

TRANSFARM 4.0

Deliverable D.C.4.2

Version 1

Participation in Thematic events

06 2022

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1. Executive Summary

TRANSFARM 4.0 has put significant efforts into promoting the participation of its partners to thematic events across the Central Europe region. As specified also in the Dissemination and Communication strategy issued at the start of the project, connecting with the rest of the community of practice (farmers, advisory services, research entities, technology providers and more).

Coherently with such strategy, partners have engaged since the start of the project in communicating to their constituencies of reference about the scope and activities of TRANSFARM 4.0 and in a second phase also on its results, as the work unfolded in the Pilot Actions providing tangible evidence of the innovations produced.

Needless to say, the Covid pandemic has had a significant impact on the dissemination and communication actions of the project, and in particular on those that entailed direct contacts with other organisations and participation into public events.

Some of the regularly occurring events that had been identified as key targets for the action were cancelled, whereas others were reconfigured into online events. TRANSFARM 4.0 partners have been involved in a total of 14 thematic events, therefore achieving more than originally prospected, even within the limits imposed by the Covid crisis.

The following chapters provide a concise summary of the activities partners have engaged in:

1.1. Prega Science 2020, 18-02-2020

Attended by SZIE (later in the project MATE)

The Prega Science 2020 Scientific Conference on Precision Agriculture and Agro-Informatics conference took place on the 18th February 2020 in Hungary, gathering various representatives of the agricultural sector, mainly but not exclusively from Hungary.

The conference hosted a total of 150 presentations, 40 exhibition stands, 1.000 visitors among farmers, growers, technology providers, students, stakeholders, political stakeholders. Partner SZIE (later MATE) introduced principles and methods of precision viticulture applied to the monitoring of canopy microclimate and topography by PA technologies. Such exposure prompted meetings and follow up contacts with Precision Agriculture technology providers and clusters.

A short summary of the event is available at: <https://agroforum.hu/szakcikkek/gepeszet/szemelvenyek-a-prega-2020-konferenciarol/>

Webpage of the event: <https://www.prega.hu/prega-science-hu/>





1.2. Viral Mostar, 6-7 October 2020

Attended by UM

The VIRAL Mostar conferences were promoted by the Erasmus project VIRAL (Vitalising ICT Relevance in Agricultural Learning). The 2020 edition was carried out online in October 2020 due to the Covid crisis.

Jurij Rakun from the University of Maribor opened the scientific sessions on Day 1 with a module on Robotics in Agriculture, which drew examples from the work being performed in the ROVITIS project and in TRANSFARM 4.0 with the planned Pilot Action on the variable rate sprayer in viticulture.

The workshop last two days and reached a total crowd of about 60 university students mostly from Bosnia Herzegovina and Montenegro. Most of the speakers came from the target region, from Slovenia and from the Netherlands.

Participation in the workshop was functional to establish and consolidate collaboration with the Wageningen research centre (Joao Valente).

1.3. ATAE Symposium Zagreb 2-4 March 2021

Attended by UM

The Symposium “Actual Tasks on Agricultural Engineering” is organised every year by the University of Zagreb (Croatia) and is one of the main events at academic level for practitioners and experts of agricultural mechanisation. TRANSFARM 4.0 Slovenian partners Jurij Rakun and Peter Lepej took part by presenting a publication on autonomous farm robot software architecture, a theme that is immediately related to experimental work done in the ROVITIS project (Veneto Region) and forms the technological basis of the Pilot Action focusing on the variable rate sprayer in TRANSFARM 4.0.

Participation in the ATAE Symposium reinforced the positioning of UM in the landscape of regional experts in agricultural engineering. The symposium gathered about 100 experts from different countries. Rakun and Lepej’s article is included in the public proceedings of the event.



AN OVERVIEW OF AN AUTONOMOUS FARM ROBOT SOFTWARE ARCHITECTURE

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1.4. Dunavin, Budapest, 25 June 2021

Attended by MATE

The DUNAVIN competition is a key event for the wine sector in Hungary and neighbouring countries. It attracts a relatively small but highly qualified attendance of the best producers in the region, as well as growers, wine experts, service providers and students.

Peter Bodor Pesti of MATE introduced the main aims and preliminary results of the TRANSFARM 4.0 project and invited technology providers and growers to accelerate the introduction of precision farming technologies in Hungary. The event provided a good opportunity for liaising with farmers and the winemaking industry.

