Logical Framework, Path Selection and Mechanism Design for Cultivation of New Type Professional Farmers

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Abstract New type professional farmers are farmers who possess certain resources and capitals, have certain extent of spirit of entrepreneurship, and are fully capable of obtaining and allocating resources related to agricultural production and management, and engaged in agricultural production and management for obtaining average profit. Cultivation of new type professional farmers should be promoted in the process and at the background of "coordinated development of industrialization, informationization, urbanization and agricultural modernization". It should establish a proper cultivation subject system consisting of government, enterprises, rural communities and nonprofit organizations. Relying on multiple motive forces, efforts should be concentrated on cultivating those farmers with enterprising, highly innovative and learning ability, to guide traditional farmers to change into learning, enterprising and innovative ones. In addition, cultivation of new type professional farmers must rely on farmer education and training, modern agricultural development, increase in agricultural comparative advantage, innovation of rural management system and mechanism, multiple types of agricultural operation on a fairly large scale, as well as construction and regulation of new rural communities. Finally, it is recommended to provide system guarantee from long-term input mechanism of new type professional farmer education and training, incentive and restrictive mechanism of new type professional farmer cultivation, and construction of favorable environment for agricultural entrepreneurship.

Key words New type professional farmers, Logical framework, Path selection, Mechanism design

1 Introduction

No. 1 document of central government in 2013 stated that agricultural and rural development is now entering the new stage of "rise of agricultural integrated production cost, prominent structural conflict of agricultural product supply and demand, accelerative transformation of rural social structure, and accelerative integration of urban and rural development". Rigid growth in total demand for agricultural products and rapid upgrade of consumption structure set down higher requirement for growth of agricultural output and diversity of agricultural products. In the meantime, agricultural development is beset with problems of large population but relatively little land, shortage of water, increasing external dependence, excessive labor flow, part-time households, village hollowing, as well as aging of population. Under the condition of restraint of household contract responsibility system of farmland and selective transfer of rural and agricultural labor, sound development of agriculture needs deepening of agricultural manpower capital[1]. In the new period, the gist of China's agricultural development policies is to increase farmers' human capital accumulation rate by strengthening and solidifying deepening of farmer's human capital[2]. Both the *Report to the Sixteenth National Congress of the CPC* and 2013 No. 1 document of central government stress that we should foster new types of agricultural business entities, develop large-scale agricultural operations in diverse forms, and establish a new type of system for intensive agricultural operations that are specialized, well organized and commercialized. Cultivation of new types of agricultural business entities mainly depends on fostering new professional farmers, who are interested in developing commodity agriculture, capable of expanding agricultural scale, have knowledge of utilizing modern technology, active in increasing agricultural benefits and promoting sustainable development of agriculture, and have higher management ability. New type professional farmers are new generation of farmland managers and operators integrating abilities of management and operation, production demonstration, and technical services, who are characterized by independency, conscious activity and creativity. Cultivation of new type professional farmers has features of public goods, quasi public goods and private products, which determines that multiple supply entities mainly including government, enterprise, rural community and nonprofit organizations. And a multiple supply system need to be set up, which are characterized with government as major supply entity, and enterprises, individuals, rural communities and nonprofit organizations as auxiliary entities[3].

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2 Overview

2.1 Related foreign researches Foreign scholars carried out researches mainly from following two points. (1) Accumulation of human capital, development of education and agriculture. Schultz believed that transformation of traditional agriculture needs intro-

