

## **СЕКЦІЯ 4**

### **ГЛОБАЛЬНІ ВИКЛИКИ ТА ПРАВА ЛЮДИНИ: ВІЙНА, ПЕРЕМІЩЕННЯ, ЕКОЛОГІЧНІ ЗАГРОЗИ**

## **SECTION 4**

### **GLOBAL CHALLENGES AND HUMAN RIGHTS: WAR DISPLACEMENT, ENVIRONMENTAL, THREATS**

UDC 340

**Juxiang Chi<sup>1</sup>**

Department of International Economics,  
West Ukrainian National University,  
Ternopil, Ukraine

#### **ENVIRONMENTAL THREATS FOR THE FARMERS' INCOME FORMING IN CHINA**

##### **1. Macro-Context: Farmers' Income and Rural Revitalization in China**

Agriculture has long been the foundational sector of the Chinese economy, and the welfare of its vast rural population remains a critical determinant of national stability and sustainable development. Over the past four decades, China has achieved unprecedented success in poverty alleviation and rural economic growth. However, as the nation transitions into the post-poverty-alleviation era, the central government has explicitly shifted its rural policy paradigm from mere poverty reduction to comprehensive "Rural Revitalization" (Huang et al., 2022). At the very core of this strategic shift lies the sustainable growth of farmers' income. The formation of farmers' income in China is inherently complex, comprising four primary components: operating income (from agricultural production), wage income (from migrant labor or local employment), property income, and transfer income. Ensuring the steady and resilient formation of these income streams is not only an economic imperative but also a crucial pillar of the overarching goal of "Common Prosperity."

##### **2. The Emerging Crisis: Environmental Threats as a Systemic Risk**

Despite the remarkable historical trajectory of income growth, this momentum is increasingly encountering formidable structural bottlenecks, among which environmental degradation stands out as the most unpredictable and pervasive threat. China's ecological context is uniquely fragile relative to its immense

<sup>1</sup> Juxiangchi@126.com

population density and agricultural demands. The country possesses merely 9% of the world's arable land and 6% of its freshwater resources, yet it must feed nearly 20% of the global population. This inherent vulnerability is being drastically exacerbated by accelerating environmental threats.

These threats manifest in multiple, interconnected dimensions. Firstly, climate change has led to a significant increase in the frequency and intensity of extreme weather events—such as prolonged droughts in the North China Plain, devastating floods in the Yangtze River Basin, and abrupt cold spells—which directly disrupt crop yields (Chen et al., 2016). Secondly, long-term anthropogenic activities have resulted in severe land degradation, including soil acidification, heavy metal contamination, and the loss of black soil in the Northeast, fundamentally undermining the natural capital required for income generation (Shao et al., 2020). Thirdly, water pollution and the over-extraction of groundwater pose existential risks to agricultural sustainability. Unlike market volatility or policy adjustments, which are often cyclical, environmental threats impose irreversible damages on the bio-physical foundations of agriculture, thereby striking at the very root of farmers' income formation.

### **3. Literature Gap: From “Yield Loss” to “Income Formation Mechanisms”**

A robust body of existing literature has extensively documented the impacts of climate change and environmental degradation on agricultural sectors. Traditionally, agronomists and environmental economists have predominantly focused on “crop yield variations” or “total agricultural output value” as their primary dependent variables. While these studies provide valuable insights into physical productivity losses, they fail to capture the full socio-economic reality of Chinese farmers.

There is a glaring gap in the current literature regarding how environmental threats specifically alter the \*formation mechanisms\* of farmers' income. Yield reduction is merely one pathway. Environmental stress triggers a complex chain of economic responses. For instance, facing degraded farmland, smallholder farmers may be forced to increase their reliance on chemical fertilizers and pesticides, which inflates production costs and squeezes net operating income (Zhang & Hu, 2020). Alternatively, severe environmental shocks may act as a “push factor,” compelling rural laborers to abandon agricultural operations entirely and migrate to urban areas in search of wage income, thereby fundamentally restructuring the income composition of rural households (Yang, 2018). Furthermore, how environmental degradation affects property income (e.g., through the devaluation of land transfer rights) and transfer income (e.g., government ecological compensation subsidies) remains critically under-explored (J.Li & W.Li, 2025). Failing to distinguish between these mechanisms leads to biased policy prescriptions.

### **4. Research Objectives and Methodology**

To bridge this critical gap, this paper aims to systematically investigate the environmental threats to the formation of farmers' income in China. Specifically, this study seeks to answer three core questions: (1) How do different types of environmental threats (climate shocks vs. chronic pollution) impact the total income of farmers? (2) Through what transmission mechanisms do these threats alter the structural composition of farmers' income (operating, wage, property, and transfer)? (3) Are there significant heterogeneous effects across different geographical

regions and farmer stratifications?

Methodologically, this study employs a comprehensive framework combining econometric analysis with empirical data. We utilize panel data derived from the China Household Finance Survey (CHFS) and the China Statistical Yearbook, spanning the period from 2010 to 2022. To measure environmental threats, we construct a composite index incorporating meteorological anomaly data (temperature and precipitation extremes) and provincial environmental quality indicators (wastewater discharge and fertilizer application intensity). By employing Fixed-Effects models and Mediation Effect models, we rigorously quantify the direct shocks of environmental threats on total income and decompose their indirect effects on the four sub-categories of income formation.

## 5. Contributions

This paper makes three distinct contributions to the field of agricultural and environmental economics. First, conceptually, it shifts the analytical focus from physical agricultural output to the socio-economic “income formation” of rural households, offering a more holistic perspective that aligns with the multifaceted nature of modern rural economics. Second, methodologically, it unpacks the “black box” of income composition, revealing how environmental threats act not just as income destroyers, but as structural transformers of rural household economies. Third, practically, by identifying the heterogeneous vulnerabilities of different farmer groups, the findings provide granular, targeted policy implications for designing the next generation of eco-compensation mechanisms and climate-adaptive agricultural insurance in China (Sun, 2022).

## References:

1. Chen, S., Chen, X., & Xu, J. (2016). Assessing the impacts of temperature variations on rice yield in China. *Climatic Change*, 138(1), 191-205.
2. Sun, Y. (2022). Environmental regulation, agricultural green technology innovation, and agricultural green total factor productivity. *Frontiers in Environmental Science*, 10, 955954.
3. Huang, J., Rozelle, S., Zhu, X., Zhao, S., & Sheng, Y. (2020). Agricultural and rural development in China during the past four decades: an introduction. *Australian Journal of Agricultural and Resource Economics*, 64(1), 1-13.
4. Shao, Y., Jiang, Q. O., Wang, C., Wang, M., Xiao, L., & Qi, Y. (2020). Analysis of critical land degradation and development processes and their driving mechanism in the Heihe River Basin. *Science of the Total Environment*, 716, 137082.
5. Li, J., & Li, W. (2025). Ecological compensation, financial support, and rural revitalization. *Finance Research Letters*, 108233.
2. Zhang, C., & Hu, R. (2020). Does Fertilizer use intensity respond to the urban-rural income gap? Evidence from a dynamic panel-data analysis in China. *Sustainability*, 12(1), 430.
3. Yang, J. (2018). Climate change and domestic migration in China. *Chinese Journal of Urban and Environmental Studies*, 6(03), 1850020.