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Analysis on the Dilemma and Solutions of Emerging Economical Crops in Frontier Villages—Taking the Red Jujube Crop of K Village in Ruoqiang County as an Example

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Abstract: K Village is a multi-ethnic border village where jujube cultivation is being carried out on a large scale. The research found that jujube cultivation in K Village is facing persistent challenges, including fundamental challenges to the fragile ecosystem in the agricultural fields, motivational challenges due to low jujube prices, and practical challenges caused by the lack of regulation in the jujube market. The reasons behind these challenges include the strict resource and technological requirements of economic crops, the unfavorable geographic location in the heart of the desert for market information and agricultural product distribution, and the overreliance on the market economy for economically driven crops, which ultimately results in weak risk-mitigation capabilities. In response, proposed measures to alleviate these challenges include increasing investment in crop research and developing diversified cultivation models, establishing a county-town-village market information dissemination system to enhance information retrieval capabilities, accelerating infrastructure development to improve the circulation of agricultural products, and enhancing the village-level logistics system of rural e-commerce to broaden agricultural product sales channels.

As emerging cash crops are being cultivated on a large scale, they are facing a series of persistent challenges. This has attracted the attention of the author. Currently, academic research on crops primarily focuses on four areas: crops and their relations to capital and power [1], crops and their relations to livelihood, sociocultural changes [2], crops and their relations to the environment and ecology [3], and research on genetically modified crops [4]. Among these, research on the challenges faced by crops mainly includes Wang Yufeng's analysis of the cultural conflicts in the promotion of glutinous rice over sticky rice in the mountainous areas of southwestern China [5], Dai Gaofeng's interpretation of the structural contradictions in the promotion of genetically modified crops [6], and Zheng Yu's anthropological interpretation of the social mechanisms leading to the decline of tobacco as an emerging livelihood in Miao villages [7]. It is evident that there is significant academic research on crops, but there is relatively little analysis of the persistent challenges that economically driven crops currently face.

K Village is a village committee under the jurisdiction of Tieganlike Town, Ruoqiang County,

Bayingolin Mongol Autonomous Prefecture, Xinjiang. It is located 5 kilometers northwest of Ruoqiang County town and has a total administrative area of 1.73 square kilometers with 2,524 mu (approximately 168 hectares) of arable land. The village consists of three villagers' groups and four residential areas. The villagers belong to three different ethnic groups: Han, Tu, and Zhangzu, making it a multi-ethnic village. The primary livelihood in the village is agriculture, with jujube cultivation as the main crop. The history of jujube cultivation in K Village is relatively short. In 1978, Ruoqiang County began importing jujube tree seedlings from inland areas, and sporadic cultivation began in oasis areas, including K Village. Despite intensive promotion of jujube cultivation in Ruoqiang County starting in 2001, jujube cultivation did not commence in K Village until 2003, and it only became widespread by 2006. Due to favorable conditions in terms of sunlight and climate for jujube cultivation, jujube cultivation in Ruoqiang has achieved significant success. However, as it has developed over the years, it has begun to face persistent challenges. Therefore, this paper attempts to use jujube cultivation in K Village, Ruoqiang County, as an example to analyze the challenges faced by jujube cultivation and the underlying reasons, and to propose some mitigating strategies, with the aim of providing insights for the development of the jujube industry in Ruoqiang County.