ducing new production factors of modern agriculture and investing in human capital of farmers[4]. In rapidly changing technological or economic environment, education plays an important role in increasing agricultural output[5]. Knowledge broadening promotes skill acquisition and labor specialization, thus increases labor productivity and promotes technological progress which is the main part for agriculture[6]. Compared with traditional agriculture, education plays a greater role in the drive of agricultural modernization. Farmers with higher education can make better adjustment than those who receive less education[5,7]. In the post green revolution period, technical knowledge, technological extension and education are deemed as major factors influencing difference in farmers' skills. Improvement of farmers' educational level should be in coordination with technological R&D and extension to maximize agricultural output[8]. Andrew D. Foster and Mark R. Rosenweig[9] studied the relationship between learning by doing, learning from other people and increase in human capital and technological change, and found imperfect knowledge of new technologies is a significant factor hindering farmers adopting new technologies. With accumulation of experience in new technologies, the obstacle decreases. Since the changes in overall intelligence level brought about by school education takes on non-linear changes with time, directly using school education to carry out empirical research will result in biased explanation of relation between education and human capital effect, which means that the school education has no extensive and direct influence on agricultural development[6]. (2) Cultivation of farmers' spirit of entrepreneurship. Rougoor *et al.* contended[10] that management ability includes individual aspect and decision-making process. Individual aspect includes driving forces and initiative, ability and skills, age and education level , while decision-making process includes practice and experience related to production plan, execution and decision control. Improving farmers' management ability will increase agricultural output by a large margin. Factors influencing farmers' management ability include resources (labor and farm tools), individual characteristics (education level and age), and external support. Researches of Verhees *et al.* indicated that the enterpriser tendency of farmers plays positive role in farmers' performance and expectation of performance. Initiative is the most influential factor of performance of farmers, and risk assumption and innovation ability contribute to cultivation of farmers' initiative.

2.2 Related domestic researches (1) Definition of new type professional farmers. New type professional farmers refer to those farmers who are interested in developing commodity agriculture, capable of expanding agricultural scale, have knowledge of utilizing modern technology, active in increasing agricultural benefits and promoting sustainable development of agriculture, and have higher management ability. They are new generation of farmland managers and operators integrating management, operation, production demonstration, and technical services. They are characterized by independency, conscious activity and creativity. In the opinion of Zhou Yingtang, one of the most distinctive characteristics of new type farmers is the increasingly deepening of labor division. Ma Jingjing considered that new type farmers are farmers who have certain economic basis, production scale and desire for establishing business. Zhang Chunlian contended that new type farmers are operators and workers who pursue maximal profit and are engaged in professional production in the process of prior-production, in-production, and post-production of modern agriculture.

(2) Accumulation of human capital of farmers, education and agricultural development. Human capital becoming source of agricultural growth has precondition. When stock of human capital exceeds certain threshold, human capital will show its important function in agricultural growth. Under the condition of labor selective transfer, sound development of agriculture needs deepening of agricultural human capital as a new prerequisite[1]. In the new period, the gist of China's agricultural development policy is to increase farmers' human capital accumulation rate from strengthening and solidifying deepening of farmer's human capital. Besides, deepening of accumulation of human capital depends on wide application of modern agricultural technology, balance in quantity and quality of population production, and support of related government policies.

(3) Cultivation of new type farmers. As a systematic project, this should be carried out from reform of education, science and technology, infrastructure and fund input, system and legal protection, improvement of rural operating model, improvement of grass-roots organizations, and promotion of urbanization development. Besides, it should enhance effectiveness of guarantee factors and strengthen improvement of incentive mechanism. Also, it needs energetically cultivating entrepreneurial farmers, improving social public service system, improving agricultural management types, and increasing rural education input and public goods input[11]. Xiao Li *et al.*[3] contended that cultivation of new type professional farmers has feature of public goods, quasi public goods and private products. Its supply entities mainly include government, enterprise, rural community and nonprofit organizations. We should set up a multiple supply system for cultivation of new type processional farmers with government as major supply entity, and enterprises, individuals, rural communities and nonprofit organizations as auxiliary entities. Zhang Chunlian stated that growth of new type farmers is mainly driven by specialized labor division, system innovation and technological progress. Zeng Yiping[13] considered that the cultivation of new type professional farmers should correctly grasp its connotation, give prominence to key cultivation points, select proper cultivation objects, optimize education and training methods, and strengthen supporting policies. It is recommended to improve farmer education and training system with cultivation of large farmer households as breakthrough point; speed up building modern agricultural industrial system; improve supporting policies for professional farmer cultivation; protect legal rights and interests of farmer; create favorable environment for new type professional farmers. As for farmer education, human capital accumulation and agricultural development, both domestic

