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Pathways for Higher Agricultural Institutions to Cultivate Grassroots Talents under the Rural Revitalization Strategy

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Abstract: *The in-depth implementation of the Rural Revitalization Strategy has raised new higher requirements for higher agricultural institutions to serve grassroots talent cultivation. Against the backdrop of rural revitalization, this paper systematically elaborates on the functional strengths of higher agricultural institutions in talent supply, farming-reading culture, full-coverage education and think tank services. It further reveals four prominent practical dilemmas, namely the low matching degree between talent supply and grassroots practical demands, students' weak willingness to work in rural areas, the shortage of dual-qualified and dual-competent faculty, and immature multi-party coordination mechanisms covering universities, local governments and agricultural enterprises. From four dimensions including innovating talent training models, reinforcing value guidance, deepening industry-education integration and perfecting multi-party coordination systems, this study explores optimized cultivation paths for higher agricultural institutions to cultivate high-quality grassroots talents. This research intends to provide theoretical references and practical implications for higher agricultural institutions to boost their contribution to comprehensive rural revitalization.*

Keywords: *Rural Revitalization; Higher Agricultural Institutions; Grassroots Talents; Talent Cultivation Paths*

1. Functional Advantages of Higher Agricultural Institutions in Cultivating Grassroots Talents

Grassroots talents serve as the core support for the comprehensive advancement of rural revitalization. As vital platforms for fostering grassroots talents, higher agricultural institutions shoulder the critical mission of cultivating high-caliber talent teams equipped with agricultural expertise, rural affection and farmer empathy for rural revitalization. Meanwhile, their distinctive school-running characteristics and disciplinary orientations enable them to underpin grassroots talent cultivation, whose functional strengths are mainly reflected in talent supply, cultural inheritance, education coverage and policy research.

1.1. Advantage in Talent Supply

As major suppliers of grassroots talents, higher agricultural institutions enjoy the capacity to dynamically adjust talent training models in response to diversified rural revitalization demands, thereby balancing talent supply and rural multifaceted needs. Through in-depth investigations into rural economic development, industrial structures and talent requirements, they timely revise talent training programs, integrate knowledge and competencies required for rural development into major construction, curriculum systems and practical teaching modules, and cultivate interdisciplinary talents with solid professional expertise, management capabilities and on-the-ground familiarity with rural development. This demand-oriented training model represents a proactive response of higher agricultural institutions to the contemporary questions of "what kind of talents should be cultivated for rural areas and how to cultivate such talents", laying a sustainable long-term talent supply mechanism for comprehensive rural revitalization[1].

1.2. Advantage in Cultural Leadership and Inheritance

Higher agricultural institutions stand as primary carriers for inheriting and innovating farming-reading culture, tapping into its values, spiritual connotations and ethical norms to exert

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educational functions. As an integral component of native rural culture, farming-reading culture aligns perfectly with the fundamental goal of fostering virtue through education in higher agricultural institutions, thus providing mainstream value guidance for their curriculum ideological and political education[2]. Through multi-dimensional and multi-level systematic design, agricultural institutions incorporate traditional farming experience into professional teaching to realize in-depth integration of theory and practice, guiding students to understand agriculture, rural areas and farmers via farming practice and build value recognition of understanding, loving and serving agriculture. In short, the full exploration, collation and application of farming-reading culture in teaching bring students closer to real agricultural production, facilitate the cultivation of more grassroots talents dedicated to agriculture, rural areas and farmers, encourage students to embrace grassroots employment and rural service, and fuel comprehensive rural revitalization.

1.3. Advantage in Comprehensive Educational Coverage

Higher agricultural institutions have constructed a full-chain, multi-dimensional and widely radiating training system, demonstrating their comprehensive coverage strengths in grassroots talent cultivation. Breaking the confines of conventional single-form academic education, this system forms a three-in-one education network encompassing academic education, vocational training and lifelong learning. In terms of academic education, undergraduate and postgraduate programs in agriculture-related disciplines deliver high-level talents to grassroots regions. For vocational training, projects such as expert service groups and village cadre outreach dispatch agricultural specialists and administrators to rural frontlines to conduct technical instruction and training. Regarding lifelong learning, modern information technologies including massive open online courses and live remote classrooms deliver premium educational resources to rural communities, helping local farmers update their knowledge systems and upgrade vocational skills, so as to provide sustainable human capital support for rural revitalization.