1. Persistent Challenges Faced by Jujube Cultivation

Firstly, the fragility of the agricultural ecosystem poses a fundamental challenge to jujube cultivation. The agricultural ecosystem is a semi-natural ecosystem that relies on natural elements such as land, light, temperature, water, and human inputs like seeds, fertilizers, pesticides, irrigation, and machinery to produce food, fiber, and other agricultural products.[8] Its ability to perform ecosystem functions and provide ecological services is based on agricultural biodiversity. Before the cultivation of jujubes, K Village grew a variety of crops, including corn, wheat, cotton, flax, legumes, and vegetables. At that time, they practiced crop rotation, dividing the land into two parts for a winter wheat-corn-spring wheat-winter wheat-corn-spring wheat sequence and a spring wheat-winter wheat-corn-spring wheat-winter wheat-corn sequence. This approach focused on sustainability and a harmonious coexistence with nature, using fewer chemical fertilizers, pesticides, and minimal flood irrigation. It represented a traditional farming model that was ecologically diverse and productive. However, with the widespread cultivation of jujube crops, the landscape of K Village changed significantly as jujubes became the predominant crop. The monoculture of jujube crops led to heavy reliance on synthetic fertilizers, pesticides, herbicides, and flood irrigation. Consequently, the agricultural ecosystem in K Village became more fragile, marked by a reduction in species diversity, decreased soil fertility, increased pest infestations, and declining groundwater levels. This shift has left jujube cultivation in a precarious situation, given the vulnerable ecological conditions.

Secondly, the low jujube prices create a motivational challenge for jujube cultivation. Unlike staple crops, economic crops are characterized by commercialization, requiring market exchanges to realize their economic value. "The price of agricultural products is the most significant factor affecting farmers' income increase," [9] and low agricultural prices can negatively impact farmers' enthusiasm for cultivation. To illustrate, we can look at the example of GCH family in K Village. GCH family experienced fluctuations in jujube prices, where prices increased from 2007 to 2012, reaching their peak in 2012. Prices then began a continuous decline from 2013 onwards, with minor decreases in 2014. In 2015, 2016, and 2017, jujube prices significantly dropped. From 2018 onwards, prices remained similar to those of 2017, indicating a persistently low pricing trend. This sustained period of low jujube prices has led to changes in the village. Post-2017, many villagers abandoned jujube cultivation to pursue other livelihoods, primarily because of the unprofitability caused by low jujube prices. From the perspective of producers, jujube prices are a pivotal issue that determines whether jujube cultivation can continue, as persistently declining prices have dampened farmers' enthusiasm

for cultivation.

Lastly, the market irregularities in the jujube market present practical challenges for jujube cultivation. Market irregularities refer to economic practices that disrupt market economic order, jeopardizing public and private interests. The jujube market in Ruoqiang, particularly the misrepresentation of jujube origins, has been marred by counterfeiting. Ruoqiang jujubes are renowned for their superior quality and command much higher prices than jujubes from other regions. Consequently, there has been a proliferation of jujube counterfeiting, where jujubes from other areas are misrepresented as Ruoqiang jujubes and sold in the market. In a summary of Ruoqiang jujube rights protection and anti-counterfeiting work in 2015 by the Ruoqiang Jujube Management Association, it was noted that counterfeiting and infringements were prevalent both online and offline, and these incidents were widespread with little legal intervention. The market irregularities, particularly the counterfeiting of Ruoqiang jujubes, have undermined consumer rights, disrupted market hierarchies based on jujube quality and prices, and tarnished the reputation of Ruoqiang jujubes. This adversely affects the circulation of Ruoqiang jujubes in the market and, ultimately, harms the interests of local jujube farmers.

In summary, the fragility of the agricultural ecosystem, low jujube prices, and market irregularities, respectively, represent the fundamental, motivational, and practical challenges facing jujube cultivation in K Village. These challenges interact and are interconnected, collectively constituting the persistent challenges faced by jujube cultivation and impacting the sustainability of jujube livelihoods.

