



Thinking and Exploration of Rural Meteorological Services Under the Rural Revitalization Strategy

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Abstract

The implementation of the rural revitalization strategy is a major decision and deployment made by the 19th National Congress of the Communist Party of China, and it is a major historical task to decisively build a moderately prosperous society in an all-round way and build a modern socialist country in an all-round way. The "Opinions of the Central Committee of the Communist Party of China and the State Council on the Implementation of the Rural Revitalization Strategy" makes arrangements for the implementation of the rural revitalization strategy. In November 2021, the China Meteorological Administration issued the "14th Five-Year Plan for the Development of Public Meteorological Services", requiring meteorological departments at all levels to focus on Rural revitalization requires the general policy of "prosperous industry, livable ecology, civilized countryside, effective governance, and prosperous life", actively integrating and consolidating the achievements of poverty alleviation and rural revitalization and construction, and providing characteristic agro-meteorological support services around the adjustment of agricultural industrial structure and the optimization of agricultural regional layout, to help the construction of beautiful countryside.

Keywords

Rural revitalization; rural areas; meteorological services

Introduction

The development of agriculture is closely related to ecological meteorological technology. Meteorological conditions can directly affect the final output and quality of agricultural production. In recent years, due to the deterioration of the ecological environment, meteorological disasters have occurred frequently. In order to ensure the smooth progress of agricultural production, it is necessary to deeply analyze the ecological environment and the frequent meteorological disasters. At present, many rural areas have problems such as low quality of agricultural meteorological science and technology services, discrepancies between agricultural product quality and yield forecasts, and the overall agricultural production in the region is in a state of decline. Various obstacles to development have emerged, which urgently need to be resolved and innovated.

1. Specific content of meteorological services

Meteorological services are services that focus on weather, and mainly include four aspects: decision-making meteorological services, public meteorological services, professional meteorological services, and scientific and technological services. The four mainly provide meteorological services to citizens, all walks of life, and government departments. The frequent occurrence of extreme weather events will cause changes in the farmland ecosystem and

have a great impact on agricultural production. For example, complex and changeable weather such as heavy rain, hail, and strong winds will have a greater impact on agricultural production. Meteorological services are mainly used to predict various natural disasters and are an important measure to prevent and mitigate agricultural disasters. Farmers understand future weather changes and when they will have a greater impact on crop growth. According to different situations, different response strategies can be adopted in advance to minimize losses.

2. Problems

Transforming to modern agriculture is the major goal of my country's agriculture. Modern agricultural development has shifted from focusing on quantitative growth to emphasizing both quantity, quality and efficiency, and from material input to scientific and technological innovation. The importance and urgency of agricultural meteorological development have long been insufficient within the department, and agricultural meteorological work has not received enough attention and has been underinvested, causing agricultural meteorological work to lag behind the development of bulk and park-type modern agriculture. First, agricultural meteorological observations are not targeted, and only basic development information is recorded according to phenological observations, and detailed observations of the impact of different meteorological disasters have not been carried out during the critical development period. Second, the capacity for agricultural meteorological experiments is insufficient, agricultural meteorological experiments have not yet been carried out, there are no test sites, and there is a lack of experimental technical design plans. Third, the existing agricultural meteorological service products are not targeted, and the timeliness cannot meet production needs, and cannot achieve full coverage of all growers. Fourth, the content and methods of agricultural meteorological services are backward, and the degree of intelligence is not enough, which cannot meet the needs of characteristic agricultural development and the construction of national and provincial modern agricultural parks. With the implementation of the national modern agricultural development and rural revitalization strategy, there is a demand for more refined and precise meteorological services for the development of agricultural modernization. At present, the business support of agricultural meteorological modernization scientific research results is insufficient, and the support of agricultural meteorological business services and technical equipment is weak, which restricts the effectiveness of services; the degree of refinement of agricultural meteorological indicators is not enough, the research on applicable technologies is small and the methods are backward, and the developed applicable agricultural meteorological technologies have not been fully applied and integrated into agricultural technology promotion services; the degree of quantification and modeling of service products is not high, and the pertinence and practicality are not strong, and the refinement and accuracy are insufficient; there is a lack of mechanism to combine agricultural meteorological services with research-based services, and there is a gap between the existing business platform and the needs of smart agricultural meteorological services. The system support capabilities for automation and intelligence need to be improved, and more research efforts need to be made in the seamless connection between intelligent grid forecasts and agricultural meteorological service products.