and foreign scholars conduct study from change in fertility rate, education under the background of labor transfer, influence of human capital accumulation on agricultural development and increase of farmers' income, and influence degree by the theory of human capital accumulation. In foreign countries, farmer is a profession, while in China, farmer represents status. For researches of new type professional farmers, foreign scholars conduct researches mainly from cultivation of farmers' spirit of entrepreneurship and improvement of management ability. Domestic scholars define new type professional farmers from the perspective of professional characteristic, and study the cultivation of new type professional farmers from product characteristics and growth mechanism. However, attention is not paid to agricultural labor division and specialized development, agricultural structural adjustment and industrial upgrade. Thus, researches on path dependence and guarantee mechanism for cultivation of new type professional farmers are to be further deepened.

3 Logical framework of cultivation of new type professional farmers

3.1 Connotation of new type professional farmers and cultivation of new type professional farmers The connotation of new type professional farmers is developing and changing. From the perspective of theoretical framework of "capacity dominating resources", new type professional farmers should possess certain resources and capitals (mainly physical, human and social capital), have certain spirit of entrepreneurship (mainly manifested in market opportunity recognition, adventurous spirit and market development ability), and are fully capable of obtaining and allocating resources related to production and management of modern agriculture, and engaged in agricultural production and management for obtaining average profit. From the perspective of modern agricultural development requirements, new type professional farmers are various agricultural producers and managers adapted to demand for modern agricultural development, have excellent professional skills, and conduct agricultural production and management services, modern agricultural production, and agricultural products processing and marketing businesses.

Both emerging and development of new type professional farmers are necessity of modern agricultural development and also self-development of farmers. Modern agricultural development is beset with serious realities, including natural environment and resource, market demand recognition, production decision making, market supply and fierce competition, and deepening of agricultural labor division. From the point of view of productivity, agricultural modernization includes modernization of agricultural production and management entities (mainly farmers), objects, and theories and methods. From the perspective of relations of production, agricultural modernization is the process of agricultural relations of production adapting to demand of modern agricultural productivity development and acting on modern agricultural development, and also the process of change in ownership system of agricultural means of production, combination and cooperation of agricultural production entities, rise of agricultural comparative income, increase in agricultural output and farmers' income. The cultivation of new type professional farmers is contained in the development of agricultural productivity development and the process of innovation of production relations. Thus, expansion degree of connotation and cultivation of new type professional farmers are determined by agricultural productivity development and agricultural production relations. In addition, agricultural development is contained in the overall economic environment made up of three industries. Therefore, the cultivation of new type professional farmers is influenced and restricted by the overall economic development level, and should be carried out with coordinated development of industrialization, informationization, urbanization and agricultural modernization.

3.2 Logical framework of cultivation of new type professional farmers

3.2.1 Objects of cultivation of new type professional farmers. New type professional farmers emerge from market competition, which dose not mean that all existing farmers or subsequent people of agricultural production and management can become new type professional farmers. From the perspective of cultivation, it should focus on key points, set up Pyramid shape agricultural production and management human resource system, put forth effort on cultivating farmers with highly innovative and learning ability, and guide traditional farmers to change into learning, enterprising and innovative ones.