1.4. Think Tank Advantage in Policy Research

Leveraging academic accumulation, interdisciplinary research and scientific and technological innovation capacities, higher agricultural institutions act as indispensable high-end think tanks for comprehensively advancing rural revitalization. As hubs for policy research, they rely on specialized institutions such as rural revitalization research institutes and modern agricultural science and technology research institutes to organize faculty and students to conduct grassroots field investigations, and carry out forward-looking research on key issues including rural revitalization development planning, rural governance and industrial policies. Their research outputs, presented in the forms of research consultation reports and planning schemes, directly inform local government decision-making and promote scientific and localized policy formulation. This research process itself functions as a “living classroom” for talent cultivation: by participating in major research projects and planning compilation, students refine their ability to analyze and tackle complex practical challenges.

2. Practical Dilemmas Facing Higher Agricultural Institutions in Grassroots Talent Cultivation

Despite prominent functional strengths in grassroots talent cultivation, higher agricultural institutions encounter multiple practical bottlenecks in implementation, including mismatched talent supply and practical demands, insufficient initiative among students to serve rural areas, the shortage of dual-qualified and dual-competent faculty, and immature multi-party cooperation mechanisms linking universities, local governments and enterprises, which restrict the full play of their talent cultivation efficiency.

2.1. Low Compatibility between Talent Supply and Practical Grassroots Demands

Noticeable disconnection exists between the talent training systems of higher agricultural institutions and the real development needs of grassroots agriculture and rural sectors, with structural lag in curriculum design and disciplinary layout as the core root cause. On the one hand, current curricula fail to keep pace with rural industrial transformation; teaching content still prioritizes traditional disciplines such as crop science, pomology and animal husbandry, while practical courses targeting emerging sectors including smart agriculture and rural cultural tourism planning remain insufficient, leaving students unable to master knowledge and skills required for real agricultural and

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rural industrial practices. On the other hand, disciplinary structures remain dominated by traditional industries with inadequate deep integration across disciplines, and inter-disciplinary barriers hinder students' holistic and systematic understanding of modern agriculture, resulting in narrow knowledge frameworks. Grassroots regions are in urgent need of interdisciplinary and application-oriented talents capable of conducting on-site production guidance, technology promotion and rural construction, yet graduates from higher agricultural institutions often fail to satisfy the requirements of rural industrial upgrading and diversified development. Such supply-demand disconnection renders some talents ineffective at grassroots posts and weakens the practical value of higher agricultural institutions' grassroots service[3].

2.2. Insufficient Awareness among Students to Take Initiative in Serving Rural Areas

The advancement of rural revitalization calls for high-caliber agricultural talents, yet influenced by traditional mindsets, employment orientations and personal perceptions, a widespread trend exists among agricultural university students to distance themselves from rural areas. First, many students are shaped by the traditional mindset of "escaping rural areas through higher education", viewing university studies as a pathway to leave rural regions rather than a foundation for rural service. Such social perceptions erode their professional identity, driving numerous graduates to opt for urban jobs or non-agricultural careers post-graduation. Second, students hold biased perceptions of grassroots work, simplifying it as arduous and underdeveloped while lacking in-depth understanding of the broad prospects and development opportunities brought by the Rural Revitalization Strategy. Cognitive limitations directly weaken their willingness to engage in agricultural work. More fundamentally, value guidance and career education in higher agricultural institutions fail to deliver systematic and immersive training aligned with the Rural Revitalization Strategy, making it difficult to inspire students' mission of understanding and loving agriculture and their sense of responsibility to strengthen agriculture and revitalize villages[4]. Therefore, reshaping students' values and reinforcing their affection for agriculture and professional identity holds the key to resolving the difficulty of retaining grassroots talents.

2.3. Shortage of Dual-qualified and Dual-competent Teaching Faculty

Cultivating application-oriented talents matching rural demands requires a cohort of dual-qualified and dual-competent teachers proficient in both theoretical knowledge and practical application. However, the faculty structure of most higher agricultural institutions exhibits a strong academic bias, with severe shortages of dual-qualified and dual-competent instructors. Three primary challenges persist:

First, faculty evaluation systems prioritize scientific research over teaching, and academic papers over practical work. Professional title promotion and performance assessment attach greater weight to research projects, research funding and academic publications, while lacking effective incentives for teachers to conduct grassroots technical promotion, industrial services and student practical guidance, dampening their enthusiasm for practical teaching[5].