3. The role of meteorological information services in agricultural production

Regional drought has seriously affected the development of agricultural economy and is one of the disasters that hinder agricultural production. In view of this, the government can cooperate with the meteorological department to establish a drought relief headquarters. Based on the meteorological information service platform, it can monitor weather changes to understand the local drought relief requirements and take a series of effective measures to reduce the damage caused by drought to agricultural production. The drought relief headquarters can also use weather radar and satellite cloud maps to carry out artificial rainfall to curb the development of drought and protect the agricultural economy. Heavy rain is also an important factor affecting agricultural production. On the basis of weather forecasts, the meteorological department can also issue weather warnings about heavy rains through various video platforms, SMS platforms and communication platforms to improve people's awareness of prevention, remind farmers to make flood prevention preparations, ensure the timeliness of flood prevention measures, and prevent major economic losses caused by severe weather such as heavy rains. Hail disasters are one of the disasters in agricultural production. If hail disasters occur, it will not only damage crops but also threaten the personal safety of farmers. Therefore, it is necessary to strengthen the awareness of hail disaster defense and do a good job of prevention. Traditional hail prevention work is that farmers only start to make defense arrangements after hail occurs. This method is inefficient and has poor hail prevention effects, and cannot completely protect crops. However, the use of modern meteorological information technology can greatly improve the accuracy of hail disaster predictions. Through predictive analysis, disaster

information can be promptly transmitted to the meteorological department, which will then publish the information to various agricultural information platforms to raise farmers' awareness of hail prevention so that they can take effective measures to prevent it, thereby reducing the adverse effects of hail.

4. Some suggestions on promoting the development of rural meteorological services in the rural revitalization strategy

4.1 Improving basic business capabilities of meteorological services for agriculture

The development of agriculture is greatly affected by meteorological and climatic conditions. In order to ensure the smooth development of agricultural production, the meteorological department needs to deliver timely and effective meteorological information to farmers in advance so that they can prepare in advance. As the basis for promoting the smooth development of meteorological services, enhancing the accuracy of meteorological forecasts is the focus of meteorological services for agriculture. At present, due to the low accuracy of forecasts, there is a big gap between the public's demand for refined forecast services. Therefore, it is necessary to make full use of modern science and technology, and continuously improve the accuracy of meteorological forecasts and meteorological service capabilities, which has gradually become a trend of the development of the times and a necessary measure to improve the quality of meteorological services. Meteorological service personnel should strengthen their studies in their spare time, continuously enhance their professional quality and technical level, and make full use of various modern means, such as lightning locators, weather radars, satellite cloud maps, etc., apply information processing, artificial intelligence, big data and other information technologies, and combine various modern forecasting technologies to gradually transform the "manual calculation" in the previous forecasting process into computer processing, and devote more energy to the correction of model forecast results, turning point, and disastrous weather judgment, etc., make full use of the intelligent grid forecast model, and gradually replace the traditional experience forecast with qualitative forecast and objective forecast, so as to finally achieve the goal of improving the accuracy of weather forecast. Since severe convective weather has the characteristics of strong suddenness, short duration and large impact range, it is necessary to improve its accuracy level as the focus of severe convective weather forecasting work, provide timely and effective weather forecast warning information to the public in advance, and effectively reduce the harm of disastrous weather to agricultural production.

