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## **ANALYSIS OF DEVELOPMENT TREND IN INTERNATIONAL AGRI-FOOD MARKETS**

### **АНАЛІЗ ТЕНДЕНЦІЇ РОЗВИТКУ МІЖНАРОДНИХ АГРОПРОДОВОЛЬЧИХ РИНКІВ**

**Summary.** *The international agri-food market, as an integral component of the global food supply chain, has been continuously evolving and adjusting to meet the ever-growing global food demand. This work aims to combine the current state of development in the agri-food market with an analysis of its developmental trends, in order to assist decision-makers, agri-food professionals, and investors in gaining a better understanding of the dynamics within the*

*agri-food market. The study reveals that the global trade volume of agri-food products has gradually increased in recent years, with the proportion of agri-food trade within the global total trade remaining relatively stable. In comparison to other sectors such as fuel and mineral products and manufacturing industries, the agri-food sector exhibits greater stability in trade growth. Consumer demand for agri-food products is evolving towards greater diversity, sustainability, and nutritional value, with a shift towards healthier dietary choices representing a major lifestyle trend. Technological innovations at various stages of agri-food production and distribution have played a pivotal role in enhancing production efficiency and quality while reducing production costs. Simultaneously, these innovations have provided consumers with more diversified choices. To maintain competitiveness, the agri-food market needs to proactively adapt to the ever-changing external environment, continuously engage in technological innovation, and provide stable product support for global sustainability development.*

**Key words:** *agri-food market, development trend, consumer demand, technological innovation, analysis.*

**Анотація.** *Міжнародний агропродовольчий ринок, як невід'ємна складова глобального ланцюга постачання продовольства, постійно розвивається та пристосовується, щоб задовольнити постійно зростаючий глобальний попит на продукти харчування. Ця робота має на меті поєднати поточний стан розвитку агропродовольчого ринку з аналізом тенденцій його розвитку, щоб допомогти особам, які приймають рішення, фахівцям агропродовольчої галузі та інвесторам отримати краще розуміння динаміки в агропромисловому комплексі. - продуктовий ринок. Дослідження показує, що обсяг світової торгівлі агропродовольчими товарами поступово зріс за останні роки, при цьому частка торгівлі агропродовольчими товарами в загальному обсязі світової*

*торгівлі залишається відносно стабільною. Порівняно з іншими секторами, такими як паливо та мінеральні продукти та обробна промисловість, агропродовольчий сектор демонструє більшу стабільність у зростанні торгівлі. Споживчий попит на агропродовольчу продукцію розвивається в бік більшої різноманітності, стійкості та поживної цінності, причому головною тенденцією способу життя є зрушення до вибору здоровішого харчування. Технологічні інновації на різних етапах виробництва та розповсюдження агропродовольчої продукції відіграли ключову роль у підвищенні ефективності та якості виробництва при одночасному зниженні виробничих витрат. Одночасно ці інновації надали споживачам більш різноманітний вибір. Щоб підтримувати конкурентоспроможність, агропродовольчий ринок має активно адаптуватися до зовнішнього середовища, що постійно змінюється, постійно впроваджувати технологічні інновації та забезпечувати стабільну підтримку продуктів для глобального сталого розвитку.*

**Ключові слова:** *агропродовольчий ринок, тренд розвитку, споживчий попит, технологічні інновації, аналіз.*

**Statement of the problem.** The international agri-food market has perennially played a pivotal role within the global food supply chain, exerting significant influence on the entire economic system, societal structure, and environmental sustainability. Agri-food commodities, apart from catering to the nutritional and energy requirements of the global populace, constitute the economic backbone of rural communities, providing livelihoods and social support to farmers. Nevertheless, amidst a confluence of challenges including burgeoning populations, shifts in dietary preferences, climate change, global trade uncertainties, and technological innovations, the international agri-food market finds itself in the midst of profound transformation. Concurrently, consumer demands for food quality, traceability, and sustainability continue to

escalate, ushering in new challenges and opportunities for the agri-food market. Hence, it becomes imperative to undertake a systematic analysis of the current state of the international agri-food market to better comprehend and address the developmental issues it presently confronts and anticipates in the future.

