BENEFIT NEWSLETTER

Boosting Innovation in Education and Research of Precision Agriculture in Palestine

WHAT IS BENEFIT PROJECT?

BY AZIZ SALAMEH - QOU

We are delighted to share with you our first issue of BENEFIT e-newsletter. Boosting Innovation in Education and Research of Precision Agriculture in Palestine /BENEFIT is a three years (2020-2023) co-funded project by Erasmus+.

A consortium of ten universities from five countries are involved in BENEFITt project. Namely, from Palestine, AL-Quds Open University, Palestine Technical University-kadoorie, University College of Applied Sciences, An-Najah National University , Hebron University, AL-Istiqlal University, University Slovak University of Agriculture In Nitra (Slovakia), University of Patras (Greece), University of Ruse (Bulgaria), and Institute of Technology and Business in Czech Republic (Czech).

Agriculture sector in Palestine is very important sector. Many challenges are threatening the agriculture sector. Adopting precision agriculture could allow the agricultural sector to achieve big leaps in Palestine. “Precision agriculture”, also called “digital farming”, is an innovative concept in the countries of Middle East and especially in Palestine. The main Objectives of BENEFIT project are: Involving Palestinian High Education Institutes in Research Movement related to Precision Agriculture in Europe and encouraging both Palestinian researchers and academics interests related to concept, domains, tools and digital technology of the Precision Agriculture. BENEFIT project is targeting: Academic staff, researchers, and students in Palestinian Universities, Agronomists and extension agents, Policy makers, Farmers and agribusiness sector

Coming to you on a four months basis, BENEFIT e-newsletter will cover trends in precision agriculture, and activities related precision agriculture in Palestine, region and Europe. e-newsletter will also keep you up to date on latest activities in BENEFIT project.

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WHAT IS PRECISION AGRICULTURE?

BY: ZUZANA PALKOVÁ , SPU IN NITRA - HARNIČÁROVÁ MARTA, VSTE

In the second half of the last century, the original management of fields by manpower with the help of farm draft animals was replaced mainly by tractors and harvesters. In this century, digital technologies are beginning to serve modern farmers. The significant environmental and economic losses caused by climate change, which have become increasingly intense in recent decades,

weather reversals historically unusual in some agricultural regions, in particular, prolonged droughts suddenly alternated by extensive inundations,

floods, storms and torrential rains, depletion and soil erosion leading to desertification must be compensated to the greatest possible extent. Today, digital technology is used by a large proportion of farmers in both Europe and Palestine; these

appropriately applied technologies enable them to implement various innovative solutions, both in plant and animal production.

The objectives of precision agriculture

• optimization of the costs of agricultural production in order to produce quality food in the required quantity,

• increasing the economic profit of the farm and its financial savings,

• lower consumption of agrochemical preparations in order to increase environmental protection and safety of cultivated crops, i.e. to prevent overdoses, especially concerning protective sprays, fertilizers and feeds,

• more economical water management, especially in conditions of permanently insufficient irrigation,

• clear and quick decisions about the organization of the farm,

• improving soil fertility and the quality of cultivated products.

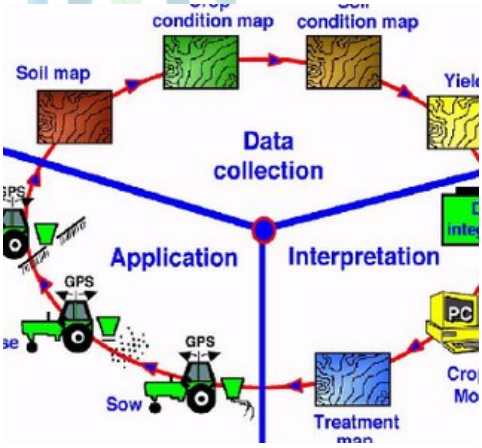
THE MEANS OF PRECISION AGRICULTURE AS A TOOL FOR EFFICIENT MANAGEMENT ARE IN PARTICULAR:

- meteorological forecasts focused on the monitored locality,
- satellite systems monitoring agricultural machinery,
- drones, aerial photographs and topographic maps,
- smartphones and tablets,
- sensitive soil sensors to estimate soil composition and current needs,
- targeted sprays and fertilizers for plant protection and weed control,
- precision measuring instruments and specialized programs compatible with them for the analysis of the obtained database of input data (with an order of magnitude accuracy of measuring lengths up to units of cm) as well as tools for fast processing of large volumes of data,
- various information sources, including the Internet,
- tools of artificial intelligence, automation and robotics (e.g. autonomous agricultural vehicles, which can react flexibly to the current state of the field and adapt the way and speed of driving to this state).

