

Analysis of the Action Mechanism of Agricultural Modernization Driven by Science and Technology-Oriented Poverty Alleviation Project in Poor Areas in China

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Abstract

Science and Technology-oriented (STO) poverty alleviation project in China has been used for more than twenty years, the effectiveness of poverty reduction is remarkable, in particular, to vigorously promote agricultural modernization process, but most researches tend to discuss the effectiveness of poverty alleviation, agricultural modernization is less involved. This article studies from STO poverty alleviation by studying its meaning, features and general pattern to explore its effect on agricultural modernization process, and analyzes some of the problems that exist in the process of poverty alleviation, finally makes relevant recommendations.

Key words: Technology; Poverty; Agricultural modernization; Technical training

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INTRODUCTION

Agriculture is the key to achieve the poverty reduction and the total elimination of critical poverty goal at the

present stage in China. From the mid-1980s to now, China has been developing and implementing a series of rural poverty alleviation and development planning, and poverty reduction policy changes from focusing on rural pool to the county poor, and then to the regional pool (delineated fourteen contiguous destitute areas), which reflects the vital role of regional economic development for poor governance, but also makes people realize that it is hard to rely on farmers and rural areas themselves out of poverty. China, as a large agricultural country, agriculture modernization is the crucial factor to stimulate economic growth, increase farmers' income and accelerate rural economic development. Scholars and government walkers have been working hard on rural poverty governance and alleviation projects for years, from the root causes of poverty alleviation, they have summed up the Transfusions Poverty Reduction project and Hematopoietic Poverty Reduction project, from the poverty reduction content they have summed up a series of projects like Knowledge Poverty Alleviation and Industry Poverty Alleviation, from the thought, they have summed up Endogenous Poverty Alleviation, Science Poverty Alleviation and Precious Poverty Alleviation, however, they do not propose specific and targeted poverty reduction approach to promote agricultural modernization. STO poverty alleviation project focuses on scientific and technological progress, development of agriculture and rural economy, quality enhance of farmers in the process of poverty alleviation and development, develops scientific and technological resources, spreads scientific and technological achievements, especially supports simultaneous development of science and technology and the rural economy, accelerates the farmers out of poverty and pays more attention to agricultural modernization, which are significant to the current situation and tasks of poverty alleviation, help science and technology play a sustainable role in poverty alleviation poverty, change traditional poverty alleviation way that rely on external

support to internal forces, and speed up the process of the poor areas out of poverty and the elimination of absolute poverty.

1. INTERPRETATION OF RELATED CONCEPTS

1.1 Definition, Connotation and Characteristics of STO Poverty Alleviation Project

STO poverty alleviation project is defined in many ways, some scholars point out that it means

a poverty alleviation method to take science and technology as the main carrier, through application and popularization of scientific knowledge, improve the low quality of workers due to the lack of knowledge and ability, thus improve their abilities to overcome the poverty factor and adapt to adverse environment, ultimately get rid of poverty and achieve self-accumulation and self-development. (Xie, 2007)

Some scholars believe that STO poverty alleviation project refers to the application of mature science and technology and modern management science, which enhance capacity development of farmers, significantly improve the level of resource development and labor productivity, seek the best economic, social and ecological benefits, and promote commodity economy development to help local farmers out of poverty in poor areas. Jin (2011) considered the connotation of STO poverty alleviation project is that: Through professional practice guidance, technical updates promotion, theory outreach, and other forms, will apply advanced science and technology into the poor area, as a new productivity, change the backward traditional small peasant economy model in poverty-stricken areas and improve farmers' own culture, skills, and accomplishment of science and technology, excavate the potential of its development resources and improve labor productivity, on the basis of regional advantage and enliven and rapid development of commodity economy in the poor areas, to help poor farmers become prosperous as soon as possible. The kernel of STO poverty alleviation project is to make science and technology through a closely integrated way with production practices and other activities, penetrate into the interior of the farmers or the rural economic entities and effectively use, improve production efficiency and technological content, thus to provide effective protection for the expanded reproduction. We believe that from a more comprehensive perspective, STO poverty alleviation project relies on technological progress to overcome some disadvantages like weak rural infrastructure, lack of product diversification, product consumption shortage, low production efficiency, improves the physical production of soft (human use of technology skills) and hardware conditions, so that to promote industrial development in poor areas, construct and expand pillar industries, cultivate core talents to ensure the sustainable development. In general, STO

poverty alleviation project has the following basic characteristics.