A short summary of the event is available at: <https://borespiac.hu/2021/06/28/borok-a-duna-ket-oldalarol/>

1.5. Vite in Campo, Susegana 26-27 July 2021

Attended by CREA and UM

Vite in Campo (Vineyard in the field) is a yearly event organised in Veneto region by INformatore Agrario, one of the most important publishers in agriculture in Italy. The 2021 edition was organised in Susegana, at a local winery in the Prosecco region, very close to the CREA experimental farm.

The event was organised over a two days with presentations, meetings, stands and a “carosello” (showcase) area devoted to demonstrations of the technologies developed. Luca Masiero of CREA provided a presentation of the TRANSFARM 4.0 approach to precision agriculture and a summary of the work being deployed in the Pilot Actions. Jurij Rakun of the University of Maribor illustrated together with Italian producer Maschio Gaspardo, the variable rate sprayer engineered for precise treatment on grapes in the framework of Pilot Action 2.



Vite in campo 2021 featured a total of 2000 visitors, 55 companies exhibiting products and technologies and about 200 machines. It was a robust source of contacts and a great exposure to general visibility in the sector for the TRANSFARM 4.0 project and its partners.

1.6. TrendTalk at the Pöttinger Landtechnik GmbH

Attended by Francisco Josephinum



Transfarm4.0 was at the TrendTalk at the Pöttinger Landtechnik GmbH company on 01 09 2021. Mr. Heinrich Prankl, Vice-Director at HBLFA Francisco Josephinum addressed current developments in the agricultural machinery sector in connection with future challenges and illustrated the main activities performed in TRANSFARM 4.0, highlighting the importance of smart and connected machines, to optimise farm operations.



1.7. RIEDER EXHIBITION

Attended by Francisco Josephinum

TRANSFARM 4.0 was represented from Francisco Josephinum at the Ried exhibition. Innovative technologies for agriculture were presented and live demonstrations carried out within the framework of the "Innovation Farm" hall.

The event saw also the visit of Federal President of Republic Austria Alexander van der Bellen, the Minister of Agriculture Elisabeth Köstinger and the Governor of Upper Austria Thomas Stelzer.

With the attendance on the fair in Ried, it was possible to reach a crowd of approximately 500 farmers

from Austria and Bavaria (Germany). FJ held a stand, regularly attended by Reinhard Streimelweger and Helmut Steinkellner, devoted to TRANSFARM 4.0 and recorded several interactions with potential users, as well as some bilateral meetings with solution providers and other research institutions.





1.8. Lippay János-Ormos Imre-Vas Károly Scientific Congress, 24th September 2021

Attended by MATE

The János-Ormos Imre-Vas Károly Scientific Congress is a highly reputed appointment for practitioners and researchers in agricultural innovation from Hungary and abroad. Its 24th edition took place in Budapest in September 2021, attracting a total of 140 people, among researchers, professors and students.

Partner MATE presented some of the main technological concepts of the TRANSFARM 4.0 project, including the introduction of the canopy architecture of the pilot action plots, and the 2D visualization of the canopy structure linked to the Sensor Data Acquisition for Precision Viticulture in a FI-Ware data lake for Big and Smart Data Management under Pilot action case study 3. These results were included in the data evaluation provided by sensors, and correlation between canopy architecture, microclimate and plant physiology.

The presentation was functional to consolidate relations with researchers and students interested in the deployment of data driven technologies in farms environments.

Különböző öntözési módok hatása a szőlő lombosítási szerkezetére – előzetes eredmények
Taranyi Dóra Agniesz, Mikóczy Nárcisz, Váradi Gyula*, Bodor-Pesti Péter*

*Magyar Agrár- és Élettudományi Egyetem, Szőlészeti és Borászati Intézet
*Mikóczy és Mikóczy Csajági Gazdaság
*VITIS Keszthely, P. 51