THE IMPLEMENTATION OF ACCURATE MEASUREMENT IS MAINLY THE MEASUREMENT OF SOIL CONDITIONS IN THE FIELD AND RELATED MONITORING:

- trends of changes and variability of soil conditions,
- negative effects on the environment,
- the state of agricultural technology,
- the state of growth of field crops and livestock health,
- specific activities targeted at a specific section of the field or a specific group of livestock farming,
- the compliance of reality with animal yield and performance planning,
- costs and energy losses,
- working conditions of farmers.

WHAT IS PRECISION AGRICULTURE?



The data stream on agricultural production is an integral part of precision agriculture and the agricultural economy. Improving the flow of information in the purchasing and marketing phases of food chains can bring a number of benefits to all stakeholders, including farmers and distribution and retail parties, in particular for domestic producers and domestic retail chains. The benefits of increased transparency can also be felt by consumers, researchers, governmental and non-governmental organisations.

Although the availability and acceptance of digital technologies in agricultural production is already advanced, the level of use of different types of technologies by farmers in practice varies greatly from initial expectations. The causes are in particular:

• higher initial investment required,

• more demanding testing of specific implementation conditions or geographical positions, • acceptance of "complex digital innovations" in conditions of misunderstanding the efficient operation of the farm.

The BENEFIT project

focuses primarily on eliminating the causes of insufficient use of precision agriculture technologies and on the realisation of assets that will help in particular farmers in Palestine to accept these technologies as advantageous and then apply them effectively.

Farmers, students of agricultural faculties and advisers from specialized advisory institutions can gain new knowledge and skills in the field of precision agriculture, i.e. get acquainted with the means used on "smart farms", specifically with:

- control systems and principles of their remote control,
- mobile robots or unmanned vehicles,
- sensors for measuring the most frequent quantities in agriculture,
- technologies for spectral analysis of images and their applications (e.g. mapping of gas concentrations),
- inspiring experiences on an effective way to support small and family farms through Agri-Food Incubators

EXAMPLES OF GOOD PRACTICE. EXAMPLES FROM FARMS ACROSS THE EUROPEAN UNION ARE:

- autonomous agricultural vehicles,
- precise fertilization,
- precise irrigation,
- processing of the overall image of crop production,
- the use of various information systems as important support systems for farms.

Environmental protection and prevention of adverse climate change through precision agriculture technologies will be presented as an example of the Application of Renewable Energy Systems in Agriculture, within the decentralized (autonomous) energy supply systems within agricultural processes .resource sovereignty

WHY PRECISION AND SMART AGRICULTURE IN PALESTINE

STAFF OF THE AN-NAJAH NATIONAL UNIVERSITY AGRICULTURE FACULTY

Agricultural education, at An-Najah National University, began in 1986 with the establishment of the Department of Agricultural sciences, in the College of Science. In 1992, the department became a full-fledged college and the ninth in the university. In 1996 the college was transferred from the University main campus in Nablus to the new campus in Tulkarm, which is known as Khadouri. The new campus is about 14 km to the east of the Mediterranean and is one of the most important agricultural areas of Palestine. The college campus includes an old building which was built in 1930, an experimental and educational Facilities including: dairy farm having about 50 heads, sheep and goats farm with about 150 heads of different breeds, poultry houses, an olive field of several local varieties, fruit trees orchard of different varieties, five dunums of modern greenhouses as well as open fields used for growing open field vegetables, field crops and forages. Also, a number of scientific laboratories are available for teaching and scientific research.

The vision of the college of agriculture is part of the overall vision of the university. The college aims to produce qualified and competitive graduates capable of keeping up with the continued scientific developments in agriculture, contributing to applied agricultural research and serving the agricultural community. The college seeks to provide the local and foreign societies with the needed agricultural specialists who meet the international standards of scientific background, skills and personal attitude.

THE AGRICULTURE SECTOR IN PALESTINE

The agriculture sector in Palestine carries both economic and political importance. According to the Palestinian Central Bureau of Statistics, this sector is employed about 11,5% of the labor force. Further, the agriculture income represents 5,6% of the gross domestic product (GDP) and accounts for 21% of the total exports. More notably, the agriculture in Palestine plays a central role in land protection from Israeli confiscation and settlements. Thus, the vision of the agriculture strategy “resilience and development” announced by ministry of agriculture (2017-2022), to be achieved during the coming years: to have a sustainable and feasible agriculture sector that can compete domestically and externally; and can effectively contribute to enhancing food security and the connection between the Palestinian people and their land, while also enhancing Palestinian state-building efforts through resource sovereignty

THE AGRICULTURE SECTOR IN PALESTINE

The agricultural sector and its activities show that the sector is facing many challenges and obstacles. The environmental and political challenges are the main factors threaten the agriculture sector in Palestine. However, the effects of these issues are more intensified when considered in the frame of Climate Change. In this perspective, water quantity and quality have been continuously declining during the last years. Further, the scarcity of land resources, rapid population growth, pollution of the aquifers and marine environment, desertification and land degradation are challenging.