Firstly, technology is the dominant. Technology is the dominant in STO poverty alleviation project, through a series of scientific and technical introduction, promotion, use and innovation, it improves the conditions of material production, improve work efficiency and quality of output.

Secondly, take industry as the starting point. STO poverty alleviation project takes industry as the starting point, clears a local pillar industry according to local conditions, targeted to grow pillar industries through science and technology, so as to do well in pillar industries packing, planning and promotion, promote rural economic development.

Thirdly, take talent as the core. STO poverty alleviation project takes talent as the core, by cultivating excellent scientific and technological personnel, and outputs the main body of technology spreading in poor areas, or the implementation of local human resources technical training, to guide the industry development in poverty-stricken areas and innovation of science and technology and development model.

Fourthly, innovation-driven. STO poverty alleviation project is innovation-driven, including the innovation of the personnel training, science and technology innovation, industry innovation, business model innovation, etc., from reality, develops high efficiency, high output mode of poverty alleviation.

Fifthly, take poverty reduction as the goal. STO poverty alleviation project takes poverty alleviation as the starting point and goal, pays more attention to the top priority: Eradication of poverty and hunger in the implementation process, and the sustainable development of vulnerable groups. In the formulation of policies, it attaches great importance to narrow the urban-rural and the wealth gap between villages and towns, not simply pursue economic efficiency.

Sixthly, development-oriented. STO poverty alleviation project pays more attention to their own development in poor areas. Under the guidance of scientific theory and technology, the correct guidance of market competition, and the national policy support, the project reasonably develops the advantages of resources in poor areas and makes the resources into a fist products in the market competition. Through theoretical training and practical guidance, the project help to improve the sense of participation of poor farmers, so that they recognize the market has both the brutal competition and positive sides, and then to find their own advantages to be able to achieve a favorable position in the market competition. Thus to promote the development of poor areas themselves.

1.2 Research on the General Model of STO Poverty Alleviation

For more than twenty years, China adhere to the technology demonstration, technology training,

technology services as the starting point of poverty alleviation, through technology demonstration, extensive technical training, supporting the STO industries, strengthening information construction, selecting cadres appointed to rural etc. in rural areas, to accelerate the pace of poverty alleviation in poor areas, improve the ability of self-accumulation and the self-development, and has achieved remarkable results. Currently, STO poverty alleviation has formed “point, sheets, face” three levels to carry out specific work, focused on six designated counties to guidance Dabie Mountains, Jinggangshan and northern Shaanxi three key contact areas and two of “Spark plan, poverty alleviation test area” in southwestern Guizhou, Bazhong and Bijie area (Cheng, 2011), to create a series of poverty alleviation and development mode.

Firstly, the regional pillar industry development mode. Select several industries with growth potential as the original growth of the regional economy, through direct introduction in the area of advanced and applicable technological achievements, to make a product or industry develop high-quality products, so that form pillar industries, thereby radiating the entire region’s economic development (Wu, 2014).

Secondly, the change places of technology development poverty mode. For some poverty-stricken areas with perennial drought, scarcity of arable land, serious soil erosion, difficult resource utilization, backward technical extension services system and traffic inconvenience, if they can not out of the poverty by relying on its own strength and advanced technology to escape poverty and improve local agricultural production conditions, the government needs to pay a huge price to remove people.

