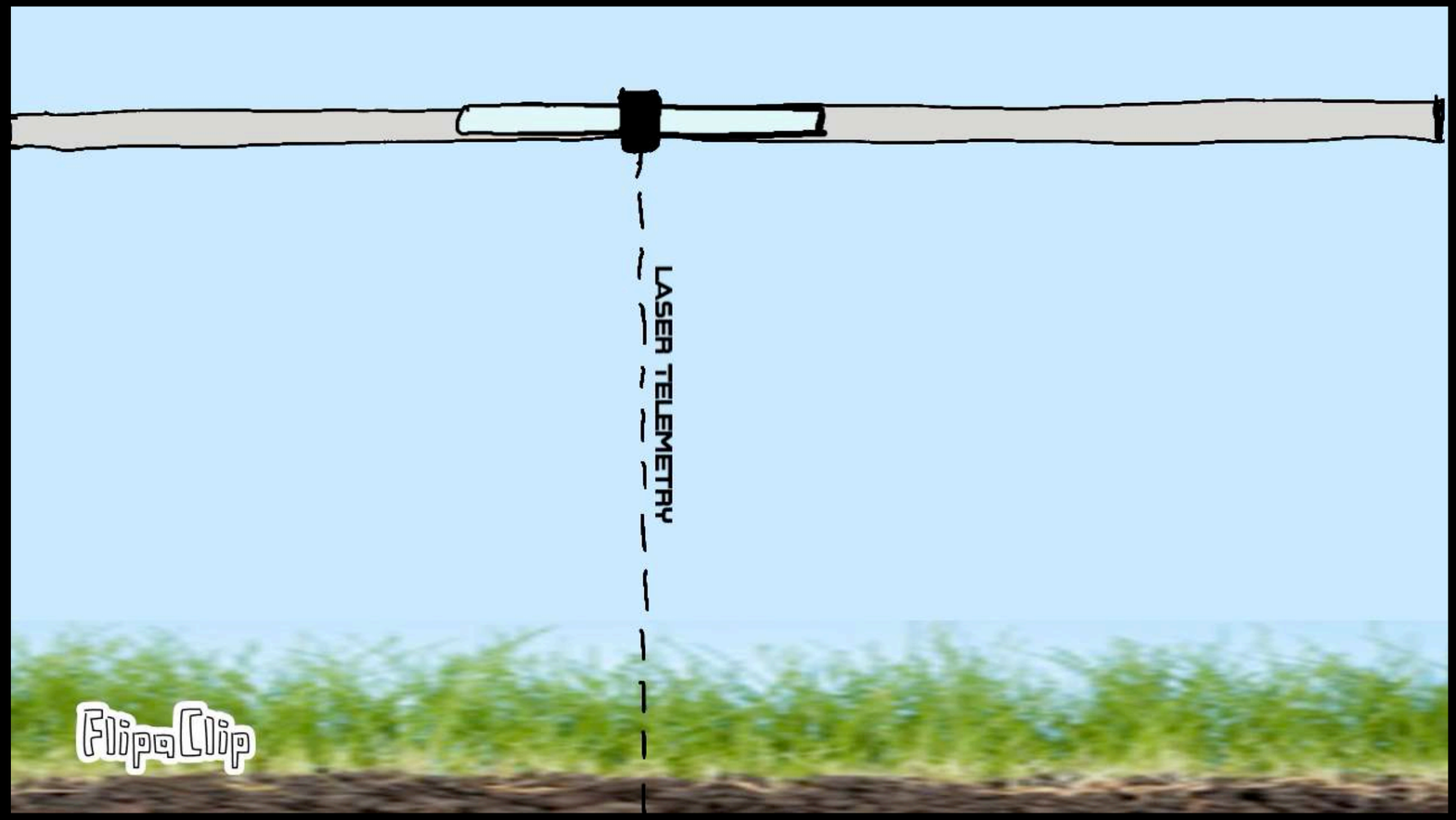
Figure 5 Relationship between radiation reduction (%) from shade and the simulated relative yield reduction (%) for a maize crop cultivated in the Po Valley, Italy (Amaducci et al., 2018), with data taken from four AV systems with increasing panel area/ground area ratios between 0.12 and 0.45.

