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INSTITUTIONAL AND BEHAVIORAL FACTORS STRENGTHENING KAZAKHSTAN'S ORGANIC LIVESTOCK SECTOR

ҚАЗАҚСТАННЫҢ ОРГАНИКАЛЫҚ МАЛ ШАРУАШЫЛЫҒЫ СЕКТОРЫН НЫҒАЙТУДЫҢ ИНСТИТУЦИОНАЛДЫҚ ЖӘНЕ МІНЕЗ-ҚҰЛЫҚ ФАКТОРЛАРЫ

ИНСТИТУЦИОНАЛЬНЫЕ И ПОВЕДЕНЧЕСКИЕ ФАКТОРЫ УКРЕПЛЕНИЯ ОРГАНИЧЕСКОГО ЖИВОТНОВОДЧЕСКОГО СЕКТОРА КАЗАХСТАНА

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Abstract. The organic agricultural system in Kazakhstan has been strengthening its position since the early 2000s and is regarded as a promising direction for the sustainable transformation of the agrarian sector. *The objective* – is to identify the factors determining the readiness and practical engagement of beef cattle farmers in transitioning to organic production. *Methods* – the study of works by domestic and foreign scholars, the use of data from the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan, and reports of the Department of Agriculture of the West Kazakhstan Region were employed to identify trends in the development of environmentally sustainable livestock farming. The methodological framework was based on the Theory of Planned Behavior (TPB) and econometric modeling, including structural equation modeling, which were applied to validate the TPB model, assess the direct and indirect effects of behavioral strategies focused on the organic livestock sector, and analyze the adoption

of organic farming practices. *Results* – the study demonstrated that motivational attitudes, subjective norms, and perceived behavioral control have a positive influence on farmers' intention to engage in organic agricultural production. Recommendations were developed to reduce certification barriers, optimize advisory services, provide financial support during the transition period, and stimulate demand for organic products. *Conclusions* – encouraging agricultural producers to manufacture organically certified food products is the dominant factor that drives actual behavioral change during the transition process and has a stronger influence than preparedness alone. Farm size (livestock numbers and land area) is positively correlated with the likelihood of conversion to organic production. Effective and targeted government measures, including certification subsidies, advisory services, and the expansion of the domestic market, are of decisive importance for unlocking the considerable potential of the republic's organic livestock sector. In the future, consumer demand for natural livestock products is expected to increase.

Аңдатпа. Қазақстандағы органикалық аграрлық жүйе 2000-шы жылдардың басынан бері позициясын нығайтып келеді және аграрлық секторды орнықты түрлендірудің перспективалық бағыты ретінде қарастырылады. *Мақсаты* - органикалық өндіріске көшу үшін етті мал шаруашылығымен айналысатын фермерлердің дайындығы мен практикалық белсенділігін анықтайтын факторларды анықтау. *Әдістері* – отандық және шетелдік ғалымдардың еңбектерін зерделеу, Қазақстан Республикасы Стратегиялық жоспарлау және реформалар агенттігінің Ұлттық статистика бюросының деректерін, Батыс Қазақстан облысы ауыл шаруашылығы басқармасының есептерін экологиялық қауіпсіз мал шаруашылығының даму үрдістерін белгілеу үшін пайдалану. Әдістемелік негіз-жоспарланған мінез-құлық теориясы (ТРВ) және эконометрикалық модельдеу, оның ішінде ТРВ моделін тексеру және органикалық бағыттағы мал шаруашылығы саласына бағытталған мінез-құлық стратегияларының тікелей және жанама әсерлерін бағалау, органикалық тәжірибелерді енгізуді талдау үшін қолданылатын құрылымдық теңдеу әдісі. *Нәтижелер* - мотивациялық көзқарастар, субъективті нормалар және қабылданған реттеуші бақылау органикалық ауылшаруашылық өндірісіне деген ұмтылысқа оң әсер ететіні көрсетілген. Сертификаттау кедергілерін азайтуға, консультациялық қызметтерді оңтайландыруға, өтпелі кезеңді қаржылық қолдауға және органикалық өнімге сұранысты қалыптастыруға бағытталған ұсыныстар әзірленді. *Қорытындылар* - ауыл шаруашылығы тауарын өндірушілерді органикалық таза азық-түлік өнімдерін жасауға ынталандыру-бұл тек дайындықтан гөрі жетілдіру процесінде нақты әрекеттерді негіздейтін басым критерий. Ферманың мөлшері (мал басы, жер көлемі) өзгертілім ықтималдығымен оң байланысты. Тиімді және мақсатты мемлекеттік шаралар: сертификаттауға, консультациялық қызметтерге және ішкі нарықты кеңейтуге арналған субсидиялар республиканың органикалық мал шаруашылығы қызметінің елеулі әлеуетін ашу үшін өте маңызды. Болашақта тұтынушылар тарапынан жануарлардан алынатын табиғи тауарларға сұраныс артады.