Entrepreneurial and innovative farmers generally have more material capital accumulation, human capital accumulation, social capital accumulation, and have higher entrepreneurial and innovative spirit and ability. Thus, cultivation objects of entrepreneurial and innovative farmers should focus on existing large professional farmer households, large transportation and sales households, agricultural brokers, small agricultural enterprisers, agricultural cooperatives, and agricultural association responsible person. Attention should be paid to cultivation of entrepreneurial and innovative ability and creation of environment, and bringing to play leading role of entrepreneurial and innovative farmers, so as to bring about the effect of sheep flock. Compared with entrepreneurial and innovative farmers, learning farmers are weaker in entrepreneurial and innovative ability, but have certain capital accumulation, and have higher ability of learning and imitating production, management and sci-tech application actions of entrepreneurial and innovative farmers. Cultivation of learning and imitating farmers should focus on those new type farmers with higher sci-tech and skill demand in existing family households, and concentrate on improvement of scientific, technological and vocational skills, to encourage them to change into entrepreneurial and innovative farmers.

3.2.2 Entities of cultivation of new type professional farmers. Content of cultivation of new type professional farmers includes cultural and education quality, sci-tech quality, economic behavior quality, ideological and ethical quality, political and legal

quality, physical and psychological quality. Thus, cultivation of new type professional farmers has feature of public goods, quasi public goods and private products. Its supply entities mainly include government, enterprise, rural community and nonprofit organizations. It is required to set up a multiple supply system for cultivation of new type processional farmers with government as major supply entity, and enterprises, individuals, rural communities and nonprofit organizations as auxiliary entities[3]. Government should put forth effort on supply of agricultural and rural basic public goods (such as infrastructure, rural education, agricultural vocational education, agricultural extension, rural basic social security products, and construction of agricultural market system), creation of agricultural development environment (protection of farmers' rights and interests, and incentive of agricultural and farmer innovation), construction of agricultural and rural development system.

3.2.3 Motive force for cultivation of new type professional farmers. Innovation is the result of joint effort of internal and external motive force, and the process of new thing overcoming the original path and realizing increase of income. New type professional farmers are new things compared with traditional farmers. Cultivation of new type professional farmers is the process of external factors driving farmers and traditional agriculture towards modernization. It is a combined and progressive action of multiple factors. As to internal aspect, it is inseparable from agricultural labor division, deepening of specialization, increase in comparative income of agriculture, realization of average profit sharing, giving play of self entity of farmers, and accumulation of capital factors; as to external aspect, it is inseparable from extensive participation of system supply entities, innovation of modern agricultural development system, building of service supply entity incentive and service system, building of market system, and creation of excellent competition environment.

4 Path selection for cultivation of new type professional farmers

4.1 Path for cultivation of foreign new type professional farmers There are mainly three training models: Asian farmer training model characterized by small scale farmer management, European training model with family farm management as major part, and American training model characterized by large scale mechanized farming and large-scale operation[14].

Japan and South Korea are typical examples of Asian model, which promoted agricultural development, farmers' entrepreneurial action and professional farmer education though building perfect farmer and agricultural education system, cultivation of key objective farmers and developing agricultural associations and cooperatives. Japan set up the five-level education system consisting of undergraduate education, agricultural university education, agricultural higher institution education, farming preparation education and agricultural instruction education. South Korea relies on three-level education system made up of 4 – H education, farmer and fishermen successor and professional farmer education, to provide pertinent and centralized training for different farmers by different levels.

France, UK and Germany are typical examples of European model, which is mainly characterized by organic integration of government, universities, scientific research institutions and agricultural training network. It provides education and training for farmers in the form of general education, vocational education and adult education. In France, without receiving vocational education, farmers are not allowed to operate agricultural enterprises. Agricultural education includes higher agricultural education, secondary agricultural vocational education and farmer vocational education. Farmers who have received certificate will be benefited from financial aid, subsidy and preferential loan. The UK set up special organizations to launch and support farmer training through formulating relevant laws and training plan. Government subsidizes farmer vocational education and technical training, relies on agricultural training network, higher universities, scientific research institutions and advisory organizations. High, medium and primary levels have been established, and Government relies on strict incentive and examination system to guarantee training quality and efficiency. Germany legislates to guarantee financial subsidies. Relying on green certificate system, it strengthens formal vocational education of farmers. Farmer training organizations consist of official training institutes, training organizations subordinate to professional associations, cooperatives, and vocational training institutes of church system.