*Bodor-Pesti Péter@uni-mate.hu

Bevezetés
A szőlőkérdésekben egyre gyakrabban felül-
szárítottak egyes területek a természetben, mely
akár jelentős gazdasági kárt is okozhat a termésnél.
A klímaváltozás hatásainak megelőzése érdekében
új módszereket kell alkalmazni a szőlő termesztésében,
amelyek a vízvesztést csökkentik, és a szőlő
terméshozamát növelik. A szőlő termesztésében
a vízvesztés csökkentésének egyik módja a szőlő
lombosítási szerkezetének módosítása. A lombosítási
szerkezet módosításának célja a szőlő levelei
közötti levegő hőmérsékletének csökkentése, és
a szőlő levelei közötti párolgás csökkentése.
A szőlő termesztésében a szőlő lombosítási
szerkezetének módosítása a szőlő termesztésének
fontos részét képezi. A szőlő termesztésében
a szőlő lombosítási szerkezetének módosítása
a szőlő termesztésének fontos részét képezi.
A szőlő termesztésében a szőlő lombosítási
szerkezetének módosítása a szőlő termesztésének
fontos részét képezi.

Vizsgálati módszer
Munkánk során háromféle szőlő termesztési
módszert vizsgáltunk: a hagyományos szőlő
termesztést, a lombosítási szerkezetű szőlő
termesztést, és a lombosítási szerkezetű szőlő
termesztést. A vizsgálatok során a szőlő
lombosítási szerkezetét, a szőlő levelei közötti
párolgást, és a szőlő levelei közötti hőmérsékletet
vizsgáltuk. A vizsgálatok során a szőlő
lombosítási szerkezetét, a szőlő levelei közötti
párolgást, és a szőlő levelei közötti hőmérsékletet
vizsgáltuk.

Eredmények
A vizsgálatok során a szőlő lombosítási
szerkezetének módosítása a szőlő termesztésének
fontos részét képezi. A szőlő termesztésében
a szőlő lombosítási szerkezetének módosítása
a szőlő termesztésének fontos részét képezi.
A szőlő termesztésében a szőlő lombosítási
szerkezetének módosítása a szőlő termesztésének
fontos részét képezi.

Következtetések
Eredményeink azt mutatják, hogy a szőlő
lombosítási szerkezetének módosítása a szőlő
termesztésének fontos részét képezi. A szőlő
termesztésében a szőlő lombosítási szerkezetének
módosítása a szőlő termesztésének fontos
részét képezi. A szőlő termesztésében a szőlő
lombosítási szerkezetének módosítása a szőlő
termesztésének fontos részét képezi.

Köszönetnyilvánítás
A kutatást a Transfarm 4.0 program pályázat
finanszírozza.

1.9. Researchers night (Kutatók éjszakája) event, 24th September 2021

Attended by MATE

The Researchers night is a European wide initiative that takes place in different countries and research institutions, usually opening up labs, infrastructure and demonstration sites to facilitate the interaction between the world of research and civil society. The Budapest edition in September 2021 prompted the visit to the MATE lab of six students and visitors.

Peter Bodor-Pesti provided them with a general introduction of the Precision Agriculture principles, and illustrated their application within the Pilot Action 3 for Sensor Data Acquisition for Precision Viticulture. In particular, he pointed to the benefits in terms of quality and optimisation of operations and environmental gains that the wine industry can obtain by applying such technologies.

As a follow up, some students interested in Precision Agriculture contacted MATE to find out about possible specialisation opportunities.

A summary of the event is available at: <https://app.kutatokejszakaja.hu/esemenyek/magyar-agrar-es-elettudomanyi-egyetem/applikaciokkal-a-szoloben>



1.10. “Digitalization in the viticulture sector” online conference, 20th October 2021.

Attended by MATE

The Digitalizáció a szőlészeti-borászati ágazatban konferencia (Hungarian Title) was an online conference addressing primarily the wine industry of Hungary, especially on issues related to quality control, optimisation, sustainability and marketing. It provided a relevant exposure to most of the sector key stakeholders in the country, with 250 participants (searchers, grapevine growers, technology providers, students).

Peter Bodor-Pesti provided an Introduction of the Sensor Data Acquisition for Precision Viticulture in a FIWare Data Lake for Big and Smart Data Management under Pilot action case study 3. The video recording of the conference is available at:

<https://www.youtube.com/watch?v=KWWq9LXJjA>

Peter Bodor-Pesti’s presentation was scheduled at 10.30 under the title Transfarm4.0: Határon átnyúló precíziós gazdálkodási együttműködések (TRANSFARM 4.0: Cross-border Precision Farming Collaborations)

After the conference MATE got several requests from researchers and technology providers to collaborate in the topic. Sencrop company requested an on-line meeting where they introduced the technology they provide and further collaboration with the company is in progress. Kertészet és Szőlészet (Horticulture and Viticulture) printed magazine contacted with PP6 to write a paper about the Transfarm4.0 project.