Thirdly, the “technology project + company + demonstration base + poor farmers” poverty alleviation mode. Based on the actual situation of the region, government departments determine project; poor market information services company is responsible for process or wholesale and crops; research institutions to provide seeds, breeding stock, seed, etc. and is responsible for providing technical support to farmers; the establishment of demonstration bases display the research project, so that farmers could reference to project while be assured acceptable technology project. Meanwhile, to ensure farmers have income, companies and farmers should sign a product purchase contracts, and the purchase price should be higher than the current market price of the same product to solve the worries of farmers planting.

Fourthly, the science and technology correspondent mode. Scientific and technical personnel with professional technical titles selected to poor villages, they establish a community of interests with farmers in the aspects of bottlenecks and key agricultural industrial chain around the regional advantageous industries, found, co-host and help economic entities and professional cooperative

organizations, carry out technology innovation and entrepreneurship union type, promote, optimize and upgrade industrial chain, develop and strengthen regional advantageous industries, and enhance regional economic development with an entrepreneurial cluster association to help farmers get rich (Ding, 2010).

Fifthly, the agricultural expert workshop mode. Through STO poverty alleviation, science and technology to the countryside and demonstration project, experts, agricultural technology personnel to guide farmers on-site in the countryside, teach farmers new technologies, which is even easy to accept, learn and understand new technology for the farmers with low cultural quality (Xiao, 2010).

Sixthly, the technology services microfinance mode. Issue microcredit for technology service-based industrial project, to support the follow-up development of the industry.

Seventhly, the technology training demonstration mode. To implement poverty alleviation demonstration in poor villages, through training farmers, popularizing scientific knowledge and information to launch a number of demonstration village, which led to the development of regional science and technology poverty alleviation.

1.3 Agricultural Modernization Connotation

Agricultural modernization refers to the process of modernization of agriculture from traditional agriculture to modern agriculture transformation. The basic connotation of agricultural modernization includes the following four aspects: First, the material and equipment modernization: Use modern industry to build modern agriculture to change the passive situation of agriculture depending on natural for thousands of years, realize local mechanization, irrigation, chemical technology and electrification, as well as rural transportation and communication network (Yang, 2012). Second, technological modernization: the use of modern science and technology to arm agriculture, change thousands of years of the old single traditional practices experience, old varieties, to achieve intensive land use, high yield and good quality, entire hectareage, the farmer knowledge-based. Increase investment in agriculture materials, and enhance the role of agriculture through science and technology. Third, management modernization: The use of modern social and economic development of agricultural science, close thousands of years’ subsistence-based economy, gradually transformed it into open-commodity economy, achieve commercialization, marketing, rationalization of the structure, large-scale, organized and socialization, and ultimately achieve efficient, greatly improve labor productivity and farmers’ income. Fourth, resources and environment excellent: The strengthening of environmental protection consciousness of modern agriculture, strive to increase in population, economic development and agriculture of high yield and efficiency,

while improve the state of resources and the environment, realize the harmonious development between mankind and nature, sustainable use of resources, clean up the environment, and ensure sustainable development of agriculture.

2. ACTION MECHANISM OF STO POVERTY ALLEVIATION TO PROMOTE THE MODERNIZATION OF AGRICULTURE IN POOR AREAS

Agricultural modernization is the realistic choice to build a new socialist countryside and promote rural economic development. In the process of industrialization and urbanization, agricultural modernization must rely on technological progress in order to achieve conservation of land resources, human resources, and constantly improve land productivity, labor productivity, while protect the environment (Li, 2013). STO poverty alleviation project is adapted to the requirements of the new era's poverty alleviation and development, helps rural pool population out of poverty and further promotes agricultural modernization.