The United States and Canada are representatives of American model, which integrates agricultural education, agricultural scientific research and agricultural technological extension through establishing agricultural college leading agricultural science and education system, to improve overall quality of farmers. The United States has set up perfect agricultural education, agricultural scientific research and agricultural technological extension system. Government at all levels guarantees improvement of agricultural science and education, farmers' vocational skills and operation and management ability from legislation and financial support.

4.2 Path selection for cultivation of new type professional farmers In foreign countries, farmers' vocational skills are mainly improved through agricultural education and training system. Training entities are varied with national conditions. Training objects and contents take on hierarchical form, to satisfy development demands of different levels of farmers and agriculture. Some countries or regions attach greater importance to functions of agricultural associations and agricultural cooperative organizations in professional farmer cultivation. In China, since there is distinct regional difference, agricultural development is not balanced in regions, and development of agricultural modernization lags far behind, the cultivation of new type professional farmers must be considered in the drive of agricultural modernization, and be promoted in step with cultivation of other new types of agricultural production and management entities. In other words, the cultivation path

should be multiple. Following are some feasible cultivation paths.

(1) Building agricultural and farmer education and training system. Foreign experience has proved that perfect and coordinated labor division of agricultural and farmer education and training system is an important path for ensuring improvement of farmers' vocational skills. In the process of pushing forward agricultural modernization, China must further establish and improve regular agricultural education system, including agricultural higher education, agricultural vocational education and farmer vocational training. In addition to cultivating agricultural talents and innovating agricultural science and technology, it should reinforce agricultural sci-tech extension.

(2) Safeguarding farmers' rights and interests, giving impetus to modern agricultural development in many ways, increasing comparative income of agriculture, and attracting and holding subsequent agricultural producers and operators. Transfer of agricultural and rural labor originates from low agricultural performance and comparative income. To hold and attract excellent labor forces to return to agriculture, it is required to create favorable environment and system for agricultural development through many channels and in many ways, and ensure farmers having equal living and development rights, to increase comparative income of labor forces and capital investment in agriculture.

(3) Promoting innovation of rural operating system and mechanism, to realize multiple types of agricultural operation on a fairly large scale. It is recommended to regulate and push forward rural land circulation, encourage large planting and cultivation households and family farms to put together agricultural land, to realize management of agricultural land on a fairly large scale. Besides, it should strengthen innovation of rural and agricultural financial system, and gradually promote mortgage loan of three rights in rural areas, to realize management of agricultural capital on a fairly large scale. Furthermore, it is required to promote agricultural science and technology and agricultural information to concentrate on objects of new type professional farmer cultivation, so as to realize management of agricultural science and technology and agricultural information on a fairly large scale. In addition, it should increase support for large agricultural processing, transportation and sales households, to realize management of agricultural processing and transportation and sales on a fairly large scale. Also, it should promote cultivation of entrepreneurial and innovative, learning and imitating type farmers.

(4) Regulating and promoting building of new type communities, to accelerate coordination of urban development in rural areas and construction of agricultural modernization. The process of agricultural modernization is the process of agricultural labor division and professional deepening. In this process, the transfer of agricultural surplus labor to non-agricultural sectors and urbanization are important characteristics. At present, transfer of agricultural population has become a difficult problem hindering urbanization and agricultural modernization. Practice of integrating urban and rural reform pilot areas manifests that construction of new communities is an optional and feasible path for realizing rural urbanization and agricultural modernization. It is favorable for promoting transfer of agricultural surplus labor, transferred agricultural population becoming citizens in-situ, giving into play driving effect of urbanization on agricultural development, and also favorable for rural land circulation.

5 Mechanism for cultivation of new type professional farmers

5.1 Building long-term input mechanism for education and training of new type professional farmers Experience of agricultural developed countries indicates that financial security of government is an essential support for cultivation of new type professional farmers. In view of multi-level agricultural education, multiple agricultural training entities, and heavy financial burden of economic development, increasing input into education and training of new type professional farmers must take diversified path. Government finance should assume major responsibilities for universal education and education; for vocational skill and entrepreneurial and innovative education and training, other relevant entities should undertake major responsibilities, and government can provide financial reward and subsidy on the basis of assessment.