2. Reasons for Triggering the Persistent Challenges in Jujube Cultivation

Firstly, the strict requirements of economic crops for fundamental resources and technologies contribute to the fragility of the agricultural ecosystem. Jujube cultivation, like other economic crops, relies heavily on fundamental resources such as land, forests, water sources, and sunlight. Initially, jujube cultivation demands flat terrain and contiguous land, which is conducive to large-scale farming. Additionally, given K Village's location in the heartland of the desert, protective afforestation is essential to shield crops from sandstorms. Moreover, the region experiences limited natural precipitation, while jujube crops require substantial water resources, necessitating a well-established irrigation system. This, too, is a requirement for large-scale cultivation. Lastly, jujube crops demand a significant amount of solar radiation. Despite K Village's abundant sunlight, there is almost no intercropping of jujube crops to ensure they receive ample solar radiation. These strict requirements for fundamental resources and management practices have led to the fragility of the agricultural ecosystem, resulting in issues such as reduced species diversity, declining soil fertility, increased susceptibility to pests and diseases, and groundwater level depletion.

Secondly, the unfavorable geographical location in the heart of a desert impedes the circulation of market information and agricultural products. Although Ruoqiang has historically been a transportation hub, its remote location amidst the Taklamakan Desert, Kumtag Desert, and Kumukuli Desert creates significant transportation challenges. Such a remote geographical location hampers the flow of market information for jujubes and restricts the distribution of agricultural products. The primary consumer market for Ruoqiang jujubes is various provinces and cities within China. However, the considerable distance between the production and consumption areas limits the quantity of market information accessible to jujube farmers. Information acquired through kinship, geography, or business relationships is limited and often lacks timeliness due to repeated transfers. Additionally, villagers receive some market information through interactions with familiar purchasers. Yet, these interactions are characterized by conflicting interests between villagers and purchasers, which raises concerns about the reliability and accuracy of the information. Consequently, jujube farmers may not

acquire a sufficient volume of accurate market information to make informed decisions. Furthermore, the considerable distance between the production and sales areas results in high transportation costs, leaving K Village's jujubes reliant on external purchasers who visit the area. This further constrains the circulation of agricultural products.

Thirdly, economic crops, especially market-driven ones, overly rely on market economics. Jujube crops fall into this category, as their economic value primarily hinges on market sales. Jujube farmers in K Village produce up to 22 tons of jujubes per year, with minimal consumption for personal use, necessitating market-based sales. External purchasers represent the primary sales channel for K Village, constituting a substantial portion of the sales, with nearly every household having experience with this form of sales. To illustrate, during 2016, 137 households in K Village sold their jujubes to external purchasers, accounting for 77.4% of the total number of households. In 2017, out of 119 households surveyed, 103 households had sold their jujubes to external purchasers, constituting 86.6% of the households. Moreover, jujube farmers' reliance on market economics is evident in the pricing of agricultural products. The price of agricultural products is paramount in determining farmers' income, enthusiasm for crop cultivation, and the sustainability of agriculture. Economic crops, as non-self-sustaining crops, are particularly dependent on market economics and supply-demand dynamics. Overproduction in the market leads to falling prices, whereas scarcity results in price hikes. During the research conducted in K Village, many villagers expressed concerns about the significant decline in Ruoqiang jujube prices in recent years, attributing it to oversupply in the jujube market.

In summary, the aforementioned factors collectively underscore the vulnerability of a single livelihood, which fails to meet the multifunctional requirements for sustaining production, addressing market price fluctuations, and countering irregular market behaviors. Jujube farming in K Village predominantly serves as a singular livelihood for the vast majority of villagers, accentuating their livelihood vulnerability. This singular livelihood lacks the versatility to support various functions, respond to market price fluctuations, and counter irregular market practices, consequently rendering it ineffective in mitigating the risks encountered by individuals.

3. Strategies to Alleviate the Development Challenges of Jujube Farming

In light of the aforementioned analysis, we propose the following four recommendations aimed at improving the current challenges faced by jujube farming in K Village.