One novel strategy to overcome agriculture abstracts is Smart and Precision Agriculture. Precision Agriculture (PA) is a whole-farm management approach using innovative technologies such as ICT, satellite positioning (GNSS) data, remote sensing, proximal data gathering etc.

These technologies have the goal of optimizing returns on inputs whilst potentially reducing environmental impacts.

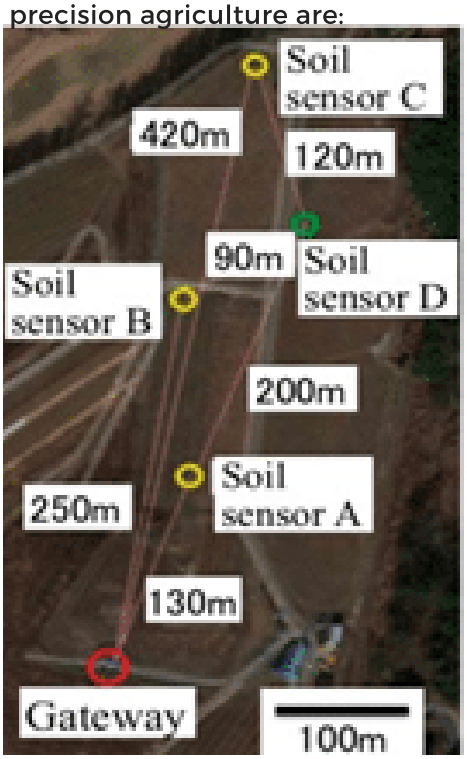
The protection and development of agriculture sector is a priority at the governmental and educational level. There is a need to increase and encouraging research in the different fields of agriculture, develop agricultural infrastructure, encourage the use of best practices in terms of water use, and encourage the application of smart or precise agriculture in order to increase the benefit values of unit of water or land.

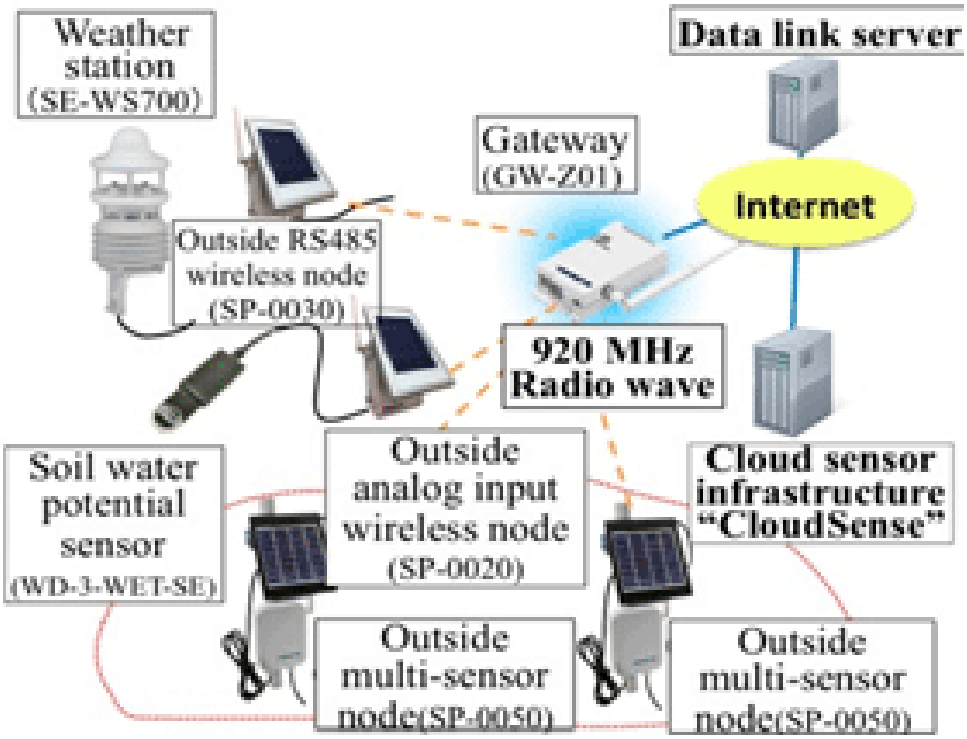
AS A RESULT, THE USE OF (DIGITAL) TECHNOLOGIES could allow the agricultural sector to achieve big leaps in Palestine, especially in improving environmental protection, increasing productivity and introducing the cultivation of new strategic classes of crops. The knowledge about advanced agricultural technologies have therefore become key for the farmers in these regions, throughout the process of cultivation and harvest

EQUIPMENT FOR PRECISION AGRICULTURE

BY: SEHER KADIROVA, RUSE UNIVERSITY "ANGEL KANCHEV"