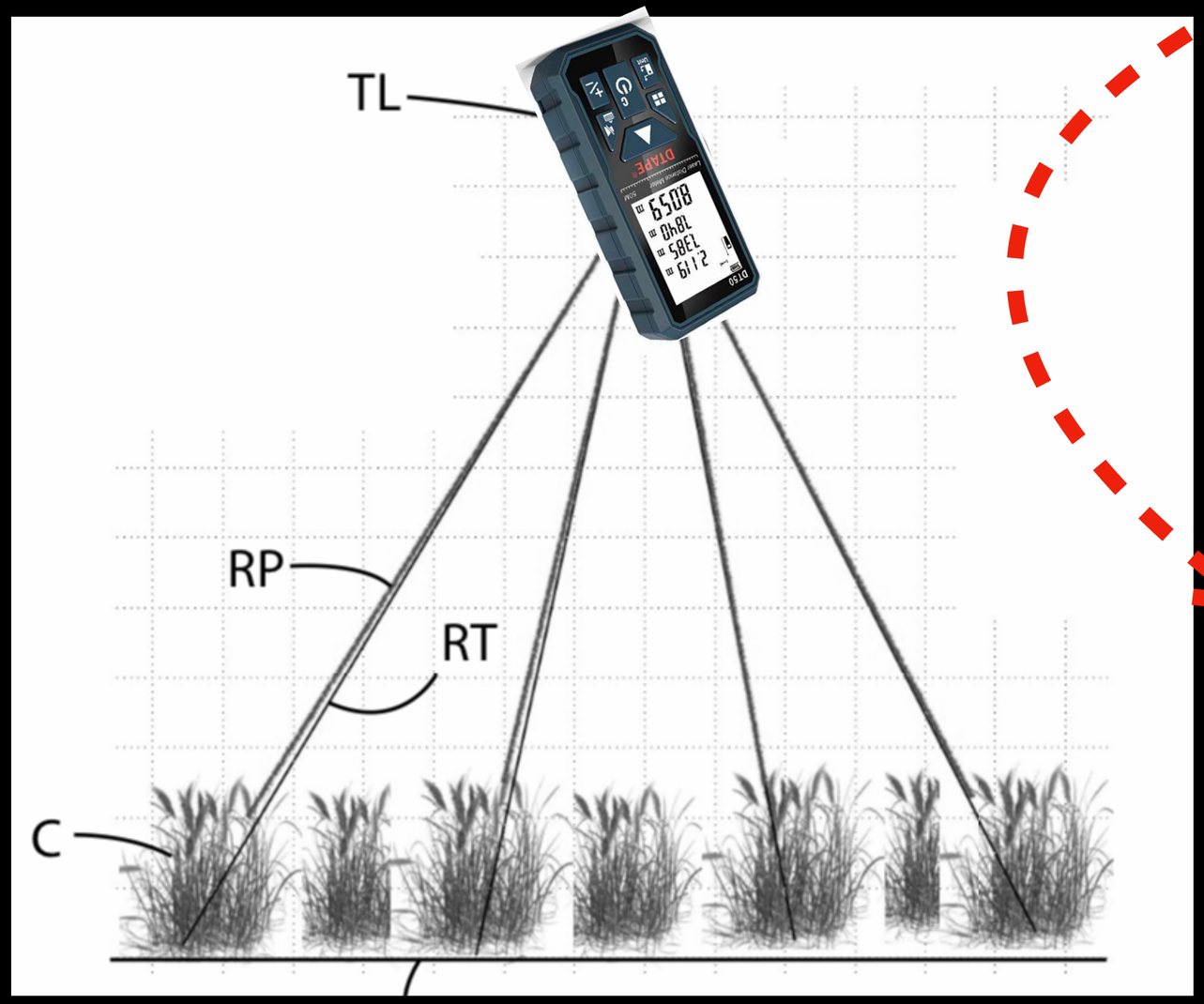

Obtained yield (%)
150
100
50
0
Shade benefit
average slope > 0
Shade susceptibility
average slope < -1
0
50
Reduction in solar