Second, teachers share homogeneous educational backgrounds and career trajectories. Most full-time instructors hold doctoral degrees obtained through consecutive university studies; while equipped with solid theoretical foundations, they lack long-term grassroots work experience or industry secondment, resulting in limited command of the latest rural development trends and hands-on technical capabilities, and leading to textbook-centric teaching disconnected from practice.

Third, mechanisms for recruiting external industry experts and dispatching internal teachers to grassroots sites operate inefficiently. Obstacles including compensation and management restrictions hinder the recruitment of part-time instructors from industries and enterprises. Meanwhile, heavy teaching workloads and short secondment cycles often render grassroots training programs for internal teachers superficial. Such structural deficiencies in faculty constrain the quality of application-oriented talent cultivation at higher agricultural institutions.

2.4. Immature Multi-Party Cooperation Mechanisms between Universities, Local Governments and Enterprises

Talent cultivation at higher agricultural institutions constitutes a systematic and comprehensive project requiring collaborative participation from universities, local governments and agricultural

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enterprises. Nevertheless, current university-government and university-enterprise cooperation is generally superficial, short-term and fragmented, lacking stable and mature collaborative education mechanisms[6].

First, cooperation remains shallow. Typical collaborative forms include student field visits and sporadic technical consultations, with limited in-depth integration in joint formulation of talent training programs, co-development of curricula and textbooks, co-construction and sharing of training bases, and joint technological research and achievement transformation.

Second, partnerships between local governments, industries, villages and universities are temporarily established to fulfill project demands, lacking top-level strategic agreements and regular organizational safeguards. Such short-term cooperation blurs the boundaries of rights, responsibilities and interests for both parties and impedes the formation of in-depth partnerships.

Third, sound benefit-sharing and risk-sharing mechanisms are absent. Universities prioritize research outputs and educational outcomes, while local governments and enterprises focus on immediate economic benefits and talent acquisition. Misaligned demands, compounded by insufficient incentive and compensation mechanisms, hinder the sustainable delivery of collaborative outcomes. Immature multi-party cooperation disconnects education and talent pipelines from rural industrial chains and undermines the precision and sustainability of grassroots talent cultivation at higher agricultural institutions.

3. Realization Paths for Higher Agricultural Institutions to Cultivate Grassroots Talents

Serving rural revitalization constitutes the bounden duty of higher agricultural institutions, whose irreplaceable role in grassroots talent cultivation remains unshakable. Against the backdrop of the new era, higher agricultural institutions must implement systematic and in-depth reforms to forge new talent training paradigms compatible with grassroots development demands. By reconstructing a demand-aligned talent cultivation system, consolidating ideological foundations of agricultural dedication, fostering a dual-qualified and dual-competent teaching workforce, and establishing a symbiotic collaborative development ecosystem, universities can achieve precise alignment between grassroots talents supply and rural development demands.

3.1. Innovate Talent Training Models and Reconstruct a Demand-Matched Education System

To resolve structural mismatches between talent supply at higher agricultural institutions and practical rural revitalization demands, systematic reforms on the talent supply side are urgently required, centered on reversing traditional training practices disconnected from industrial realities and constructing a novel demand-driven, competency-oriented education system.

In terms of training models, demand-oriented dynamic adjustment mechanisms shall be established. Higher agricultural institutions must step out of ivory towers and co-build dynamic monitoring stations for rural talent demand with local governments, agricultural enterprises and rural cooperatives to conduct regular grassroots talent demand surveys and compile industrial demand inventories. Such inventories serve as the basis for revising talent training programs and adjusting major orientations, realizing a fundamental transformation from “training talents based on institutional teaching capacity” to “training talents based on grassroots practical needs”.

In terms of curriculum systems, systematic restructuring is essential. Complex real-world rural challenges shall be integrated into teaching to cultivate students’ systematic thinking and comprehensive problem-solving capabilities. Curricula shall be optimized and updated by adding cutting-edge interdisciplinary courses covering smart agricultural technologies, rural e-commerce and logistics, modern rural governance and leisure agriculture planning, breaking traditional curriculum frameworks and developing modular course catalogs closely aligned with emerging industries.