One of the main ideas of BENEFIT project is to involve Palestinian farmers into the precision agriculture processes using the appropriate equipment, for enriching them with creative skills. Precision agriculture is a modern farm management approach that involves integrating precise farming techniques to achieve maximum output with minimum resources all while conserving the environment. It is fast gaining relevance due to its positive impact on the environment and the pockets of farmers. With the help of precision agriculture, farmers can get important information pertaining to soil data, obtain topographical maps and perform precise planting. It focuses on use of information technology tools such as GPS guidance, sensors, robotics, drones, autonomous vehicles, GPS-based soil sampling, automated hardware, and telematics to increase agricultural productivity. Some of the tools employed in precision agriculture are:





PROXIMATE SENSORS TECHNOLOGY

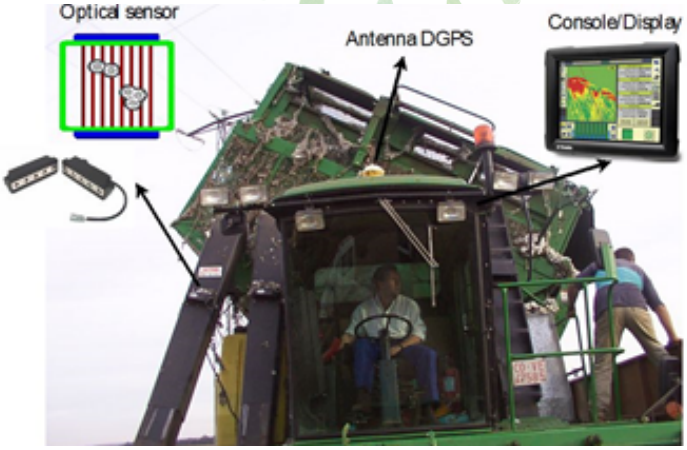
Sensors detect important signals in environment such as the heat intensity, quantity of moisture, and light signals. Precision agriculture helps farmers detect moisture content and temperature intensity and their subsequent impact on crops. Farmers may identify any stress experienced by livestock with the help of sensors and fix the problem. Remote sensing is used by farmers to make crucial decisions pertaining to crop rotation, and irrigation.

VARIABLE RATE TECHNOLOGY (VRT)

Variable rate technology involves application of farm inputs at a precise rate, time and position. It is intended to reduce wastage and get increased yields from the same size of land. It is commonly used when sowing, irrigating, weeding and fertilizer application.

GLOBAL POSITIONING SYSTEM (GPS)

A GPS system stores, retrieves, and analyses geographical information using a map. It is divided into three segments: space, control and user. The Global Positioning System helps farmers in identifying the correct location to grow crops, study soil samples, use fertilizers in a balanced quantity and monitor yield data.



DRONES

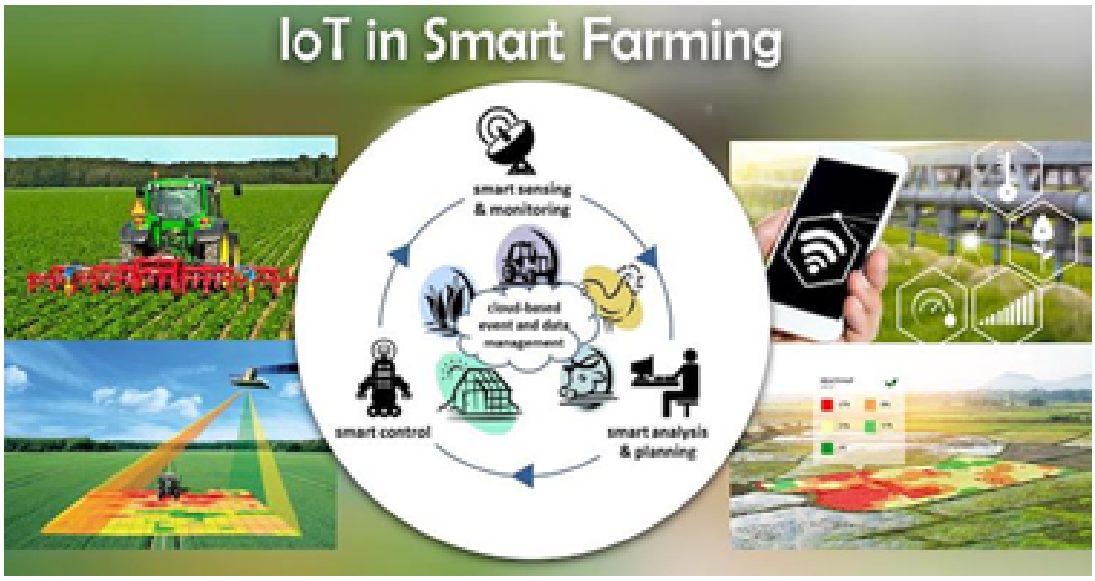
High-tech drones allow farmers, and the drone pilots who operate them, to increase efficiency in certain aspects of the farming process, from crop monitoring to planting, livestock management, crop spraying, irrigation mapping, and more. Drones equipped with high resolution cameras are intended to capture high quality images. This information can be combined with real-time data to predict future crop production.