**Analysis of recent researches and publications.** Hu Bingchuan, starting from an understanding of agri-food price fluctuations, delved into the long-term global agri-food price trends and their developmental trajectories [1]. Furthermore, he harnessed global agri-food price and market data to scrutinize the cyclical patterns governing agri-food market operation, providing detailed analyses of pertinent factors [2]. Yao Erqiang succinctly examined the current state of global agri-food trade and put forth several recommendations aimed at enhancing international competitiveness in the agri-food sector [3]. Gu Shansong et al. conducted research into the alterations in the global agri-food market and trade resulting from the COVID-19 pandemic, proffering corresponding strategies to address the issues prevalent in the agri-food market [4]. In addition, Qi Wanlin undertaken a study on global food security in the post-pandemic era, analyzing the state of world food security through descriptions of food supply and demand, prices, and trade. Subsequently, she combined an analysis of food security conditions with factors influencing food security [5].

**Formulation purposes of article.** The main purpose of this article is to conduct an analysis of the current state of the international agri-food market, elucidating the developmental trends within the agri-food market. By examining fluctuations in trade volumes across different categories of agri-food products, we aim to analyze shifts in consumer demand. Concurrently, we explore the catalyzing role of technological innovations within the agri-food market. Through this analysis of the agri-food market, we aim to facilitate enhanced adaptability among industry stakeholders in response to market dynamics. Furthermore, it is intended that this analysis will offer critical insights into the

agri-food market for policymakers, investors, and consumers alike.

**The main material.** This study employs a combined quantitative and qualitative approach to analyze pertinent data and trends within the international agri-food market. The primary sources of data were derived from the official websites of the World Trade Organization and the Food and Agriculture Organization of the United Nations, along with several survey reports.

Table 1 presents the global agri-food trade values for the past five years. In 2022, the total global agri-food trade amounted to 4689.1 billion, representing a 28.23 % increase from 2018's 3656.8 billion. Commencing from 2020, there has been a consecutive three-year growth in the total global agri-food trade, with an average annual growth rate of 9.36 %. This trend underscores the robust momentum in the global agri-food market. Over the past five years, there has been marginal disparity between the import and export trade values of global agri-food commodities, with both exhibiting similar trends to the total agri-food trade value. Furthermore, the fluctuations in the total trade value align with those of the total agri-food trade [6]. Examining the proportion of total agri-food trade within the total global trade value reveals that, apart from 2020, the total agri-food trade has consistently accounted for approximately 9.4 % of the total global trade value, maintaining a relatively stable position. This suggests stable global demand for agri-food products and underscores their stable status within the global economy. In 2020, due to the impact of the COVID-19 pandemic, the total global commodity trade was notably affected, reaching its lowest value in the past five years at 35529.8 billion. During this time, the proportion of total agri-food trade within the total global trade value reached its highest point in the past five years, standing at 10.27 %. The likely explanation for this phenomenon is the disruption of global supply chains and trade restrictions imposed by some countries on non-essential goods due to the pandemic. Consequently, trade in certain consumer and industrial goods was adversely affected, leading to a decline in the total global commodity trade. However, food represents a

fundamental necessity of life, and the COVID-19 pandemic heightened global attention to the agri-food supply chain, emphasizing the importance of food safety and reliability. This heightened awareness resulted in increased global demand for agri-food products. Additionally, agri-food supply chains possess a degree of resilience and adaptability, enabling them to respond to unforeseen circumstances. Although the pandemic posed challenges to production and logistics, the relatively minor disruptions in agri-food trade compared to other industries suggest its greater resilience to external shocks.

*Table 1*

**Global agri-food trade values in the past 5 years (unit: billion)**

Category	2018	2019	2020	2021	2022
Agri-food exports	1805.8	1782.9	1803.7	2162.4	2325.9
Agri-food imports	1851.0	1827.8	1846.5	2195.8	2363.1
Total agri-food trade value	3656.8	3610.6	3650.2	4358.2	4689.1
Total global trade value	39368.0	38353.0	35529.8	44964.1	50525.7
Proportion	9.29%	9.41%	10.27%	9.69%	9.28%