2.1 STO Poverty Alleviation Project to Improve the Rate of Technological Advances in Agriculture

According to the Agricultural Economics Research Institute of the Chinese Academy of Agricultural Sciences' specialized research on the effect of agricultural science and technology progress on agricultural growth, In the contribution of agricultural GDP growth, they found every investment of 1,000 yuan in science and technology would make 9,159 yuan investment in return, compared with education investment's return (3,171 yuan), and other related infrastructure investment returns are less than 2,000 yuan. In the contribution to grain production capacity, each investment of 10,000 yuan , returns as high as 4,141 yuan investment in science and technology, and irrigation, education, roads, communications, power returns 5,156 yuan, 2,102 yuan and 2,102 yuan, 1,184 yuan and 1,137 yuan respectively (Xu, 2005). This shows, either in agricultural development, or in the field of food production, Science and technology is the first productive force. The method of agricultural development determines the direction of agricultural science and technology innovation, the direction of agricultural technological innovation determines the development of agriculture. STO poverty alleviation project takes technology as main point, which further promote agricultural technology, including selection, seedling, cultivated land, planting, fertilizing, weeding, irrigation, harvesting, threshing, drying, storage, processing, packaging, transportation, etc. from planting to the table, all the links we have implemented mechanized operations. Meanwhile, take full

use of new energy, new materials and other high-tech of new technology in the agricultural production activities, increase agricultural production, improve the quality of agricultural products, reduce production costs, protect food safety, which greatly promoted the development of modern agriculture.

2.2 STO Poverty Alleviation Project to Promote Intensive Use of Resources

STO poverty alleviation project to cultivate pillar industry as the main task, break the previous development of industry fragmentation, break administrative barriers, intensive land, human, material and financial resources to focus on building pillar industries, which is conducive to the rapid formation of industrial highlights, cultivate characteristic brand. Meanwhile, make professional and technical personnel play a role in the process of technology research, development, introduction and promotion, promote industrial project step by step based on plan, optimize land resources and human capital allocation, realize the poverty-stricken areas to earn foreign exchange income, industry integration, urban and rural communication and take region as a whole.

2.3 STO Poverty Alleviation Project to Enhance the Quality of Farmers

In science and technology introduction and promotion process, the farmers are the main body of agricultural production and operation, production tools, management experience, science and technology depends on farmers' reasonable application and summary to play the biggest role. STO poverty alleviation focuses on training and popularization of workers labor skills and basic knowledge of agricultural science and technology, helps change and improve the production performance of the agricultural production methods to achieve agricultural modernization. Improving cultural knowledge and skills of farming workers are not only the goal of agricultural modernization, but also a reliable guarantee for the modernization of agriculture.

2.4 STO Poverty Alleviation Project to Promote the Socialization of Production Organization

"Poverty project + company + demonstration base + poor farmers" and science and technology correspondent mode can combine more community of interest, help to optimize the layout of agricultural production, coordinate social division of labor, specialization of agricultural production and management, Make the circulation of agricultural production and the various departments and interests of the community keep organic connection with each other, so that to improve labor productivity, breakthrough small and closed group of small production status into social production, it is conducive to production specialization, the rationalization of production organization and intercontinental circulation category, establish adapted reality economic operation mechanism of poverty-

stricken areas, so that make economy in the poor areas into a virtuous cycle, focus on specialty agriculture, green agriculture, ecological agriculture, tourism agriculture economy that has competitiveness in the market, which is fundamental to the development of modern agriculture.

2.5 STO Poverty Alleviation Project to Lead Environment-Friendly Development

Fragile ecological environment, excessive exploitation of natural resources, poor awareness of environmental protection are indisputable facts in poor areas in China, agricultural development is limited by reducing arable land, labor and capital outflows and other resource constraints, at the same time, faced with the pressure: excessive use of pesticides and fertilizers faced, non-point source pollution is worsening, destruction of biodiversity ambient. Currently, the community strongly advocated by the government, focuses on ecological and environmental problems, and the introduction of ecological civilization as a guide in terms of STO poverty alleviation project, all emphasize the need to protect the ecological environment in poverty alleviation and development in order to promote economic and ecological environment in poor areas coordinated development, we must strive to achieve harmony between man and nature, the natural ecological balance of the harmonization of economic and human goals. Science and technology, industry, science and technology project is the main carrier of poverty alleviation (Wang, 2013). With these vectors, poverty alleviation can make use of the guiding role of the market to play the leading role of science and technology in order to promote economic development in poor areas and trap villagers out of poverty. At the same time, these carriers also pay more attention to ecological benefits, greenization of technology, industry, which are key elements to guide environment friendly development in the new era of STO poverty alleviation implemented, combining with ecological agriculture economic development advocated by agricultural modernization.

