WFO E-MAGAZINE

F@RMLETTER

ISSUE N°66 AUGUST 2017

2017 INTERNATIONAL YEAR OF SUSTAINABLE TOURISM FOR DEVELOPMENT

DIGITAL FARMING KEY TO YOUTH INVOLVEMENT IN AGRICULTURE

E-Magazine

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DIGITAL FARMING MAKING AGRICULTURE ATTRACTIVE

Tobias Menne
HEAD OF BAYER DIGITAL FARMING,
MÜNSTER, GERMANY

The United Nations Population Division reports: more than half of the world population live in urban areas and that all countries are becoming increasingly urbanized. The exodus to the cities resulted in an ageing population of farmers; their average age is around 60 years old . It is clear that agriculture needs to attract more young people.

The exodus of the rural population to the cities combined with limited arable land, climate change and weather fluctuation, and food losses are posing significant challenges to the future of food supply. However, while these challenges are significant they are not unsurmountable, innovation will allow farmers to meet these growing economic, environmental and societal challenges.

Every day we experience how bytes, bits and pixels are changing the way we live. From the smartphone in our pocket to the highly sensitive sensors in combines and fields - we are more connected, integrated, and informed than ever before, no matter where we are or what we do. Agriculture is no stranger to these innovations; it is undergoing important changes through further digitalization which are reshaping the industry.

Tobias Menne is Head of Digital Farming at Bayer. He leads a team of professionals passionate about providing growers – big and small – around the world with insights about their crops and fields which will enable them to make more accurate agricultural decisions, and ensure healthy fields and food.

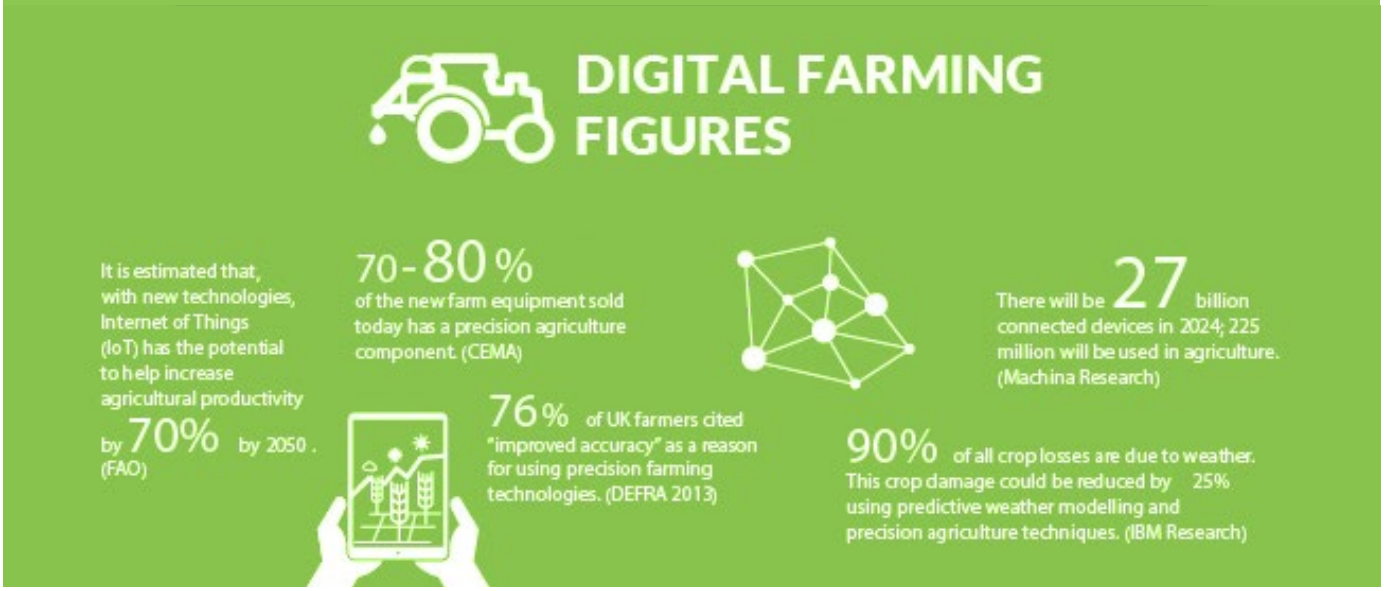
He started his career at Bayer as Managing Director of Bulgaria, moved to Ukraine as Managing Director and Head of Agricultural Operations. For a short stint he joined Group Myria Agroholding as Chief Technology Officer, and returned to Bayer to lead the Digital Farming Business.

In these different roles, he drove the strategy and implementation of precision farming and on-farm data management particularly in large scale farms. His entrepreneurial style combined with his optimistic vision about the future of agriculture inspires him to try to break new frontiers in science and technology to help growers deliver food in a sustainable fashion.

Farming has and will always be a field where decisions are made from a mixture of knowledge, experience, and gut-feeling. Digitalization provides the farmer the ability to more accurately predict the outcomes, as well as most effectively respond to nature's challenges. Farmers around the world are being able to act and react significantly faster – at the speed of 'now' – as patterns and changes can be recognized in much more detail. Growers have the opportunity to more precisely predict the impact of their decisions, such as: choice of seed variety, application rate, or harvest timing, making the risk management of the farm easier and affording higher profitability.