ROBOTS

Farm machinery can be programmed by GPS to plough land, sprinkle pesticides, spread fertilizers and identify pests and weeds. Many solar-powered machines are used to deal with the herbicides, weedicides and different forms of insects. Robots are taking on many tasks in agriculture these days, including planting greenhouse crops and pruning vineyards. The biggest push has been for autonomous machines that are remotely controlled using telematics.

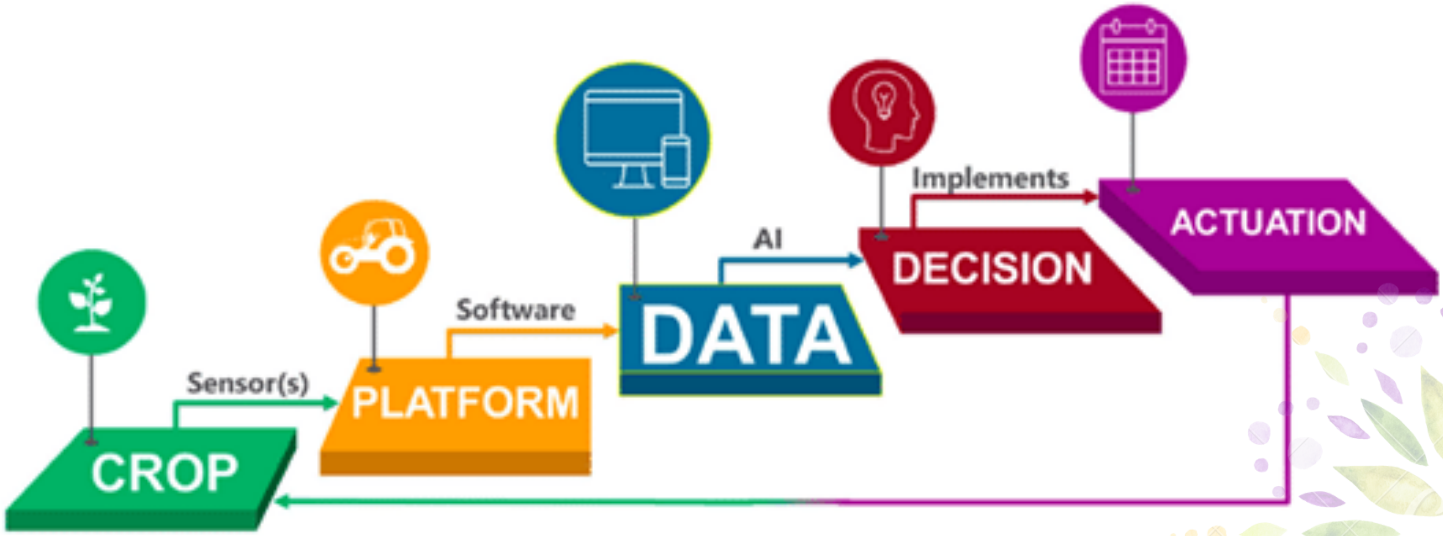
INTERNET OF THINGS (IOT)

IoT builds two-way communications between object and a farmer. Installed sensors measure parameters of soil, climate, water, light, livestock and everything included in farm and record these data which then can be transmitted to smartphone/tablet/PC hundreds or thousands of Kilometres away through the internet with real-time monitoring and management for the farm. Integration of Internet of Things technology in the agricultural operations minimizes the requirement for manual labour with automation, accelerates machinery commands with remote and real-time monitoring, and at the same time, it allows the farmers to utilize resources much efficiently with preventive maintenance and environmental prediction. Once these advancements are implemented in the agricultural sector, they are certain to scale up the revenues and will also enable the farmers to manage more acreage.



BIG DATA

The first stage in data analysis is the crop management, which is the beginning and the end of the cycle. Next, follow the platform supporting sensors, required for implementing crop monitoring and obtaining objective information about them. During the third stage, the collected data is processed and summarized, using a variety of methods and software tools. The main goal of BIG DATA analysis is to transform data into a meaningful and easy to understand form. It is the necessary requirement for stage four, in order to conduct the decision-making process effectively. The final fifth stage represents the actuation taken, which should influence the next production cycle.



