



EDUDRONE.EU

ERASMUS+
STRATEGIC PARTNERSHIP IN THE FIELD OF
VOCATIONAL EDUCATION AND TRAINING

PROJECT

Drone European Platform

PROJECT NUMBER N.º 2017-1-ES01-KA202-038136

1

**Use of drones in thermal detection and remote
sensing of the plant vigour index (NDVI) on
melon' extensive crops**





EDUDRONE.EU

Project:	2017-1-ES01-KA202-038136
Intellectual Output	IO1
Deliverable	IO1 Platform
Lead Participant:	ERIFO
Authors:	
Document Type:	Report
Distribution:	Public
Status:	Draft
Document file:	Good Practice
Version:	0.0
Date:	
Number of pages:	

2



Title	Use of drones in thermal detection and remote sensing of the plant vigour index (NDVI) on extensive crops
Summary	Using of the Drones in horticulture
Major area of work	Horticulture: Cultivation of high quality melons
Key Facts	Location: Mantova (Italy)
	Target group: Nadalini company
	Other stakeholders: Consumers, peasantry
	Objective: to precisely identify the performance of the soil according to the vigour of the plants and to mapping the bad weeds.
	Timeframe: during the evaluation phase of the cultivation trend. Since 2016 this analysis procedure has been constantly implemented.
Context and problem addressed	The horticultural crops in the area are characterized by various dimension fragmented areas and many underground crops. The survey is normally carried out by someone on foot. The Nadalini company has chosen to complement the classical method of survey with the technological support of drones. The reason why they acted in this way is because the mapping of plots of over 15 hectares was facilitated both in the time to devote to that specific patrol's task and because, from above and thanks to the drone, they can easier recognize where to intervene to adjust areas with depressions, with stagnant water or where bad weeds are present. Thus being able to intervene in a timely and targeted way.
How does it work	Drones that fly at 80 meters height from the ground and with a speed of 5 meters per second have been used. Aforementioned drones, are equipped with high resolution cameras for reconnaissance, or with thermal imaging camera and with NIR sensors for the remote detection of plant's vigour index (NDVI: Normalized Difference Vegetation Index). Moreover, drones have been equipped with a special tool, in order to implement a sexual confusion of plants, a pollination procedure and a for the distribution of plant protection products. In both cases, the recognition and the active intervention through drones, have brought to excellent results while minimizing the using of resources.
Validation	Nadalini company has welcomed the use of drones in horticulture for the melons' cultivation on its own plot, and they chose to proceed in using this methodology.
Impact	Nadalini company believe that drones are not replacing the human intervention in horticulture. However, drone acts as an important support tool to facilitate the work of horticulturist. Thanks to the use of the drone, Nadalini' horticulturists realized that the



EDUDRONE.EU

	<p>different kind of plastics used as roofing of the 65 greenhouses of the company, generated an internal heat difference of more than 5 degrees. This made it possible to manage the cultivation in more efficient way by choosing, indeed, specific plantings according to the temperature of each greenhouse.</p> <p>In the long term this methodology limits the risks of human error in the choice of places and in the management of crops.</p>
Innovations and Success factors	<p>The using of a latest generation technology (drones equipped with specific sensors tailored for the agricultural use) to be used in cultivation of high quality horticultural crops. The innovation in the cultivation methodology and maintenance of cultivated areas.</p>
Constraints	<p>The major obstacle lies in having to acquire the skills and the specific tools suitable for the using of this technologies from outside (drones, drone's pilot, the processing and management of analysis data). Costs are significantly reduced for the extensive agricultural cultivation. In the case of smaller cultivated areas, the evaluation of economic costs/benefit must to be taken in consideration.</p>
Lessons learned	<p>Intervening with these tools saves resources, reducing the environmental impact and increasing yields.</p>
Sustainability	<p>The cost of the service (in this case Nardini has benefited of the contribution of an external specialized company) is sustainable and it's repaid by the lower costs of treatments and greater efficiency in results and used resources, while reducing environmental impact and maximising the yield.</p>
Students/teachers story	<p>Insert a short testimony of a beneficiary</p> <p><<In the company we have 65 greenhouses with plastic purchased from two different suppliers and using drones we realized that between the various greenhouses, or rather plastics, there was a difference of 5 ° C. The thing in itself is neither a good nor a bad thing, but knowing it has made us manage the cultivation more efficiently: we have planted the early varieties in greenhouses at higher temperatures and medium late ones where the temperature is lower>> Francesca Nadalini, owner</p>
Websites and other resources	<p>https://terraevita.edagricole.it/wp-content/uploads/sites/11/2018/07/M-Nadalini-meloni-droni.pdf</p> <p>https://www.giornaledibrescia.it/rubriche/impresa-4-0/raggi-ultravioletti-e-droni-i-meloni-di-francesca-sono-pi%C3%B9-dolci-1.3211636</p>