Digital Farming solutions from Bayer will enable farmers to optimize the input of crop protections products and achieve a more reliable outcome. These solutions will bring greater transparency and make it easier to comply with regulations. As with any new technology there are still some hurdles to overcome. Bayer has chosen to collaborate and partner with diverse companies and research institutions focusing on climate modeling, soil mapping and farm machinery, to deliver digital solutions which meet different types of farms and needs.

We are confident digitalization in agriculture is the engine that will drive its future. Digitalization is at the core of innovation, enabling new business models and higher efficiencies through data analytics. From product development to decision making tools, it is exacting changes in agriculture which will



contribute to the global goals of zero hunger through higher yields; financial improvement for farmers, big and small, through access to knowledge and information; and, protection of the environment through sustainable farming practices.

At the core of all these we are observing a change in the profile of those who are and will be involved in agriculture. The use of Big Data in the farms, drones to capture images to make better decisions, the use of sensors to make better predictions requires a new set of skills in the industry. Not only is the profile of the farmers changing but also the image of agriculture among young people. Simply put, we are departing from the perception of farming being back-breaking labor, without an economic pay-off and little room for career advancement. The Journal of Business and Science published a study which indicates that societal acceptance, together with attitude and knowledge are determining factors among youth to pursue a career in Agriculture.

Therefore, Universities and other educational institutions are actively involved in re-shaping careers. The Global Confederation of Higher Education Associations in Agriculture and Life Sciences (GCHERA) is working with over 600 Universities to make agriculture-based courses more relevant to the skills and opportunities they now seek – i.e., more attractive. Wageningen University in the Netherlands has redefined its courses to meet the needs and priorities of today's young people. To attract young students, Wageningen focuses on the theme 'healthy food and living environment' and works closely with both governments and the business community.

Bayer has engaged in several initiatives to capture young professionals. One of them is the Youth Ag Summit which takes place every second year. In 2017, it will take place in Brussels on October 9-13 bringing together over 100 youngsters from 49 countries. During the week-long event young leaders will be able to discuss opportunities, collaborate and find answers and solutions to the question "How do we feed a hungry planet?" Bayer also implemented the International Fellowship Program, which offers students and apprentices tailor-made financial support to pursue their innovative projects. After they acquire their degrees, additional offerings for postdocs provide further support by giving them opportunities to deepen their research with exciting projects, publications, and visits to renowned institutions.

In addition to engaging young people in the diverse opportunities agriculture offers today, we want

Investments in 2015 in different branches of U.S. agritech start-ups

Sources: Statista, AgFunder, CrunchBase

to attract talent to our business and we know a well-paid job is not enough, they want more. Today young professionals want to be part of the solution to a global challenge. Within Bayer through technology we seek at making farming more efficient and more environmentally-friendly. We develop solutions for farms big and small, so that they can tackle their challenges and grow their businesses.

Additionally, we know young talent expect a different work environment. They look for non-hierarchical, open and dynamic environments in which they can grow and develop. We want to enable this start-up culture at Digital Farming. We have built a young, multidisciplinary and highly connected team that is not afraid of pursuing unusual ideas and concepts.

We are confident, that by implementing initiatives, which create a community of young people interested in agriculture, the work we do with other companies, institutions and associations to explain how agriculture is a science and technology driven career, and by providing a working environment that is consistent with today's expectations we will attract young professionals around agriculture. They, in turn, will help amplify the message and create awareness of the opportunities within the industry.

We expect these new opportunities will help reverse the disconnect between the agricultural sector and consumers as young city professionals from exact sciences become more involved in agriculture.

If we want to achieve the United Nations Sustainable Development Goals (SDGs) 2030 agenda, and make sure that all peoples have access to sustainable and healthy food we will need the younger generation to get involved. This is one of our focus goals at Bayer.

COULD THE ANSWER TO GETTING YOUTH INTERESTED IN FARMING LIE BENEATH THEIR FINGERTIPS?

Vanessa Mukhebi
COMMUNICATIONS SPECIALIST, MEDIAE, NAIROBI, AND FARMING FIRST SUPPORTER

It is often said that youth carry the potential to transform agricultural productivity and contribute to global food security for a booming population that is set to increase by two billion by 2050. However, debating the future of farming and rural development is pointless without the willingness of the youth themselves to engage in the sector. This potential can only be realised through an image overhaul of farming.

So, what if I told you that several solutions to this challenge, exist right in their back pockets?

The drawback of farming-related careers in preference for white collared employment in urban areas, is partly on account of the societal prejudices and misconceptions held about such careers as well as the limited knowledge about the opportunities available in agricultural industry that are economically prosperous.

Fortunately, through rapid advancement in information and communication technologies,and increased access to the internet through mobile devices, agriculture in the developing world has become a vibrant field full of effective and creative innovations.

And with the youth already predisposed to this digital revolution, these solutions provide unparalleled access to information to help them take advantage of the exciting opportunities within the industry.

In countries like Kenya, where overstretched extension services are unable to adequately support producers, mobile solutions such as iShamba, offer the ability to disseminate timely and relevant information regarding production, input supplies, weather updates and market price information.

Additionally, the farmer information and advisory service is equip-

ped with a call centre, staffed with agricultural experts, where farmers can SMS or call to get instant advice seven days a week.