AGRICULTURAL EXPERIMENTS AT PALESTINE TECHNICAL UNIVERSITY KADOORIE (PTUK)

The college was established in 1930, Its name Kadoorie came after Sir Ellis Kadoorie who granted building the college

Vision of the Agricultural Science and Technology

Faculty of Agricultural Science and Technology embraces leadership and creativity as well as effective in applied research based on the needs of the agricultural sector

Mission of Agricultural Science and Technology

The College of Agricultural Science and Technology works to support the local and regional market with qualified and competent graduates and innovative entrepreneurs, to contribute significantly to agricultural development through applied scientific research and partnerships with all stakeholders in the agriculture and food sector The Faculty of Agricultural Science and Technology was established in 2011 to be an extension of the Kadoorie Agricultural School, which was founded in 1930. The decision of the establishment of the college stems from the belief of the university administration of the need to restore the agricultural heritage of this ancient institution known by its agricultural history, and the graduation of many agricultural competencies known locally, regionally and internationally.

The Faculty of Agricultural Science and Technology seeks to achieve leadership and creativity in agricultural technical education through the launch of a package of new academic programs that keep up with the tremendous progress in agricultural sciences, with the objective to be the best scientific technical choice at the level of Palestine and the Arab world in the field of educating and preparing agricultural engineers, based on the modern education and training methods. The college also aims to providing the labor market with specialized scientific competencies and contributing effectively to the development of the Palestinian society through holding specialized conferences and workshops which it provides solutions to the most important problems facing the agricultural sector.

AGRICULTURAL EXPERIMENTS AT PALESTINE TECHNICAL UNIVERSITY KADOORIE (PTUK)

The College have a lot of experience in agriculture sector according to the implementation of many research projects, one of these projects :

(Enhancing Water Security and Socio-economic Development in the Eastern Mediterranean under Climate Change (WASEC)

This Project is about the know how to conserve and eliminate the waste of water while considering potential climate change impacts, to enhance water resources management plans new innovative tools and methods need to be used.

WaSec Project amis to:

a) Develop a new culture of working relationships among HEIs and enterprises to allow HEIs better integration within the larger society.

b) True collaborative efforts with enterprises to provide student support from practical placement, entrepreneurship and employability that should allow graduates to develop capacities that guaranty greater success when joining the labor market,

c) Implement new and innovative learning and pedagogical approaches to offer high quality education,

d) Graduates with a cultural, environmental and social identity that utilize water resources sustainability assuring its future while also incorporating climate change impacts.

The specific objectives are:

a) a Water Network among institutions involved in water management to promote HEIs and enterprise collaboration;

b) new or updated courses on water management with the true integration of enterprises in English and Arabic;

c) graduates specialized in water resource management specialized for the region that understand climate change implications;

d) courses with clear learning outcomes and materials, accredited in all partner countries, jointly taught and delivered, tailored to utilize new technologies;

e) to run and assess the pilot courses in the partner countries,

f) to develop a virtual learning platform with learning materials in digital format to facilitate learning and assessment,

g) to disseminate the results in order to be adopted by universities from other countries of the region,

h) to exploit the results by organizing knowledge transfer to other practitioners.

SLUDGE MANAGEMENT, TREATMENT AND REUSE IN GAZA STRIP

CASE STUDY: NORTH GAZA EMERGENCY WASTEWATER TREATMENT PLANT (NGEST)

LUAY I QRENAWI, MAJD H. NASSAR, MARAM A. HAMADA, REEM M. AL-HALABI, DINA R. NASSAR

ENGINEERING AND INFORMATION SYSTEMS DEPARTMENT, UNIVERSITY COLLEGE OF APPLIED

Sludge consists of solids generated from primary, secondary, advanced, and liquid residuals of wastewater treatment processes. The amount of produced sludge depends on the wastewater characteristics, the specific processes used for treatment and their efficiencies. Undesirable constituents in sludge can generally be grouped into: metals, trace organic contaminants, and pathogenic organisms. Sludge treatment and disposal system can be broadly classified into the following categories: thickening, stabilization, dewatering, conditioning, and final disposal.

North Gaza Emergency Sewage Treatment Project (NGEST) is located in the north eastern part of Gaza Strip in semi-arid Mediterranean climate. The plant depends on activated sludge system to treat wastewater volume of 36,000 m3/day, with 96%, 97%, 95%, 85.8% and 91.6% removal efficiency for BOD5, COD, TSS, total-nitrogen and ammonia removal respectively. The plant has a sludge treatment system which treat 40 m3/day of sludge from primary and secondary processes. Within the plant, sludge treatment processes are: thickening, anaerobic digestion and dewatering. Finally, the thickened sludge is pumped to the sludge storage with a retention time of 100 days where drying of the sludge is taking place.

The objectives of the present study are to investigate and study the current practices concerning sludge management and treatment at the NGEST, to propose effective options for sludge management, and treatment at the NGEST and to assess the possibility and applicability of sludge reuse as an agricultural fertilizer.