In terms of disciplinary layout, construction of New Agricultural Sciences shall serve as the guiding framework. Cross-disciplinary integration shall be strengthened to break professional barriers; modern information, engineering and biotechnologies shall be leveraged to upgrade existing disciplinary systems, forming course clusters featuring deep integration of agriculture with engineering, science, liberal arts and medicine. Teachers shall be encouraged to form interdisciplinary research teams to co-deliver courses, supervise student projects and conduct research, advancing thorough cross-disciplinary integration.

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3.2. Strengthen Value Guidance and Consolidate Ideological Foundations of Devotion to Agriculture and Rural Areas

To address students' weak willingness to serve rural areas, a comprehensive, immersive value shaping and incentive system must be established, aiming to elevate students' basic awareness of understanding and loving agriculture into a mission to strengthen agriculture and revitalize rural areas, and ultimately translate such conviction into voluntary grassroots service, laying solid ideological talent foundations for rural revitalization.

First, comprehensively deepen curriculum-based ideological and political education, integrating the Rural Revitalization Strategy and dedication to agriculture, rural areas and farmers into all stages of talent cultivation. Higher agricultural institutions should tap into rural elements embedded in specialized courses to develop a curriculum ideological and political resource library featuring authentic rural practice cases, which closely connects national strategies, industrial frontiers and students' personal career development. In both specialized and general education, they shall integrate knowledge imparting with value guidance, as well as explicit education with implicit cultivation, so as to strengthen students' professional self-confidence and career identity.

Second, develop an immersive farming-reading education system to cultivate rural affection through real-world scenarios. A strong farming-reading cultural campus atmosphere shall be fostered, with compulsory farming-reading education courses incorporating thematic modules on farming-reading culture and rural China into general education, systematically imparting the essence of farming civilization, rural social structures and agricultural policy evolution to deepen students' cultural understanding. Long-term stable practical farming bases including science and technology yards, agricultural industrial bases and rural revitalization demonstration stations shall be prioritized. Through professional practice and internships, students engage with rural frontlines firsthand, developing profound emotional bonds with rural areas and fostering genuine affection for agriculture.

Third, establish a role model guidance and value incentive system to stimulate students' internal motivation for rural service. Higher agricultural institutions shall regularly invite outstanding alumni new farmers, grassroots agricultural experts and distinguished village officials to give lectures, adopting vivid firsthand stories rather than rigid indoctrination to deliver value education. Meanwhile, the universities will set up special scholarships for rural revitalization and the honorary title of Grassroots Service Star, and grant tangible preferential treatment to award winners in all assessments and evaluations. This integrated mechanism of role models and value incentives systematically reshapes students' value recognition and translates it into long-term dedication to grassroots rural service.

3.3. Deepen Industry-Education Integration and Build a High-Quality Dual-qualified and Dual-competent Teaching Workforce

Resolving the shortage of dual-qualified and dual-competent faculty requires profound institutional reforms to teacher evaluation and development mechanisms. The core objective is to continuously infuse industrial frontline expertise into teaching teams through institutional innovation, and rebuild a faculty ecosystem capable of fully supporting grassroots talent cultivation.

First, eliminate the bias of the "five-only" evaluation criteria and reform teacher assessment and evaluation mechanisms. Higher agricultural institutions shall appropriately lower the weight of academic indicators while raising the weight of practical teaching and industrial outreach achievements in the evaluation of professional title appointments and performance pay allocation. Such adjustments encourage faculty to engage in industrial services, technology popularization, planning consulting, and the supervision of student innovation and entrepreneurship projects. Only by shifting the evaluation focus from papers and research projects to solving practical problems and generating tangible value can we fundamentally transform academia-oriented teachers into practice-oriented instructors and expand the cohort of dual-qualified and dual-competent faculty.

Second, adopt a dual strategy of external recruitment and internal training to upgrade teaching teams. To address structural faculty shortages, both external introduction and internal transformation shall be implemented. For external recruitment, industry specialists with extensive practical experience shall be recruited from local governments, leading agricultural enterprises and top research institutes to serve as visiting professors and part-time supervisors, delivering elective courses to integrate cutting-edge industrial trends and knowledge into teaching and enhance the practicality and

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forward-looking nature of student learning. Higher agricultural institutions shall advance internal faculty transformation by rolling out a teacher industrial competency certification program. Specifically, the universities encourage faculty to take training and further education courses, acquire vocational qualifications or skill grade certificates, and accumulate a minimum of six months of grassroots secondment, project engagement or technical service experience every five years so that they can meet the assessment criteria for dual-qualified and dual-competent teachers.