Farming communities can also exchange information with each other through the service's location-based WhatsApp groups and get advice from iShamba's agricultural experts on best farming practices. Simon Mwangi, a young farmer from Nyeri, Kenya, says that the platform helped him venture into farming."Thanks to iShamba's agronomic advice, I managed to grow tomatoes for the first time. I have already started harvesting my tomatoes and they are doing well."

Though the platform is highly interactive, the challenge remains on how best to engage youth.

In regards to this, the appeal of farming to young people hinges on its ability to be recast and marketed as a profitable enterprise; agribusiness has to be promoted in favour of agriculture.

A reality television show called Don't Lose the Plot is aiming to do just that - stem the exodus of rural youth to urban areas and encourage them into agribusiness.

Set on a sprawling farm on the outskirts of Nairobi, Kenya, the show follows four young farmers from Kenya and Tanzania, who are given one acre plots to farm side-by-side for nine months. At the end, the farmer with the most profitable and sustainable business wins an agricultural investment worth US$10,000.

Each young farmer had access to a panel of advisors that critiqued their ideas and approach while encouraging them to use modern, labour saving techniques to make the most of their land. After developing a business plan for their farm, they got access to financing, set up their farms, managed them and marketed their produce profitably.

Ken, one of the contestants from Kenya, lauded the show for exposing him to the opportunities that youth such as himself have at their disposal to improve their livelihoods. "I see this competition as an eye opener, to the resources that we have in our country. To increase food security, and to try to solve the unemployment issue amongst youth. I think I'm doing something great here."

Nevertheless, what was evident right from the start is that young farmers need assistance in creating realistic budgets and managing their finances.

Enter Budget Mkononi, the web-based agricultural budgeting tool initiated by the producers of Don't Lose the Plot, The Mediae Company, and Mercy Corps Agri-Fin Accelerate.

The tool allows young aspiring and inexperienced farmers to view estimated costs and profits from various commodities that are high-value and short term such as broilers and onions.

Through Budget Mkononi, hopeful entrepreneurs can explore the relative merits of each and visualise their cash flow requirements for the duration of the farming cycle, showing young farmers how to farm in a productive and sustainable manner.

Developed by Regulus Ltd, the tool is designed specifically for use on mobile devices and went through several stages of user-testing to ensure that it met the needs of it's target audience. The interactive functionality also allows farmers to customise their budgets based on their specific circumstances.

What's apparent is that with such solutions at hand, gone are the days that farming is the domain of an uneducated farmer.

Connectivity through ICTs enables solutions such as iShamba and Budget Mkononi to shape a new frontier of farming that is young, vibrant and innovative. All youth need to know, is that success is within their reach - right under their fingertips.

DIGITAL FARMING AS A KEY TO YOUTH INVOLVEMENT IN AGRICULTURE:

THE GERMAN PERSPECTIVE

Nina Sehnke
CHAIR, BUND DER DEUTSCHEN LANDJUGEND, BERLIN

For more than 10,000 years people have cultivated crops using trial and error, received wisdom and how the soil feels when they rub it between their fingers. Only recently in history, mechanization revolutionized the countryside with machinery and replaced horses with tractors. Nowadays, we are witnessing a new farming evolution triggered by the adoption of staggering new technologies as satellites, high precision positioning systems, smart sensors and a range of IT applications combined with high-tech engineering.

Future Agriculture will not get along without Digital Farming or as we call it mostly: Smart Farming. The linkage between agricultural engineering and data processing on the one site and cross-linking between the different operational areas on the other site, will lead to more productivity. And this aspect is most important to go easy on resources, natural and economical. Smart farming is about managing variations in the field accurately, to grow more food using fewer resources and reducing production costs. All aspects of environment - soil, water, weather, vegetation – vary from place to place. And all these factors determine crop growing and farming success. Farmers all over the world have always been aware of this. That means that smart farming has a lot of positive effects on environment, society and Young Farmers. These future farmers will make a difference to food production facing the challenge of a rising world population and can achieve greater sustainability, higher economic benefits and environmental protection.