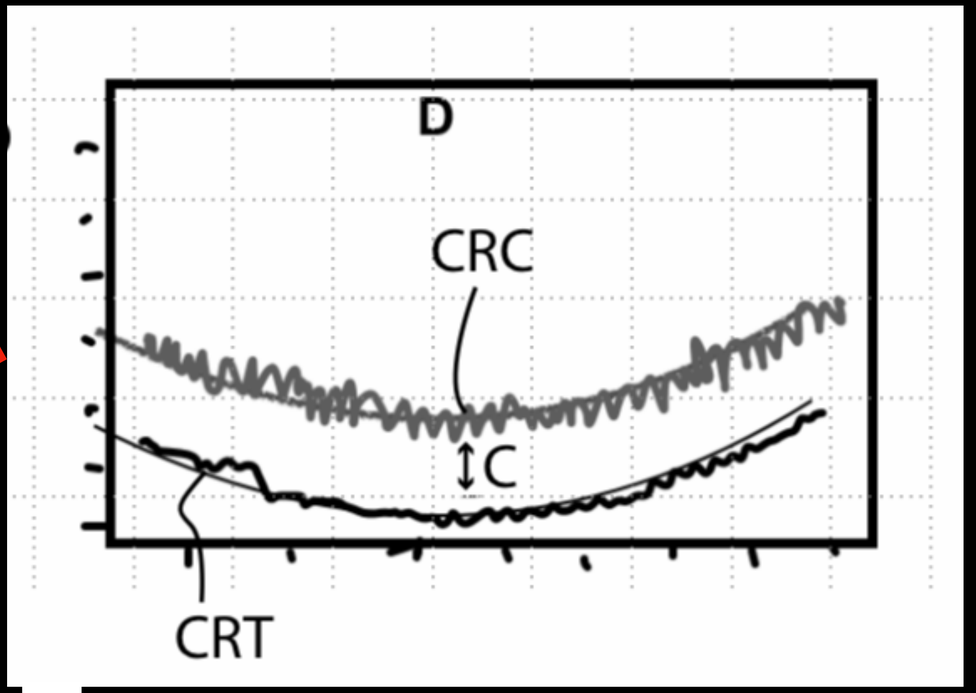

Yield change compared to unshaded control (%)
-100
-80
-60
-40
-20
0
+20
+40
+60
+80
Berries
Fruits
Fruity vegetables
Leafy vegetables
C3 Cereals
Maize
Tuber/root crops
Grain legumes
Forages
20% RSR
40% RSR
60% RSR

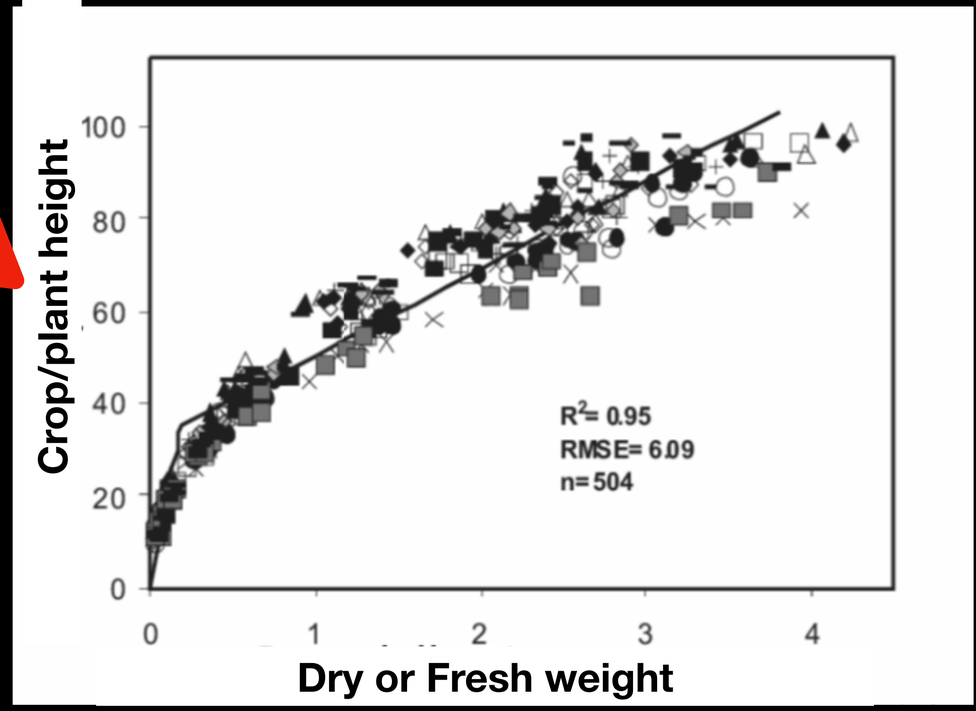
- L'agrivoltaico sarà un punto di svolta verso l'agricoltura di precisione ?