Firstly, increase investment in crop research and develop diversified cropping patterns. Diversified cropping patterns not only broaden income sources but also enhance the agricultural ecosystem, thereby increasing both economic and ecological benefits. Diversified cropping involves the application of modern science and technology within traditional intercropping, mixed cropping, and sequential cropping methods to create ecologically balanced agricultural systems. This system encourages different biological species to coexist and mutually benefit from the system, optimizing the utilization of sunlight, water, nutrients, and establishing a multi-layered, multi-sequenced industrial structure.[10] K Village employs wide-row, densely planted jujube cultivation methods and possesses essential resources such as existing irrigation systems, ample solar resources, and established windbreak forest belts, which can support the development of diversified cropping. Developing diversified cropping methods not only ensures the growth and development of jujube crops but also provides ecological and economic benefits for intercropped crops. The key to K Village's success in adopting diversified cropping lies in increasing investment in crop research to establish compatible and mutually beneficial diversified cropping models alongside jujube cultivation.

Secondly, establish a county-town-village market information dissemination system to enhance information acquisition. As previously mentioned, K Village's remote location within a desert hinders connections with the outside world and results in limited access to market information. This

information imbalance is one of the reasons for farmers' disadvantageous position in the market, their challenges in increasing income, and the prominence of issues related to rural development.[11] To address this, we recommend that Ruoqiang County takes the lead in establishing a specialized working group responsible for consolidating, analyzing, and researching market information related to jujubes. Create a dedicated jujube market information sharing platform, such as a website, public account, or similar channels, to promptly disseminate relevant findings. Subsequently, local townships should be in charge of transmitting this information to village committees and leaders. Village committees can share this information with jujube farmers during community meetings, while resident groups can communicate and exchange information within their communities. By establishing a county-town/village information dissemination system, this would enhance jujube farmers' capability to access market information.

Thirdly, expedite infrastructure development to improve the circulation of agricultural products. Ruoqiang has historically served as a pivotal transportation hub; however, due to its desert location and sparse population, infrastructure development has been sluggish, primarily relying on road transportation. The region still needs to prioritize infrastructure development, improving transportation connectivity by establishing a comprehensive multi-modal transportation network that connects Southern Xinjiang, Northern Xinjiang, Xinjiang, and the mainland. This will effectively reduce the physical distance between Ruoqiang and surrounding regions, strengthen regional ties, and enhance the circulation of distinctive agricultural products from Southern Xinjiang, facilitating economic development along the route. Moreover, this development aligns with the objectives of the "Belt and Road Initiative," contributing to oasis preservation, border consolidation, and regional security maintenance.

Fourthly, enhance the village-level logistics system of rural e-commerce and expand agricultural product sales channels. In recent years, Ruoqiang County has shown considerable interest in selling jujubes through e-commerce platforms. In August 2017, e-commerce service centers were established in twelve village committees, with each center managed by local villagers who received uniform basic e-commerce training. However, the research revealed that e-commerce service centers had limited participation and contribution to jujube sales in the villages. Several factors contributed to this situation: inadequate promotion of e-commerce services, exclusive collaboration with the postal service, a limited number of choices, slow postal delivery, and non-competitive postage fees compared to those in county towns. In fact, "logistics are the biggest challenge in entering rural markets and the key to sustainable rural e-commerce development."[12] The village-level logistics system is often characterized by issues like inadequate infrastructure, heterogeneity, a scattered network, and high empty load rates. To address this, it is essential to expedite the development of village-level logistics systems, resolve the "last-mile" distribution challenge, and provide jujube farmers with discounts or financial subsidies for delivery costs. This approach promotes rural e-commerce development and requires additional training for jujube farmers to equip them with essential e-commerce operation skills, thereby expanding agricultural product sales channels.

In conclusion, to ameliorate the persistent challenges faced by economic crops, enhance the market competitiveness of jujubes, increase farmers' incomes, and achieve sustainable agriculture, the fundamental approach is to improve jujube quality and embark on the path of branding. Especially in today's fast-growing economy, consumer choices for agricultural products have shifted from price to quality. Therefore, enhancing jujube quality, expediting the development of environmentally friendly and organic cultivation, ensuring jujube quality, and safeguarding the jujube brand are imperative for Ruoqiang jujubes. This is the road that must be taken for both Ruoqiang jujube and the sustainable development of emerging agriculture.

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