Аннотация. Органическая аграрная система в Казахстане укрепляет позиции с начала 2000-х годов и рассматривается как перспективное направление устойчивой трансформации аграрного сектора. *Цель* - выявление факторов, определяющих готовность и практическую активность фермеров, занимающихся мясным скотоводством, для перехода к органическому производству. *Методы* – изучение трудов отечественных и зарубежных ученых, использование данных Бюро национальной статистики Агентства по стратегическому планированию и реформам Республики Казахстан, отчетов Управления сельского хозяйства Западно-Казахстанской области для обозначения тенденций развития экологически безопасного животноводства. Методологическая основа – теория планируемого поведения (ТРВ) и эконометрическое моделирование, включающее метод структурного уравнения, которые применялись для проверки модели ТРВ и оценки прямых и косвенных эффектов поведенческих стратегий, ориентированных на животноводческую отрасль органического направления, анализа внедрения органических практик. *Результаты* - показано, что мотивационные установки, субъективные нормы и воспринимаемый регулятивный контроль оказывают позитивное влияние на стремление к органическому сельхозпроизводству. Разработаны рекомендации, направленные на снижение барьеров сертификации, оптимизацию консультационных служб, финансовую поддержку переходного периода и формирование спроса на органическую продукцию. *Выводы* - стимулирование сельхозтоваропроизводителей к созданию органически чистых продуктов питания является доминирующим критерием, который обосновывает фактические действия в процессе модификации, более сильным, чем просто подготовленность. Размер фермы (поголовье скота, площадь земель) положительно коррелирует с вероятностью преобразования. Эффективные и целенаправленные государственные меры: субсидии на сертификацию, консультационные услуги и расширение внутреннего рынка имеют решаю-

щее значение для раскрытия значительного потенциала органической животноводческой деятельности республики. В дальнейшем возрастет спрос на натуральные товары животного происхождения со стороны потребителей.

Keywords: organic agriculture, livestock farming, organic production-oriented livestock farming, Theory of Planned Behavior, probit model, behavioral control.

Түйінді сөздер: Органикалық ауыл шаруашылығы, органикалық өндіріске бағытталған мал шаруашылығы, жоспарланған мінез-құлық теориясы, бұзылған модель, мінез-құлықты бақылау.

Ключевые слова: органическое сельское хозяйство, животноводство, ориентированное на производство органической продукции, теория планируемого поведения, пробит-модель, поведенческий контроль.

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Introduction

Against the backdrop of a global shift toward sustainable development models, organic agriculture is becoming a key priority in the agricultural policies of both developed and developing countries. The rapid growth of the global market for organic products, stricter environmental standards, and evolving consumer preferences are driving steady demand for environmentally friendly food, which creates new opportunities for the agricultural sector in countries rich in natural resources.

Kazakhstan possesses significant potential for the development of organic livestock farming: the country has vast pasturelands, a relatively low level of chemical use in agricultural production, and a diversity of traditional livestock breeds. In terms of its natural conditions, Kazakhstan can be compared to leading global producers of organic livestock products such as Australia and Argentina, where up to 80% of organic land is used for pastures (Holka M., Kowalska J., Jakubowska M.) [1]. Nevertheless, organic livestock farming in the country remains a niche and underdeveloped segment of the agricultural economy.

Organic production in Kazakhstan began to take shape in the early 2000s, primarily through the efforts of export-oriented companies. The adoption of the Law of the Republic of Kazakhstan "On Organic Production" in 2015 marked a crucial stage in the institutionalization of the sector. Regulatory development was carried out with the support of international organizations, including the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Development Programme(UNDP). By 2020, there were 279 certified organic producers in the country, and the volume of exports amounted to approximately 9 million euros (Islyami A., Aldashev A., Thomas T. et al.) [2].

