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Digital innovations offer opportunities for the agri-food sector in Eurasia

Over 450 conference participants discussed online at the IAMO Forum 2020

Halle (Saale), 28 July 2020 – Digital transformation is reshaping agricultural and food systems all over the world, creating new opportunities for more efficient, competitive and sustainable value chains. It is widely expected that the use of digital technologies will fundamentally change the conditions of development and the behavioral patterns of economic agents, bringing forth new business models and market structures, restoring competitive conditions, and strengthening global agri-food chains. Against this background, more than 450 experts from over 50 countries took part in the IAMO Forum 2020 entitled "Digital transformation - towards sustainable food value chains in Eurasia". The participants from science, business and politics exchanged views on the opportunities and challenges of digitization in the agri-food sector in four plenary sessions, 23 parallel sessions and one panel discussion that took place on June 24 – 26, 2020. The geographical focus was mainly on Europe, Central Asia and China.

The online conference was opened by IAMO Director **Thomas Glauben**. In his speech he discussed the social and economic expectations concerning digital technologies. Companies and consumers benefit from improved data processing and information transmission, higher production and market efficiency, innovative production processes and new business models. Digital technologies make transactions among market players along the value chain more transparent and trustworthy. Web-based platforms and apps with relevant market information can help innovate agricultural and food sector processes in transition countries and also enable small farmers to access markets. Based on IAMO research by using satellite imaging, remote sensing and drone data, index insurances are currently launched in a number of Central Asian countries and in Mongolia in order to counteract climate risks in agriculture. "Although digital opportunities are already being used in the Eurasian agri-food sector, there are still some challenges and obstacles for the implementation. Politics, in dialog with business and science, has to implement un-bureaucratic and innovation-friendly conditions that encourage market players to take risks, invest in

(novel) digital technologies, integrate them into existing work processes as well as to train and educate people accordingly," highlighted Glauben.

Digital transformation and food economy

The first day of the conference dealt with the latest digital developments and their impact on agricultural markets and the food system from a scientific perspective.

In her presentation, Professor **Sarah Hallerberg**, Hamburg University of Applied Science, Germany, gave an overview of multiple machine learning methods and approaches, which nowadays are getting more attention and can be applied in many areas due to big data availability, improved computer facilities and new algorithms development. Together with her colleagues, she has been using deep learning techniques for many projects such as the prediction of extreme events, identifying critical links in transport networks and reconstruction of biological models. In her opinion, these techniques can also be employed in agriculture and agricultural sciences, for example, for studying biological species or food safety risk assessment. Hallerberg highlighted the poultry industry, where advanced machine learning methods are used for early disease detection based on the animal sounds.

Professor **Bernhard Brümmer**, Georg August University of Göttingen, Germany, pointed to a variety of perceptions of the digitalization that exist nowadays. He stated that in the field of agricultural economics new data types and data collection approaches are in trend, for example, big and real time data, as well as electronically supported and large-scale surveys. Respectively, new methods, such as artificial intelligence methods and new combined algorithms, have been developed and employed for data analysis. Despite existing challenges like the high costs of the digital transformation, protecting data privacy, getting funding for data infrastructure and updating educational curricula. Brümmer is certain that the digital transformation of agri-food value chain creates numerous opportunities for agricultural economics research as well as for the interdisciplinary scientific cooperation.

Agricultural economist **Kateryna Schroeder**, World Bank, USA, emphasized the importance of digital technologies for increasing efficiency gains in agriculture. In particular, the use of digital technologies in production can ensure optimal allocation of resources and reduction of transaction costs, for example, search and information costs. Also, digitalization can benefit smallholder farmers by improving their productivity and access to markets. At the same time, the public sector needs to provide an enabling environment for successful digital transformation of agri-food value chains.

Continuing the topic of digitalization-induced efficiency gains in agriculture, Professor **Wenbin Wu**, Chinese Academy of Agricultural Sciences (CAAS), China, pointed that digital transformation is the long-lasting trend in Chinese agriculture which favorably impacts the national farming sector being triggered by supporting policy environment. Using precision farming technologies to map and monitor crop development, farmers in China are able to improve the efficiency of resource use, reduce their production costs, as well as to collect and analyze information about the quality of crops making their cropping practices more efficient.

Focusing on the applicability of machine learning to policy analysis, Professor **Gopinath Munisamy**, University of Georgia, USA, highlighted the importance of machine learning algorithms for predicting agricultural trade patterns to make decisions in public and private domains. Particularly, the superiority of machine learning algorithms over traditional statistical approaches of data analysis has been demonstrated. Munisamy mentioned that being a data-driven process, digitalization requires extensive data to come up with new solutions for agri-food systems.

Digital solutions for agribusiness

The second day highlighted the advantages and challenges of implementing new technologies from a business perspective.

Bjoerne Drechsler, CEO at EkoNivaTechnika Holding, Russian Federation, shared his experience of implementing digital technologies in crop production. According to Drechsler, large-scale agricultural companies need to implement digital tools in their production and management processes in order to effectively operate vast farmland areas. Today, agroholdings in Russia routinely use satellite imagery, self-driving tractors and spatial crop management software to streamline their production, cut costs and increase their profit margins.

Bohdan Kryvitskyi, a Chief Innovation Officer at IMC S.A., Ukraine, explained that digital tools are deeply integrated into production and management structure of the IMC company at all levels. For instance, the tractors are equipped with digital mechanisms, which aim to facilitate and control performance indicators of tractor drivers. At the same time, the top managers can easily analyze the company's key metrics on a tablet in the office. He emphasized that the key driver behind implementing digital technologies is efficiency improvement. Both Drechsler and Kryvitskyi admitted that although the gain from the usage of digital technologies quickly outweighs the investment costs, there are still challenges for the digitization of agricultural production, namely poor infrastructure and internet connection in rural areas, lack and low quality of AgTech consulting services, and resistance to new technologies on the part of employees.