5.2 Building incentive and restrictive mechanism of new type professional farmer cultivation Foreign experience proves that legislation, incentive and restrictive mechanism are effective measures for promoting cultivation of new type professional farmers. American-European developed countries enhance agricultural education, agricultural extension and training through legislation. In particular, for agricultural new enters or succeeding people, participation of training and education and obtaining certificate become threshold of agricultural operation. Professional farmers who have received certificates can obtain incentive awards through financial subsidy or other preferential policies. China has numerous agricultural population, thus operation of farmland must be carried out with particular emphasis and by levels. It is recommended to gradually provide certificate training and qualification access system for entrepreneurial and innovative, leaning and imitating farmers. For training farmers, it should turn incentive and restrictive mechanism objects to training and extension organizations, to fully understand demands of farmers for training, sci-tech demands, and to provide excellent training and guide traditional farmers to participate in training.

5.3 Creating favorable entrepreneurial environment for agriculture, and promoting cultivation of new type professional farmers relying on entrepreneurial activities of agriculture Agricultural entrepreneurial activities include appropriate scale of agricultural operation, setting up agricultural associations, establishing agricultural cooperatives, and building agricultural enterprises. Agricultural entrepreneurial activities are helpful for transforming traditional agriculture, promoting development of non-agriculture, accelerating transfer of rural surplus

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students'learning with the teachers'education, knowledge transmission with self-exploration. The model aims to stimulate the students'study enthusiasm, exploit their potential, highlight the teachers'leading role, activate the class and improve the learning efficiency.

3.3 To set up a resources sharing mechanism of urban and rural compulsive education By promoting the school-district and one-school systems, a community could be established to realize the sharing of educational resources between urban and rural areas. Firstly, the teachers are uniformly managed and distributed so as to flow regularly within the community, which can not only make sure the fair and even distribution of teachers resources, but also improve the teachers' salaries and lay a solid foundation for quality education. Secondly, a unified management system should be constructed, which means to promote the advanced schooling concept, management model and appraisal system within the community. Therefore, a unified management system, uniform teaching progress and unified quality appraisal system could be established. Thirdly, a sharing mechanism of teaching facilities and resources, including teaching places, facilities, softwares, and libraries, should be constructed so as to compensate for the shortage of teaching resources in rural areas[6].

The modern distant education engineering should be actively promoted in the middle and primary schools of rural areas so as to achieve the sharing of urban and rural education resources. Given that the urban and rural education resources are unevenly distributed, it is suggested that the resources be enriched and the teachers' quality be improved with the aid of information and internet technique. By means of the information sharing platform, the children in remote areas could have a chance to receive quality education, which will be an effective way to upgrade the rural quality education.

3.4 To construct a perfect care system and dynamic monitoring mechanism for left-behind children Various measures should be adopted to improve the care system and dynamic monitoring mechanism for left-behind children. Firstly, to improve the infrastructure in rural schools, so as to provide the necessary accommodation conditions for the children. Secondly, to enhance the communication between the left-behind children and their parents, so as to feedback their physical and psychological needs and enable the children to communicate with their parents by various means. Thirdly, given the large quantity and proportion of left-behind children, the schools should put forward related education. By setting up special lectures and model examples, the children could be better fit into the community, so as to develop their personality and eliminate their loneliness and sense of inferiority.

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labor, pushing forward agricultural modernization, rural industrialization and urbanization[16]. In addition, it is also favorable for cultivation of entrepreneurial, innovative, learning and imitating farmers. These depend on excellent entrepreneurial policies and atmosphere. It needs building agricultural entrepreneurial training mechanism, capital fund security mechanism, and entrepreneurial supporting mechanism.

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