4.2 Strengthen meteorological support services around food security and industrial prosperity

Agricultural production is mainly open-air production, and meteorological conditions are an important factor affecting the breeding industry. Actively integrate into agricultural zoning, cooperate with local rural agricultural management departments to carry out agricultural climate feasibility demonstration based on natural environmental conditions such as climate and geography, provide farmers with reliable meteorological scientific basis for variety selection, aquaculture and other projects, and develop advantageous crops and animal husbandry and aquaculture. Promote the construction of smart meteorology, establish agricultural meteorological comprehensive observation stations or smart meteorological systems in characteristic agricultural product advantage agricultural parks and new agricultural business entities, obtain meteorological elements such as rainfall, air temperature, ground temperature, water temperature, sunshine, etc. in a timely manner, and transmit dynamic, graphic meteorological forecasts and warnings and pest and disease prevention and breeding care assessment products to farmers or professional users; before important agricultural activities, farming seasons or critical and disastrous weather, provide "direct" special meteorological services to farmers, agricultural planting and breeding cooperatives, etc. Extend the scope of meteorological services for agriculture, link "improving quality and increasing efficiency" with the vital interests of rural farmers, inject the "+" meteorological factor into the secondary and tertiary industrial chains such as agricultural product processing, storage, transportation, and market sales, and effectively regulate the market, control costs, and improve efficiency through precise smart meteorological guarantee services, and use smart meteorological services to promote quality-oriented agriculture.

4.3 Improving the efficiency of early warning signal transmission

Compared with ordinary weather forecast, short-term nowcast has obvious characteristics, a smaller application area, and can accurately predict climate change in a short period of time. However, since the transmission efficiency is a dynamic variable in the transmission process of weather forecast information, the data transmission efficiency is a

decisive factor for agricultural meteorological services. If the transmission efficiency cannot be transmitted to the planting personnel when the weather is close to the boundary point, or the arrival time is short compared to the near boundary point, the planting personnel will not be able to take preventive measures in time, affecting the effect of short-term temporary weather forecast and reducing the level of agricultural meteorological services. Therefore, in order to improve the application level of short-term nowcast weather forecast, it is necessary to improve the transmission efficiency, accurately transmit weather data to planting personnel through different methods, ensure that planting personnel can understand weather changes in time, formulate protective measures according to weather changes, reduce the impact of natural disasters on crops, and improve the quality of crop production. In the process of information dissemination, information technology such as agricultural Internet of Things technology, cloud computing technology, sensor technology, and intelligent terminal technology can be used to accurately release various types of information, increase the scope of data release, improve the efficiency of prediction and dissemination, and give full play to the role of short-term and near-term weather forecasts, and provide guiding opinions for agricultural production. In addition, monitoring personnel can also use various apps such as Moji Weather and Weather Pass to release data, and do a good job in improving various apps, improve the diversification and diversity of various software functions, and accurately transmit weather forecast information to farmers' network terminals to complete data transmission. Finally, relevant departments also need to do a good job in infrastructure construction, especially in areas with relatively backward economic conditions, where network infrastructure is relatively backward and planting personnel cannot receive corresponding information in time. Relevant departments need to pay attention to it, improve network infrastructure according to the actual development of different regions, and provide guarantees for weather information dissemination. In short, if relevant departments want to improve agricultural production efficiency, they must do a good job in the dissemination of short-term and near-term weather data, combine agricultural production with environmental meteorological data, so that the two can complement each other, improve the quality of meteorological services, and make agricultural production more scientific and rational.

4.4 Build a meteorological data sharing platform

Establishing a local meteorological agricultural service system on major network media platforms will provide local inquiries and solutions when people encounter various agricultural problems, and will also make the services for agriculture and people more professional, detailed and diversified. Therefore, the establishment of a professional meteorological service platform is the basic foundation for achieving scientific and technological intelligent meteorological services, and the higher requirements for the quality of meteorological science and technology service personnel and the advanced level of communication technology are the basic conditions. Traditional communication does not transmit information quickly enough, is not very convenient to use, and has a low ability to share real-time information. Therefore, the equipment should be updated to match the same resource allocation of current scientific and technological development, and improve the database at all technical levels. At the same time, strengthen cooperation with other departments in the region that have meteorological service needs, such as water conservancy departments, environmental departments, etc. In addition, if there is no convenient and fast network channel for mutual communication and dissemination of information, it is impossible to efficiently output high-quality meteorological services to these regional departments, so it is necessary to increase the data dissemination channels of the meteorological department. For example, use media social software to expand the dissemination range of meteorological data and increase the people's dependence on meteorological data.