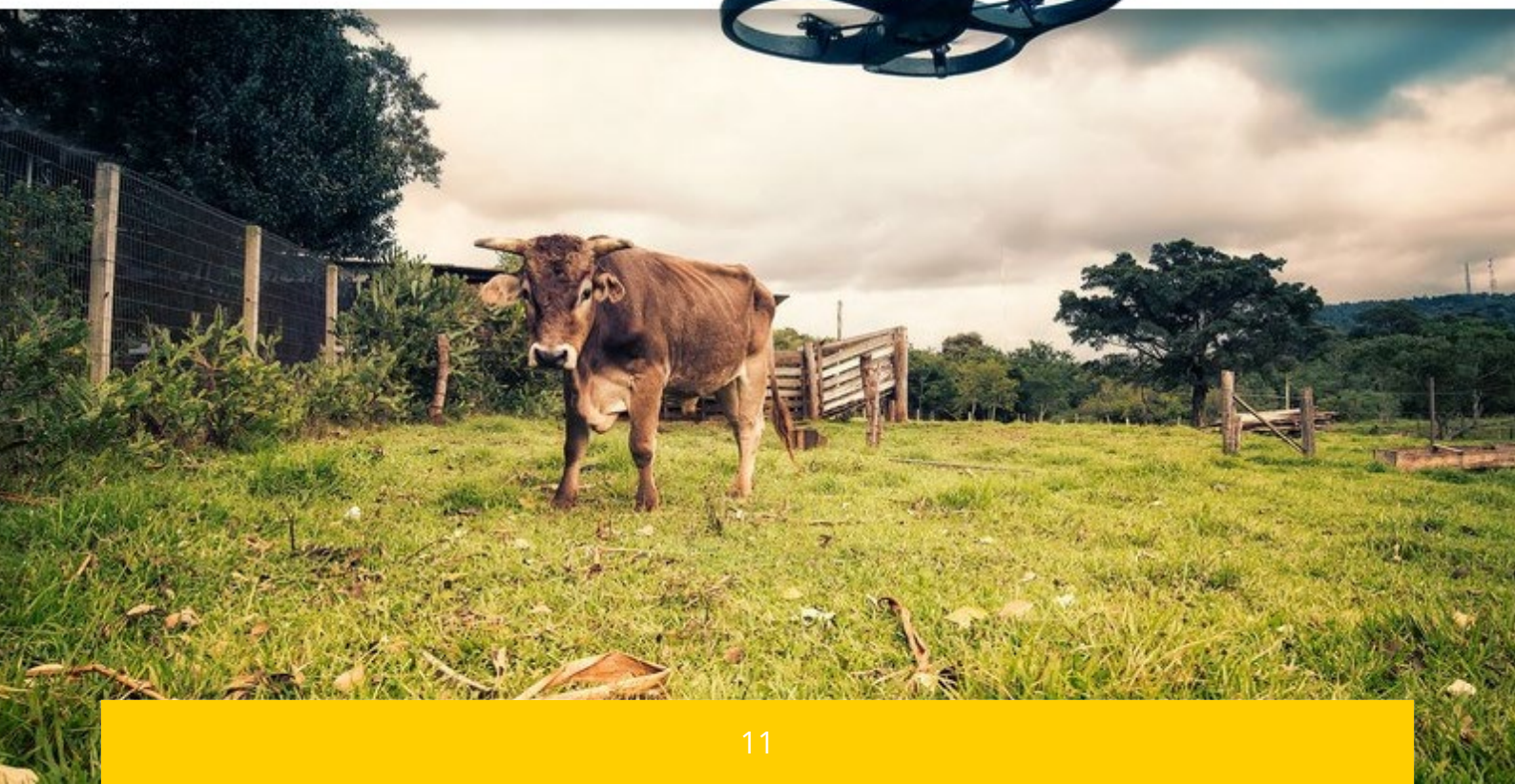
In addition to all these positive aspects there are also some points to be considered and the uncertainties cannot be ignored. For that reason, we as BDL demand more research on smart farming, which must be supported out of our government. Data security and independence from big companies must be ensured for the future. Simultaneous there is a strong need of special measures for young framers in the range of promote innovation to buy new technologies and equipment with data processing. All these new technologies provide an important opportunity for more productivity on smaller areas and more environmental protection as well – as long it is affordable for young farmers. If that can be done,

smart farming will be the key for the future agriculture, no matter if the young farmers take over the family business, buy or rent a new farm or take place in the agricultural sector in any other way.

Even more young people are interested in a career in the agricultural sector and the amount of them, which did not grow up on a farm is getting higher. This fact is a positive counterpart to the "Demographic change" we have and will get even more in Germany and Europe. But the access to land is not getting easier. Access to and to access to capital are some of the greatest barriers for young farmers, so young farmers looking for affordable and are forced to be creative. So many young farmers are not taking the traditional route. They are not buying land, but renting instead. Or they are forming partnerships with older farmers who are leaving the business, having no own kids but not want to sell their family land to an unknown person. That can be a way to land access especially for young farmers, which are not part of a family farm business. So we need to create a national...ore maybe international... system, to connect young farmers to the leaving ones.

In the reason of land access for young farmers, the BDL stands for something that we call in Germany the "Hofabgabeklausel". That means that, when older farmers stop their business before a special age, they get a retirement and the younger generation is in charge. This system is the bet guarantee for the future, because young famers have the opportunity to be accountable for their own business in a younger age and can make their own (innovative) decisions. Out of the view of the BDL, young farmers are more innovative and more open for new technologies ore business diversity – and for all of this, they need to be the owner of the farms.

There is another challenge the young farmers have to face. A lot of the Germans have lost the touch with agriculture and have an romantic view on the production of food and demonize the extensive farming. Young people are good in going between. Not only because they are young, optimally educated and full of passion for their work, but also because they are digital natives. Naturally they open their farms to public and talk to everyone interested in agriculture. But they are not getting tired in finding new social media channels to interact with everyone about agriculture. It's part



of their life to shoot films about what they do and they love it. They get a lot of fun and motivation out of it und develop modern networks supporting each other. In this point of view, Digital Farming is not only a big deal in the part of production, it´s also a way of communicate to the public – with all the positive side effects it has. Young farmers have to be smart in Farming and smart in public relations all in one.

Our world is getting larger…and hungrier…with every tick of the clock. Each second the world population grows by nearly 3 more people, which are 240000 people per day. By 2025 the global population will reach 8 billion people and 9.6 billion in 2050. That means there will be a big extra amount of mouth to feed within the next years. Feeding the growing world population poses an unprecedented challenge to human ingenuity – and that is very well known by the young farmers and they are aware of their social responsibility.

All in all smart farming is multilayered and every young farmer has to focus on what is useful and necessary on their own (future) farms and create their own future. Investments in young farmers and new technologies is not even an investment in the future of the farms, it is an investment in the whole sector and the rural areas.