At the same time, the sector's growth trajectory reveals significant constraints: the area of organic farmland peaked at 303.4 hectares in 2015, after which it declined by approximately two-thirds in subsequent years. The main constraints are high certification costs, insufficient development of market infrastructure, a lack of professional expertise among producers, and limited domestic demand for organic products (Bulkhairova Z. S., Alieva A.) [3].

Despite the relevance of the topic, there are virtually no studies in the academic literature devoted to the readiness and behavior of Kazakhstani farmers regarding the transition to organic livestock farming. International studies show that the transition to organic production is driven not only by economic considerations but also by psychological, social, and institutional factors (Aivazidou E., Tsolakis N.) [4]. The application of the Theory of Planned Behavior (TPB) allows for a systematic examination of these determinants and the identification of the most significant ones in the context of Kazakhstan.

The aim of this study is to identify the key factors influencing the willingness and actual behavior of beef cattle farmers regarding the transition to organic production in Kazakhstan.

Literature review

The Theory of Planned Behavior, developed by Ajzen, is one of the most widely used theoretical frameworks for explaining intentional behavior. Studies on the transition to organic production have found that behavioral attitudes and perceived behavioral control are the most significant predictors of farmers' willingness (Aivazidou E., Tsolakis N.; Patle G., Kharpude S., Dabral P.) [4, 5]. A number of studies highlight the role of subjective norms: in traditional agrarian communities, the influence of one's professional environment, family, and institutional actors often outweighs individual behavioral attitudes (Aghasafari H., Karbasi A., Mohammadi H. et al.) [6].

In studies of organic livestock farming, the application of TPB helps explain why farmers who have a positive attitude toward organic production nevertheless fail to make the transition in practice. This phenomenon is linked to the intention-behavior gap, which is caused by a high level of perceived barriers (Stampa E., Schipmann-Schwarze C., Hamm U.) [7].

Economic factors include the expected profitability of organic production, premium market prices, high initial investment costs, and certification costs (Walia S., Kaur T., Dhawan A.) [8]. In developing economies, including Kazakhstan, the economic barriers of the transition period are particularly pronounced.

Institutional factors include the regulatory framework, government support, the availability of subsidies, and the development of the certification infrastructure (Areri V.M., Obulinji H.W., Recha; Canavari M., Gori F., Righi S. et al.) [9,10] and (Muthmain J.) [11]. Studies on Kazakhstan indicate that the adoption of relevant legislation is a necessary but not sufficient condition for the sustainable growth of the organic sector (Karabasov R., Pyagay A., Bespaeva R.) [12].

Information and educational factors determine farmers' awareness of organic production technologies, the availability of advisory services, and opportunities for professional training (Aivazidou E., Tsolakis N.) [4]. Given Kazakhstan's limited counseling infrastructure, this set of factors takes on particular significance.

Social factors include the influence of professional networks, industry associations, family environments, and media coverage of organic production (Bulkhairova Z.S., Alieva A.) [3]. In the Kazakhstani context, where organic production remains a niche market, social approval from one's immediate circle plays a significant role in shaping behavioral norms.

The experience of countries with economies in transition shows that the transition to organic livestock farming is associated with specific institutional risks: an unstable regulatory framework, underdeveloped markets for organic products, and limited government support (Islyami A., Aldashev A., Thomas T. et al.) [2]. Nevertheless, a number of post-Soviet countries are demonstrating steady growth in the organic sector, provided there is a targeted government policy.

In the context of Kazakhstan, the significance of this issue is determined by several factors. First, the country's agricultural sector continues to play a vital role in the national economy and employment (Оскар М.) [13]. Second, growing global demand for organic products is creating export opportunities for Kazakhstani producers (Nasiyev B., Vassilina G., Zhylkybay A. et al.) [14].

Materials and methods

The theoretical framework for this study is the Theory of Planned Behavior, according to which behavioral decisions are determined by three key constructs: Attitude - an individual's assessment of whether the behavior in question is desirable; Subjective Norms - an individual's perception of social pressure regarding the behavior; and Perceived Behavioral Control (PBC) - an individual's subjective assessment of their ability to perform the behavior.

The empirical basis of the study was data from a questionnaire survey of farmers engaged in beef cattle production in Kazakhstan. The questionnaire included sections designed to measure key TPB constructs, as well as the sociodemographic and structural characteristics of the farms. TPB constructs were measured using Likert-type multi-item scales.