The challenges of digitalization for global grain trade were presented by **Ludwig Striewe**, a member of the Management Board at ATR Landhandel, Germany. The actors of the global value chain are confronted with complicated legal procedures, various trade regulations and payment terms in different countries. Accordingly, they need a common IT-language, trusted partners, digitally connected and smart contracts to communicate with each other. To overcome some of the most important obstacles in grain trade, ATR Landhandel has developed a platform that helps digitize the trade and thereby foster cooperation among international market players.

Matija Zulj, a founder of the globally present ag-tech company Agrivi, Croatia, pointed out that digitalization alone should never be considered the primary goal while implementing innovations. For an effective change management, it is important to analyze the feasibility of a new digital technology for a particular company. While large-scale companies momentarily lead the way in digitizing agricultural

production, it can be expected that smaller-scale farms will also be able to benefit from digital technologies in the future, as appropriate tools become increasingly available.

Enabling sustainable digital transformation

The highlight of the IAMO Forum 2020 was the panel discussion on the last day of the conference. National and international experts from science, civil organizations, agribusiness and politics discussed strategies for a sustainable digital transformation in the agri-food sector. Among the discussants were Professor *Vladimir Crnojević*, BioSense Institute, Serbia, *Engel Hessel*, Federal Ministry of Food and Agriculture (BMEL), Germany, *Linda Kleemann*, GFA Consulting Group, Germany, *Valeria Pesce*, GODAN and FAO, Italy, *Stig Tanzmann*, Bread for the World, Germany, and *Máximo Torero*, FAO, Italy. The panel discussion was moderated by Professor *Jens-Peter Loy* from Kiel University, Germany.

As an introduction to the panel discussion, *Máximo Torero* presented a keynote speech on digital transformation of agri-food value chains. During the panel, it was noted that digitalization can address multiple market failures along the value chains, for example, information asymmetry, high fix and transaction costs as well as search, tracking and verification costs. In order to make digitalization inclusive, basic conditions need to be met, such as (digital) literacy and empowerment, regulatory frameworks and interoperability, physical infrastructure, internet coverage and services, connectivity as well as data issues of collection, storage and dissemination. We need to tackle the currently existing rural-urban divide and power structures, otherwise digitalization can exacerbate these gaps. Combining digital technologies with analog complements brings innovation, efficiency and inclusion. The aim should be to minimize the risk of concentration and inequality on the global level as well as to use the data and all its potential without abusing it. Therefore, the transformation should be research-based and digital tools should be easy to use for all actors along the agricultural value chain. Since digital transformation has already begun, policy-makers and stakeholders need to become more active in providing clearly defined regulatory framework, remove the barriers for the digital progress, and empower all actors of the agri-food value chain to fully realize the given potential.

Alongside the fruitful discussion on the future of digital transformation, the third day of the Forum was marked by a special speech on a critical analysis of ethics in times of COVID-19 held by Professor *Ingo Pies* from Martin Luther University Halle-Wittenberg, Germany. Just like any other pandemic, also COVID-19 is shaping the moral sentiments. While individual morality is increasing the willingness for social distancing and thus lowering the virus prevalence locally, group morality has two dimensions: solidarity within one's group and the disconnection to the out-group, which becomes the object of anger and scape goat. Due to this "moral paradox of modernity", institutions must be built to foster moral progress. "We shouldn't forget that markets can increase resilience and open our sense of solidarity with our out-group," said Pies.

The young generation learned about innovative technologies from a new perspective within an interactive kids session on "Bits, Bytes & Burger?! Digitalization in Food Production". The webinar took place in

conclusion of the Forum. ***Iren Schulz***, a lecturer at the University of Erfurt and the Erfurt University of Applied Sciences, Germany, explained to primary school children how digital technologies are used in agriculture and food production and which measures can contribute to a healthier diet.

IAMO Forum 2020 was jointly organized by the IAMO department Agricultural Markets, the Agriculture and Food Global Practice of the World Bank, the Kyiv School of Economics, the Tashkent State Agrarian University, the Higher School of Economics Moscow, the Faculty of Agriculture of the University of Belgrade and the Institute of Agricultural Economics and Development, Chinese Academy of Agricultural Sciences. The conference was funded by the German Research Foundation (DFG), the Rentenbank and the city of Halle (Saale).

Detailed information and the photo gallery can be found here: www.iamo.de/forum/2020.

Next year, IAMO Forum on "Agrifood systems in the bioeconomy" will take place in Halle (Saale) from 7 to 9 June 2021. Further information can be found here: www.iamo.de/forum/2021.

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About IAMO

The Leibniz Institute of Agricultural Development in Transition Economies (IAMO) analyses economic, social and political processes of change in the agricultural and food sector, and in rural areas. The geographic focus covers the enlarging EU, transition regions of Central, Eastern and South Eastern Europe, as well as Central and Eastern Asia. IAMO works to enhance the understanding of institutional, structural and technological changes. Moreover, IAMO studies the resulting impacts on the agricultural and food sector as well as the living conditions of rural populations. The outcomes of our work are used to derive and analyse strategies and options for enterprises, agricultural markets and politics. Since its founding in 1994, IAMO has been part of the Leibniz Association, a German community of independent research institutes.

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