HARVESTING THE POWER OF TECHNOLOGY FOR THE FUTURE OF FARMING.

Jannes Maes
PRESIDENT, CONSEIL EUROPÉEN
DES JEUNES AGRICULTEURS (CEJA), BRUSSELS

That digitalisation already surrounds our world and lives comes as no surprise. A majority of you is reading this very sentence on a computer, tablet or smartphone. Young farmers all across the world are combining in their daily activities centuries-old traditions with the newest and most cutting edge technologies.

The innovations that have already taken place have played a crucial role in the development of farming business. Technologies are allowing us to use GPS tracking to optimise crop management, from the moment of soil cultivation to the time of harvest. Not only can we decrease our fuel consumption and improve our seeds per hectare ratio, but combined with camera technology GPS tracking also allows us to utilise plant protection and fertiliser in a more efficient, sustainable way.

Livestock farmers across the globe are using sensor technology to help them better understand the signals their animals are sharing, from heat detection over bad digestion to upcoming fever.

It is not only in the area of technical production that the digital revolution is creating new opportunities. By collecting data true the food chain and sharing it among farmers, we can further strengthen farmers in their economic endeavours. Young farmers in South Africa can be given information about yields and prices in Canada from front line information sources, even before they have to start negotiating with their trading partners. Young farmers in Japan can have a quick look at their smartphone to see the USD/YEN exchange rate before they make a decision on their next sale.

Back to the future

But the digital revolution is not stopping today. Researchers, governments and the agricultural sector are investing time and money in developments in digital farming more than ever before. These should take in account the needs of young farmers in particular. As the young farmers of the world wrote in their manifesto last year: “Scientists should be acquainted of young farmers’ issues and these have to be involved in the research process.”

Digitalisation can play an important role in connecting producers with their consumers, whether they are individuals, processors or big retailers. It gives agriculture the chance to reinvent it selves once more. Digitalisation is not only making production and economic analysis easier on farm level, it is also making it more exciting than ever to be a young farmer today. Although physical labour still plays a prominent role in the profession, specialised knowledge and entrepreneurial skills are becoming more important.

On the one hand, the image of farming is often an outdated one that can push young peo-

ple away from farming and rural areas. On the other, digitalisation can create a new wave of communication. Young farmers are often only 3 clicks away from any consumer or citizen. In the twenty-first century, children across the world can enjoy hours of YouTube images of modern farms.

By using virtual reality, people living in the world's biggest cities are able to see how today's farms are organised without having to leave their living room.

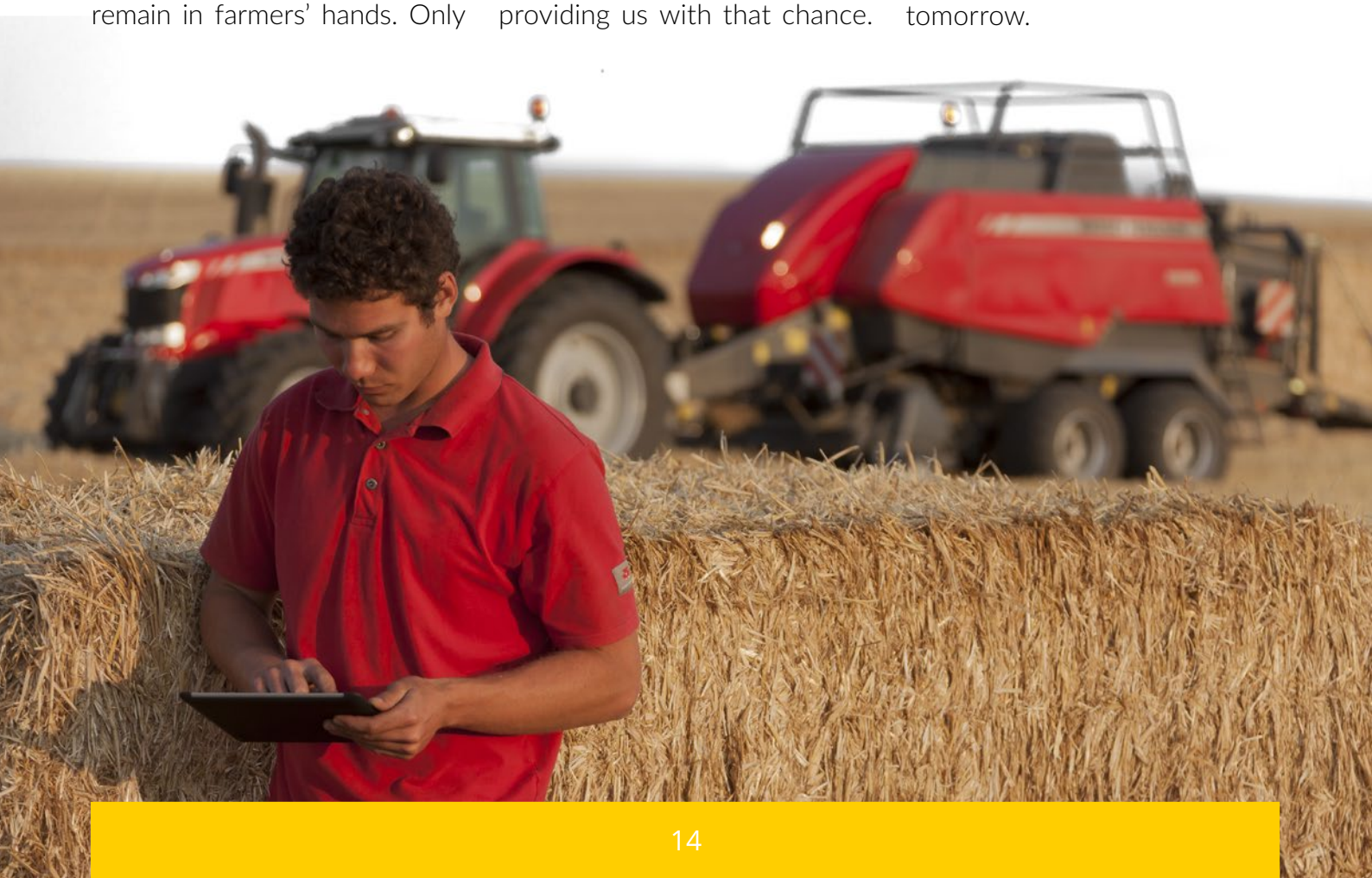
Policymakers should ensure rural areas have access to internet and create a concrete policy concerning the safety of data collection. That must ensure that the ownership of data will remain in farmers' hands. Only then can young farmers fully enjoy the benefits of todays and tomorrows digital revolution.