LASER TELEMETRY
FlipaClip

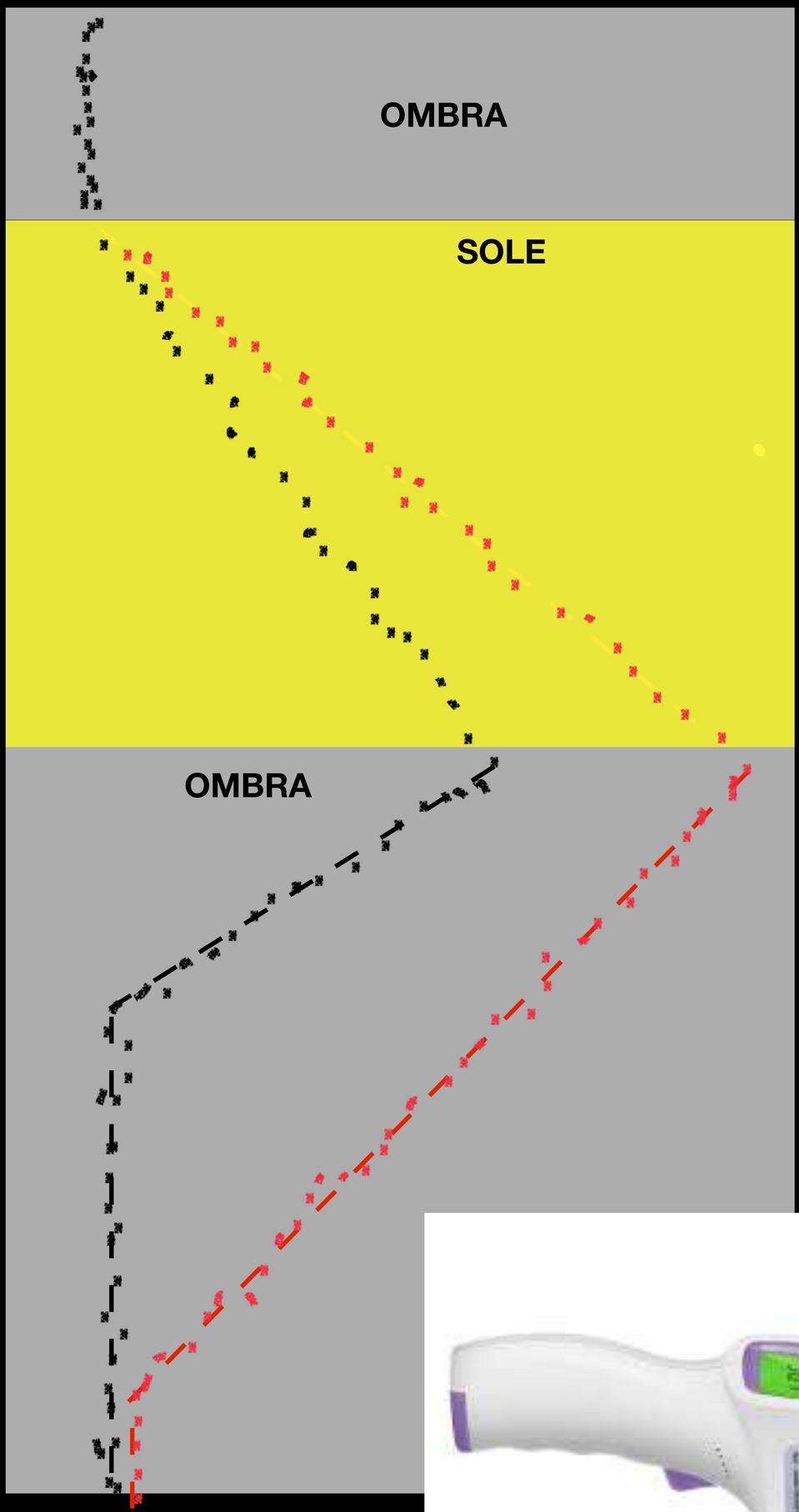

TL
RP
RT
C


D
CRC
C
CRT

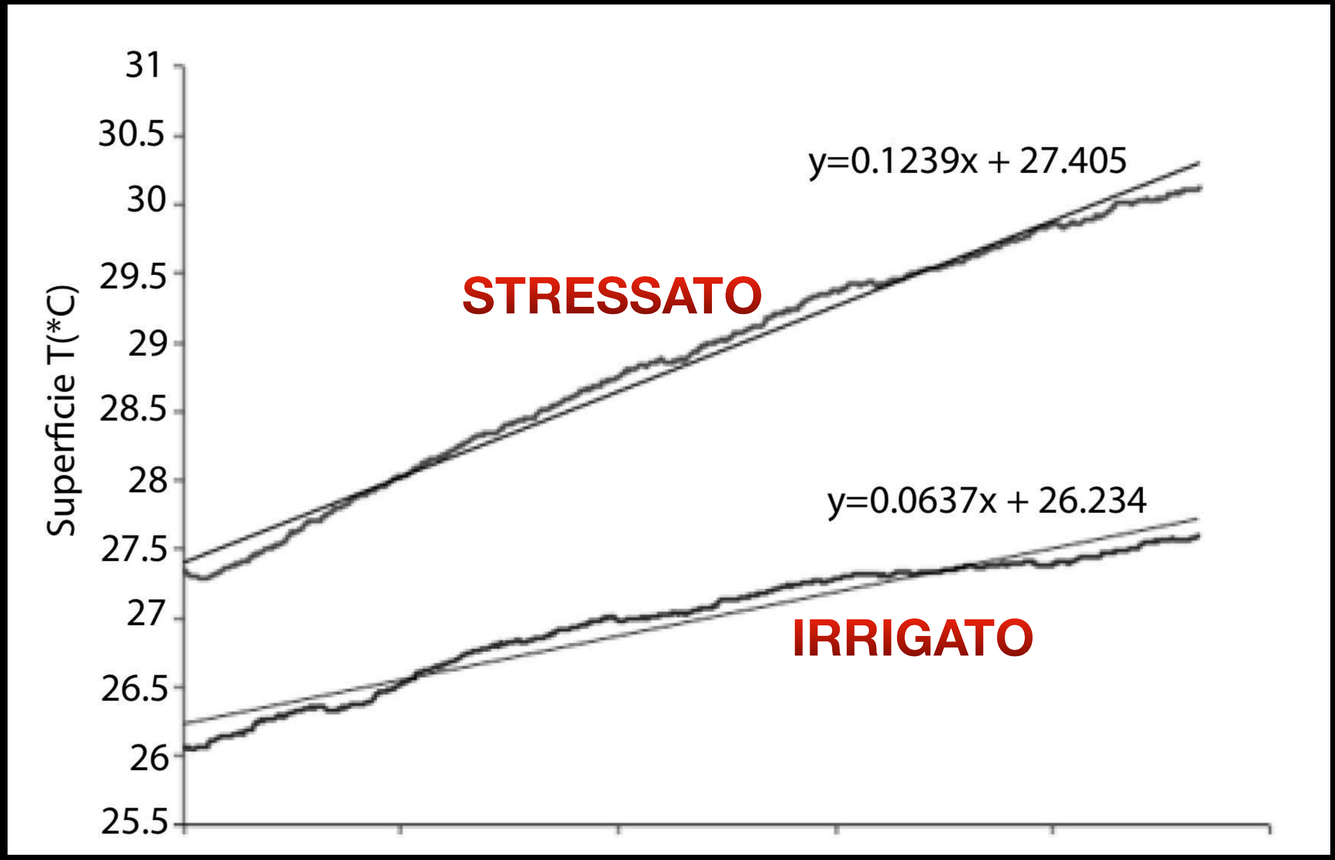

Crop/plant height
Dry or Fresh weight
R^2= 0.95
RMSE= 6.09
n= 504
0
20
40
60
80
100
0
1
2
3
4