A set of complementary econometric methods was applied for the empirical analysis. Structural equation modeling (SEM) was used to test the TPB theoretical model and to assess the direct and indirect effects of behavioral constructs on readiness for organic production. A probit model was used to estimate the probability of a binary outcome - transition to organic production (1) or continuation of traditional practices (0). An ordinal probit model was used to analyze the degree of adoption of organic practices (on a scale from 1 to 3: preliminary, partial, and full transition).

Results

The Government of Kazakhstan has laid the legal foundation for organic agriculture by systematically adopting a series of strategic documents: the "Kazakhstan 2050" strategy, the concept for the transition to a "green economy," and the Law of the Republic of Kazakhstan "On the Production of Organic Products". This indicates that Kazakhstan is entering the era of organic agriculture. At the same time, active cooperation with international organizations to promote environmentally friendly products creates opportunities to attract additional investment in the agricultural sector. At the same time, consumer demand for eco-friendly products is recognized as the most significant factor in the expansion of both the global and domestic markets for organic products (Akhmetova V., Baldzhi Y., Kandalyina Y. et al.) [15].

As part of the study, a survey was conducted among farmers in the West Kazakhstan Region, and the data were analyzed using probit model methods.

A total of 187 farmers engaged in beef cattle production participated in the survey, of whom 64.7% operated farms with fewer than 100 head of livestock. The sample included farms at different stages of engagement with organic practices: 42% at the preliminary stage of considering organic production, 34% at the partial adoption stage, and 24% at the full adoption stage. The data were analyzed using probit model methods.

The results of the probit model analysis (table 1) indicate a statistically significant influence of key factors on the probability of transitioning to organic production.

Table 1 - Results of the probit model estimation (dependent variable: adoption of organic practices, 0/1)

Variable	Coefficient	Standard error	z-statistic	p-value	Significance
Readiness for organic production	0.412	0.098	4.20	0.000	***
Perceived behavioral control	0.685	0.124	5.52	0.000	***
Age	-0.073	0.041	-1.78	0.075	*
Education	0.156	0.067	2.33	0.020	**
Livestock headcount	0.118	0.039	3.03	0.002	***
Experience	0.091	0.052	1.75	0.081	*
Land area	0.134	0.046	2.91	0.004	***
Family involvement	0.064	0.058	1.10	0.270	—
Number of employees	0.082	0.071	1.15	0.248	—
Constant	-1.942	0.453	-4.29	0.000	***

Note: statistical significance levels: *** p < 0.01 (highly significant); ** p < 0.05 (significant); * p < 0.1 (marginally significant); - not statistically significant. Standard errors are robust. The dependent variable equals 1 if the farmer has adopted any organic practices, and 0 otherwise. N = 187

Perceived behavioral control has the greatest influence on the probability of transition (β = 0.685, p < 0.001), exceeding the effect of readiness for organic production (β = 0.412, p < 0.001). Farm size (livestock population and land area) is positively and significantly associated with the probability of transition. The farmer's age has a negative effect, indicating a greater propensity for innovation among younger producers. Family involvement and the number of hired workers do not reach statistical significance, suggesting that informal household labor dynamics are not primary drivers of organic adoption decisions.

Calculating marginal effects (table 2) allows for the interpretation of the obtained coefficients in meaningful terms.

Table 2 - Limit effects of the probit model (ΔP)

Variable	Marginal effect	Interpretation
Readiness	+0.118	A 1-point increase in readiness raises the probability of transition by 11.8%
Perceived control	+0.196	An increase in perceived control raises the likelihood of conversion by 19.6%
Education	+0.045	A higher level of education increases the probability by 4.5%
Livestock headcount	+0.034	An increase in farm size increases the likelihood of transition
Note: marginal effects are computed at the mean values of all independent variables		

Perceived behavioral control has an influence on the likelihood of adoption that is nearly 1.7 times stronger than that of readiness (0.196 vs. 0.118), confirming the central role of this construct in explaining farmers' actual behavior. This finding underscores that it is not a lack of positive attitudes toward organic production that inhibits transition, but rather farmers' subjective assessment of their capacity to navigate the practical barriers involved.

The ordered probit model (table 3) allows us to assess the determinants not only of the transition itself but also of the degree of adoption of organic practices, distinguishing among preliminary consideration, partial adoption, and full organic conversion.