The study concluded that 45-days for sludge treatment in Gaza Strip by the drying beds technique with direct exposure to the sun, will be sufficient to completely remove fecal coliform, Escherichia Coli and salmonella from the sludge samples. Heavy metal concentrations for the treated sludge samples are all fall within the Palestinian specification that regulates using treated sludge as fertilizer.

The study recommends that the treatment period of sludge is relatively long (45 days), which requires more research to be shortened, the existence of intestinal helminths eggs in the treated sludge need extra treatment, the ministry of agriculture and the ministry of health should have positive role in applying the treated sludge as a fertilizer and encourage farmers to its use.

AL-ISTIQLAL UNIVERSITY ENHANCING FOOD SECURITY THROUGH PROMOTING SMART FARMING AT JERICHO DISTRICT, PALESTINE.

BY: WALID KHALILIA, ALISTIQLAL

The agriculture sector in Palestine carries both economic and political importance and plays a central role in land protection from Israeli confiscation and settlements. The environmental and political challenges are the main factors threaten the agriculture sector in Palestine.

Food insecurity situation in Palestine remains grave. The main reason for food insecurity in Palestine is the lack of economic access to food. Since the root causes of poverty are entrenched in the occupation, high unemployment, and insufficient economic growth.

Al-Istiqlal University is a pioneer in the field of security sciences, such as food security. PASS located in the city of date palm, Jericho, and date palm is a major fruit crop in Palestine. It has historically been connected with sustaining food security for Palestinian households.

In this sense, several works must supply to eliminate the gap between university and poor families in this area by training students and farmers to achieve a sustainable development by conserving of technical, environmental, social and economic factors. In addition to raise their capacity skills and experience in smart farming to manage palm field and applying the new technologies in this field.

On the other hand, there is a concern among consumers about the contamination of agricultural products due to irrigation with wastewater and using not allowed pesticides, such as irrigating of date palm trees in Jericho and Jordan Valley with untreated wastewater, especially farms in Israeli settlements. In order to face these ethical issues PASS developing new courses by using smart agriculture and new technologies. This leaded to improve food security and environmental protection in the region.

BOLOGNA PRINCIPLES

BY: ZUZANA PALKOVÁ , SPU IN NITRA

One of the most important aims of internationalisation of the higher education is to build cooperation based on common key values such as freedom of expression autonomy for institutions independent student unions, academic freedom, free movement of students and staff. Through this process, countries, institutions and stakeholders of the European Higher Education Area, but in the partners' countries as well, continuously adapt their higher education systems making them more compatible and strengthening their quality assurance mechanisms with the main goal is to increase staff and students' mobility and to facilitate employability.

In the frame of program Erasmus, launched 30 years ago, more intense and structured cooperation among higher education institutions has been triggered. As the demand for student mobility grew rapidly, it became clear how difficult it was for single institutions to recognise periods of study across different national higher education systems with divergent degree structures and different academic traditions.

The Bologna Process, starting with the Sorbonne and Bologna Declarations, was the response of national governments to the challenges arising from students and graduates' mobility and in the present time, big progress has been made in reforming higher education systems in the EU Member States and beyond the European Union. Thus, the Bologna Process represents the key to building the necessary trust for:

- successful learning mobility,
- cross-border academic cooperation,
- the mutual recognition of study periods and qualifications earned abroad,
- enhancing the quality and relevance of learning and teaching.

Education Ministers have also adopted the Paris Communiqué highlighting priority activities in this area for the coming years. The Communiqué outlines the joint vision of education ministers from 48 European countries for a more ambitious European Higher Education Area by 2020.

So, what we can understand under "the Bologna Process" term?

The Bologna Process seeks to bring more coherence to higher education systems and to facilitate student and staff mobility, to make higher education more inclusive and accessible, and to make higher education more attractive and competitive worldwide. As part of the Bologna Process, all participating countries agreed to:

- introduce a three-cycle higher education system consisting of bachelor's, master's and doctoral studies.
- ensure the mutual recognition of qualifications and learning periods abroad completed at other universities.
- implement a system of quality assurance to strengthen the quality and relevance of learning and teaching.

THE FRAMEWORK OF QUALIFICATIONS AND 3-CYCLES SYSTEM

In order to reach principles of Bologna process, various instruments have been developed, adopted and implemented at the European, national, regional and institutional level aiming at facilitating fair recognition of foreign qualifications and/or study periods abroad.

Those instruments are amongst others:

- ECTS - the European Credit Transfer and Accumulation System, which makes studies and courses more transparent and thus helping to enhance the quality of higher education.
- DS - the Diploma Supplement, a document describing the knowledge and skills acquired by holders of higher education degrees.
- QF - the overarching and national qualifications frameworks, which aim to organise national higher education qualifications into an overarching European-wide qualifications framework via defining levels of complexity and difficulty
- ESG - the European Standards and Guidelines for Quality Assurance of Higher Education, where is defined that higher education institutions have primary responsibility for the quality of their provision and its assurance.