1.11. EIMA International 2021, 19-23 October 2021

Organised by FEDERUNACOMA, attended by CREA, UM, ARRSA

A detailed account of TRANSFARM 4.0’s participation at EIMA International 2021 is provided in DC5.2 Open Innovation Week. EIMA International is one of the largest world’s fairs of agricultural machinery and technologies. It is organised every two years in Bologna in the month of November and is a not to be missed appointment for producers, experts, farmers associations and the world of research and innovation in general. The 2021 edition took place in October as a catch-up edition for the 2020 one which had been cancelled due to the Covid crisis.



During its five days from the 19th to the 23rd of October, TRANSFARM 4.0 partners managed a dedicated stand in the Digital EIMA section of the fair, showcased the innovations proposed by the project, including the variable rate sprayer engineered for Pilot Action 2.

EIMA International recorded a very high participation with more than 270.000 visitors (reaching almost the 2016 levels) and 1.364 exhibitors. The TRANSFARM 4.0 stand was visited and attracted interaction with approximately 1.500 visitors. TRANSFARM 4.0 organised in this context a short session in the Digital EIMA area, a Press Conference for international journalists, a main conference with the participation of about 70 people and one live streaming. Partners regularly engaged into presentations, bilateral talks and explored potential collaboration opportunities with other organisations from different parts of Europe and the world. The project’s participation at EIMA got also a good media coverage during the period.



1.12. International Forum of Mechatronics, 20-21 October 2021

Attended by LCM and FJ

The Austrian partners presented the TRANSFARM 4.0 project at the IFM (International Mechatronics Forum) held in Linz on the 20-21 October 2021. A specific workshop was organised on the 21st under the Title: “Smart Farming, Innovation Transfer in Agriculture”





The workshop was participated by about 20 experts and researchers, while the whole event attracted roughly 500 participants, 139 of which took part also in bilateral meetings. TRANSFARM 4.0 was presented also out of the specific workshop into sessions with companies interested in its technological developments. The presentation of TRANSFARM 4.0 in the workshop was managed jointly by Reinhard Streimelweger of FJ and Albert Pötsch of LCM.

1.13. 2-5 March 2022, Fiera Agricola di Verona

Attended by CREA, FEDERUNACOMA and UM

Fiera Agricola (Agricultural Fair) is a relevant event for the agricultural sector at international level. The 2022 edition took place in Verona between the 2nd and the 5th. CREA managed a stand for TRANSFARM 4.0 and showcased the key innovations generated by the project with its Pilot Actions, with a special emphasis on the work done in Pilot Action 2 with the variable rate sprayer engineered also by UM and implemented on a sprayer provided by Italian manufacturer Maschio Gaspardo.

Fiera Agricola hosted 520 exhibitors and attracted a total of 68.000 visitors. TRANSFARM 4.0 was exposed to interaction with hundreds of visitors at the stand and with ten companies (some of them associated to FEDERUNACOMA) willing to explore potential collaboration on the basis of the innovations generated).

1.14. Prega Science 2022 Scientific Conference on Precision Agriculture and Agro-Informatics conference, 11th May 2022., Hungary

Attended by MATE

The Prega Science is organised every two years and is a key event for the sector in the Central Europe and Danubian region. Its 2022 edition attracted 150 presentations, 40 exhibition stands, 1000 visitors farmers, growers, technology providers, students, policy makers and other stakeholders.

MATE presented the key results of the project and in particular of trials carried out under Pilot Action 3. Given the maturity of the results shown in the final phase of TRANSFARM 4.0, a special emphasis was given to messages and interaction with policy makers. Meetings were also organised with clusters of the Hungarian wine industry.

1.15. CONAVI IX Convegno Nazionale di Viticoltura, 13-15 June 2022, Conegliano (TV) Italy

Attended by CREA, MATE

CONAVI (National Congress of Viticulture) is a highly reputed scientific event for all researchers, farmers, growers and interested parties in wine making. It is co-organised by the University of Padova and by TRANSFARM 4.0 coordinator CREA. Aside from CREA, also MATE attended the congress with a presentation by Peter Bodor-Pesting on the Remote Sensing evaluation of the canopy microclimate and plant physiology of the grapevine cultivar Harsevelu with different irrigation methods.