Table 3 - Results of the ordered probit model (degree of organic behavior: 1–3)

Variable	Coefficient	Std.Err	z	p-value	Significance
Readiness	0.356	0.087	4.09	0.000	***
Perceived control	0.741	0.119	6.22	0.000	***
Education	0.142	0.063	2.25	0.024	**
Livestock headcount	0.129	0.041	3.15	0.002	***
Area	0.151	0.048	3.14	0.002	***

Note: statistical significance levels: *** p < 0.01; ** p < 0.05; * p < 0.1. The dependent variable is an ordered categorical variable coded as 1 (preliminary stage – passive consideration of organic transition), 2 (partial adoption – implementation of selected organic practices), and 3 (full adoption – complete transition to certified organic production)

Perceived behavioral control has the greatest influence on the transition from partial to full organic production (β = 0.741), indicating its particular importance at the highest level of transformation. This finding suggests that as farmers progress along the adoption continuum, subjective perceptions of capacity become increasingly decisive, likely because full organic conversion involves the most complex organizational, financial, and regulatory requirements.

The probabilities of achieving levels of organic behavior are shown in table 4.

Table 4 - Probabilities of achieving various levels of organic behavior (based on average variable values)

Behavioral level	Probability
1 (preliminary)	0.42
2 (partial)	0.34
3 (complete)	0.24
Note: predicted probabilities are calculated at the mean values of all independent variables using the ordered probit model estimates in table 3. Probabilities sum to 1.00. A one-standard-deviation increase in perceived behavioral control raises the probability of complete transition from 0.24 to 0.37	

When perceived behavioral control increases by 1 standard deviation, the probability of a complete transition rises from 0.24 to 0.37, indicating that the system is highly sensitive to this factor. Most farmers (42%) are in the preliminary stage of considering organic production, reflecting the generally low prevalence of organic practices in Kazakhstan's beef cattle industry. This distribution confirms that organic transition in the region is still in an early diffusion phase, with the majority of farmers yet to commit to even partial adoption.

To gain a comprehensive understanding of the economic and environmental consequences of transitioning to organic production, a comparison of three types of farms was conducted (table 5).

Table 5 - Comparison of three types of farms

Indicator	Traditional	Transitional	Organic
Production costs	Low	Moderate	Above average
Market selling price	Standard	Elevated	Premium (+20–35%)
Access to export markets	Limited	Partial	High
Ecological impact	High	Moderate	Low
Government support	Total	Target	Specialized
Profitability (long-term)	Average	Increasing	High
Note: data are based on survey responses from farmers in the West Kazakhstan Region (N = 187) combined with analytical reports of the Department of Agriculture of the West Kazakhstan Region and secondary sources			

Data analysis indicates that organic farms generate higher profit margins in the long term due to premium sales prices and expanded access to export markets. The transition period is characterized by a temporary increase in costs and institutional risks, which necessitates targeted government support at this stage. Environmental sustainability is directly linked to the degree of adoption of organic practices.

An analysis of the institutional environment reveals the following key barriers to the development of organic livestock farming in Kazakhstan:

High certification costs. Dependence on international certification bodies significantly increases transaction costs for domestic producers. The cost of obtaining and maintaining organic certification remains a significant financial burden, especially for small and medium-sized farms.

Inadequate market infrastructure. Limited organic supply chains, a lack of specialized logistics solutions, and a weak quality control system hinder the development of the domestic organic meat market.

Lack of expertise and advisory support. Farmers' insufficient awareness of organic production technologies and the limited availability of advisory services increase the perceived risks of transitioning to organic farming.

Limited domestic demand. Consumer demand for organic products in the domestic mar-

ket remains low due to a lack of public awareness and the price premium associated with organic products.

Institutional uncertainty. The instability of mechanisms for implementing agricultural policy and the inconsistency of government support measures create additional barriers to long-term investment in organic production (Oskar M.) [13].

The results obtained are generally consistent with empirical data from countries with a developed organic sector. However, a fundamental difference in the Kazakhstani context lies in the fact that in developed countries, perceived behavioral control is shaped by mature government support and stable domestic demand, whereas in Kazakhstan it is largely determined by institutional uncertainty and structural constraints.

Based on the results obtained, the following priority areas of agricultural policy in the field of organic livestock farming development in Kazakhstan have been formulated.