TEMPERATURA SUPERFICIALE

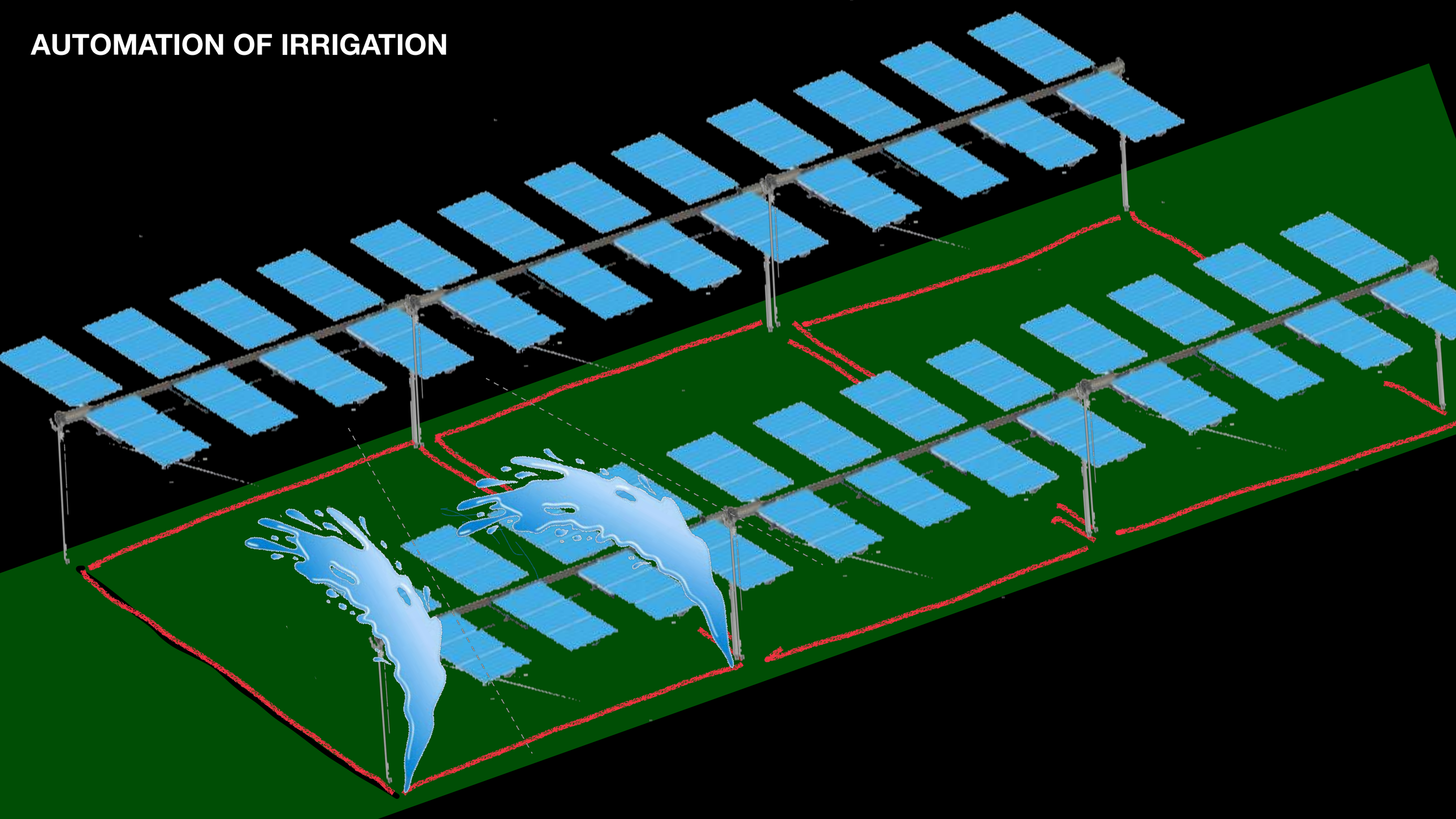
TEMPERATUR SUPERFICIALE



EXPERIMENTAL DATA ON WATER STRESSED LETTUCE



AUTOMATION OF IRRIGATION



CONCLUSIONS

- E' davvero possibile integrare produzione di energia e di cibo ?

Le prospettive sono buone, ma bisogna lavorarci ancora (agricoltori, e ricercatori)

- L'agrivoltaico sarà un punto di svolta verso l'agricoltura di precisione ?

- la struttura dell'agrivoltaico favorisce l'uso di strumenti avanzati di monitoraggio e controllo

- l'ottimizzazione fra produzione di energia e di cibo è alla frontiera di una virtuosa interazione fra ricerca, imprenditoria è società

Grazie per l'attenzione !!