Last but not least

Besides the "on-farm" advantages that digitalisation brings to our profession, it is also very important to acknowledge its value for life. Not only does it enable citizens to see and experience farms, it also brings the world closer to farmers.

Young farmers today are so much more than just farmers. They are parents, partners, consumers, citizens, voters. Both as entrepreneurs, as well as individual persons with interests and passions, we want to be connected to the rest of the world. Digitalisation is providing us with that chance. The chance for a young sheep farmer to stand in the middle of her flock having a video chat with the love of her life on the other side of the world. The chance for a young dairy farmer to follow his favourite team's most important football match while milking his cows. The chance for a young wheat farmer to follow a political debate while driving his harvesting combine two days before going to the polls.

Young people who are the next generation of farmers are fully adapting to the innovations digitalisation brings to their farm and life. I believe it is key to supporting the young farmers of today, but also a means of attracting the young farmers of tomorrow.



DIGITALISATION AS A KEY TO BETTER FARM MANAGEMENT

Kati Partanen
MEMBER OF THE BOARD, MTK, HELSINKI, SENIOR LECTURER IN SAVONIA UNIVERSITY OF APPLIED SCIENCES, KUOPIO, FINLAND, FACILITATOR OF THE WOMEN'S COMMITTEE IN THE WFO

Digitalisation is changing the way people work and act. It has already affected on how we connect other people, search and share information, study and e.g. transfer money. The speed of change is even accelerating. It's not about automatizing the current processes, but doing things in totally different way.

Digitalisation brings a lot of chances to the rural economy. As the activities are no longer dependent on time and place, it can bring a new advantage in rural areas where nature is close and standards of living are high. At the same time areas with weak internet connections will suffer. Therefore, special attention must be paid to improving internet connections in rural areas.

Nordic farmers' view

Farmer organizations in Northern Europe (NBC) discussed about the digitalisation in their recent meeting. Nordic farmers see the possibilities of digitalisation enormous. It can develop the efficiency and competitiveness of food sector as consumers require more information from the products they purchase. It can bring new possibilities for smaller companies producing value-added products. As agriculture and food production are not familiar for most consumers, digital services could reconnect consumers back to the basic realities in food production. Consumer could find paths of the food from farm to fork. The development requires active investments from food chain to technological development, education and research. Being active in technological development and digitalisation can also attract young people entering the business.

Benefits and challenges for food chain

Finnish government published a report "Digitalisation in the development of the food chain" in September. Digitalisation is in the report seen to further food chain in many ways as it helps to optimize production and logistics, improve customer orientation and will bring consumer knowledge in the centre of busi-

ness. In agriculture, digitalisation can improve cost-efficiency of the production, real-time resource planning and traceability and quality of products.

Big possibility of the digitalisation in farm level is the possibility to utilize better and wider information collected through farm machinery. The problem is, that the information is often only available through the services of manufacturers. Yet, often information is not easy to be connected to other services. Interfaces to connect different services are still missing.

Information collected through the farm machines could be e.g. monitoring information of the seeding, fertilization and harvesting. Quality information e.g. from milk is benefitable both for farmer and her/his customers. Hence, digitalisation brings a lot of tools for farm management even to animal breeding services. In the above-mentioned report systems, farmer can plan production and control the economy of farm is called Farm Management Information System, FMIS. Originally these systems were made to work in PC, but nowadays they work usually in servers, through internet with mobile devices. This enables to broaden the services and connect them to other digital services available for farmers.

In the report is highlighted the importance of trust to the digital systems. Without trust to the systems they won't be taken into use broadly. Data ownership and control and on the other hand data openness, are crucial to build trust from farms point of view. These questions are discussed in many parts of the world. E.g. in USA is established Open Ag Data Alliance (OADA) to solve data control and data transfer questions. In Europe, European Agricultural Machinery association (CEMA) has stated in its vision to respect farmers' right to control her/his data.

Digitalisation can hence save time and help to grow the farm size. It can help farmer to use work input efficiently and help management of the farm.