Third, build joint faculty development platforms to sustain teachers' competency upgrading. Higher agricultural institutions shall cooperate with agricultural enterprises to build teacher workstations and master craftsman studios, and pair university instructors with industrial specialists to jointly compile teaching materials and carry out horizontal research projects. Constant engagement with industrial frontlines enables teachers to iteratively update professional knowledge, ensuring students master theoretical and practical skills aligned with industrial frontiers, and delivering a robust teaching workforce engine for cultivating outstanding grassroots talents at higher agricultural institutions.

3.4. Deepen Collaborative Models and Establish a Symbiotic Collaborative Development Ecosystem

To resolve immature university-government and university-enterprise cooperation mechanisms and transform short-term, loose partnerships into long-term, close alliances, fundamental reform of collaborative paradigms is required. Centered on institutional innovation, this reform aims to build a symbiotic collaborative development ecosystem featuring shared responsibilities, mutual benefit and cyclic advancement.

First, strengthen top-level design to establish stable cooperation frameworks. Higher agricultural institutions, together with local governments and industrial enterprises, shall push forward the founding of a university-government-enterprise tripartite collaborative development council for the Rural Revitalization Strategy with all three parties as its members. As a top-tier coordination body, the council systematically integrates scattered collaborative projects, consolidating cadre training, training base construction, technological research and targeted talent cultivation into systematic cooperation plans. All participating parties shall incorporate cooperation outcomes into local government performance appraisal systems and the key performance indicators (KPIs) of faculty in higher agricultural institutions. This institutional arrangement can deliver binding constraints and incentive mechanisms, thereby aligning strategic goals, concentrating resources and coordinating practical actions across all stakeholders.

Second, co-build physical platforms to deepen collaborative operation carriers. Higher agricultural institutions shall co-found rural revitalization colleges and characteristic industrial colleges alongside local governments and agricultural enterprises to carry out targeted and order-oriented talent training. Enterprises will be deeply involved in curriculum teaching and student evaluation to realize full-cycle joint cultivation of designated talents. Furthermore, the three parties will jointly construct technology transfer and incubation centers and adopt project-based management: enterprises put forward technical bottlenecks, universities conduct targeted research, and local governments offer policy and resource support, which enables university research to better match the industrial demands of local regions. Joint investment and operation of physical platforms transcend superficial cooperation such as base plaque unveiling and memorandum signing, converting temporary partnerships into daily institutionalized operation, and enabling sustainable collaborative talent cultivation and technological research.

Third, innovate linkage mechanisms to sustain long-term development momentum. Higher agricultural institutions, local governments and agricultural enterprises shall jointly build a resource allocation and sharing mechanism. Under this mechanism, local governments offer policy support and government procurement services in return for talent supply and comprehensive economic growth gains; enterprises invest equipment, technical demands and research funds to obtain priority recruitment rights for graduates and preferential access to research outcomes; universities input intellectual resources, patents and student teams to secure practical training bases and educational resources. The three parties shall also set up a risk-sharing sustainable development fund. The fund is initially capitalized with government guiding funds, and subsequent contributions are proportionally allocated from collaborative revenues to fund forward-looking joint research projects and hedge market risks, thereby fostering a self-sustaining virtuous cycle. Only by constructing such a linkage mechanism featuring complementary resources, shared benefits and co-shouldered risks can the sustained integration of education, talent, industrial and innovation chains be realized.

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4. Conclusion

The in-depth advancement of the Rural Revitalization Strategy endows higher agricultural institutions with new missions of the times and broad development prospects. This study demonstrates that higher agricultural institutions possess prominent functional strengths in talent supply, cultural leadership, educational coverage and think tank services for grassroots talent cultivation, yet they must resolve practical dilemmas including supply-demand mismatches, insufficient value guidance, underdeveloped teaching faculty and flawed cooperation mechanisms. Through innovating talent training models, reinforcing value guidance, deepening industry-education integration and improving collaborative mechanisms, higher agricultural institutions can enhance the pertinence and effectiveness of grassroots talent cultivation, evolve into robust conveyors and incubators of high-quality talents for rural revitalization, and provide solid talent and intellectual support for comprehensively advancing rural revitalization, accelerating the construction of an agricultural powerhouse and realizing the modernization of agriculture and rural areas.

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