Promoting Big Data for Agricultural and Rural Development in China

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INTRODUCTION

Big data is a national strategy in building up powerful agri-data, improving governance ability and pushing forward economic transformation and upgrading. In order to implement major decisions and deployment such as Action Framework of Promoting Big Data Development by the State Council, the Ministry of Agriculture (MoA) issued the implementation of the "Opinions on Promoting the Agricultural and Rural Big Data Development" in December 2015, and comprehensively deployed relative work.

Function and effect of agricultural rural big data

Modern information and technology such as big data provides historical opportunity for advancing the development of modern agriculture. It is comprehensively and deeply integrated with agricultural industry, and has become the new engine in leading and driving the transformation of agricultural development mode and in building up modern agriculture, which has great potential for agricultural and rural economic development.

From the perspective of agricultural production and operation, the value of big data mainly lies in that it could realize precision and intelligence of agricultural production. Comprehensive and deep integration between new- generation information technology such big data and Internet of Things and modern agriculture make it possible to have correlation analysis of big data from the monitoring and perception of agricultural production environment and animals and plants bodies, and promote online agricultural production and digitalization. This will promote the quality and efficiency of agriculture, push forward the step-by-step realization of connection between agricultural industrial chain, value chain and supply chain, and achieve substantial improvement of the ability in intelligent agricultural production, Internet operation, efficient management and convenient service.

From the perspective of the operation of agricultural products markets, the value of big data mainly lies in setting up consumer-oriented operation mechanism for agricultural products markets. Giving full play of the decisive role of the market in configuring resources can't be done without the key function of big data prediction. Utilizing big data technology at consumers' end is conducive to solving problems such as scattered and messy market information and could promote the data backflow from consumer's-end to production and operation end, facilitate the precise interlocking between demand and supply reversely force the supply-side reform, form structural adjusting pattern that powers from both supply and demand side, and reduce periodic fluctuation of agricultural production and market price of

agricultural products.

From the angle of agricultural administrative management, the value of big data mainly lies in effectively improving the ability of macroeconomic regulation and control and making management decisions. Agricultural and rural economy includes a variety of industries and a wide range of areas, and faces complicated situations. In particular, as the process of urban-rural integrated development speeds up, the externality of agriculture gets stronger and stronger. Using big data technology, the MoA can enhance timeliness and precision of the information on agricultural and rural economic operation, and improve the mechanism of data-driven decision making and innovation management. As agricultural competition intensifies internationally, the function of data stands out. And what's behind data is discourse power. Via exploring global agricultural big data construction, the MoA can improve the country's ability to acquire and analyze agricultural data from main countries, thus enhance the nation's discourse power, pricing power and influence in global agricultural market. In the aspect of rural information service, the value of data mainly lies in effectively reducing urban-rural digital gap. Informatization should not be the new manifestation of urban-rural difference. Playing big data's supporting role for Internet Plus is conducive to effectively integrating rural information resource, fully improving agricultural comprehensive information service ability, building comprehensive information service system toward agriculture and countryside, solving the problem of farmers on what to plant in the spring, what to sell in autumn and what's cheapest means of production to buy, turning information resources into social wealth, improving the level of equalization of urban-rural information service, and letting farmers share the fruits of informatization development.

Foundation of the development of agricultural and rural big data

The country's 5000-year agricultural civilization provides a profound historical background for the development of big data. Agriculture and the countryside are important fields where big data is born and been applied. Agricultural data resources have a long history with large quantity and various types, and developing big data has already had certain bases.

There are some realistic conditions. At present, the internet broadband has covered 93.5 percent of China's administrative villages, the number of rural netizens has already reached 186 million. With the steady expanding of broadband construction in China, the condition for big data development will certainly be notably improved. Meanwhile, agriculture and the countryside have obvious advantages in data resource carrier and application market. Right now, important agricultural big data is forming in the areas such as agricultural meteorology, agricultural resources and environment, crop breeding, agricultural production, disease prevention and control of animals and plants, circulation and processing of agricultural products and agricultural machinery operation.

There is foundation for work. The MoA now has 21 sets of investigation regulations, 300 report forms, and more than 50 000 indicators, which covers various aspects such as production, market price, rural operation and management, cost benefit of agricultural products, agricultural reclamation, processing of agricultural products, agricultural resources and rural energy and environment, with massive data resources accumulated during past decades. At present, 36 systems has been completed and put into operation via Jinnong project, with an average of daily updates of about 300 000 items and nearly 900 million pieces of information in current data warehouse. There is certain condition for data sharing. As the National Agricultural Data Center was set up, it has basically realized the unified storage of investigation data from each industry, and at the same time realized the interconnectivity of data between different departments such as customs and tax. Besides, through cooperating with international organizations including Food and Agriculture Organization of the United Nations and Organization for Economic Cooperation and

Development, the MoA explored releasing authoritative information on supervising and forecasting agricultural products market, and such efforts gained initial achievement, which laid good foundation for big data work.

There is room for expansion. As the development of a new generation of information technology, the sources and collection channels of big data are constantly expanding. Agricultural e-commerce rapidly develops, creating massive data online everyday, which has great potential value in aspects such as marker forecasting, production and sales. Grasping and mining such data is an important approach for developing agricultural and rural big data. As the sped-up generalization and application of agricultural Internet of Things, real-time monitoring of agricultural production and ecological environment will create a steady stream of data information. Agricultural information goes into villages and households at an accelerated rule, and at the end of the 13th Five-Year Plan, it will cover all administrative villages nationwide, as all information on farmers' production and lives will become online data. Three major sources and channels of future agricultural and rural big data will be formed: for one, monitoring and statistics of government departments; for two, internet data such as agricultural and rural e-commerce; three, Internet of Things data from terminals such as sensors and mobile phones.

At the same time, it should be noticed that currently the construction of agricultural and rural big data laces several problems, including unclear bases, lack of core data, low data quality, lack of sharing and openness, lack of development and utilization and overall weakness of data, which has led to several issues affecting the construction of national agricultural data, including incomplete content, conflicting data, different criteria, inaccurate and outdated data, and non-standard and not concentrated release. There has not been a comprehensive, accurate, timely and closely related agricultural whole industrial chain data information, which has impacted the timeliness and accuracy of information on agricultural and rural economic operation, and has been constraining macroeconomic decisions.

Trend remark

In the coming period, the development and application of agricultural and rural big data will focus on five major basic tasks and 11 key areas. The five major tasks include consolidating the construction of national agricultural data center, pushing forward data sharing and opening up, giving play to the functions and channels of various data, improving criteria system of agricultural data, and enhancing data security management; whereas the 11 key areas include highlighting the support of agricultural production intelligentization, implementing precise monitoring of agricultural resources and environment, launching prediction and forecasting of agricultural natural disaster, enhancing the monitoring and forecasting of animal diseases and plants diseases and pests, realizing whole-course tracing of agricultural products quality and safety, realizing the traceability of whole industrial china information of crops and seed, strengthening the data support for information monitoring and forecasting of agricultural products production and sales, providing service on the innovation of agricultural operation system and mechanism, promoting the data and resources sharing on agricultural science and technology innovation, meeting the personalized demand of farmers' production operation, and facilitating efficient and transparent agricultural management. In 5 to 10 years, the MoA strives to achieve an orderly opening of agricultural data, initially realizing agricultural digital transformation, and largely promoting the ability and level of intelligent agricultural production, network operation, efficient management and convenient service.

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