1. Strengthening perceived behavioral control. Given the dominant influence of this construct on actual behavior, government policy should aim to reduce practical barriers to transition: subsidizing certification procedures and reducing administrative costs; developing national certification bodies to reduce dependence on international structures; expanding advisory and educational programs for producers; and establishing sustainable supply chains for organic products.

2. Human capital development. Training programs, demonstration farms, knowledge-sharing among farmers, and digital advisory platforms can boost producers' confidence in their ability to implement organic practices. The positive impact of education on the likelihood of transition justifies long-term investments in the professional training of agricultural personnel.

3. Financial support during the transition period. A comparative economic analysis of farm types indicates that the transition to organic production is accompanied by a temporary increase in costs and institutional risks. Targeted subsidies, preferential loans, and tax incentives during the conversion period can reduce financial uncertainty and stimulate the sustainable adoption of organic practices.

4. Stimulating domestic demand. Despite the sector's export orientation, the long-term sustainability of organic livestock farming requires the development of the domestic market. Awareness campaigns, improvements to labeling systems, and the inclusion of organic products in government procurement and food aid programs can help expand domestic demand.

5. Improving the institutional environment. Ensuring the stability and predictability of the regulatory framework, increasing the transparency of government support mechanisms, and developing regional organic associations are intended to reduce institutional uncertainty, which is one of the key factors contributing to low perceived behavioral control.

Discussions

This study provides empirical evidence on the factors determining farmers' transition to organic livestock production in Kazakhstan and fills a significant gap in research on this topic in Central Asian and post-Soviet countries. This finding is consistent with international studies indicating the important role of social approval, professional networks, and market legitimacy in shaping environmentally responsible behavior (Aghasafari H., Karbasi A., Mohammadi H. et al.) [6].

Second, perceived behavioral control demonstrates the greatest influence on the actual adoption of organic practices, surpassing readiness in terms of impact. This is theoretically consistent with the provisions of the extended TPB, according to which intention may not translate into action in the presence of high perceived barriers. In the Kazakhstani context, such barriers include the high cost of certification, insufficient development of the advisory infrastructure, logistical constraints, and dependence on international certification authorities.

The structural characteristics of farms - livestock size and land area - correlate positively with the likelihood of transitioning to organic production. Large farms have greater resources to cover the costs of the transition period and meet certification requirements. Educational attainment has a positive effect on the probability of transition, underscoring the role of human capital in the sustainable transformation of agricultural production. The negative relationship between age and the probability of transition indicates that younger farmers are more innovation-oriented and is consistent with the theory of innovation diffusion.

This study has several limitations that must be taken into account when interpreting the results. First, the use of farmers' self-reported data as a measure of TPB constructs carries a risk of bias. Second, the sample primarily covers beef cattle farming, which limits the generalizability of the results to other livestock sectors. Third, the cross-sectional study design does not allow for the establishment of causal relationships.

Conclusion

This study presents a comprehensive analysis of the institutional conditions and behavioral factors that determine the development of organic livestock farming in Kazakhstan. The main conclusions can be summarized as follows.

1. First, behavioral attitudes, subjective norms, and perceived behavioral control have a statistically significant positive effect on farmers' readiness for organic production, confirming the applicability of the theory of planned behavior to the analysis of agricultural decisions in a developing economy.

2. Second, willingness to adopt organic production statistically significantly increases the probability of actually implementing organic practices; however, perceived behavioral control has a stronger direct impact on actual behavior - approximately 1.7 times greater than willingness. This suggests that the key limiting factor is not farmers' motivation, but their subjective perception of the complexity and riskiness of the transition.

3. Third, the structural characteristics of farms - livestock numbers and land area- are positively associated with the likelihood of transition, suggesting that larger farms have an advantage in adopting organic practices and highlighting the need for tailored support measures for small-scale producers.

4. Fourth, educational attainment is a significant positive predictor of conversion, while age is a negative one, which is consistent with the theory of innovation diffusion and points to a gradual generational shift as a structural factor in the transformation of the agricultural sector.

5. Fifth, the decline in organic farmland area after 2015 demonstrates that the adoption of legislation is a necessary but insufficient condition for the sustainable development of the organic sector. To ensure long-term growth, a set of measures is needed to strengthen farmers' perceived behavioral control by lowering certification barriers, developing advisory support, and fostering the domestic market.

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