Possibilities in consumer contact

Digitalization allows better information sharing from farm to fork. Consumer could scan package with cell phone, and see where the food is coming from, where it has been produced and how. This could increase reliability of food production and even make it more familiar. Consumers are more and more interested about food traceability. New possibilities of digital tools could also allow consumer to find a farm to follow through internet.

Access to markets, even in global level, is easier as digital tools are available to everyone. This gives a lot of opportunities even for small producers, who can sell their products almost anywhere. Logistics is usually hindering direct selling through internet a lot. Even more important could be individual farmers as social media persons. Nowadays video-blogging, vlogging, is very popular. Especially children and young people follow other young people who are sharing their days and thoughts through videos. This is a huge opportunity for farmers as well! Sharing normal farming day in social media can be an efficient information channel and effect on people's mind: agriculture is done by farmers, it's not anything to be mystified.

Equality must be considered

Equal possibilities to access digital services are very important. Access requires both skills and internet connections. In education, digital skills are becoming very important. However, teachers' interest and knowledge about digital tools and their motivation to use it, varies a lot. Digital tools do not make education necessary any better, but digital skills are essential

in future working life. It's not only about ability to use digital tools, but also learning the logics of digital world. As search and sharing of information is very easy in the Internet, also critical attitude towards information sources is essential.

Digitalisation could be a possibility to make the world more equal. In the recently published study "The Effects of Digitalisation on Gender Equality in the G20 Economies" digitalisation is seen as a tool to narrow gender gaps. Digital revolution should be complemented by policies which enable women to access and use the digital tools and other new technologies to their full potential. However, the study stated that gender gap is still wide in accessing and using mobile and digital technologies especially in rural areas of developing and emerging economies. Better technical literacy, affordable access to the new technologies and effective support regarding data security problems is needed in such regions. Digitalisation can activate unused entrepreneurial opportunities, but this study highlights the importance of improving especially women's entrepreneurial skills, bringing role models and improving access to financial resources to achieve them.

Agriculture as a future business

Younger generations' farms have, according to several research's, higher automatization level compared to their older colleagues. Also, farms with more automatization are more willing to grow. If farming is business with modern tools, development and nice people, it attracts more young people to study it. Agriculture is a future business. Biological processes are still a basis of agriculture, but work and management can be facilitated with new technologies. When food demand is growing we need to take the full potential into use, but in a sustainable way.

DIGITAL FARMING: FOSTERING YOUNG PEOPLE IN AGRICULTURAL LANDSCAPE

Dinesh Panday
NEPAL REPRESENTATIVE OF YPARD AND COMMUNICATION OFFICER FOR YPARD ASIA AND PACIFIC COORDINATOR UNIT

Drone at corn V6 growing stage
Photographer credit: Dinesh Panday

Collecting NDVI and NDRE readings at corn V8 growing stage using RapidScan CS 45
Photographer credit: Dinesh Panday

Our agriculture is heavily determined by natural and biological factors. With an expected population growth of 9.2 billion by 2050, it will pose huge challenges for the sustainability of both food production and of terrestrial and aquatic ecosystems. A recent estimate suggests that food production should increase by 70 percent if we are to feed everyone in 2050. So, the question remains: who will feed future generations?

The answer, then, is improved productivity. But this is not as straightforward as it seems. There are many other challenges facing the future of agriculture including limited arable land, climate change, food waste, and a decreasing interest among youth in entering agriculture related fields.

Look back to agricultural history in the 1960s where the Green Revolution increased yields, especially in Asia and Latin America, but it failed to address environmental costs. Later, with the access of military GPS-signals for public use, precision farming enables us to improve agronomic output while without producing more waste. In the early 2010s, precision farming was boosted by the technological advancement such as GIS, high-tech sensors, high bandwidth cellular communication, mobile applications, cloud based ICT systems and big data analytics. Most recently, sensor based algorithms are being used for transformation of data into actionable intelligence.

Digital farming is the interconnection of agriculture and agricultural engineering from precision farming to connected, knowledge based farm production systems. Data is the key ingredient to use sensors and optimize the algorithm and to create actionable intelligence and meaningful added value. Digitalization can give farmers timely field-level information for selecting the right varieties and accurate dose of fertilizer or crop protection. For example, aerial images from satellites or drones (also called unmanned aerial vehicle), weather forecasts, and soil sensors are making it possible to manage crop growth in real time. The process improves farm productivity and reduces input waste by using analytics to facilitate data-driven farming practices for farmers.

The success of digital farming has mainly come from developed or industrialized nations, and large corporations, like Monsanto,

Bayer, CEMA, CropX. The Climate Corporation (under the Monsanto) offers a Climate FieldView platform which is a social media app, and it sends notifications to farmers about precipitation and nitrogen levels, among other advisories and updates. It also provides maps with green (healthy) and red (warning) areas from the field.

The Knorr-Holden plot in Scottsbluff, Nebraska is one of the five oldest continuous field crop experiments in the United States. Since its establishment in 1912, the plot has yielded valuable information about the ecology, environmental impact and production principles of long-term continuous irrigated corn. The objective of experimentation plot is to access long term effects of manure and chemical fertilizer on soil quality and crop productivity. The average corn yield in 1914 was about 60 bushels per acres, and the average today is 160 bushels per acres. The practice of adding manure has greatly improved the physical condition of the soil. The research done on this 0.86 acres plot has played a critical role in advancing the farming techniques used in western Nebraska.