"BENEFIT INSTRUCTIONAL DESIGN AND EXCELLENCE FRAMEWORK"

BY:Fragkaki Maria, Mystakidis Stelios, UPAT

What is it: BENEFIT- Instructional Design Framework consists the basis of the Precision Agriculture Curriculum. It defines not only the Pedagogy that it will be used to support the Precision Agriculture Course/s, but also the related Content and the needed Technology, as well as their effective and efficient alignment.

Why we need it: If we were developing a synchronous curriculum, without setting all the crucial aspects of its design (pedagogy-content-technology), someone could say that our project would not have either a basis on to stand or an instructional framework to be infused by. It would be a curriculum without heart and mind- without philosophy.

How it will support the curriculum development: The "BENEFIT -Instructional Design Framework" will set the scaffolding of the whole Precision Agriculture Curriculum design and consequently the PA Course/s development. The BENEFIT TPACK Model will add a critical thinking component to the project, by specifying the basic elements of the pedagogy, the content, the technology, and their combinations, within a layered, multifaceted, multi-factorial approach that emphasizes "why" and "how" beyond "what".

BENEFIT-Instructional Design Framework MODEL

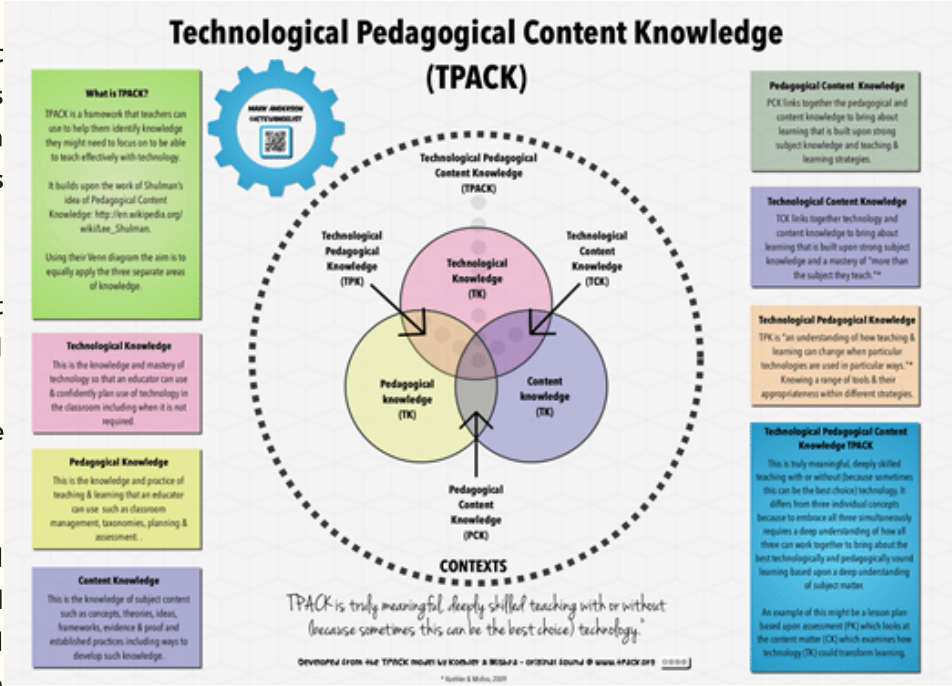
The BENEFIT-Instructional Design Framework it is based on the TPACK model and features a complex interplay of three primary forms of knowledge: Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK).

BENEFIT INSTRUCTIONAL DESIGN EXCELLENCE INDICATORS

B1. BENEFIT Pedagogical Content Knowledge describes how the resources that have been chosen can be aligned with the pedagogy it is followed and the Course/s Syllabus. **(PCK indicators)**

B2. BENEFIT -Technological Content Knowledge defines how the technological aspects can be
aligned with the content/ resources and the Course/s Syllabus. **(TCK indicators)**

B3. BENEFIT Technological Pedagogical Knowledge defines how the technological aspects can be aligned with the pedagogical aspects they have been set and the Course's Syllabus. **(TPK indicators)**



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BENEFIT

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ALQUDS OPEN UNIVERSITY (QOU)

Palestine Technical University Kadoorie (PTUK)

Slovak University of Agriculture in Nitra (SPU)

University of Patras (UPAT)

An-Najah National University (ANNU)

University of Ruse (RUAK)

institute of Technology and Business in Czech Republic (VSTE)

Hebron University (HU)

AL-Istiqlal University (PASS)

University College of Applied Sciences (UCAS)

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