*Source:* World Trade Organization

Table 2 presents the month-on-month growth rate variations in global agri-food, fuel and mineral products, and manufacturing trade values over the past five years. From Table 2, it is evident that the month-on-month growth rate of global agri-food trade was negative only in 2019, with positive growth rates in other years. In contrast, the month-on-month growth rates of trade in fuel and mineral products and manufacturing were negative in 2019 and 2020 for two consecutive years, with these negative rates being lower than that of agri-Food. The factors contributing to the simultaneous negative growth in global trade of agri-food, fuel and mineral products, and manufacturing in 2019 primarily encompassed trade frictions among major economies, economic slowdown, fluctuation in crude oil prices, and global value chain adjustments. These interrelated factors ultimately resulted in the global trade downturn that year. Global agri-food trade, which had experienced negative growth in 2019,

rebounded to positive growth in 2020. In contrast, trade in fuel and mineral products and manufacturing continued to decline, with a shift towards positive growth not occurring until 2021. This suggests that agri-food trade exhibited comparatively better stability in terms of growth rate when compared to trade in fuel and mineral products and manufacturing. The relative stability in agri-food trade can be attributed to factors such as the stability of food demand, global food security concerns, and the diversity of agri-food products. On the other hand, the relatively higher volatility in trade of fuel and mineral products and manufacturing is primarily influenced by factors such as commodity prices, supply chain adjustments, and global economic conditions. Therefore, the trade performance of different sectors is affected by distinct factors, leading to variations in their trade growth rates. Overall, the relatively stable growth rate of agri-food trade and its lower sensitivity to external environmental changes can be attributed to the inherent characteristics and functions of agri-food products.

*Table 2*

**Month-on-month growth rate variations in global agri-food, fuel and mineral products, and manufacturing trade values over the past five years**

**(unit: billion)**

Category	2018	2019	2020	2021	2022
Agri-food	4.81%	-1.26%	1.10%	19.40%	7.59%
Fuel and mineral products	24.45%	-6.02%	-24.06%	57.45%	40.73%
Manufacturing	7.95%	-1.74%	-5.14%	21.86%	3.09%

*Source:* calculated by the authors based on data from the World Trade Organization

With the development of the economy and society, production capacity has significantly increased, and consumer demand for agri-food products is exhibiting a trend towards characteristics of demand that are green, health-oriented, diversified, development-driven, service-oriented, and functional, rather than singular, subsistence-oriented, or materialistic [7]. Furthermore, as residents' income levels rise, consumer attitudes are

continuously evolving, and consumption patterns are gradually shifting from being primarily concerned with basic sustenance to a focus on nutrition, showcasing an increasing diversity in consumption. Table 3 presents the trade volume variations of major agri-food products in recent years. From Table 3, it is evident that crops such as maize, soybeans, and wheat continue to dominate the agri-food trade volumes, maintaining consistently high levels of trade each year. Dairy products, flour, Whey, and vegetable also exhibit stable trade volumes. In contrast, products like Groundnuts, rice, and mutton have relatively lower annual trade volumes. From another perspective, the trade volumes of maize, cheese, and pigmeat have been steadily increasing year by year, while the trade volume of flour has experienced a consecutive three-year decline since 2019. This may be related to changing consumer dietary preferences and attitudes. As people's living standards improve, consumer dietary preferences are shifting towards greater diversity, rationality, and nutritional value, with healthy eating becoming a major trend in lifestyle changes. This viewpoint is supported to some extent by the gradual decrease in the trade volume of cigarettes from 2018 to 2021, indicating changing consumer preferences and lifestyles.

*Table 3*

**Trade volume variations of major agri-food products in recent years (unit: 10000 tons)**

Category	2017	2018	2019	2020	2021
Maize	32622.46	35172.28	38729.66	39808.33	42810.92
Soybeans	39938.74	39667.04	40026.24	44393.95	42377.16
Wheat	39681.11	38215.46	37442.79	40275.70	41014.11
Dairy Products	15614.72	16240.58	16701.36	16348.89	17944.68
Cheese	5562.14	5675.94	5948.53	5986.69	6390.29
Skim Milk & Buttermilk	4669.24	4914.00	5078.31	4747.31	5048.61
Flour	4474.54	4500.76	4363.11	4355.71	4166.37
Whey	3761.69	3735.38	3618.96	3841.55	3957.76
Vegetable	3767.77	3782.37	3954.83	3930.58	3863.58
Pigmeat	2869.81	2885.99	2988.59	3315.57	3410.61
Meat, Poultry	2840.65	2914.45	2991.50	2988.27	3158.43