From the time of establishment to the present, at least three dozen scientists and graduate students have been involved in research in the plot. Currently, I am also a member of this historical experimentation plot. Very recently, we have started to use active (RapidScan CS 45) and passive (DroneDJI m600 pro) sensors to detect corn nitrogen stress, predict grain yield, determine in-season an additional side-dress application of nitrogen fertilizer, and reduce environmental impacts. Using both types of sensors also mean to compare the efficiency of sufficient index responses for variable rate N management.

As developing countries such as Nepal, Bangladesh, Uganda, considering how farmers can benefit from such initiatives will be critical where farmers hold small and marginal farms and lack the system specific technologies. Digital agriculture has the potential to transform the way we produce the world's food but the approach is still very new, costs of the tools are high and the details of the long-term benefits are rarely available. Many countries in the world do not have a comprehensive soil map like the U.S. Web Soil Survey to provide soil data and information. So, the main players in farming data game are big sized entrepreneurs and investors, and it will create a monopoly in farming, by restricting farmers' choices.

However, digital farming brings highly specialized expertise to the developing countries and a new approach for engaging with young people who are ready and eager to take advantage of new technologies. Better access to professional advice is something that can have a great impact and is expansible via digitalization. The introduction of apps, like GLUES Geoportal, is helping young people to understand the best land management practices. By increasing farmers' knowledge and efficiency, digital farming tools can help them to see an increase in their land's yield.

So, digital farming opens the vast untapped potential for farmers, investors, and entrepreneurs to improve the efficiency of food production and consumption. Continuous initiatives to support youth in agricultural enterprises and widen the opportunities to showcase their successes to attract more young people are paramount. A change of attitude and a little seed money could be the next big thing to improve agricultural productivity. Since today's progressive farmers are an early adopter of technology and hold the strong risk bearing capacities.

GPS= global positioning systems

GIS= geographic information systems

ICT= information and communications technologies

NDVI= normalized difference vegetation index

NDRE= normalized difference red edge

NEWS

UNFCCC Head Patricia Espinosa, German State Secretary Walter Lindner and Deo Saran Fiji's ambassador to Belgium and permanent representative to the European Union.

Credit: UNFCCC

Germany and UN signed the hosting agreement for COP 23

Yesterday State Secretary Walter Lindner of the German Foreign Office and the UNFCCC Executive Secretary Patricia Espinosa, signed the agreement on the organisation of the UN Climate Change Conference that will take place from 6 to 17 November. The Conference, presided by Fiji, will be held in Bonn and will be organised by the UN Framework Convention on Climate Change supported by German Federal Government, the Land of North-Rhine-Westphalia and the city government.

Once the agreement was signed Wlater Lindner declared that "Climate change often causes water and food shortages, leads to conflicts over land and resources and consequently gives rise to refugee and migration crises. The UN Climate Change Conference in Bonn is therefore of particular global relevance".

Commenting German commitment on climate change, Patricia said: "Germany has given the UN a home in Bonn with world-class facilities – the UN campus and the World Conference Center. The City of Bonn has been an exemplary partner to work with, as has the government of the State of North Rhine Westphalia. And Bonn is a UN city and is now truly becoming a sustainability hub".

COP 23 aims to continue implementing Paris Agreement and raise awareness on the challenges and risks of climate change.

Farmers are on the forefront of climate change and are those who tackle it every day. WFO will be in Bonn to make the Farmer's unique voice heard!

Credit: The World Food Prize

Dr. Akinwumi Ayodeji Adesina is the 2017 World Food Prize Laureate

Dr. Akinwumi Ayodeji Adesina, President of the African Development Bank, named as the 2017 World Foods Prize Laurate.

All his career has been dedicated to the development and the modernisation of African Agriculture and to the support of small-scale farmers. Particularly, he was able to steer the political will towards the expansion of agricultural production; fighting corruption in Nigerian agricultural sector and improving availability of credit for small-scale farmers.

Before to be appointed President of the African Development Bank, he was part of the Rockefeller Foundation, Vice-President of the Alliance for a Green Revolution in Africa (AGRA) and Minister

of Agriculture in Nigeria. Thanks to his work as Agriculture Minister, Nigeria showed a great increase in food production and incomes for farmers.

Since 2015 Dr. Akinwumi Ayodeji Adesina is President of the African Development Bank and his commitment was immediately directed towards farmers, working with governments and business leaders to increase livelihood of African farmers.

WFO congratulates with President Adesina for his achievement and wishing him to continue with the same successes in the rest of his mandate.

EVENTS

Credit: UN Photo/Mark Garten

International Youth Day

12 August

On 17 December 1999, the United Nations General Assembly endorsed the recommendation made by the World Conference of Ministers Responsible for Youth, establishing 12 August as International Youth Day.

International Youth Day 2017 was dedicated to celebrating young people's contributions to conflict prevention and transformation as well as inclusion, social justice, and sustainable peace.

Credit: UN Photo/Gill Fickling

International Day of the World's Indigenous Peoples.

9 August

Ten years ago, on 13 September 2007, the General Assembly adopted the United Nations Declaration on the Rights of Indigenous Peoples, promoting cooperation and solidarity between indigenous peoples and Member States. The celebration reminds international community that special measures are required to protect indigenous rights and maintain their distinct cultures and way of life.

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