This enabled further contacts with researchers and the definition of potential new research collaborations with CREA and with IASMA (the Agricultural Institute of San Michele all'Adige), a research organisation based in Trentino region.

The event link is available at: <https://www.conavi2022.it/index.html>

Bodor-Pesti, P., Deák, T., Taranyi, D., Váradi, Gy., Fazekas, I., Scherhäufl, M., Mikóczy, M., Varga, Zs., (2022): Remote sensing evaluation of the canopy microclimate and plant physiology of the grapevine cultivar 'Hárslevelű' with different irrigation methods: preliminary results. IX Convegno Nazionale di Viticoltura, 13-15 June 2022, Conegliano (TV) Italy.

Sessione 3 - Viticoltura di precisione e telerilevamento

- Bodor-Pesti P. - Remote sensing evaluation of the canopy microclimate and plant physiology of the grapevine cultivar 'Hárslevelű' with different irrigation methods: preliminary results.
- Pisciotta A. - Stima del numero di acini su grappoli di uva da tavola attraverso l'analisi di immagini.
- Shmulevitz R. - Application of proximal and remote sensing to study the spatial variability in the Valpolicella area.
- Sozzi M. - Telerilevamento iperspettrale per applicazioni di viticoltura di precisione: risultati preliminari dalla missione PRISMA.
- Zanchin A. - Potential pesticides losses reduction thanks to lidar sensors and nozzles section control.

CONAVI 2022 - IX Convegno Nazionale di Viticoltura
13-15 June 2022

REMOTE SENSING EVALUATION OF THE CANOPY MICROCLIMATE AND PLANT PHYSIOLOGY OF THE GRAPEVINE CULTIVAR 'HÁRSLEVELŰ' WITH DIFFERENT IRRIGATION METHODS: PRELIMINARY RESULTS

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INTRODUCTION
Remote sensing is a widely acknowledged useful tool for the evaluation of vineyards. Satellite, UAV and ground-based terrain characterization, plant physiological measurements, yield estimation, and canopy microclimate monitoring provide valuable information for both the farmers and researchers. Microclimate evaluation is one of the most widespread precision farming methods in viticulture as scheduling plant protection is partly based on temperature and precipitation observations. In those countries where vineyard irrigation is a commonly applied practice it's scheduled based on the soil microclimate, plant physiology and also on meteorological data.

OBJECTIVES OF THE STUDY
Remote sensing probes were installed to evaluate the effect of different irrigation systems on the microclimate and plant physiology of the 'Hárslevelű' grapevine cultivar. The aim of this experiment was to implement a smart data acquisition system which allows the farmers to monitor and analyze relevant parameters, and to act accordingly.

MATERIALS AND METHODS
The following sensor and data analysis network were established:
• TEROS 12 - volumetric soil water content, temperature etc. (NOV196)
- photosynthesis and stress related plant reflectance
• infrared temperature sensor
• The sensor data is sent to the FIWARE context broker, where it can be stored and analyzed.
• The Orion Context Broker forwards the data to a QuantumLeap instance, which stores the time series in a CrateDB database.
• A Grafana web server is used to access and visualize the data from the CrateDB.

RESULTS AND CONCLUSION
Preliminary results show that the sensor network is an efficient tool for monitoring plant physiological and microclimatic response of the vineyard to different irrigation strategies. This utilization process leads to an optimized irrigation scheduling that will be refined from year to year via feedback from yield, fruit composition and plant health results. Data collection, analysis and visualization system applied in our model farm in Hungary provides a solid basis for this working process to use complex data pool of the soil-plant-microclimate continuum in constructing optimized irrigation scheduling and sophisticated irrigation technologies.

TAKING COOPERATION FORWARD
E-mail: Bodor-Pesti.Peter@uni-mate.hu This study was supported by the Transform4.0 CE1550 Interreg project.

CREA's poster on the TRANSFORM 4.0 activities obtained also the prize for under 35 researchers posters.

CONAVI just preceded the TRANSFORM 4.0 Final event in Susegana on the 16th June, which has enabled participation to the TRANSFORM event also by

researchers and companies attending the CONAVI.