Soya Bean Oil	2457.18	2404.87	2571.44	2743.46	2817.95
Butter and Ghee	2331.96	2469.23	2530.29	2538.57	2744.00
Beef	2185.09	2339.64	2524.70	2461.70	2590.05
Wine	2323.51	2209.96	2244.16	2188.84	2305.05
Coffee	1469.44	1518.36	1593.52	1538.92	1556.63
Chocolate Products Nes	1183.25	1244.04	1296.94	1272.40	1379.59
Evaporated & Condensed Milk	996.60	976.62	1020.07	1031.45	1043.12
Groundnuts	476.62	462.50	571.48	697.23	667.99
Rice	521.16	603.94	547.46	638.21	624.71
Mutton	243.35	257.99	257.20	237.11	270.27
Cigarettes	261.34	301.19	271.89	246.47	239.92

*Source:* Food and Agriculture Organization of the United Nations

Technological innovation plays a paramount role in enhancing the production efficiency and quality of agri-food products. It not only benefits farmers and agricultural producers but also exerts a positive influence on global agri-food supply, food safety, and sustainable agriculture. Therefore, sustained technological innovation is indispensable in modern agri-food production. Technological innovation in the agri-food sector encompasses various stages, including cultivation, management, harvesting, transportation, and marketing.

For instance, the Smart Agriculture System developed by SZ DJI Technology Co., Ltd. in China utilizes precision technologies and systems such as Geographic Information Systems, Agricultural Machinery Supervision Systems, and Precision Planting Management Systems to monitor the quality of operations in the four phases of agri-food production: plowing, planting, management, and harvesting. This forms a complete planting cycle, enhancing the automation level and economic benefits of agri-food cultivation. The National Agriculture and Food Research Organization in Japan has developed new meteorological forecasting technologies to provide more precise meteorological data for farmland, thereby reducing agri-food product damage rates. In Israel, Taranis, a smart agricultural technology company, has developed

new technologies encompassing weather forecasting, irrigation, and pest and disease control. This technology utilizes big data resources such as satellite imagery, on-site crop growth reports, and local pest distribution to establish plant growth models. Farmers can then use predictive data to precisely control irrigation equipment thresholds and directions, as well as the quantities of fertilizers and pesticides used. This approach increases agri-food yields and reduces costs.

According to statistics, the global agri-food supply chain incurs economic losses of \$ 400 billion annually due to improper transportation and storage. With the advent of the Internet of Things and blockchain technologies, real-time monitoring of factors such as temperature and agri-food spoilage during transportation and storage can effectively track the agri-food supply chain. Technological innovation in the agri-food supply chain can reduce annual agri-food waste by 3.3 million metric tons. As agri-food processing technology continues to innovate and develop, the variety of plant-based alternatives such as plant-based meats and dairy products is increasing and gaining consumer acceptance. An International Food Information Council survey found that over 40 % of consumers consider plant-based products to be healthier.

Furthermore, with the development of the Internet and social media technologies, agri-food marketing models have undergone significant transformations. The emergence of e-commerce and live-streaming has provided new opportunities and channels for the promotion and sale of agri-food products, reducing marketing costs and increasing product visibility. According to the "2022 Harvest Festival Douyin E-commerce Support Rural Development Report" published by Douyin E-commerce (China), in the past year, a total of 2.83 billion orders for agri-food products were sold through Douyin E-commerce, reaching consumers nationwide. The number of e-commerce influencers grew by 252 %, and the number of agri-food product merchants increased by 152 %. Douyin E-commerce has become a crucial link connecting

high-quality agri-food products with consumers across the country.

**Conclusions.** From the above analysis, it can be discerned that the global trade volume of agri-food products has been gradually increasing, and the proportion of agri-food trade in the total global trade remains relatively stable. The trade growth rate of agri-food products exhibits greater stability compared to that of fuel and mineral products as well as manufacturing. This can be primarily attributed to the stability of food demand, global concerns about food safety, and the diversity of agri-food products, among other factors. Consumer demand for agri-food products has undergone changes with the improvement in living standards. Dietary preferences are evolving towards greater diversity, rationality, and nutrition, with a focus on healthy eating becoming a major trend in lifestyle changes. Technological innovation at various stages of agri-food production and marketing has played a significant role in enhancing the efficiency and quality of agri-food products while reducing production costs. Simultaneously, technological innovation has provided consumers with a more diverse range of healthy products. The agri-food market will continue to play a pivotal role in ensuring global food supply while also adapting to dynamic external environments. Continuous technological innovation, sustainable and environmentally friendly agri-food production practices are essential to meet the global goals of sustainability.

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