4.5 Increase the construction of observation points

On the basis of the improved meteorological observation stations in the region, the upgrading and transformation tasks of the four-element regional stations and the two-element regional stations have been completed. It is reported that the monitoring items of the four-element regional stations are temperature, rainfall, wind direction and wind speed, and the monitoring items of the two-element are temperature and rainfall. The completion of the regional meteorological observation station network will help the meteorological department to increase the monitoring density of disastrous weather conditions, improve the accuracy and precision of weather forecasts, and meet the people's growing demand for meteorological information services. At the same time, the data collected by the regional meteorological observation stations will help analyze the climate characteristics of various places and actively and effectively respond to climate change.

4.6 Strengthen the construction of talent team

Whether a department can develop in the long run depends on the quality of its personnel. Among the various hard science and technology items to improve the level of meteorological science and technology services, the quality improvement of meteorological service personnel is indispensable. The professional ability and work experience of agricultural meteorological service personnel will affect the development of the entire department. When personnel are working, if their level is not enough, the working time will be extended, and the problems cannot be solved well, which will make the people lose patience. Therefore, the training and management system of internal personnel of meteorological science and technology service departments should be improved to update their thinking and keep up with the pace of the times; regularly train staff to improve the professional quality of meteorological service personnel, improve their proficiency in the use of scientific and technological machinery, and their theoretical mastery of agricultural production knowledge, and regularly optimize and clarify the performance goals of staff; meteorological service staff should deepen their understanding of local farming fields, increase various farming experiences, observe agricultural meteorology and the nutrients of farming soil, use meteorological observation instruments to calculate data, and quickly practice to improve work proficiency, so as to prepare for solving various agricultural problems in the future and establish the professional prestige of meteorological science and technology services.

4.7 Improve cooperation mechanisms and jointly promote high-quality development

First, a scientific and technological cooperation mechanism will be established. Focusing on the needs in production management, disaster prevention and mitigation, and climate resource utilization, the four cities (districts) will carry out targeted technical cooperation and research, make full use of the advanced technological achievements of weather and climate services, and improve the scientific research and business level of characteristic agricultural meteorology; second, a project cooperation promotion mechanism will be established, and contacts with Anyue Industry Bureau and other functional departments will be strengthened to jointly promote project development and establish a linkage mechanism between relevant departments for the prevention of characteristic agricultural meteorological disasters; third, a service channel cooperation mechanism will be established to strengthen the exchange of agricultural meteorological business services among the four cities (districts), establish a corresponding cooperation mechanism, and realize the real-time sharing of observation methods and observation data; fourth, an information sharing mechanism will be established to establish a cooperation mechanism of interaction between upper and lower levels, service docking, mutual support between left and right, product sharing, and benefit sharing, so as to expand the coverage of characteristic agricultural meteorological services and improve service efficiency; fifth, a long-term development mechanism will be established to promote the cooperative construction of characteristic agricultural meteorological service centers, actively seek support from local governments, and promote the government to include the construction and operation guarantee funds of characteristic meteorological service centers into the local fiscal budget, effectively play the role of the first line of defense of meteorological disaster prevention and mitigation, and closely follow the strategic tasks of scientific and technological innovation, precision monitoring, accurate forecasting, and fine services to promote the high-quality development of characteristic agriculture.

5. Conclusion

Rural meteorological services have always been the top priority of meteorological services. Under the background of the rural revitalization strategy, rural meteorological services are facing higher requirements and are also facing new opportunities and challenges. Therefore, the meteorological department has taken the initiative to shoulder the political responsibility of serving rural revitalization in the new era, improve the pertinence of agricultural meteorological services, strengthen scientific and technological innovation on key technical issues, enhance the supply capacity of smart agricultural meteorological services, promote meteorological services for agriculture, standardize and orderly, and develop in the long term, and contribute meteorological power to rural revitalization.

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