3. DISCUSSION AND RECOMMENDATIONS

Although STO poverty alleviation make large contribution to the modernization of agriculture, there still exist many constraints of system factors and other development problems in the development of agricultural modernization. First, China's huge agriculture research institutions and research teams are not well adapted to the new stage of agricultural development needs. According to statistics, there have been about 10,000 items of agricultural science and technology achievements annually, but the conversion rate of polar research has not reached 50% since 2010, while developed countries can reach about 80%. China's agricultural extension is also flawed, result in increased difficulty of transformation. Second, agricultural research institutions failed to form a good

incentive, since the public welfare research and operational development of technology unit intertwined and not easy in classification management, which seriously affected the improvement of agricultural science and technology innovation strength. Third, the process of industrialization, the non-agricultural sector compete for agricultural scientific and technological strength, result in scientific personnel crowding-out effect on many related sectors.

Poverty alleviation is a complex system engineering, if lack of a complete system of measures and policies to support, but undue emphasis on science and technology to enhance the farmers' quality of science and technology is not up to the final results of poverty alleviation (Zuo, 2014). Science and technology play an effective role in poverty alleviation, and need policy, market demand and technology services to tripartite closely, not only should promote innovation for the entire rural economy through technological innovation, but also support other rural reforms to make STO poverty alleviation become a powerful driving force in the new time of poverty alleviation and development, and scientific and technological achievements and knowledge should be effectively penetrated among agricultural industrialization to speed up scientific research into practical productive forces, increase the technology content of agricultural products, so that the majority of farmers relied on science and technology will truly become rich.

Only continuous improvement of agricultural science and technology innovation in poor areas could change agriculture from traditional agriculture to modern agriculture to become a solid foundation for a modern country (Dai, 2008). First, agricultural science and technology must pay attention to personnel training and scientific research platform building. Compared with developed countries, China's personnel training and scientific research platform to building of agricultural research and development are still lagging behind. Farmers are the application managers and the main actual operators of agriculture. Farmers' scientific and cultural level of technical, ability to absorb and use new technology, are the main factors restricting agricultural scientific and technological progress. Modern human capital theory thinks the economic strength of the region depends on the quantity and quality of the physical human capital stock (Zhang, 2012). Thus, China's agricultural modernization should focus on the introduction of personnel's advanced agricultural technology and research skill, strengthen the cultivation of a number of leading agricultural frontier science and technology, promote agricultural scientific and technological achievements of China's agricultural science and technology talent in order to support China's modernization of agricultural industrialization and urbanization, and synchronize advance. Second, strengthening the agricultural science and technology is an important way to achieve China's agricultural modernization. Currently, the level of

China's agricultural modernization is relatively low as well as the overall level of the quality of farmers. To further accelerate the pace of development of agricultural modernization, we must introduce advanced agricultural technology, promote agricultural science and technology based on the resource endowment of each element in the poor region, through the promotion of agricultural science and technology innovation mechanism help to achieve agricultural modernization, and provide advanced material technology and equipment support. Third, use science and technology to develop special agriculture to achieve the overall goal of agricultural industrialization. The scientific and technological achievements and promotion of science and technology used in the development of leading priority industries could gradually speed up structural optimization varieties, increase the varieties of promotion, further promote quality, develop agricultural efficiency, enhance market competitiveness of products, further develop and expand competitive industries, change traditional agriculture to contract farming, realize the goal of ecology agricultural transformation and agricultural efficiency. Fourth, make full use of the principle of mutual benefit, based on local natural, ecological, labor and other resources and combine talent, technology, capital advantage to form complementary advantages and promote common development, and continuously expand cooperation areas and raise the level of collaboration, through various forms of technical training, the exchange of cadres, labor export, transfer of technology to gain the introduction of advanced production and management technology, and constantly improve the technological content and competitiveness of local products, accelerate scientific and technological development of poverty alleviation.

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